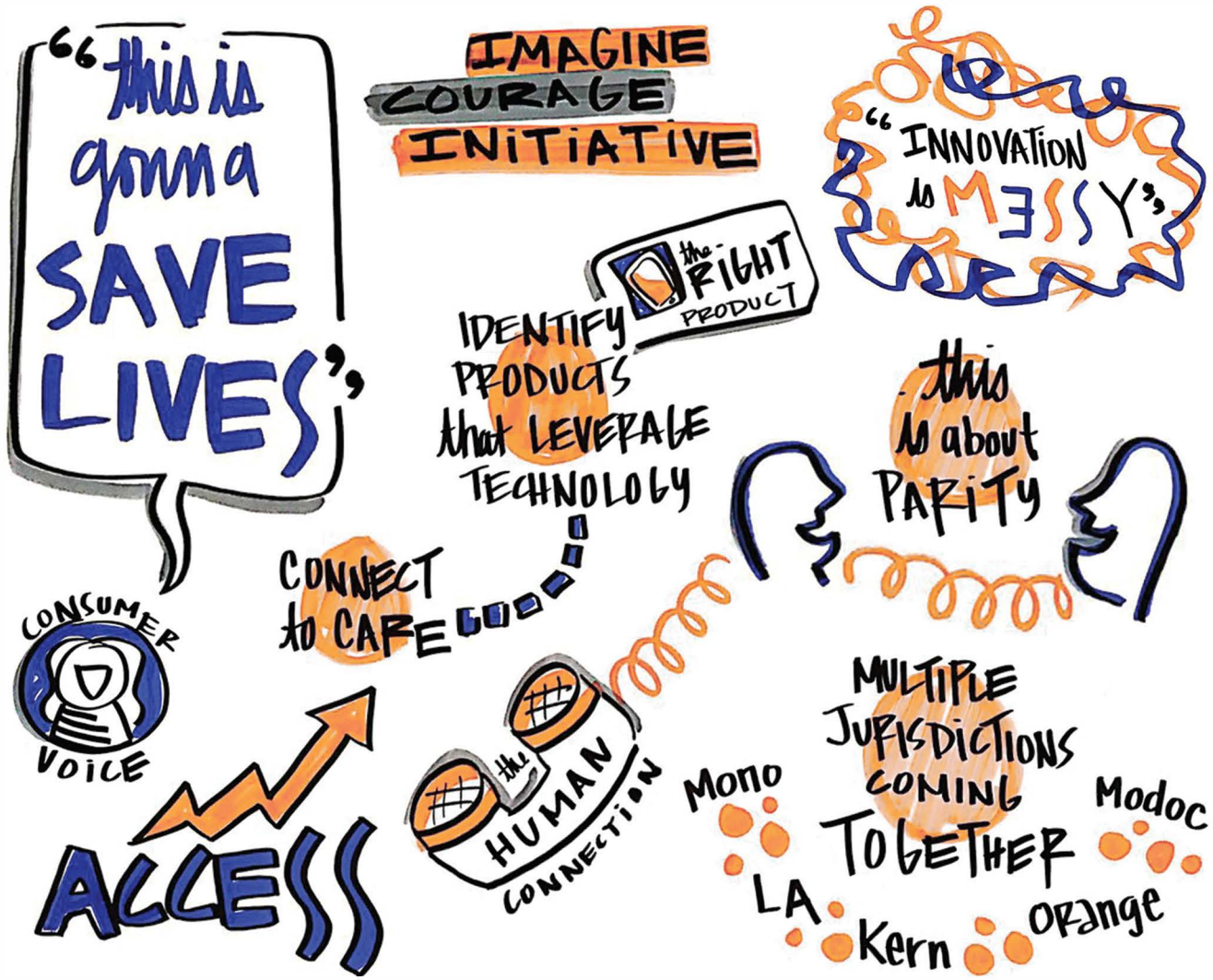
"THE TECHNOLOGY SUITE"

DRIVING ACCESS TO BEHAVIORAL HEALTH CARE THRU INNOVATION



A STATUS REPORT AND REFERENCE GUIDE FOR

THE MENTAL HEALTH OVERSIGHT AND ACCOUNTABILITY COMMISSION

JULY 26, 2018

County Behavioral Health Technology Collaborative

THE TECHNOLOGY SUITE
MHSOAC STATUS REPORT – EXECUTIVE SUMMARY

About the Collaborative: The Technology Suite collaborative partners are pleased to provide this summary and reference guide (https://calmhsa.org/programs/innovation/) describing our progress towards bringing interactive technology tools into the public mental health system through a highly innovative set or "suite" of applications (apps). As initially proposed, the "Tech Suite" has the following objectives:

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

This innovative approach also represents an opportunity to bring parity to those who do not have comparable access to technology that the private sector frequently offers. (See Section 2 of the Reference Guide for a more detailed set of project descriptions.)

Summary of Progress: The progress described in this summary and appended references demonstrate that, in five initial collaborating counties, the public sector is building the means to bring parity in the use of mobile technology and achieve these objectives.

Since the MHSOAC's approval in October 2017 for Kern and Los Angeles to initate and form the foundation for this statewide innovation collaborative, the "Tech Suite" has made steady progress towards launch of its first mobile-device based applications. As a result, during July 2018, participating counties conducted targeted 'soft launches' of an initial application (7 Cups) and will similarly launch a second application (Mindstrong) in August/September 2018. (See Section 1 of the Reference Guide for detailed project-wide and county milestones achieved.)

This initial, small scale launch is the result of many critical activities, including:

- Selection of an initial set of apps (7 Cups and Mindstrong) and preparation of those apps for county-specific deployment (See Section 5 of the Reference Guide for more detail on app vendor procurement and administration);
- Engagement of local peers and end users in the app selection process and launch readiness activities;
- In depth investigation of privacy and security requirements to develop appropriate safe guards for user information (e.g. contractual requirements, privacy policy, guiding principles) (See Section 9 of the Reference Guide for a more detailed description of approach to privacy and security);
- Development of the central role of peers in the engagement of end-users as well as advancement of app design (See Section 4 of the Reference Guide for more detailed descriptions of the roles and activities of peers);

- Selection of a highly qualified evaluator (University of California, Irvine) to develop and conduct a formative evaluation of the collaborative innovation (See Section 10 of the Reference Guide for more detail on the selection process, UCI's evaluation team, and their proposed framework);
- Creation of implementation pathways for selected apps that will streamline and facilitate these efforts in future counties;
- Initiation of a statewide brand development process that will generate both broad brand recognition and population-specific relevance (e.g. sub-branding) (See Section 8 of the Reference Guide for more detailed descriptions of the firm supporting this work, their statewide partners, and planned methodology to develop the branding and outreach and marketing support);
- Initiation of culturally and linguistically accurate translations of the 7 Cups apps into Spanish and Vietnamese with statewide partners, while creating the methodology for comparable translation for all participating counties' threshold languages; and,
- Organization of end-user testing structure to inform app design and redesign.

Procuring the Initial Applications: The two initial apps were selected via an extensive review process that included end user feedback. These vendors were part of a pre-qualified vendor group developed through an open Request for Qualification process conducted by CalMHSA; an independent panel reviewed submitted qualifications and selected five qualified vendors. Each of these then conducted in-person presentations and demonstrations to county project staff and CalMHSA. Based on review of qualifications, these presentations and demonstrations, and actual testing by end-users and staff, the Tech Suite selected Mindstrong and 7 Cups as the initial set of apps. (See Section 5 of the Reference Guide for an outline of the selection process, as well as contract administration activities to support procurement).

- ***Mindstrong***: Mindstrong provides a digital phenotyping, artificial intelligence (AI) enabled, telemedicine network for outpatient management of behavioral health disorders that reduces resource utilization, increases access and improves patient outcomes by diagnosing behavioral comorbidities early, detecting relapse early, and intervening early. (See Section 7 of the Reference Guide for a more detailed set of descriptions of Mindstrong and their apps.)
- ***7 Cups***: 7 Cups is an on-demand emotional health and well-being service. It anonymously and securely connects real people to real listeners via one-on-one text chat. Anyone who wants to talk about whatever is on their mind can quickly reach out to a trained, compassionate listener through their network. There are hundreds of listeners from all walks of life with diverse backgrounds and experiences. (See Section 6 of the Reference Guide for a more detailed set of descriptions of 7 Cups and their app.)

Early Learning: Not surprisingly, these activities and resulting progress have generated rapid and substantial learning. An important and representative sample includes:

- Peers are not just central to the success of these applications, they are and will be the driving force. As such, they will be the largest component of the workforce supporting the use and advancement of the apps. This will be especially true as the Tech Suite works with app vendors to 'tailor' their technology to better serve specific populations.

- Technology allows for direct, rapid, and continuous peer feedback to inform system design, something traditional systems have frequently struggled to do.
- While a multi-county collaborative has complexity, two early and predicted benefits have been observed: 1) shared, parallel processes speed and deepen the learning of all counties; and 2) multiple, simultaneous views result in more robust and flexible solutions that substantially help current and future participants.

The Tech Suite Collaborative – An Innovation Platform: While this learning and progress has been generated over the last eight months, the Tech Suite has communicated regularly with counties around the State – using monthly convenings of county leaders, MHSA Coordinators and other staff. This has resulted in approximately 20 additional counties expressing interest in joining the collaborative. Twelve of these have conducted community planning processes to explore the potential value of the Tech Suite in terms of local needs that resulted in stakeholder approval to join the collaborative.

In helping these counties to explore the value of bringing the Tech Suite into their counties, the collaborative has become its own 'innovation platform'. While the initial five participating counties are pursuing the foundational innovations of this project and approach, these future counties represent opportunities for even more innovation. Through future county participation, additional innovation will be possible in two categories: 1) customization and tailoring for additional, highly specified target populations, and 2) expanded app functionality.

Examples of planned innovation associated with the next 'cohort' of counties to join the Tech Suite include:

Target Populations	App Functionality
o hearing impaired	o 'smart' referrals (highly customized local service recommendations)
o criminal justice involved	o delivery of clinical services via mobile app
o foster youth	o linkage with Wellness Recovery Action Plans
o visually impaired	o evidence based practices (e.g. Strengths Model)
o pregnant and new mothers	o *others we cannot predict!*
o *others we cannot predict!*	

These innovations will increase the responsiveness and effectiveness of Tech Suite apps in terms of meeting the needs of the large and diverse California populous.

With its resources, diversity and collaborative approach, the California Public Mental Health system has the opportunity to lead the way in proving how technology can fundamentally transform how we serve a large, diverse population with an otherwise large, unserved and under-served need. The Tech Suite is well on its way to demonstrating that the public mental health delivery system can both benefit from and drive advancement of technologies that are low cost and high value, generating benefit to communities beyond their traditional scope.

See the Tech Suite Reference Guide (https://calmhsa.org/programs/innovation/) to learn more about the project approach and progress to date.

About the Tech Suite Reference Guide

The following appendices are offered to provide more detailed descriptions of the Tech Suite's progress to date, offer future participating counties the opportunity to share more information about the collaborative with stakeholders, and to initiate local 'pre-work' that advances their readiness to implement *(see above link to learn more about the project).*

Progress Overview – Accomplishments & Milestones: This section provides a chronological summary of select key accomplishments and milestones reached by both the collaborative and individual counties since November 2017.

About the Collaborative Innovation: In this section is a 'tear-out' flyer about the project, as well as brief summaries of the project's over-arching goals, learning questions and target populations. Also included is a high-level view of the continuum delineating levels of care integration and data sharing with each app (each of which has operational, data sharing and privacy/security implications).

Collaborative Development & Approach – A Statewide Innovation Platform: Appendices in this section describe the collaborative approach (a critical part of the project design to allow efficient and reliable expansion) as well as how this approach creates expanded opportunity for innovation. Also included are descriptions of collaborative events, key phases of implementation to structure the effort, and the methodology for cultural and linguistic adaption of the apps.

Peer Involvement: The various roles for peers in the marketing, engagement and advancement of selected Tech Suite apps are described in this section. Also provided is a brief description of the emerging process for peers and end users to inform and test app design changes.

Technology Procurement: Appendices in this section outline the method applied to select initial app vendors (the planned methodology to expand the array of available apps in the future), as well as the approach to budgeting and pricing to create a formula driven, fair pricing structure. Also included is a summary of the contract administration support for procurement, transactions and budget management – and brief summaries of the initial technology vendors selected.

7 Cups: This section contains appendices that describe the 7 Cups organization, their application and its evidence basis. Also included are frequently asked questions about the 7 Cups app and a glossary of relevant terms.

Mindstrong: This section contains appendices that describe the Mindstrong organization, their application and its evidence basis. Also included are frequently asked questions about the Mindstrong app and a glossary of relevant terms.

Outreach and Marketing: Appendices in this section describe the contracted outreach and marketing firm (RS-E) and their methodology for developing a Tech Suite brand. Also provided are early examples of marketing materials related to the initial 'soft launch' phase of the collaborative (pre-branding).

Privacy and Security: This section includes appendices that describe Intrepid Ascent, the contracted firm with technical and legal expertise related to data sharing, privacy and security requirements, informed consent and other technical areas key to assuring appropriate safeguards are in place.

Evaluation and Performance Monitoring: Appendices in this section provide a brief overview of the selected evaluator (University of California Irvine), the over-arching approach to evaluation and example of the 7 Cups dashboard for county-level performance monitoring.

"THE TECHNOLOGY SUITE"
MHSOAC STATUS REPORT – REFERENCE GUIDE

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County Behavioral Health Technology Collaborative

Progress Overview

Statewide Collaborative Accomplishments & Milestones

TIMEFRAME	ACTIVITY	OUTCOME
Oct 2017	**Collaborative Development:** Kern and Los Angeles Counties submitted proposals to the MHSOAC for a statewide collaborative Innovation project	MHSOAC Commissioners approved statewide collaborative and two inaugural counties to create the foundation for the collaboration
Nov – Dec 2017	**Collaborative Development & Approach:** CalMHSA engaged to provide administration of the statewide collaborative	• CalMHSA assigned staff to begin Tech Suite vendor acquisition activities
	Technology, Evaluation, Outreach & Marketing Procurement: • RFSQ developed and distributed for 5 tech components of the tech suite • Panel convened to review submissions to identify set of qualified vendors in each component category	Qualified vendors selected in the following categories: • Digital Applications (5 vendors) • Outreach and Marketing (1 vendor) • Evaluation (2 vendors)
Jan – Feb 2018	**Collaborative Development & Approach:** • Mono County submitted proposal to the MHSOAC to join the collaborative • Opportunity to join collaborative shared with CBHDA Governing Board	MHSOAC Commissioners approved Mono County to join collaborative
	Implementation: • Collaborative Project Manager hired through CIBHS • Plan for collaborative infrastructure developed	• Detailed infrastructure development launched • Individualized county development launched (per existing plans) (See Section 3d. of the Reference Guide)

Mar – Apr 2018	**Technology Procurement:**
	• Prequalified vendors provided a project orientation
	• Each vendor conducted an in-person demo and presentation of their apps for teams from initial 3 counites, including peer representatives
	(See Section 5 of the Reference Guide)
	• County staff and peers practiced with pre-qualified apps to identify initial set of apps
		• Initial vendors and apps selected
		  • *7 Cups* (Reference Guide, Section 6)
		  • *Mindstrong* (Section 8 of the Reference Guide)
		• Vendors provided initial planning contracts to support readiness work

	Collaborative Development & Approach: • Modoc and Orange counties submitted proposal to the MHSOAC to join the collaborative	• MHSOAC Commissioners approved /Modoc and Orange Counties to join collaborative • CalMHSA executed Participation Agreements with Los Angeles and Kern Counties

TIMEFRAME	ACTIVITY	OUTCOME
	• Monthly call launched for county MHSA Coordinators across the state to support their community planning efforts and Innovation proposal development	• Learning from initial counties is regularly shared with interested counties to increase their understanding of the opportunity, support useful local adoption of the apps and promote greater readiness once approved
	Outreach and Marketing: Based on limited respondents to initial RFSQ in Nov. 2017, a focused RFP was issued for an outreach and marketing vendor	RFP resulted in 15 letters of interest and then 5 proposal submissions.
	Evaluation: RAND engaged to assist with approach to evaluation, including development of over-arching approach and critical qualifications and capabilities of collaborative evaluator.	Collaborative determined to proceed with a follow-up Request for Qualification (RFQ) to select an evaluator to support development of evaluation plan as well as conduct the actual evaluation.
	Peer Roles: Participating counties began preparation of their plan to engage peers to support individual use of apps, as well as inform needed improvements and advancements to those apps	County leads reach out to and engage initial peer reps into planning activities.
	Implementation: Budgeting and pricing methodology created to support flexible, formula driven contracts with vendors driven by size of participating county, desired level of customization and allocation of funds for shared needs as well as local supports.	• Vendors oriented to formula driven approach to pricing that enables periodic addition of counties to their contract without re-contracting for each county • Initiation of new counties in their budget planning per slide fee schedule based on county size (See Section 5b. of the Reference Guide)
May – June 2018	**Privacy and Security:** • The Tech Suite conducted search for agency with technical, legal and operational experience with data sharing and associated privacy and security concerns • Intrepid Ascent worked with The Tech Suite and vendors to determine needs and approach to privacy and security across the elements of the project	• ***Intrepid Ascent*** engaged to support development of privacy and security guidelines, associated vendor contract requirements, contract language for data owner ship and intellectual property, as well as informed consent • Intrepid Ascent develops initial "Privacy and Security Guidelines" and "Clinical Integration and Data Sharing Continuum" to inform data sharing (See Section 9 of the Reference Guide)
	Technology Procurement: The Tech Suite worked with Intrepid Ascent to develop contract for app vendors that support complexity of the project, including: privacy and security issues, customization for specific county size and needs,	App vendor contract reflecting the aims, legal complexity, and privacy/security of the collaborative developed, including a Work Order to link each county's Innovation Proposal and

TIMEFRAME	ACTIVITY	OUTCOME
	informed consent and other unique terms and conditions	Participation Agreement with the Vendor Contract (See Section 5 of the Reference Guide)
	Peer Roles • The Tech Suite supported a shared learning process to identify the roles of peers in each county's deployment of apps • Counties evaluated opportunities for existing peers and peer network to support outreach and engagement of target populations (See Section 4 of the Reference	• Individual counties appointed their lead peers for the project • Individual counties, working with 7 Cups and their local peers, develop the Tech Suite (paid) Peer role and plan recruitment • Individual counties identify existing peer network and plan to engage these individuals in marketing and support of app use
	Guide) **Outreach and Marketing:** • A Tech Suite independent panel reviewed proposals received in response to RFP and identified a recommended vendor (RSE) • RSE worked with app vendors and counties to develop initial marketing outreach materials (shared and customized per county) • RSE oriented project to brand development process	• Leadership from initial 5 collaborating counties accepted CalMHSA panel recommendation and ***RSE*** awarded outreach and marketing role • RSE created prototype handout cards and flyers to be customized for each county • RSE developed an expedited branding process to generate collaborative brand and awareness campaign (See Section 8 of the Reference Guide)
	Evaluation: • The Tech Suite issued a focused RFQ to pre-qualified evaluator candidates to gain deeper understanding of each agency's capabilities • The Tech Suite convened an independent panel to review RFQ responses and develop recommendation for selection • Demographic reporting requirements (per MHSA Innovation regs) provided to app vendors	• Leadership from initial 5 collaborating counties accepts CalMHSA panel recommendation and ***UCI*** (is awarded evaluator role) • App vendors developed method to gain demographic information from end-users in an engaging, person-centered way (to be tested by peers to finalize) (See Section 10 of the Reference Guide)
	Implementation: • Cohort #1 carried out detailed readiness work to support initial "soft launch" of the apps in July and then steady expansion after initial debugging • The Tech Suite advanced infrastructure development to support county and vendor contracting, budgeting and associated transactions	Counties developed initial plans and readiness associated for their Soft Launch in July (See Section 3 of the Reference Guide)
	Collaborative Development & Approach:	• Over 100 staff, peers and stakeholders convened in Los Angeles in a shared learning

TIMEFRAME	ACTIVITY	OUTCOME
	• The Tech Suite convened a day-long kick-off session for initial counites (cohort #1) • The Tech Suite supported Innovation proposal development, including budgets aligned with vendor contracting strategy	session focused on target population needs, relevant app-based solutions, and IT concerns • Over 20 counties indicated interest in joining the collaborative with at least 12 planning to submit Innovation proposals to the MHSOAC in order to join as part of "Cohort #2" • CalMHSA executed Participation Agreements with Orange, Mono and Modoc Counties (See Section 3 of the Reference Guide)
July – Aug 2018	**Implementation:** • Counties launch initial outreach and marketing efforts in association with each vendor • 7 Cups launches customized app in Cohort #1 counties • Mindstrong launches Health and Care apps in each Cohort #1 county per initial target population (launch dates are county-specific)	
	Outreach and Marketing: • Branding and marketing campaign to be developed with county input • Counties initiate outreach and marketing efforts for soft launch and plan expanded outreach and marketing to support next phase of implementation	
	Peer Roles: • Local paid peers to be hired, trained and deployed • Local peers in existing networks to be trained to support use of apps by individuals they assist	
	Evaluation: • UCI to develop evaluation plan and assure core data gathering and reporting capability is developed • App vendors to initiate sharing of county-level dashboards and other analytics	
	Collaborative Development & Approach: • Counties in Cohort #2 to receive support to maximize readiness for implementation activities once approved to join the collaborative • CalMHSA to plan and prepare for an all-county, all-vendor in-person learning session in Fall 2018 to support transfer of knowledge of Cohort #1 counties to Cohort #2 counties and support all counties planning their next steps to expand (Cohort #1) or initially launch (Cohort #2)	
	Adapting to Local & Population Needs: • App vendor to work with RSE and their partners to develop translation of their app content; initial translations will be Vietnamese and Spanish (See Section 3e. of the Reference	
	Guide) **Technology Procurement:** • App vendor contracts to be finalized	

Progress Overview

County Accomplishments & Milestones

All of the Collaborative milestones described in the previous summary were accomplished with the deep support and involvement of participating counties (Kern, Los Angeles, Modoc, Mono and Orange). Further, each of the over-arching project milestones described in the "Statewide Collaborative Accomplishments & Milestones" table represent equivalent progress in each county. The items below describe county-specific activities that address their unique needs and objectives. The relationship between the project-wide milestones and the local accomplishments reflects the continuous learning about how to balance statewide pursuits with unique local needs and objectives.

Outlined below are milestones each county has achieved to support their local soft launch (Phase I) and prepare to shift into Phase II (clinical integration). The Phase I soft launch of 7 Cups is taking place in this current month, July 2018; similarly Phase I completion and current activities are driving counties towards the soft launch of Mindstrong in August and September 2018. Note that while Mono County's local activities are not included, it continues to participate in the Tech Suite; the county has delayed implementation until Fall 2018 due to unexpected shifts in organizational priorities and demands.

- Project Infrastructure:
  - Recruited and convened Tech Suite Project Team with representatives from peer program(s), clinical leadership/management, social media team, privacy/information security office, information technology, and others as appropriate for the local project.
  - Appointed a Peer Lead or Leads (either interim or permanent) to oversee the development and ongoing role of peers.

- Peer Involvement:
  - Planned the approach to paid peers for the Tech Suite, including development of initial job description or job duties; planning utilized community feedback and collaboration 7 Cups peer expert (Sue Bergeson).
  - Recruited peers to participate in 7 Cups' end user testing approach; current testing underway is focused on design elements associated with its clinical assessment.
  - Planned and/or initiated outreach to existing peer network to support their roles in the Tech Suite.

- Outreach and Marketing:
  - Selected initial target populations/programs for the soft launch.
  - Developed method to outreach and engage target populations for the soft launch, including the role of peers, program staff, vendor staff, etc.
  - Developed materials needed to support outreach and marketing for the soft launch.

- App Customization for Local Branding & Needs:
  - Collaborated with 7 Cups to customize the welcome page/messaging content in preparation for the soft launch.
  - Worked with vendors to determine initial approach for use of apps in care settings for each target population.
  - Created links to apps in county's social media sites.

- Provided county-specific behavioral health support resource list to 7 Cups to support referral processes.

- Collaborative Activities:
  - Participated in the collaborative All County Kick-off event to become familiar with the Tech Suite Project.
  - Reviewed vendor RFPs and engaged in discussions with CalMHSA and collaborators regarding vendor selection.
  - Participated in regular all-county calls with vendors and CalMHSA staff to support collaborative decision-making as well as build the foundation of shared knowledge to make their activities efficient, reliable and repeatable by future counties.

- Privacy & Security:
  - Gained county privacy/security officer and county counsel approval to conduct soft launch based on due diligence conducted on behalf of the Tech Suite by CalMHSA and Intrepid Ascent.

- Performance Monitoring & Evaluation
  - Initiated training with 7 Cups on use of county-specific performance dashboards.
  - Initiated preliminary discussions with UCI regarding their needs for the evaluation.

The following are highlights of local activities. While these do not represent the scope or intensity of effort, learning and associated progress, they do demonstration local activities to date.

<u>Kern County</u>

- Worked with peer staff and peer volunteers to identify potential Tech-Suite Peer Lead to engage clients and peer center members. Formal hiring anticipated by start of second quarter.
- Peer Navigation staff and peer volunteers have taken part in a series orientations and trainings to familiarize themselves with and gain mastery over Tech-Suite applications.
- Currently coordinating with Mindstrong to provide Mindstrong Care Application training to Kern BHRS clinicians for clinical integration.
- Currently determining data available from vendors.
- Coordinating orientation and evaluation plan development meetings with UCI.

<u>Los Angeles County</u>

- Held a soft launch at the LACDMH Peer Resource Center on 7/16/18 for over 80 attendees
- Currently developing curriculum for a weekly Peer Lead “Appy Hour” workshop
- Planning and recruiting participants for weekly peer-led “Appy Hour” workshops in our peer resource center.
- Presented to peer supervisor group to bolster peer engagement
- Developed and distributed peer interest recruitment forms to create “LA Peer Super Users” for the technology suite.
- 7 Cups launched the LA County-specific organization access code for users referred by LACDMH
- Began initial planning for customization of training and implementation materials for the launch of Mindstrong at Harbor UCLA community clinic.
- Distributed training materials and onboarding packets to providers from all service areas of LACDMH, who will be participating in the soft launch.

- Presented the technology suite launch to DMH Leadership, LA MH commission and the LACDMH System Leadership Team.
- Set target date for Mindstrong launch: 8/27/18
- LACDMH staff receiving and piloting the Mindstrong app with full access/use of the Health app and care portal.
- Providing regular feedback to both vendors about how the app is functioning.
- Launched 7 Cups at Peer Respite program- SHARE (7/16).
- Presented to East LA Senior Center (7/20).
- Initiating collaboration with LA County Older Adults and Transitional Age Youth divisions for outreach and engagement presentations.
- 7 Cups implemented an LA County-specific organization access code to address secure chatting and privacy requirements.
- Developed initial planning reports for outreach and marketing on key performance indicators, including access and reach of the technology suite.

Modoc County

- Received endorsement of the Tech Suite via the Quality Improvement Report.
- Presented to BH Advisory Committee Report/Oversight (audience included peers from Access California Northern Region).
- Conducted a peer-led 7 Cups presentation to Access California personnel.
- Conducted 7 Cup webinar training for clinicians.
- Conducted a peer-led 7 Cups presentation to Modoc County peers.

Orange County

- Facilitated 3 separate community focus groups to gather input on the role of the peer.
- Attended 2 staff meetings at the Wellness Center to introduce the Tech Suite, discuss the soft launch, describe 7 Cups and address questions prior to the soft launch.
- Attended 2 community meetings at the Wellness Center to introduce the Tech Suite project, soft launch of the 7 Cups app and address questions about the app.
- Created informational flyers to assist staff and Wellness Center patrons with registering for 7 Cups text chat support services.
- Held an event on the soft launch date to provide information about the Tech Suite and assist Wellness Center patrons with registering for the app.
- Met with OC MHSA Steering Committee co-chairs to provide reports regarding the status of the project and address questions.
- Provided regular reports and updates to the Mental Health Board.
- Facilitated 6 separate focus groups with specific target populations to gather input on effective marketing strategies for diverse communities.
- PIO engaged in ongoing calls with 7 Cups, Mindstrong and Intrepid Ascent to discuss privacy.
- IT engaged in ongoing calls with 7 Cups, Mindstrong and Intrepid Ascent and provided all required documents to vet their system with OC security requirements.
- IT, Leadership, Program Managers, INN Lead, MHSA Office staff have engaged in preliminary discussions about the launch of Mindstrong clinical integration into County clinics.
- OC IT, Compliance, MHSA Office and INN Lead have engaged in preliminary discussions regarding referral of 7 Cups users into the County system.
- Exploring the opportunity to create an ongoing Tech Suite workshop at the Recovery Education Institute. Workshop materials and facilitation would be done by Tech Suite peers.

County Behavioral Health Technology Collaborative

"The Technology Suite"

Driving Access to Behavioral Health Care Through Innovation

This California statewide collaborative project is bringing interactive technology–based mental health solutions into the public mental health system through a highly innovative set or "suite" of mobile applications. These solutions are intended to reach large populations with digital mobile applications that put choice for care in the hands of individuals and deliver individualized, person-center care.

Aim: By creating a complementary and integrated set of proven mobile applications, participating counties aim to increase access to mental health care, promote early detection of mental health symptoms, and predict the onset of mental illness.

Innovation: This project represents a new approach and service modality for the overall mental health system, including prevention and early intervention. The innovation will provide diverse populations with free access to mobile applications designed to educate users on the signs and symptoms of mental illness, improve early identification of emotional/behavioral destabilization, connect individuals seeking help in real time, and increase user access to mental health services when needed.

Objectives:

- Detect and acknowledge mental health symptoms sooner
- Reduce stigma associated with mental illness by promoting mental optimization
- Increase access to the appropriate level of support and care
- Increase purpose, belonging, and social connectedness of individuals served
- Analyze and collect data to improve mental health needs assessment and service delivery

Intended beneficiaries/users of these technology-based mental health solutions include:

- Individuals with sub-acute mental health symptom presentations, including those who may not recognize that they are experiencing symptoms.
- Family members with either children or adults suffering from mental illness who are seeking support.
- Socially isolated individuals, including older adults at risk of depression.
- Clients or potential clients in outlying or rural areas who have difficulty accessing care due to transportation limitations.
- Individuals at increased risk for or in the early stages of a psychotic disorder.
- Existing mental health clients seeking additional support or seeking care/support in a non-traditional mental health setting.
- Individuals identified as at risk for developing mental health symptoms or who are at risk for relapsing back into mental illness.
- High utilizers of inpatient psychiatric facilities.

Initial Applications Offered by the Suite

- ***Mindstrong***: Mindstrong provides a digital phenotyping, artificial intelligence (AI) enabled, telemedicine network for outpatient management of behavioral health disorders that reduces resource utilization, increases access and improves patient outcomes by diagnosing behavioral comorbidities early, detecting relapse early, and intervening early.
- ***7 Cups***: 7 Cups is an on-demand emotional health and well-being service. It anonymously and securely connects real people to real listeners in via one-on-one text chat. Anyone who wants to talk about whatever is on their mind can quickly reach out to a trained, compassionate listener through their network. They have hundreds of listeners who come from all walks of life and have diverse experiences.

For more information and support to join the collaborative, please contact: Karin Kalk at kkalk@cibhs.org

County Behavioral Health Technology Collaborative

The Suite

The "App" Components

Peer Chat and Digital Therapeutics: Utilize technology-based mental health solutions designed to engage, educate, assess and intervene with individuals experiencing symptoms of mental illness.

Virtual Evidence-Based Therapy Utilizing an Avatar: Virtual manualized evidence-based interventions delivered via an avatar, such as mindfulness exercises, cognitive behavioral or dialectical behavior interventions delivered in a simple, intuitive fashion.

Digital Phenotyping Using Passive Data for Early Detection and Intervention: Utilize passive sensory data to engage, educate and suggest behavioral activation strategies to users.

The Universal Components

Community Engagement and Outreach Engaging Users and Promoting Use: A strategic approach to access points that will expose individuals to the technology-based mental health solutions.

Outcome Evaluation: Outcome evaluations of all elements of the project, including measuring reach and clinical outcomes.

Collaborative Approach

CalMHSA will serve as fiscal intermediary to facilitate contracting with technology vendors, support a shared evaluation, and maximize outreach and marketing.

Principles and aims for collaboration are:

1. Create choice and a shared learning structure for participating counties.
2. Link the technologies to support a holistic treatment approach.
3. Capitalize on shared learning to advance the scope, coverage and effectiveness of the suite.
4. Involve end users, peers and stakeholders throughout the development and operationalizing of technologies.
5. Utilize data to evaluate impact and inform services/supports for individuals and populations.
6. Maintain accountability and transparency with all stakeholders.

Evaluation Measures

Experts from the University of California, Irvine are leading the evaluation of the state and county-level impacts on:

- Access to care
- Clinical outcomes
- Self-reported purpose, belonging, and social connectedness
- Consumer's ability to identify cognitive, emotional and behavioral changes and act to address them
- Utilization rates
- Stigma associated with mental illness
- Comparative analyses of population level impacts (tech users vs non-users)
- Penetration or other unmet need metrics

About the Innovation

Over-Arching Goals & Learning Questions

The Technology Suite Collaborative is being developed to leverage MHSA Innovation funds to advance and deploy digital therapeutic technology platforms that expand the capacity and capability of the county mental health systems to serve individuals with a wide array of mental health needs. While traditional mental health services will always play an important role in supporting individuals in need, their capacity is far too small for the overall need and so new solutions are needed.

As described in the project flyer, this collaborative has set out to achieve an array of high-level goals that project participants believe are within reach based on the unique capabilities of new and emerging technology platforms. These goals are:

- Recognize and acknowledge mental health symptoms sooner
- Reduce stigma associated with mental illness as reported by users
- Increase access to the appropriate level of care
- Increase purpose, belonging and social connectedness of individuals served
- Analyze and collect data from a variety of sources to improve mental health needs assessment and service delivery

There is much to be learned in the deployment of digital applications to achieve these transformative goals. In light of this, the collaborative seeks to gain robust knowledge associated with the following 'learning questions':

- Will individuals either at risk of or who are experiencing symptoms of mental illness use virtual peer chatting accessed through a website or through a phone application?
- Will individuals who have accessed virtual peer chatting services be compelled to engage in manualized virtual therapeutic interventions?
- Will the use of virtual peer chatting and peer-based interventions result in users reporting greater social connectedness, reduced symptoms and increases in well-being?
- What virtual strategies contribute most significantly to increasing an individual's capability and willingness to seek support?
- Can passive data from mobile devices accurately detect changes in mental status and effectively prompt behavioral change in users?
- How can digital data inform the need for mental health intervention and coordination of care?
- What are effective strategies to reduce time from detection of a mental health problem to linkage to treatment?
- Can we learn the most effective engagement and treatment strategies for patients from passive mobile device data to improve outcomes and reduce readmissions?
- Can mental health clinics effectively use early indicators of mental illness risk or of relapse to enhance clinical assessment and treatment?
- Is early intervention effective in reducing relapse, reducing resource utilization and improving outcomes and does it vary by demographic, ethnographic, condition, intervention strategy and delays in receiving intervention?

- Can online social engagement effectively mitigate the severity of mental health symptoms?
- What are the most effective strategies or approaches in promoting the use of virtual care and support applications and for which populations?

The learning associated with these shared questions will be deepened by the unique goals each county has designated based on their stakeholder guidance and local priority needs. The following describes some of the county-specific goals and desired learning this collaborative is driving:

Los Angeles: Los Angeles will be one of the main testing grounds for the Tech Suite, with its large population and user base. They also provide a large urban population to test the effects of the intervention, unlike the smaller counties. They share many basic goals as other counties, but have the added focuses of:

- Decreasing emergency service use by high utilizers
- Comparing service utilization across populations
- Tracking how the Suite affects the larger landscape of unmet need metrics of LADMH
- Exploring promotion strategies for different populations
- Culturally adapting the Suite and making it available in all threshold languages

Kern: As one of the two inaugural counties of the Tech Suites, Kern County seeks to inform the foundation needed to support a suite of applications and answer the many questions associated with a traditional mental health system's use of such innovative technology. Specifically, Kern County plans to inform how to:

- Collaborate with those providing services to older adults at risk for social isolation, including working with senior apartment complexes, senior centers, Kern County Aging and Adult Services and faith-based organizations who outreach to seniors
- Work with mental health organizations, including the local National Alliance for Mental Illness (NAMI), peer-based community learning centers and local support groups to promote use of technology-based services
- Work with local public locations, including agencies, libraries and other resources to promote technology-based service use
- Engage school systems, including colleges and universities, to promote use of services and supports

Mono: Data from this county will not only make results more robust, but will help adapt and customize the interventions for their specific target populations. They seek to gain knowledge about how to reach young adults and other isolated adults who are reluctant to seek traditional services, but whose needs may be meet through these new technologies. Additionally, Mono will be using the results from this project to inform ongoing county PEI work.

Modoc: Being a small, rural county, Modoc is focused on providing services and increasing utilization among socially and/or geographically isolated individuals, as well as those concerned with confidentiality in small, close-knit communities. They are also integrating the Tech Suite project into their other Innovation projects.

Orange: Orange, similar to Los Angeles in terms of having a large user population, is exploring many basic research questions while also working to create cultural and linguistic translations of applications that match the diversity of county's population.

About the Innovation

Target Populations

As the inaugurating counites of the Tech Suite Collaborative, Los Angeles and Kern identified the following array of target populations for the project:

- Individuals with sub-clinical mental health symptom presentations, including those who may not recognize that they are experiencing symptoms
- Individuals identified as at risk for developing mental health symptoms or who are at risk for relapsing back into mental illness
- Socially isolated individuals, including older adults at risk of depression
- Clients or potential clients in the outlying or rural areas who have difficulty accessing care due to transportation limitations
- High utilizers of inpatient psychiatric facilities
- Existing mental health clients seeking additional sources of support or seeking care/support in a non-traditional mental health setting
- Family members with either children or adults suffering from mental illness who are seeking support
- Individuals at increased risk or in the early stages of a psychotic disorder

While these are the shared target populations of the collaborative, each participating county defines specific target populations based on guidance from stakeholders during the community planning process. As peers and stakeholders will continue to be involved in this project, each county's target populations will both grow in diversity as well as in specificity (e.g. subpopulations within larger segments). In this early stage of the project development, each county's target populations are noted below:

Los Angeles:

- Individuals with sub-clinical mental health symptom presentations, including those early in the course of a mental health condition who may not recognize that they are experiencing symptoms, including college students.
- Individuals identified as at risk for developing mental health symptoms or who are at risk for relapsing back into mental illness.
- Socially isolated individuals, including older adults at risk of depression.
- High utilizers of inpatient psychiatric facilities.
- Existing mental health clients seeking additional sources of support.
- Family members with either children or adults suffering from mental illness who are seeking support.
- Individuals at increased risk or in the early stages of a psychotic disorder.

Kern:

- Those with sub-clinical mental health symptom presentation, including those who may not recognize that they are in the early course of a mental health condition.
- Those at risk for mental illness or relapse of mental illness.

- Socially isolated individuals, including older adults.
- Those experiencing high frequency of inpatient psychiatric care.
- Current behavioral health clients in need of additional support.
- Family members of children and adults with mental illness in need of additional support.

Mono:

- Individuals in remote, isolated areas of the county who have less access to social support and mental health services.
- Students attending Cerro Coso Community College in Mammoth Lakes (TAY).

Modoc:

- Individuals in remote, isolated areas of the county who have less access to social support and mental health services
- Transition-aged youth with first-break psychosis.
- Transition-aged youth and adults, engaged in whole-health wellness plans, who desire to track passive data for personal wellness and treatment planning.

Orange:

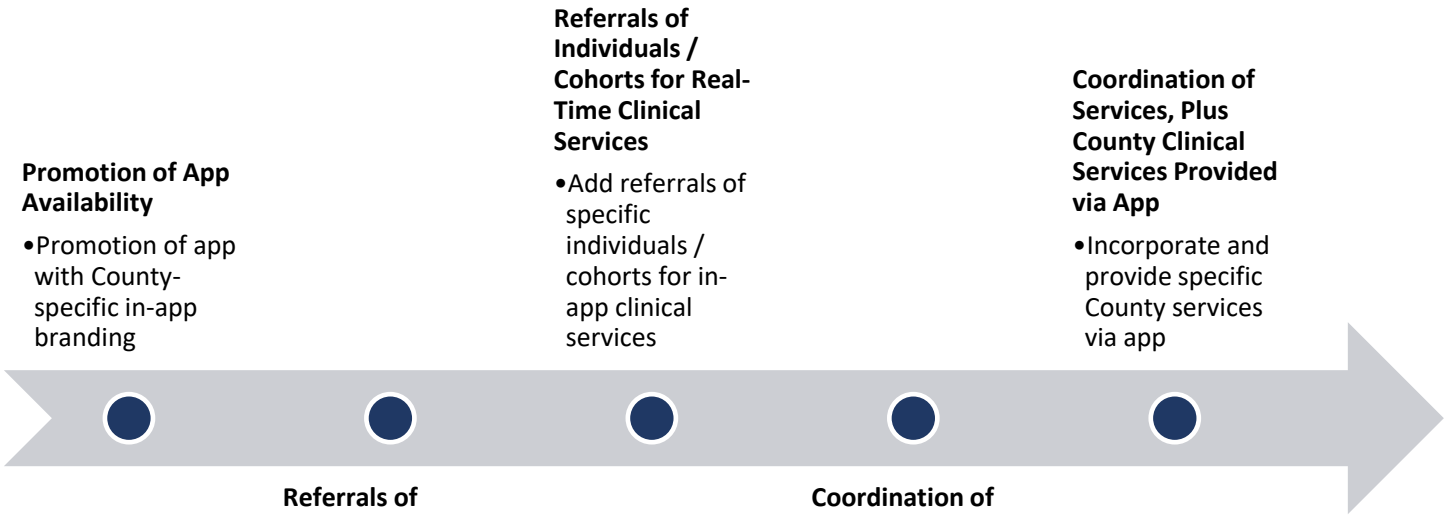
- Individuals with sub-acute mental health symptom presentations, including those who may not recognize that they are experiencing symptoms
- Family members of children or adults suffering from mental illness who are seeking support
- Socially isolated individuals, including older adults at risk of depression
- Clients or potential clients in outlying or rural areas who have difficulty accessing care due to transportation limitations
- Individuals at increased risk for or in the early stages of a psychotic disorder
- Existing mental health clients seeking additional support or seeking care/support in a nontraditional mental health setting
- Individuals identified as at risk of developing mental health symptoms or who are at risk for relapsing back into mental illness
- High utilizers of inpatient psychiatric facilities

County Behavioral Health Technology Collaborative

About the Innovation

Clinical Integration Continuum – A Working Draft

The Clinical Integration Continuum (below) is a framing of the Tech Suite's approach to service models in various levels of application integration within a County. It is intended to show a progression from limited integration (e.g., promotion of the application to Clients in the County) to full integration with County behavioral health services to support care coordination, transitions of care, and clinical services within the application. For each level of integration, the continuum also identifies the types of data to be shared and the essential privacy and security requirements. The particular service model and progression within the continuum will be determined by each County depending on their stated project goals, objectives, and capabilities.



Collaborative Approach: A Statewide Innovation Platform

The Tech Suite's collaborative approach to the innovation creates a variety of opportunities and benefits for participating counties. Some of the most immediate benefits are:

- Increased choice for counties;
- Accelerated learning in this new modality for service delivery;
- Cost sharing for app acquisition, infrastructure and administration, and shared supports like evaluation and marketing; and
- Expanded innovation to meet the diversity of populations and needs within and across counties.

Choice: By design, the suite will create a "menu" of technology options or apps. Once pre-qualified by CalMHSA, app vendors remain on a list of available technology providers to participating counties. Over time, additional vendors can be qualified and added to the menu of technology options. As counties join, they may elect to "purchase" the same array of apps as those who are already part of the collaborative, or they may create their own package from the qualified vendors (including new vendors preferred and qualified through CalMHSA's process.)

Shared Learning: To promote shared learning and manage the complement of participating counties, counties will be grouped into 'cohorts' based on the order of their MHSOAC approval timing. Cohort #1 consists of Kern, Los Angeles, Modoc, Mono and Orange Counties. Each cohort of counties will go through readiness and implementation together to allow learning from each other and to utilize vendor and expert supports as efficiently as possible. This will also allow newly formed cohorts to learn from those who preceded them. This spread of knowledge is expected to make app deployment increasingly simple, manageable and predictable.

Examples of current activities that advance implementation efforts while simultaneously sharing learning include:

- Weekly calls with county leaders and project leads;
- Weekly calls with county project leads;
- Weekly calls with each vendor and county project leads;
- Twice-monthly all vendor/all county calls;
- Periodic county-specific calls for specific topics (peer role, app customization, outreach, general readiness); and
- In person kick-off (May 11th)

Also, as each app vendor works with individual counties to customize their technology for the local needs, their knowledge and ability to support individual counties grows and becomes more efficient.

Finally, focused cross-county learning will also be facilitated in terms of large populations. Staff, peers and stakeholders from counties with the same target populations will be organized into groups that will share their learning, successes and challenges with those populations. These groups will also work with app vendors to apply that shared learning to advance their apps' effectiveness with these population segments.

Cost Sharing: Central to the intention of the collaborative method is cost sharing. This assists in several aspects of the project:

- Pooling funds for shared needs (procurement and contract administration, evaluation, outreach and marketing, and other technical expertise);
- Technology fees adjusted by size (making access to innovative apps affordable for small counties, among other benefits); and,
- Prevention of duplication of overhead and administration associated with local deployment of apps.

This collaborative and shared cost structure makes the development and conduct of technical infrastructure affordable for all participating counties. Each of the following functional areas are required to support deployment of mobile technology in a county and, through collaboration, does not need to be created in each county. By collaborating, it is possible to cost-effectively use Innovation funds to gather the knowledge necessary to develop and maintain the following functionality:

- Application Management & Advancement
- End User Experience & Guidance
- Outreach & Marketing
- Clinical Integration for Wellness & Recovery
- Evaluation & Performance Management
- Work Force Development Support
- Privacy & Security Monitoring, Safeguards
- Accounting & Contract Management

Finally, the collaborative structure itself is a platform for innovation. As collaborative grows, so does the opportunity for innovation.

County Behavioral Health Technology Collaborative

Collaborative Approach: A Statewide Innovation Platform

Driving Innovation

Innovation is possible when there exists an environment for learning and the resources (funding, skill, know-how) to act on that learning. Each instance a county joins the collaborative, both of these elements grow and there exists an opportunity to explore new possibilities and greater effectiveness for those served.

The counties in Cohort #1 are currently driving innovation on a variety of fronts, including the collaborative approach itself. However, counties seeking to join the collaborative have goals that represent additional innovative opportunities. These opportunities tend to fall into two categories: population segments and app functionality.

The following innovation areas will be come possible if the next cohort of counties is allowed to join the collaborative.

- Target Populations:
  - hearing impaired
  - criminal justice involved
  - foster youth
  - visually impaired
  - pregnant and new mothers
  - *others we cannot predict!*

- App Functionality
  - 'smart' referrals (highly customized local service recommendations)
  - Delivery of clinical services via mobile app
  - linkage with Wellness Recovery Action Plans (WRAP)
  - evidence based practices (e.g. Strengths Model)
  - *others we cannot predict!*

Collaborative Events

The Tech Suite will periodically host in-person sessions to leverage the assets of collaboration.

Cohort #1 Kick-Off: One of these has already been held; on May 11, the Tech Suite hosted Cohort #1's formal Kick-Off. This highly successful event was attended by over 100 staff, peers and stakeholders from Kern, Los Angeles, Modoc and Orange counties, statewide entities, as well as Tech Suite app vendors and experts.

Participants had the opportunity to see demonstrations of the initial apps, work in groups to understand how the apps can help specific target populations and identify issues to be addressed during readiness and implementation steps. See the next page for the agenda and specific objectives.

Learning Session #1: A similar event will be held in early October and will include teams from both cohorts #1 and #2. This two-day, in-person session will have the following objectives:

- Process and synthesize the learning to date to make it useful for all participating counties;
- Share Cohort #1 counties' learning with Cohort #2 counties;
- Support Cohort #2's readiness for launch;
- Support Cohort #1's expansion beyond the scope of initial soft launch;
- Convene population specific, cross-county groups to begin focused efforts to advance apps to better meet the needs of those populations; and
- Create an "innovation community" with a sense of its identity as a group leading a large scale change into the future.

Learning sessions such as the one target for October 2018 will be hosted every three to six months, depending on the needs of participants.

County Behavioral Health Technology Collaborative

Implementation

Phases: From Soft Launch to Sustainability

To manage the scope of county participation and gain maximum benefit from the collaborative approach, counties will be supported in groups or "cohorts". This is intended to facilitate both shared learning across counties within the same cohort, as well as transfer knowledge from early counties to those who join in a later phase. At this point, the first five counties (Kern, Los Angeles, Modoc, Mono and Orange) are in Cohort #1, at least 12 counties are preparing join Cohort #2 and at least seven more are looking to join in the future.

Phases: Learning to date has guided the organization of implementation into the following four phases, which Cohort #1 will apply and inform in order to refine for future counties.

- Phase 1 - Develop the Business & Management Framework: This phase is focused on the planning and pre-work for a "soft launch" of the suite with the basics in place, including app and marketing material customization. The scope of outreach will be small and intended to allow for the shift into phase 2.

- Phase 2 - Deepen and Strengthen Clinical Integration for Wellness & Recovery: During this phase, counties will work to create linkage with their existing care processes, as appropriate, as well as support referral activity generated by app use.

- Phase 3 - Expand Marketing & Outreach: Once clinical linkages and associated data sharing is in place, the scope of the outreach and marketing will be expanded through a variety of means, including media campaigns, local outreach, etc.

- Phase 4 - Generate Sustainability & Continuous Improvement: Once outreach and marketing has reached nearly full scale, counties will shift into to assuring that capabilities developed to date can be sustained, that continuous quality improvement is part of day to day management of the applications, and use of app-generated data is normed.

These phases are intended to allow the scope and complexity to grow gradually, with learning and problems solving to be sufficient to lay the ground for steady, methodical growth that assures desired results are achieved.

Phase 1 - Soft Launch: Specific readiness activities associated with Phase 1 include achieving:

- Vendor selection (through the Tech Suite's menu of apps)
- Initial county programs and target populations identified (per specific criteria for identification)
- Initial engagement strategies for each county program and/or target population delineated and ready (including role of peers)
- Initial customization of apps delineated and applied
- Program staff and peers trained and ready to support clients in use of initial apps (including clinical integration)
- Early phase of evaluation ready (related to scope of soft launch)

- Social media links and management ready
- Information security in place in each county and with each vendor
- Tracking processes ready to support daily monitoring of activities and identification of glitches, etc.

Implementation

Example Phase I Planning Tool

COUNTY:				
ITEM	**PREP FOR SOFT LAUNCH**	**DESCRIPTION OF PLANNING OUTCOME / DECISIONS / PLANS**	**STATUS**	**TARGET DATE**
1. County-specific project team	Recruit and convene representatives from: • Peer program • Clinical leadership/management • Social media team • Privacy/information security office			
2. Initial county programs and target populations	Describe each target populations by: • Key demographics / identifiers • Need(s) to be addressed • Location(s) for engagement activities			
3. Methodology for paid peers	Delineate approach to paid peers			
4. Initial engagement strategies for each target population delineated and ready	Develop method to outreach and engage each target population, including: • Role of peers, program staff, vendor staff, etc. • Materials needed to support outreach			
5. Initial customization of apps delineated and applied	Work with vendors to customize their apps for county-specific needs / approaches / branding.			

COUNTY:				
ITEM	PREP FOR SOFT LAUNCH	DESCRIPTION OF PLANNING OUTCOME / DECISIONS / PLANS	STATUS	TARGET DATE
customization (continued)	Initiate planning with a "customization session" with each vendor.			
6. Approach to clinical integration	Work with vendors to determine approach for use of apps in care settings for each target population. Initiate planning with a 'clinical integration session" with each vendor.			
7. Early phase of evaluation ready	Provide evaluator and vendors list of demographics for each target population. Provide evaluator list of desired outcomes to monitor for each target population,			
8. Social media links and management are ready	Create links to apps in county's social media sites: • Facebook • Instagram • Twitter			
9. Program staff and peers trained and ready to support clients in use of initial apps				

COUNTY:				
ITEM	PREP FOR SOFT LAUNCH	DESCRIPTION OF PLANNING OUTCOME / DECISIONS / PLANS	STATUS	TARGET DATE
10. Information security in place in each county and with each vendor				
11. Tracking processes to support routine monitoring of activities, identification of glitches, etc.				
12. Communication strategy (internal and external, OAC)				
13. Simulations with various apps conducted and processes smoothed				

Cultural Adaptation

An important developmental pursuit of the Tech Suite will be the cultural and linguistic translation of our vendors apps for the diverse populations within California.

This translation work, to be conducted by the vendors, will be supported RS-E.

The RS-E team, which includes Solsken PR (API Outreach Specialists), MSC Consulting (Latino Outreach Specialists) and CPEHN, share a common philosophy - that effective communication with California's various diverse populations begins with an acknowledgement that those from the community know best how to engage the community. Decades of experience have also demonstrated that even within a specific ethnicity, there will be differences based on geography and these differences must be embraced and honored. With this in mind, RSE and its team members have developed a process of cultural adaptation built on best practices.

1. **Language + Culture**: Cultural relevance moves beyond translation. Communities must be engaged very early on to explore historical trauma(s), where trust does or does not exist with other entities and challenges of daily life.

2. **Function + Form:** As communities develop trust and engage in the process, the RSE team recognizes not to assume the answer or solution. Rather, they embrace the fact that both the form and messaging of the campaign will evolve within each community.

3. **Community Engagement:** Sustain impact within a community is contingent on lasting relationships and trust. This is built through continued engagement throughout the campaign and materials development process to allow for input on draft documents, messages and campaign themes. Allowing for review and approval of all elements of the campaign builds ownership and greatly enhances the efficacy of their efforts.

The initial translations to be developed will be Spanish and Vietnamese. Through this work, our app vendors and RS-E will develop a collaborative process to assure the translations benefit from these processes and involve key constituents from each cultural group.

Peer Involvement

Peer Roles

Peers and future end users have been involved throughout the development of the Tech Suite. To date, they have participated in a variety of activities, which represents just the initial key roles and activities for peers in the Tech Suite:

- Application Vendor Selection:
  - Participation in vendor demo/presentations;
  - Experimentation/practice with pre-qualified apps; and
  - Providing feedback on potential apps to inform final selection.

- Implementation:
  - Local readiness overall;
  - Outreach and engagement strategies and networking;
  - Guidance on marketing messages and materials;
  - App design; and
  - Development of the Paid Peer role.

An early example of involvement in app design involves 7 cups, which is redesigning its clinical assessment process in order to gather demographic information about end users per the MHSA Innovations regulations. As is described in the next section, 7 Cups is developing a Peer / End User Testing Group to guide improvements to their, the first of which is this clinical assessment/data gathering capability. This initial testing process is supporting development of an effective design for data gathering while also creating the functionality to test future changes. Peer / end user informed change will be the norm for the Tech Suite and the pathway for it is being developed through this initial change area.

While engaging peers in these early stages, the role of peers in the overall design and approach to the Tech Suite has also been emerging. The learning to date has underscored the centrality of peers in every aspect of the suite. As such, peer roles are being developed in the following areas:

- State Lead: Assuming the collaborative expands in the coming months, the collaborative has budgeted to hire a full-time lead to support the role of peers throughout the project. If the collaborative does not expand, this will be a part-time role.
- Local Lead: Each county is assigning a lead peer to be part of the local project team, support the recruitment of Tech Suite Paid Peers, guide outreach to existing local peer network, and assure peer representation in all aspects of the Tech Suite and its development.
- Tech Suite (Paid) Peers: In conjunction with 7 Cups, each participating county will have paid peers to support the applications in their county.
- Peers in the Local Network: In each county, the Local Lead and Tech Suite Peers will reach out to the county's existing peer network to provide training on the apps, support these peers in their outreach and engagement of individuals they support, etc.

Below are initially identified roles and responsibilities for Tech Suite (Paid) Peers. These have been developed through leadership from Sue Bergeson, a national leader in this area and now a member of the 7 Cups team, and with Cohort #1 counties. Counties included their locally appointed peer leads and peer representatives to develop these job duties; a preliminary list of these is provided below.

Using their own lived experience perspective, the Tech Suite Peer Specialist will promote the Tech Suite apps to other consumers within clinics, provider organizations, drop in centers, advocacy organization meetings, during county events, at health fairs and in other places where consumers might gather. They will also:

- Set up meetings, create and leverage opportunities to present to groups of consumers.
- Distribute information while engaging providers, consumer leaders and others who might connect with consumers to help promote the program and engage those consumers they serve in the Tech Suite programs.
- Provide training and education for groups of consumers to help them become comfortable with the software and the apps and reduce any fears or barriers to using the programs.
- Recruit "Super users" who love using Tech Suite apps and who are willing to volunteer to walk others through signing up and using the program, including problem solving around downloading the app and other simple tech issues. Deploy these volunteers through the 7 Cups platform to help individuals. Engage super users to teach and provide tech support at specific times and in specific locations.
- Recruit county active listeners who understand the culture, speak the languages and reflect the priority population including older adults, specific monolinguist populations and college students.
- Recruit consumers who are interested in facilitating county discussion boards and facilitate online groups, especially with target populations.
- Provide specific outreach to targeted populations based on specific assignments. This includes developing outreach strategies, events and being present where these populations gather, for example have a table at a church health fair, presenting information at a table during a street festival; talking to people at a food pantry.
- Solicit, categorize, track, and communicate user issues, questions, and feedback to support constant app improvement iterations.
- Identify gaps in community resources, seek to fill gaps, add additional services that are meaningful to consumers and communicate changes in existing listing.

Peer & Underserved Cultural Community Groups User Testing

The 7 Cups community consists of millions of people. Many of these people have lived experience and have taken time and energy to help evolve 7 Cups. We listen very closely to our community because we believe it is essential to making a support system that people want to utilize and tell others about.

We will be expanding our user testing processes to incorporate a more formal peer user testing group comprised of peers across several counties. There will be different categories of peer groups that focus on specific product iterations. Broadly, the peer testing user process will work like this:

- 7 Cups team will create a beta version of a product or change to be tested.
- 7 Cups will email each peer in the peer user testing group and ask them to access this special version of the software.
- Peers in the user testing group will test the new product or enhancement.
- Peers will complete a form where they enter their name, role, county, and specific feedback on the new product change.
- 7 Cups team will collate the feedback, review, and make changes to the product.
- Peers in the user testing group will be asked to review again and make any additional comments.
- The new changes will be pushed to the live site.

In addition, 7 Cups will work closely with county Underserved Cultural Community Groups (UsCC) and will follow a similar process as outlined above. This process will start with Los Angeles. LA UsCCs include:

1. Deaf, Hard of Hearing, Blind, and Physical Disabilities
2. LGBTQI2-S
3. African/African American (AAA)
4. American Indian/Alaska Native
5. Asian Pacific Islander (API)
6. Eastern European/Middle Eastern
7. Latino

We will locate the peers by asking advocacy groups and peer run organizations in each county to nominate one or more people to serve in the testing groups. We will also seek nominations from organizations that focus on each of the seven underserved cultural community groups identified above.

Technology Procurement

Selection Process

The initial procurement process was designed to select digital technologies in three components:

- **Peer Chat and Digital Therapeutics Using Technology-Based Mental Health Solutions to Intervene and Offer Support:** Utilize technology-based mental health solutions designed to engage, educate, assess and intervene with individuals experiencing symptoms of mental illness

- **Virtual Evidence-Based Therapy Utilizing an AVATAR**: Virtual manualized evidence-based interventions delivered via an avatar, such as mindfulness exercises, cognitive behavioral or dialectical behavior interventions delivered in a simple, intuitive fashion.

- **Digital Phenotyping Using Passive Data for Early Detection and Intervention**: Utilize passive sensory data to engage, educate and suggest behavioral activation strategies to users.

Vendors seeking pre-qualification and then selection (per steps described below) were considered based on their ability to provide the following:

- bridging of offline and online services
- local resource listings
- linked, collaborative care with existing county services and nonprofits
- customized programs of on the ground and online support designed to tackle specific issues (e.g. abuse, opioid addiction, suicide prevention)
- online support and community
- access to support various languages
- 1 to 1 peer counseling, available 24/7
- group support chatrooms
- access to dedicated group discussions led by peer support and mental health professionals
- forums on a variety of behavioral health topics
- online, licensed, professional therapists offering asynchronous text messaging support
- online, licensed, professional therapists offering videochat therapy
- access to artificial intelligence-informed virtual assistant
- access to growth paths based on supported treatment protocols
- sensor data and digital phenotyping
- assess symptoms, progress, and early warning signs through real-time monitoring of the sensors on a patient's smartphone
- data empowered outreach to engage people in counties who are at risk and/or suffering and have not had contact with the healthcare system
- retrospective assessment to analyze and share insights from new patients
- Personalized Assessment and Tailoring of Interventions
- Passive Data Collection (no user interaction)
- Continuous data collection in ecological settings (e.g. not episodic, in clinical settings)
- Administration and Data Support

- Planning, Implementation, Marketing and Maintenance of the County Website, the application, and all Associated Programs, add no additional burden to County Staff
- Customize Design, Look and Feel to Reflect Individual Counties
- Re-Design of Existing Websites to Streamline Access to Services and Embed Support
- Customizable Data Analytic Reports
- Outcome and Usage Metrics

The following summarizes the steps conducted by the Tech Suite and the CalMHSA team to select the Suite's initial set of vendors. The Tech Suite plans to conduct them at least annually to develop an evolving set of pre-qualified app vendors that result in a diverse menu of options available to participating counties.

Technology Procurement
Budgeting & Pricing

Goals: The Tech Suite budget model is designed to achieve a variety of interdependent goals representing a variety of perspectives. It is intended to serve as a planning tool and a methodology for supporting the array of transactions anticipated, as well as means to ensure the wise and fair use of each county's Innovation funds. These informing goals and perspectives are as follows:

Counties:

- Support counties' initial and ongoing budgeting for proposal development, future expansion, etc.
- Offer a fair fee structure that prorates for county size and resources.
- Create a cost sharing approach that supports "statewideness".
- Licensure at the county-level to allow participating county full access to selected vendor apps for as broad a scope of use as desired.
- Use of Innovation funds for unique county needs.

Vendors:

- Provide a formula-driven contract that flexes as counties join for different durations, scopes (e.g. array of vendors selected), etc.
- Allow easy means to calculate fees for invoicing as the collaborative grows and changes.
- Provide three categories of fees to vendors: start-up, ongoing development, and licensure.

CalMHSA:

- Minimize the volume of contracting with vendors (e.g. avoid having to amend a vendor's contract every time a new county joins).
- Easily process/adjudicate quarterly invoices from contractors as counties join the project.
- Create a means to link OAC-approved budgets and the Participation Agreement budgets with a clear fee schedule based on preferred array of technology.

The Future:

- Create a reserve to allow future technologies to be added to the suite.

Structure: The structure of the budget and budget planning tool incorporates the following categories of expenses and rationale for county-specific proration.

- Overhead: CalMHSA Overhead (5%) to cover the costs of collaborative activities, administration, expert team travel, site visits, etc.
- Direct Expenses: Direct expenses will be incurred in three areas:
  - Experts: To build the project's collaborative and integrated functionality, the following expertise will be hired/contracted:
    - Project Management: A full-time project manager to support the design, development and operation of this Innovation collaborative.
    - Start-Up Guidance: In the initial start-up phase, experts will be brought in to guide early planning and decision-making. These experts will assist in, peer engagement within

individual counties, evaluation design, legal issues for critical topics like privacy/security safeguards, intellectual property rights, etc., and recruitment of long-term expert staff and/or contractors.

- Peer / End User Expert: A lead peer/end-user expert will be recruited to work on a full-time basis to support state and county-level involvement of individuals with lived-experience. Activities will include supporting existing peers to support individual use of apps, development of local "super users", and gather end-user feedback on improvements/advancements desired in the technology. This expert will also guide vendors in use of paid peers in each county's local preferences.
- App/Technology Expert: An expert in health and well-being apps will be recruited to assist individual counties and the collaborative as a whole in the deployment of selected apps, as well as the specification of desired customization and additions to those apps. This expert will work with vendors to assure apps are effectively maintained as well as advanced per collaborative participant needs and goals.
- Informaticist: A behavioral health informaticist will be recruited to work in two critical areas: evaluation oversight and real-time performance monitoring. In terms of the evaluation, this informaticist will assure each vendor is appropriately engaged in the formal evaluation and the evaluation is informing the learning objectives, etc. A substantial role will be assisting each county with the regular use of data generated by the various vendors. This will include effective use of clinical data for individuals as well as targeted populations. Finally, this individual will use this data to monitor overall performance of the suite to guide the continuous improvement process.

o Each Vendor: The cost structure planned for individual vendors will be based on the following categories of fees:
  - Start-Up Fee (year 1 only): To cover planning, customization and implementation
  - Development Fund: To cover future advancements in technology ("not to exceed")
  - Licensure/Annual Fees: Each county pays a single licensing fee to use app(s) (for either a quarter or a year - TBD); when selecting a vendor, the county receives all apps in that vendor's platform to be used as much or as little as desired.
  - Customization: Each county may elect to purchase additional customization of the vendor apps, in terms of functionality, target populations and other changes relevant to their Innovation plan.

o County-Specific, Local Costs: To be determined by each county for paid peers, local supports, etc.

Cost Sharing: The approach to cost sharing and payment to vendors is based on a simple formula which assurea fair and appropriate contribution by each participating county. This formula is:

Vendor-Specific Fee Variable x County-Specific Relative Size Unit (RSU) = Fee to Vendor per County

- Relative Size Unit: Each county is assigned a relative size Unit (RSU) based on the MHSA allocation schedule published in DHCS Notice 17-041 (September 17, 2017). The RSU is calculated by dividing a county's assigned allocation percentage in the MHSA scale and by the statewide median percentage.

Technology Procurement
Contract Administration

CalMHSA Participation Agreement(s) with a County: Once a county obtains MHSOAC approval of their Innovation plan, the county has the option to join/participate in CalMHSA's Innovation Tech Suite Program. If the county elects this approach, they work with the CalMHSA JPA Administrative Manager to gain approval from their Board of Supervisors via a Participation Agreement. Key aspects to development and execution of these are agreements are described below:

- **Participation Agreement** – In collaboration with key program staff from the county, the JPA Admin Manager drafts a Participation Agreement based on the county's MHSOAC approved Innovation Plan.

- **County Department(s) and Board of Supervisors (BOS) Approval** - Once developed, the plan is vetted internally with the county (legal counsel, finance, auditor and contracts) departments until the agreement terms have been mutually agreed upon by both the County and CalMHSA. Once mutual agreement is reached, it is scheduled to be presented to the Board of Supervisors. Upon BOS approval, the county may proceed in program participation and receive services.

- **Content of Participation Agreement** – The agreement consists of three sections: Program Description, General Terms and Conditions, County-Specific Scope and Funding.
    - **Program Description**: Describes the Innovation Tech Suite which includes the various technology based applications, marketing and outreach and evaluation.
    - **General Terms and Conditions:** Defines the responsibilities of each party (CalMHSA and County), duration and term, withdrawal/termination, fiscal provisions and indemnifying language.
    - **County Specific Scope and Funding:** This section clearly defines which components from the Innovation Tech Suite they wish to participate in, for how long, the target population, and the fiscal commitment (total funding, followed by a breakdown per fiscal year).

Vendor Contracting: Given the complexity of the project's collaborative approach, the vendor agreements are extensive. Through these agreements, CalMHSA represents its members and has a fiduciary responsibility to the California State Department of Mental Health, CalMHSA members, and the public to ensure funds are used appropriately and all shared data/information is secure and protected.

- **Content of Vendor Agreements:** The CalMHSA-app vendor agreement is extensive and includes the following 15 Exhibits: General Terms and Conditions, Statement of Work, County Work Order Template, Fees, Functional and Technical Requirements, Services Levels and Performance Standards, Maintenance and Support, CalMHSA's Administration, Contractor's Administration, Business Associates Agreement, Information Security and Privacy Requirements, Additional Terms, Terms of Use, Escrow Agreement and Work Order form.
    - **Statement of Work (Exhibit B)**: Will be tailored for each specific vendor with some language remaining applicable to all vendors.

- **Fees (Exhibit D):** A fee schedule has been developed for each vendor, which specifically defines the billable fee amounts per county based on a formula that include county size, and population amongst other criteria.
- **Work Order (Exhibit O):** This form clearly defines the scope of work, target populations, etc. for each county participating in the program. This provides clear direction to the vendors for work to be performed at each location. See example template at the end of this summary.

- **Vendor Negotiations:** CalMHSA meets with each vendor and presents the agreement to include an Exhibit O (Work Order) for each participating county. Once the parties come to mutual agreement on final terms, the vendor will commence work immediately.

Contract Management: Vendors are required to provide regular reporting to CalMHSA and counties, including monthly, quarterly and annual reporting. Given the ever-changing nature of innovative technology, these reporting requirements are important as they will ensure services are being provided as requested and needed by the participating counties.

As part of contract management, CalMHSA will ensure vendors are continuously maintaining all necessary licenses, security measures and insurance requirements. Noncompliance of these requirements could impact payments to the vendor and/or termination of the contract.

Budget Management, Invoicing and Payments: Given CalMHSA's extensive background with contract management, processes are in place that to support tracking and issuing payments. These include:

- **Budget Management:** CalMHSA has been monitoring the overall budget and will continue to do as follows:
  - Track funds committed, received and spent by county.
  - Track funds by county by reversion year, to ensure funds subject to reversion are spent first.
  - The above steps will allow CalMHSA to easily develop annual reports of expenditures for each county, as required by the state.

- **Invoicing:** Vendors will be required to submit quarterly invoices based on the number of counties being serviced and fee schedule.
  - CalMHSA will be reviewing invoices as they are submitted for accuracy.
  - CalMHSA's program staff, project manager and accounting team will meet regularly to discuss any issues that may arise with a given vendor.

- **Payments:** Payments will be made within 30 days of receipt of invoice unless issues are encountered, at which time they will be addressed prior to issuing payment.

County Work Order Template

County			
Project Summary *[Summary of the project explaining services, timeline, where Services will be performed, and other general requirements.]*			
County Goals and Objectives *[Specific goals and objectives, including learning lessons, as outlined in the County's OAC proposal.]*			
Funding Timeframe *[Commencement and termination dates for this Work Order.]*	**Start Date**	**End Date**	**Total # of Months**
Detail of Services Required *[Describe Services to be completed by Vendors, including requested apps and applicable fees:*			
(1) Start-up – initial County customization			
(2) Development			
(3) Licensure			
(4) Customization – additional county-specific application development and/or services]			
(5) Networking and Collaboration			
(6) Contract Management			

Tasks *[Tasks necessary to support the project, including (a) a description of all subtasks and deliverables; (b) scheduled beginning and end dates; and (c) reporting timeframe and frequency].*			
	Description of all Subtasks and Deliverables	**Beginning and End Dates**	**Reporting Frequency**
Deliverable No. 1: Start-Up			Upon completion of start-up phase
Deliverable No. 2: Development			Quarterly
Deliverable No. 3: Licensure			Quarterly
Deliverable No. 4: Customization			Quarterly
Deliverable No. 5: Networking and Collaboration			Quarterly
Deliverable No. 6: Contract Management			
6.1 Participation in regular and ongoing contract management meetings as determined with Contract Manager.			Quarterly
6.2 Submit Quarterly Status of Deliverables Reports to CalMHSA.			Quarterly
6.3 Submit additional program/activity reports and data as determined by CalMHSA.			As requested
6.4 Submit Annual Report to CalMHSA at the end of each year addressing the following:			
(a) Describe the accomplishments of each deliverable within the contract.			Annually
(b) Describe the external resources that were leveraged to complete activities.			Annually

Technology Procurement

Initial Vendors: 7 Cups and Mindstrong

The Tech Suite has selected two initial digital technologies. For the "Digital Phenotyping Using Passive Data for Early Detection and Intervention" component, the initial vendor selected is Mindstrong.

- Mindstrong provides a digital phenotyping, artificial intelligence (AI) enabled, telemedicine network for outpatient management of behavioral health disorders that reduces resource utilization, increases access and improves patient outcomes by diagnosing behavioral comorbidities early, detecting relapse early, and intervening early.

  Website: https://mindstronghealth.com/
  Brief video: https://mindstronghealth.com/video-care-demo/

The initial vendor selected for the remaining two components, "Peer Chat and Digital Therapeutics Using Technology-Based Mental Health Solutions to Intervene and Offer Support", and "Virtual Evidence-Based Therapy Utilizing an AVATAR", is 7 Cups.

- 7 Cups is an on-demand emotional health and well-being service. It utilizes anonymous bridging technology to securely connect real people to real listeners in one-on-one chat. Anyone who wants to talk about whatever is on their mind can quickly reach out to a trained, compassionate listener through their network. They have hundreds of listeners who come from all walks of life and have diverse experiences.

  Website: https://www.7cups.com/
  Brief video: https://www.7cups.com/demo/member/

Sections 6 and 7 have the following information for 7 Cups and Mindstrong, respectively:

- Overview of their organization;
- Descriptions of their applications;
- Evidence basis for their applications;
- Frequently Asked Questions about their applications;
- A Glossary of Terms related to their applications.

History

7 Cups started at a kitchen table. The founder, a licensed psychologist, was talking to his wife, a therapist, about a problem. She listened to him and he immediately felt better. He asked himself, “What do people do when they don’t have a therapist for a partner?” It occurred to him that everyone should have access to a great listener.

He started with an ambitious vision: to build the emotional support system for the Internet. Anyone should be able to open an app or go online to share what is on their mind. 7 Cups was born and launched in June 2013 through the support of Y Combinator (YC), the startup accelerator behind massively successful companies like Dropbox and AirBnB. The person that created Gmail and the Facebook feed, Paul Buchheit, was the YC partner that focused on 7 Cups.

7 Cups is now helping millions of people a month. Early on they had a small, dedicated team of 20 listeners. Now they have over 260,000 listeners providing support in 140 languages across 189 countries. The site was very basic to start, but now has robust training, growth paths, sub-communities, licensed professionals, and iPhone and Android apps. Additionally, 7 Cups has won the Stanford MedX Award for Health System Innovation and serves dozens of organizations like MIT and Harvard.

7 Cups has the infrastructure, the technology, and the know-how to expand its reach to include entire counties as it presently reaches 1-3% of the population in any given region. Today's adults and teenagers, beset with ever-increasing levels of stress, are struggling to thrive more than ever. Fortunately, 7 Cups is an ideal source of emotional support, as more and more of our society looks online for emotional wellness options. Health systems can easily integrate 7 Cups' member support system into their already existing systems, thereby encouraging a culture of awareness and support across the membership body. By increasing emotional support and referring people in need of enhanced care to mental health services, 7 Cups can help increase access and reduce costs.

7 Cups is well on its way to realizing its ambitious starting vision. The team at 7 Cups firmly believes in collaboration and wants to help you further support your members so that they can thrive right along with you.

Founder

Glen Moriarty is the founder and CEO of 7 Cups, a web and mobile peer to peer emotional support platform. He is a psychologist passionate about the Internet's power to help people lead better lives. He has been involved in a number of services and organizations that support people in need. 7 Cups of Tea is his most recent endeavor, marrying his background in psychology with his love for technology.

Advisory Board

Tom Insel
Chair of Advisory Board

Linda Rosenberg
CEO of National Council

Henry Harbin
Former CEO of Magellan

Amy Kennedy
Education Director for the Kennedy Forum

Ken Duckworth
CMO of NAMI, Harvard, BC/BS Head of Behavioral Health

Values

Your work saves lives
Work with purpose, step up to help others.

Grow through the path of problems
Face problems head on to continually develop, solve the most critical ones in the way.

High expectations and high warmth
Deliver quality work supported through learning, safety, and candor.

Accountability
Own your work and hold others to theirs, speak up and act.

Grit
Drive yourself, mental agility to push past barriers.

Believe in equality
Value equally everyone's background, work, and ideas; collaborate across teams and levels.

Have fun and keep full
Enjoy the experience, take care of yourself in order to give back.

Mission

7 Cups is for anyone who wants to live in a world where the human experience is free from stigma and stereotypes and rich with love and support. A world where all 7 billion of us can grow and feel like we truly belong.

We believe that each one of us is inherently valuable. We do not measure people based on where they are from, what they look like, or what position they hold. We recognize that people make sense in the larger story of their lives. We understand that people are complicated and that life is not simple or easy.

We are all on the same path. Some of us are just starting out. Others are further down the road. No matter where we are, being kind, compassionate, and accepting of one another enables us all to grow.

We do not tolerate people being mean, harmful, or rejecting of others. We do not judge or look down on people.

Although there are forces that tend to disempower and create division, we stand together as we compassionately care for and champion one another. We see our differences as a strength. We are united in our shared goal of creating a place where all can find acceptance and be welcomed to a home where we all belong.

7Cups.com

7 CUPS in California

7 Cups is an on-demand emotional health and well-being service. Our bridging technology anonymously and securely connects real people to real listeners in one-on-one chat.

7 CUPS AT A GLANCE

7 CUPS BY THE NUMBERS

58,270,696
messages sent

2,041,724
people helped*

20,846
listeners

* since2014

used in
58 Counties

county with the largest number of people helped
LA 413,555

7 Cups makes a positive impact in people's lives

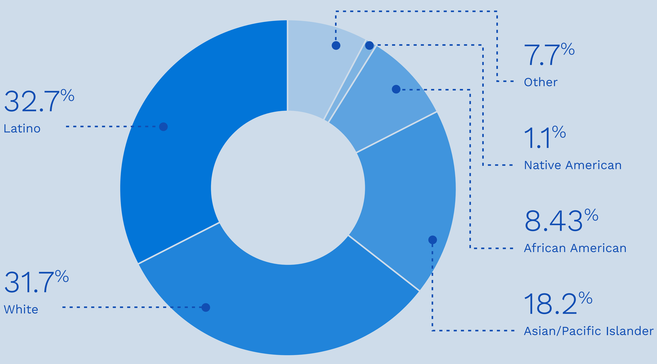
90%
people feel better after talking to listeners

97%
people view their listener positively

80%
people believe listeners can help people with mental health issues

81%
users consider 7 Cups as a helpful service

70%
people feel support provided by 7 Cups listeners is just as or more helpful than that provided by psychotherapy



Find the 7 Cups research here:
https://www.7cups.com/about/research-stats.php

7 CUPS

Research-Backed, Evidence-Based Online Emotional Support

Four peer-reviewed publications support the efficacy of 7 Cups for a broad spectrum of mental health populations including perinatal mood disorders, postpartum depression, anxiety, and schizophrenia spectrum disorders

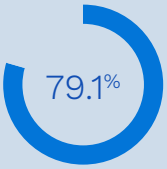
2.5

7 Cups demonstrates real clinical outcomes including a mean score reduction of approximately 2.5pts on each of the depression, anxiety and stress subscale of the Depression Anxiety Stress Scales (DASS) for our members experiencing the most emotional distress (members in the 10th percentile severity group)

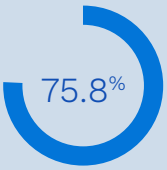
7 Cups listeners reach similar therapeutic alliance levels in 19-minute message-based conversations as licensed therapists in face-to-face settings

100% of research participants would recommend 7 Cups to people who suffer from perinatal mood disorder

indicated that the listener is a good supporter



indicated that they would like to chat with the listener again



of participants indicated that they feel much better after chatting with a listener

of research participants rate support from volunteer listeners on 7 Cups as equally, or more, effective than traditional psychotherapy

On a scale of 0 to 100, after chatting with a listener, 7 Cups users rated:

The 7 Cups platform includes 32 evidence-based therapy protocols based on the best empirically validated treatment techniques to reduce symptoms in clinical studies

CBT Cognitive-behavioral therapy

MBCT Mindfulness-based cognitive therapy

DBT Dialectic behavioral therapy

ACT Acceptance and Commitment therapy

7 Cups administers three different empirical diagnostics:

- DASS
- PHQ-9
- GAD-7

7 Cups offers a continuing education program of 50 topic-specific trainings for listeners based on microcounseling skills

The Wellness Engagement Engine - the core of the 7 Cups platform - is built on Prochaska and DiClemente's (1983) stage of change model to pace movement toward wellness based on predictable tasks necessary within each stage

7 Cups has been recognized with the Stanford MedX Prize for Health System Innovation

We have strategic research partnerships with organizations at the intersection of clinical psychology, computer science, and computational linguistics, including:

- ✓ University of Oregon Center for Digital Mental Health
- ✓ Harvard Medical School
- ✓ Harvard School of Global Health and Social Medicine
- ✓ Qntfy

We are actively pursuing research on our platform with experts in the following areas:

Psychological aspects of natural language use

Digital phenotyping, i.e., passively collecting behavioral data via monitoring naturalistic language and smartphones/wearable usage

Mental health analysis via natural language processing (e.g. language markers of depression, anxiety online)

Mobile social support in college students with depression and anxiety

Effectiveness of novel treatment strategies to improve access to mental health care for adult and adolescent populations

Chatbot/ Avatar perceptions and efficacy in providing emotional support

Adolescent emotional development

Neuropsychology of mental illness

F.A.Q.

What is 7 Cups of Tea?

7 Cups of Tea is an online emotional support service. Through a secure, anonymous bridging technology, we connect those in need of emotional support with our network of Active Listeners, individuals from all walks of life who want to provide compassionate care. Connections to Listeners are private, one-on-one conversations initiated on demand.

What is Active Listening?

Active Listening is a set of communication skills that demonstrate empathy, compassion, understanding, and respect. Active Listening is different from the normal listening we do in our everyday conversations. Instead of just “waiting to talk” or thinking about what we’re going to say once our conversation partner stops speaking, active listening requires that the listener completely focus on absorbing, comprehending, and reflecting what the speaker is saying.

Active listening is a great technique to help people feel better when they are going through hard times, dealing with loss, struggling with health issues, or just need to vent. Because active listening directs all focus towards the speaker, it removes potential sources of stress, conflict and discomfort that can happen in a regular conversation.

How does 7 Cups of Tea connect Active Listeners with people in need of support?

Since all connections are on demand, our service is run like a marketplace. When an individual reaches out to connect, we notify our available Listeners that a request has come in. The first Listener to respond can then begin a conversation with the individual in need of support. If an individual wants to connect to a specific Listener, they can request a direct connection by visiting that Listener’s profile.

Is 7 Cups of Tea really anonymous?

Yes. 7 Cups of Tea is really anonymous. Listeners only know what is disclosed to them by the person they are helping. Contact information is kept strictly confidential.

Do Active Listeners receive training?

Yes. Listeners are required to complete an online course which helps develop Active Listening skills. The course also goes over certain scenarios in which a Listener may need to refer the person with whom they are speaking to a professional licensed therapist, counselor, or emergency contact. While many of our Active Listeners happen to be licensed professional counselors and therapists, they do not give medical or psychological advice during conversations.

Can I become a listener?

We'd love to have you! Anyone can sign up to become an Active Listener. All Listeners must successfully complete our online course, which includes a mock chat. **Sign up here to begin!**

What's the story behind 7 Cups of Tea?

It's pretty simple. The founder, Glen, was sitting at his kitchen table talking to his wife about a problem he was having. Her close listening made him feel a lot better, and it occurred to him that he was incredibly lucky. For one, he is married to a Licensed Counselor. Furthermore, she was available when he needed to talk. Glen realized that many people do not have this same opportunity.

Not everyone has a friend or family member to talk to at all times, nor do they always feel comfortable doing so if they can. The only other real option is therapy, but that can be expensive and carries an unfortunate stigma, plus it involves scheduling. Glen envisioned 7 Cups of Tea as a third space to fill the gap in between the two current options.

Where does the name "7 Cups of Tea" come from?

7 Cups of Tea is actually the name of a famous Chinese poem. The suggestion is that each cup provides a different level of healing. It's important that our community feels that 7 Cups of Tea is a place where you can sit down and have several cups of tea with a friend. It isn't just a one-time meeting. You can touch base as much as you like.

7 Cups of Tea, by Lu Tong (795 - 835 CE)
The first cup kisses away my thirst,
and my loneliness is quelled by the second.
The third gives insight worthy of ancient scrolls,

and the fourth exiles my troubles.
My body becomes lighter with the fifth,
and the sixth sends word from immortals.
But the seventh—oh the seventh cup—
if I drink you, a wind will hurry my wings
toward the sacred island.
Translated by Christopher Nelson

How does 7 Cups of Tea ensure that listeners are high quality?

Our application to become a listener includes many steps. Listeners must complete the Active Listening Training Course and receive a perfect score on the accompanying quiz. Additionally, every listener is reviewed and may be subject to a background check to ensure they are friendly, considerate, and competent. Anyone can see how well a listener is doing simply by looking at their reviews' cumulative score, and by checking out the badges that they have earned.

How do I contact 7 Cups for subscription support?

For any billing issues, contact billing@7cups.com or (844) 755-8757

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7 Cups Glossary

for California Counties Tech Suite Initiative

User Types

Term	Definition
Guest	someone exploring the site who has not made or signed into an account yet
Member	a person coming to seek help/support on 7 Cups (loosely synonymous with client) who has signed up for an account
User	any participant on 7 Cups - could be a member, a listener, or a therapist
Listener	aa volunteer support provider on 7 Cups, trained in active listening. Can be thought of as a peer counselor
Therapist	a licensed, professional therapist who provides online therapy via text on 7 Cups
Moderator (or "Mod")	a member or listener designated as having a special role in supporting the community, and having powers to enforce rules.
Community Mentor	someone who combines leading discussions with moderating forums in a subcommunity
Community Mentor Leader	someone responsible for overseeing a subcommunity
Ambassador	the highest level of leadership role in the community
Verified Listener	a listener who has met an experience requirement and has been recommended by a more experienced listener following a mock chat is granted a Verified Listener badge that enables them to show up in filtered searches for more experienced listeners
Admin	a user term for staff members or high level volunteers who can solve problems
Noni	A chatbot that engages in limited conversation with guests and members who are waiting in the general request queue, and that can also take part

in 1-to-1 chats, guide users through scripted interventions, or lead a chatroom discussion.

Noni is usually referred to as she or her, as if female.

She uses artificial intelligence and machine learning to offer empathy and support, based upon outcome-driven data. (In the tech suite specifications, she would be called an “avatar”).

Noni can also offer to send users reminders and will check in with them from time to time unless asked not to

Features

Term	Definition
Forum	an online written discussion where individuals can anonymously post questions or comments, and others can respond. All responses are published to be viewed by others
Thread	a discussion about a particular topic in a forum.
Chat	a system that connects people so that they may send messages to each other with very little delay, so that the effect is quite like a real life conversation
Chatroom	a system that connects multiple people to chat with each other at the same time. 7 Cups contains many chatrooms, each of them intended for particular topics or groups of participants.
Group support	a chatroom-based place for a group of people to connect over shared experience.
Discussion	A scheduled and often somewhat formal session in a chatroom, led by one or more designated people and with a focus on a particular topic. Also, a discussion in a forum.
1-on-1	A conversation, held via text/chat between two users. At least one of the people in a 1-to-1 chat must be a listener, a therapist, or a bot, because and members cannot chat 1-to-1 with other members on 7 Cups.
PM	“Private message”. This is a message sent directly from one user to another, and cannot be seen by anyone else.

Community	The area on 7 Cups that contains all group interactions, such as forums and chatrooms. It is where users can connect with one another. This also includes Q&A and wiki sections. Sometimes referred to as *the* community as opposed to any one particular (sub-)community.
Subcommunity	An issue specific community where one can find relevant resources, such as specialized listeners, chatrooms, and forums. Also sometimes referred to as *a* community.
Feed	A sequence of posts, which are personal statements by the owner of the feed. Members, listeners and therapists can have feeds. This is similar to a Facebook feed, where a user's feed will display posts made by anyone they are following.
Repost	To copy a post from a feed into your own feed, which brings it to the attention of people who follow your feed.
Follow	A way to read all the future posts in someone's feed. The posts of all the people you follow appear in your own feed.
Upvote	A sign of approval for a post in a forum thread.
@-sign, or "@ mention"	In a feed post or forum post, a prefix that turns the name of a member, listener or therapist into a tag (sometimes called tagging or mentioning someone).. For example, @Boris tags the account named Boris. The account tagged will receive a notification containing a link to the feed or thread.
Growth Path	a series of interactive written or video exercises, based on evidence-based protocols. You can think of each as a self-help treatment plan. 7 Cups currently has growth paths on 32 different mental health topics, but new ones can be developed at any time.
General Request	when a help seeker submits a request to be connected to any available listener
Personal Request	when a help seeker submits a request to be connected to a specific listener
EARS	"Effortless Assessment of Risk States". This is a separate app by which passive data is collected for the purpose of providing users with additional information about their behavior and symptoms.

Bot/Chatbot	A computer program that behaves in some way like a person. The only bots on 7 Cups are Noni and Sophia (the therapy intake bot). (Originally short for robot.)
AMA	Ask Me Anything" A forum thread in which someone invites questions and answers them.
Status	An indicator that shows whether an account is online, offline or (only for listeners) busy.
Offline	A status setting indicating that a listener is not necessarily available to respond to messages. Listeners who are logged in can respond while offline at their discretion, but they are not required to. For members, it indicates that the person is logged out.
Online	A status setting indicating that a listener is active on 7 Cups and available for new chats. For guests, members and therapists it indicates that the account is logged in.
Onboarding	The process of welcoming people "on board" 7 Cups, or the parts of the website designed to introduce new members. (The current 7 Cups onboarding design is codenamed "Campfire.")
Wiki	Part of the website containing a linked library of articles maintained by the community
My Impact -	A private page giving information about a listener's activity on 7 Cups (as opposed to the public information in the listener's profile).
My Progress	a private page given a member details about their ongoing progress.

Moderation & Reputation

Term	Definition
Badge	A displayed award, earned through the 7 Cups reputation system - such as by gathering hearts and cheers (see below), and engaging in other useful ways on the site. A badge usually unlocks various privileges within the site. It can also be used to group users of a certain type together--for instance, all NAMI listeners will have taken the NAMI training, and earned the NAMI badge
Hearts	There are little heart icons next to all messages on 7 Cups. If a user feels that something said by another user (in a chatroom, forum, or 1:1

	messaging) was particularly helpful or empathetic, the user can click on the heart icon, giving the other user a point toward earning badges and improved reputation. It is also just another way of showing support and appreciation.
Cheer	A point awarded for activity on 7 Cups. Cheers accumulate and form part of the system of reputation. Some people have accumulated more than a million cheers. *Also sometimes referred to as* compassion heart
Reputation	A cumulative record of an account's activity at 7 Cups, particularly the number of cheers, which the system represents as a level.
Ratings	A system for evaluating 1-to-1 chats based on the qualities helpfulness, professionalism, empathy and response time, with up to five stars being awarded for each. The system includes an optional written review.
Ban	A setting that prevents an account from using 7 Cups. Used to protect the community after some rule has been broken.
Block	A setting that prevents a pair of accounts from having any contact with each other. Used to protect people from unwanted chats or messages.
Mute	A setting that prevents someone from participating in a chatroom. Used to protect the room after some rule has been broken.
Flag	A reporting system for inappropriate content in forum posts, feed posts, or profiles.

Technology

Term	Definition
Badge	**App or mobile app -** for 7 Cups, the downloadable apps for Android or iOS, as distinguished from the website.
Website, or "browser" experience	for 7 Cups, the website as accessed via a web browser, whether on a desktop/laptop device or a mobile device. The 7 Cups website is designed in a "progressive" framework that provides a good mobile experience even for devices that do not support or users who do not wish to install the mobile app.
UX, or user experience	the overall experience a user has interacting with the product or service (website or app), the sum of all the various interactions and the

	relationships that is formed between the user and the service. Distinguished from UI or User Interface, which deals with the details of interactions on each screen or interactive experience.
UI, or user interface, also just interface	the details of the screen or other interactive elements, such as boxes, buttons, links, animations, scrolling, tapping, clicking, dragging, etc.
Artificial intelligence (AI)	Various ways to automate and speed up logical insight, inference, pattern recognition, and other forms of “intelligent” processing.
Machine Learning (ML)	an algorithmic approach to artificial intelligence somewhat analogous to expert systems but trained on as large as possible a set of examples rather than by feeding in a set of a priori rules. Allows for a feedback loop of learning from data, while simultaneously integrating what has been learned.
SEO	or Search Engine Optimization - techniques intended to ensure that our content and services rank high in searches (like google) for relevant topics, so that we can be discovered by and ultimately enroll and support as many people as possible.
New Message Notifications	notifications of new messages that may be sent via email or push notification and that accumulate in the header of the website until read.
Notifications	General notifications of mentions in forums and feed sites, or of updates in subscribed communities or forum threads, may also be delivered via email or push notification.
Push Notifications	in a mobile app, a notification that may come directly to your device even if the app is not currently running.
Alerts	on 7 Cups, messages that go out to the entire community or to targeted subsets of the community (such as listeners, or teens).

mindstrong

Mindstrong Health Information Packet

PREPARED FOR THE STATE OF CALIFORNIA MENTAL HEALTH SERVICES OVERSIGHT AND ACCOUNTABILITY COMMISSION

JULY 2018

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A healthcare innovation company

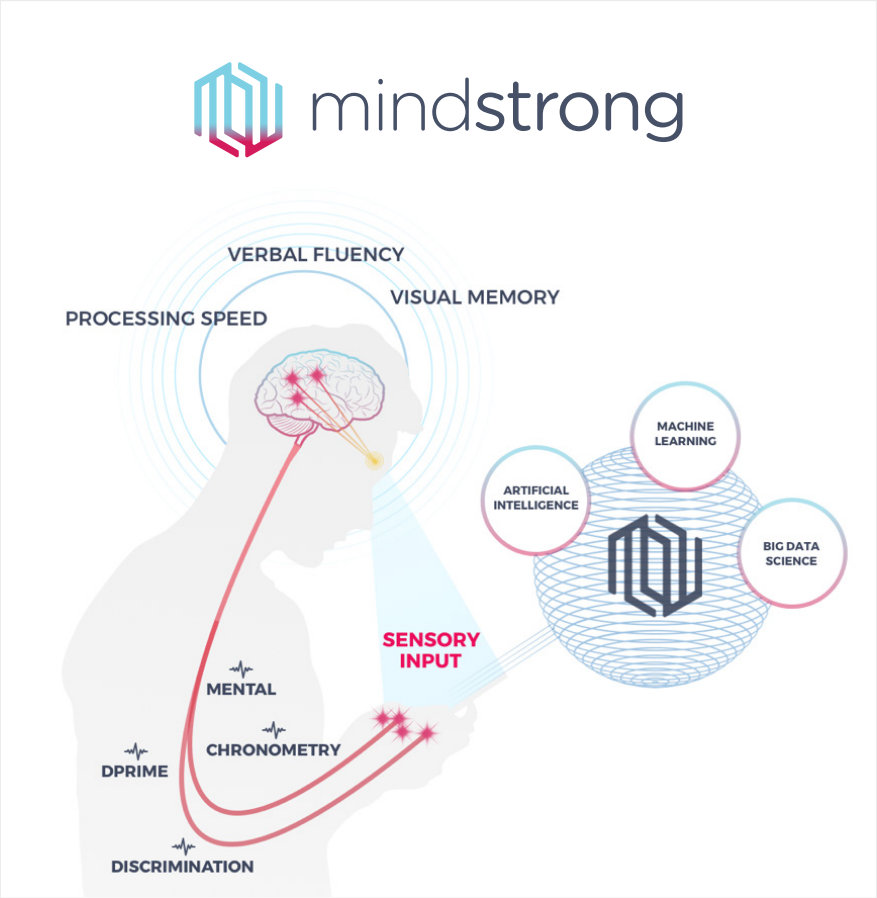
Mindstrong is a healthcare innovation company transforming brain health through pioneering work in measurement science and new models of care delivery. Mindstrong's health platform connects patients and providers with continuous, objective measures of cognition and mood giving patients agency in their care and providers confidence that they will be alerted to early signs of mental health deterioration. For overburdened mental health clinics, Mindstrong *Health Services*, a California professional corporation, provides wrap-around health services using the health platform to increase patient tenure in the community using high touch escalating levels of care. These escalating levels move from care management services, to psychologist provided therapies to psychiatrist delivered psychopharmacology. For populations at high risk of a mental illness, Mindstrong's health platform increases patient self-awareness, and its health services provides immediate access to care.

02

Mindstrong Health Clinical Evidence: 2013-2018

Mindstrong has a five-year history of clinical research in developing and bringing to market digital biomarker measures of cognition and mood. Mindstrong's unique approach is based on creating digital signals from human-computer interaction patterns. Mindstrong's clinical research has focused largely on touchscreen interactions from a user's smartphone. By capturing the patterns and the timing of these events, and not their content, Mindstrong has shown in repeated sponsored clinical studies and partnerships with leading academic centers that its digital biomarkers reproduce the major gold standard measures of cognition and mood in use clinically today.

Prior attempts to create digital phenotypes have relied on GPS signals, search terms, websites visited, Facebook postings, and other expressions of behavior and personal preferences. These approaches are beleaguered with ethical and privacy concerns. They also do not demonstrate strong and consistent signals with clinical outcomes that limit their clinical use. Distinct from these approaches, Mindstrong's science uses millisecond variability in reaction times from repeated multi-step touchscreen activities to create digital biomarkers proven in repeated clinical trials to have very high validity and reliability with gold standard neuropsychological assessments[1,2].



02

Mindstrong has been awarded five US Patents for its discovery that led to digital biomarkers of neuropsychological and neurocognitive function from human-computer interaction patterns[3-7]. Mindstrong's strong patent portfolio enables the company to freely publish its clinical results in prestigious peer-review journals and to include its clinical data and algorithms for public review of reproducibility[8]. Mindstrong promotes open science and collaboration to further the field of digital biomarkers for measuring mental health and illness. It has sponsored clinical studies that use its digital biomarker platform in the US, UK and Asia[9], and it has directly sponsored collaborators in the field[10].

Mindstrong's biomarkers have been licensed by pharmaceutical companies as sensitive functional endpoints in the development of new drugs for major depression and schizophrenia[11,12]. They are also in use for patient stratification of response for companion diagnostics and companion therapeutics[13,14].

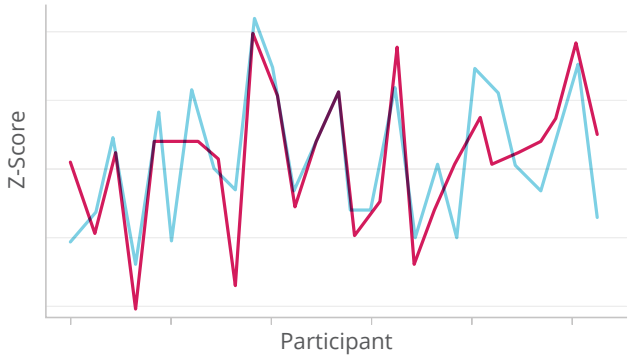
In clinical practice, Mindstrong's digital biomarkers are used in patient care for severe mental illnesses and for substance-use disorders in private clinics in the US. They have demonstrated high sensitivity and specificity in detecting early changes in deterioration and improvement with an ROC exceeding 80% in clinical programs[15] and in quality improvement programs. Clinics receive regular consult notes from Mindstrong *Health Services* with the following information:

- Mindstrong's digital biomarker evaluation reports six NIMH gold-standard, trans-diagnostic criteria of cognition and mood. The report contains trend (stable, increasing, decreasing), volatility (stable, increasing, decreasing), peak and trough performance relative to the patient's targets and percentile rank normed to age, education and gender.

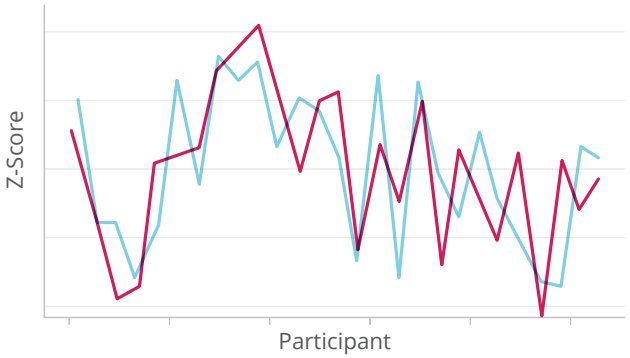
- Mindstrong assessment of the effectiveness of the current care plan and persistent gaps in care and adherence that relies on the objective digital biomarker evidence.

02

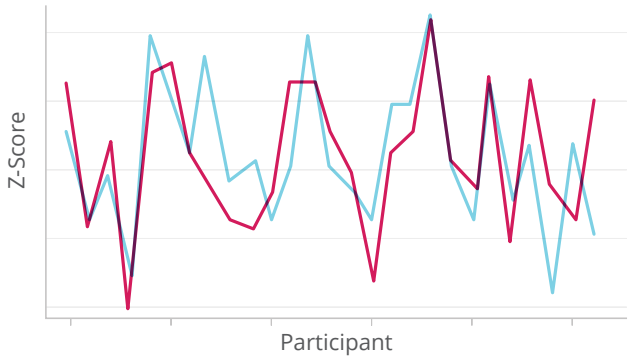
A Digits Backward
corr: 0.75 | p: 7.5e-06



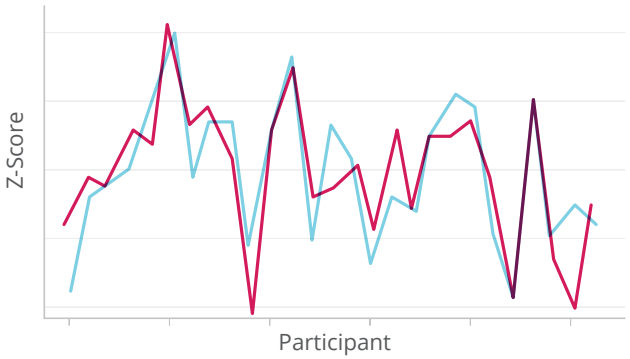
B Symbol Digit Modality
corr: 0.7 | p: 5.5e-05



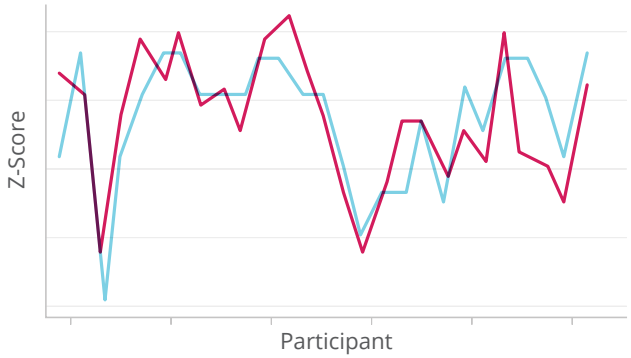
C Animal Fluency
corr: 0.67 | p: 1.5e-04



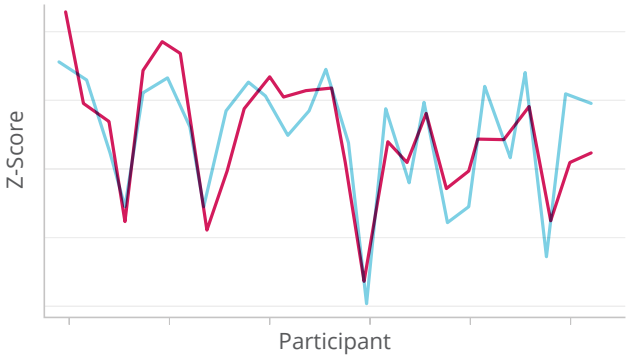
D WMS-III Logical Memory
corr: 0.82 | p: 1.9e-07



E Brief Visuaspatial Memory Test
corr: 0.77 | p: 3.2e-06



F WAIS-IV Block Design
corr: 0.83 | p: 1.1e-07



For counties that opt in for a higher level of service by Mindstrong *Health Services*, referring clinics benefit from 24x7 coverage of their patients between clinic visits to predict and pre-empt deterioration and illness early. By delivery of escalating levels of care through the Mindstrong health platform, Mindstrong *Health Services* increases patient tenure in the community. For these counties, scheduled progress notes additionally include the following:

- Subjective information acquired through the patient's engagement with Mindstrong *Health Services* through the *Health* by Mindstrong and *Care* by Mindstrong applications. This includes a summary of care plan changes since the last consult note and changes in patient symptomatology and functional impairment as reported by the patient during structured interviews and objectively observed in the digital biomarker chart.
- Care plan recommendations including psychopharmacology, CBT, DBT, psychoeducation, family and peer involvement, digital therapeutics, other.

References

1 Dagum P. Digital biomarkers of cognitive function. *npj Digital Medicine*; 1:10 (2018)

2 Williams LM, Pines A, Goldstein-Piekarski AN, Rosas LG, Kullar MS et al. The ENGAGE study: Integrating neuroimaging, virtual reality and smartphone sensing to understand self-regulation for managing depression and obesity in a precision medicine model. *Behaviour Research and Therapy; 101 (2018). 58-70.*

3 U.S. Pat. No. 9,420,970

4 U.S. Pat. No. 9,474,481

5 U.S. Pat. No. 9,538,948

6 U.S. Pat. No. 9,687,187

7 U.S. Pat. No. 9,693,724

8 https://pypi.org/project/mindstrong/https://mindstronghealth.com/clinical-trials/

9 https://news.harvard.edu/gazette/story/newsplus/the-promise-of-digital-phenotyping-in-psychiatric-care/

10 https://www.businesswire.com/news/home/20170607005392/en/BlackThorn-Therapeutics-Announces-Innovative-Clinical-Collaboration-Agreement

11 https://hitconsultant.net/2018/02/28/mindstrong-health-takeda-develop-digital-biomarkers/

12 Madrid A, Smith DG, Alvarez-Horine S, Saljooqi K, Dagum P and Mahableshwarkar AR. Assessing anhedonia with quantitative tasks and digital and patient reported measures in a multi-center double-blind trial with BTRX-246040 for the treatment of major depressive disorder (NCT03193398). *American College of Neuropharmacology*; (2017).

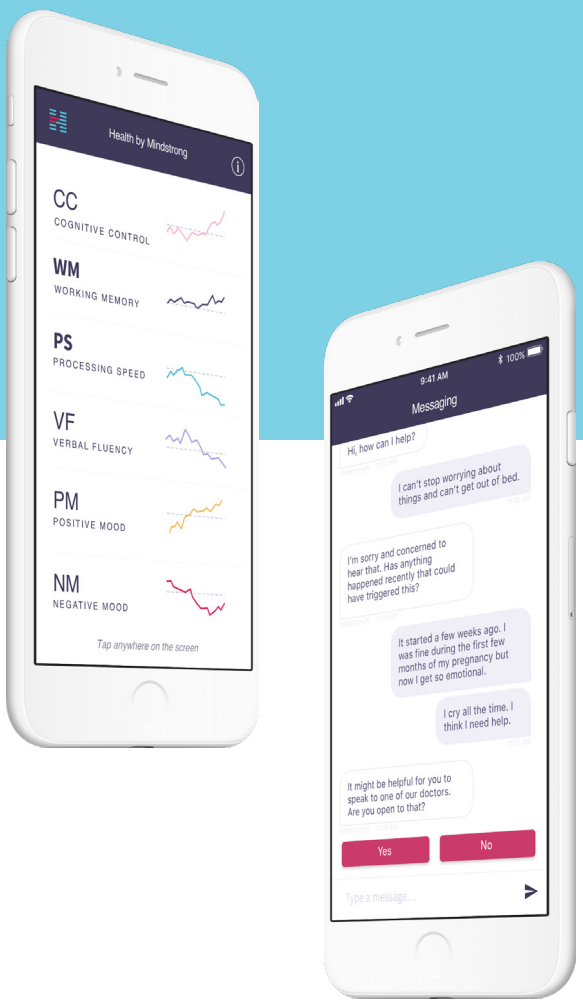
13 Smith DG, Saljooqi K, Alvarez-Horine S, Dagum P, Matrid A. Exploring novel behavioral tasks and digital phenotyping technologies as adjuncts to a clinical trial of BTRX-246040. *International Society of CNS Clinical Trials and Methodology*; (2018).

14 https://clinicaltrials.gov/ct2/show/NCT03429361?term=mindstrong&rank=1

The Mindstrong Solution

The Mindstrong Solution consists of *Health* by Mindstrong, *Care* by Mindstrong, and Mindstrong *Health Services*.

health
mindstrong

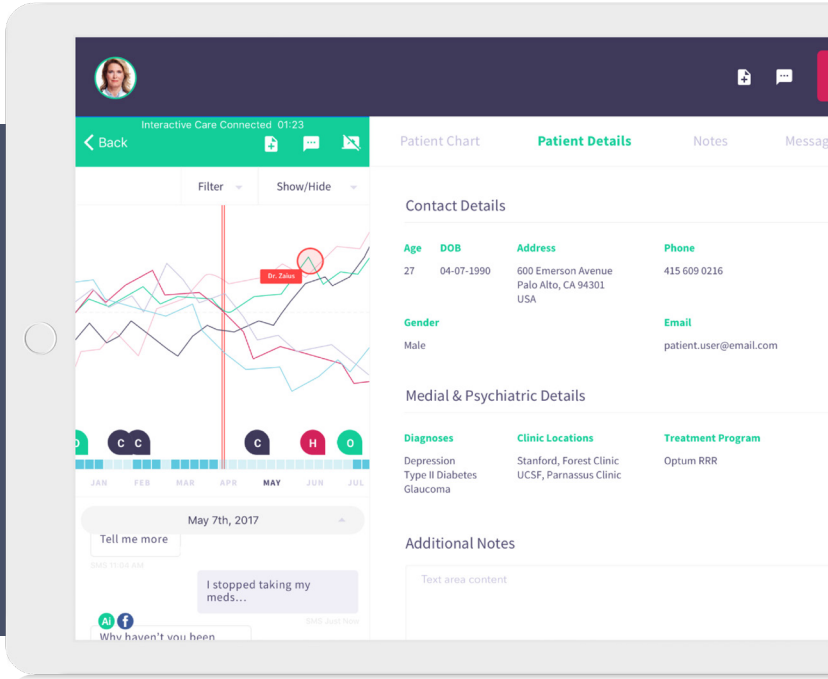


***Health* by Mindstrong** is a smartphone application downloaded onto patients' smartphones. The app comprises:

1. Measurement through passive capture of human-computer interaction (HCI) data

2. Management through communication and engagement functionality. *Health* by Mindstrong enables providers to remotely manage patients and allows patients to access their providers.

care
mindstrong



***Care* by Mindstrong** is a portal provided as a smartphone or tablet application and web portal and utilized by Mindstrong *Health Services*. *Care* by Mindstrong enables Mindstrong *Health Services* to:

1. Review and triage patients who are exhibiting high risk of relapse
2. Review trend history
3. Facilitate communication between Mindstrong *Health Services* and partner clinical staff.

Mindstrong *Health Services* comprises certified care professionals that deliver evidence-based assessment and intervention via Care.

Mindstrong *Health Services* comprises certified care professionals that deliver evidence-based assessment and intervention via Care. Mindstrong *Health Services* will review patients' *Health* by Mindstrong data daily. If it appears that a patient is demonstrating a risk signal, Mindstrong *Health Services* will contact the patient. During this contact, Mindstrong *Health Services* will conduct a brief assessment and determine the appropriate course of action, including brief intervention, referral back to the patient's existing clinical providers, or refer to immediate crisis response.

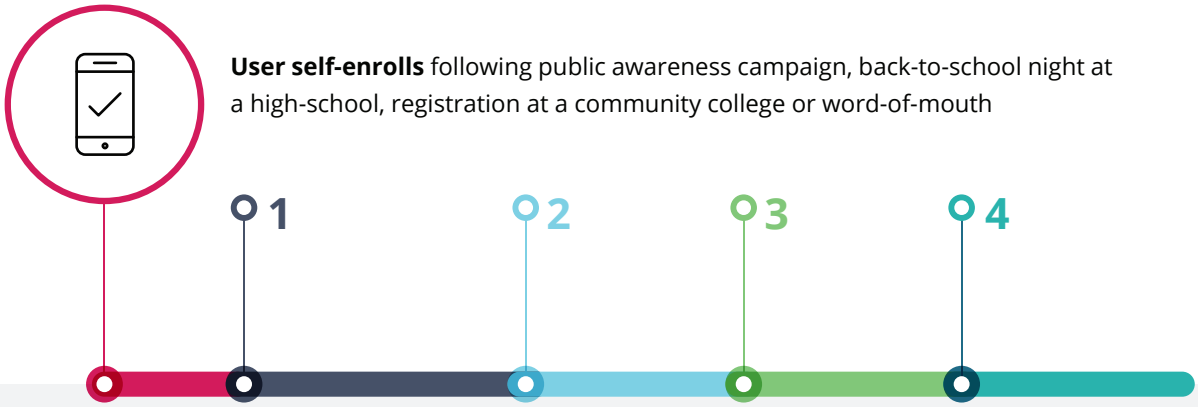
03

Mindstrong Care Delivery Models

The Mindstrong program demonstrates the improvement in patient functioning and reduction in rates of relapse, transition to higher levels of care, and clinical service utilization that are achievable with the Mindstrong Solution, which includes *Health* by Mindstrong, *Care* by Mindstrong, and Mindstrong *Health Services*.

The program offers patient enrollment into two care models: Self-Referred Care and Clinician-Referred Care. These two models span the continuum of care. Individuals that are healthy but at a high-risk for a mental illness such as depression, schizophrenia, perinatal mood disorder, or post-traumatic stress disorder will self-select into the Self-Referred Care enrollment. In contrast, individuals that have been diagnosed with a mental illness will be sent to Clinician-Referred Care enrollment during clinic visit or discharge from a County facility. The steps in the two care models are summarized below.

Self-Referred Care



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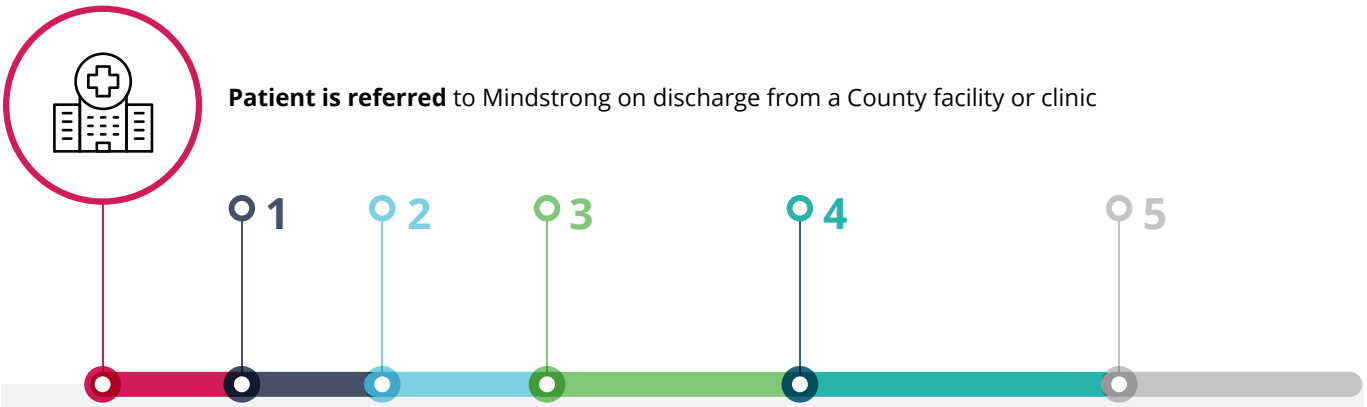
Clinician-Referred Care



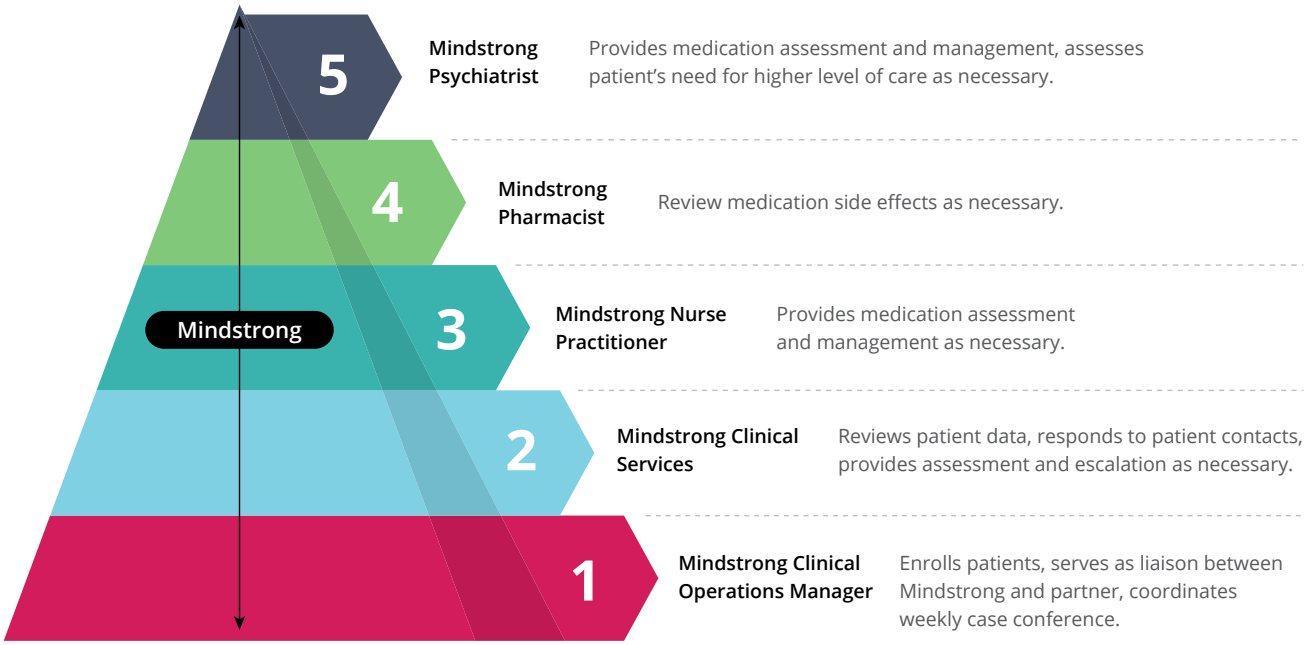
Both self-referred and clinician-referred users will have access to Mindstrong *Health Services* 24 hours a day, 7 days a week. Self-referred users accessing the services for the first time will go through an intake process that is triaged to their level of acuity. Established patients under care that initiate contact with Mindstrong *Health Services*, will undergo a brief assessment and, in partnership with partner clinical staff and/or according to agreed upon protocol, will follow an appropriate course of action.

Mindstrong Healthcare Model

The implementation of the services partnership will leverage staff from Mindstrong *Health Services* and the County. A typical model for roles, responsibilities, and communication is outlined below and can be customized based upon the County's specific needs and structure.

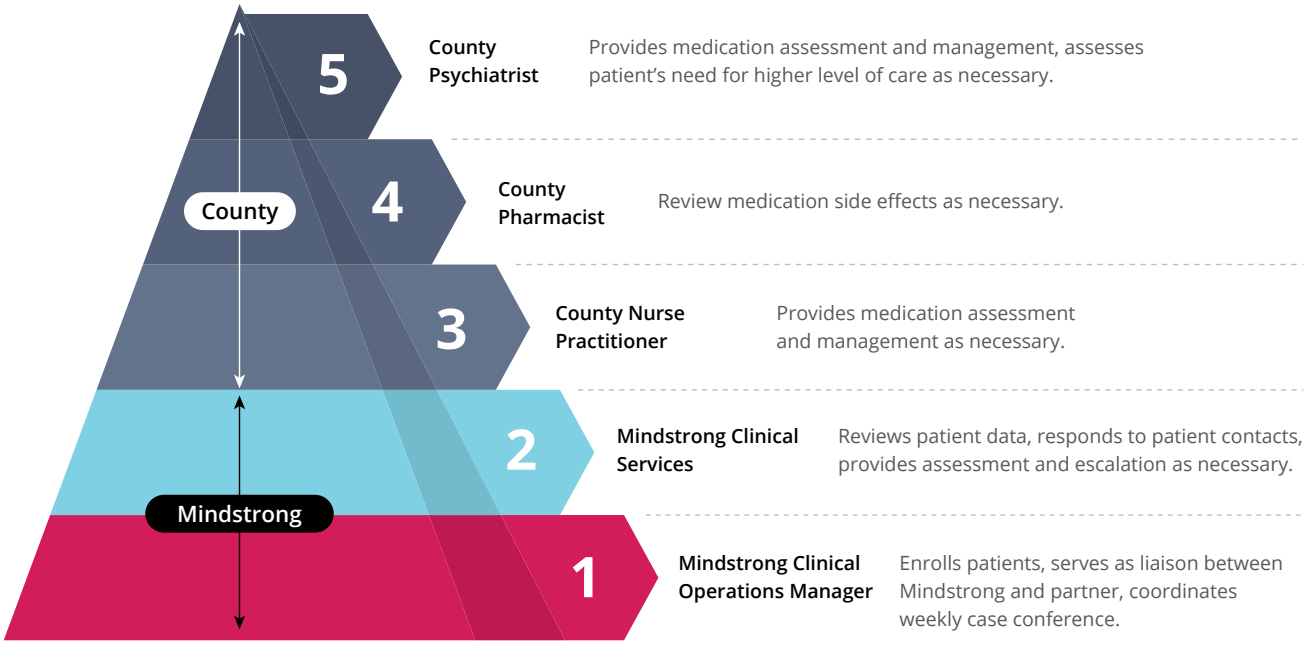
Full Service Model

In this model, Mindstrong *Health Services* provides full psychopharmacology and psychological care management of patients between clinic visits, maintains care plan adherence and clinic follow up appointments, and provides 24 x 7 access. The *Care* by Mindstrong application enables care coordination across the various levels of care from clinical operations manager to psychiatrist. The patient receives the care interactively through the *Health* by Mindstrong application.



Hybrid Model

In this hybrid model, continuity of care between clinic visits is shared by Mindstrong and the County. Mindstrong supports the lower two tiers of disease interception and care management and the County provisions the upper three tiers of care. As in the first model, the *Care* by Mindstrong application is used across all tiers of care for care coordination and care interaction with the patient that is received through the *Health* by Mindstrong application.



03

Real-Time Needs Assessment, Stabilization and Escalation

Mindstrong coordinates closely with County/partner mental health providers to deliver continuity of patient care. Mindstrong *Health Services* escalation pathways ensure each patient receives the appropriate level of care referral without delay that results in improved outcomes at reduced total cost of care. A patient case summary accompanies an escalation referral by a Mindstrong referring clinician to a County/partner clinician.

Escalation Pathway

1. **Mindstrong Clinical Services** reviews patients' Health data and identifies risk signal OR patient initiates contact with **Mindstrong Clinical Services**
2. **Mindstrong Clinical Services** conducts brief assessment and/ or intervention with patients

3a

- **Mindstrong Clinical Services** determines that no further follow up is necessary at this time
- **Mindstrong Clinical Services** generates report for partner

3b

- **Mindstrong Clinical Services** determines that patient needs more intensive follow up
- **Mindstrong Clinical Services** facilitates follow up with partner
- **Partner** follows up as indicated

3c

- **Mindstrong Clinical Services** determines that patient needs crisis intervention
- **Mindstrong Clinical Services** facilitates contact with crisis services (e.g., 911) and communicates this to partner.
- **Partner** follows up as indicated

03

Assessment and Intervention

Mindstrong *Health Services* utilizes an evidence-based assessment and intervention workflow to provide care to patients via *Care* by Mindstrong. The clinical assessment and intervention workflow includes general areas that are applicable to all patients (e.g. safety risk, medication compliance) and specific areas that are relevant to specific patient populations (e.g. substance use disorder, mood/anxiety disorders, psychosis). The assessment and intervention workflow is designed to allow clinicians to flexibly move between areas of assessment and intervention that are most relevant to the individual patient's needs. For a full schematic of the assessment and intervention workflow see the Assessment and Intervention Decision Tree.

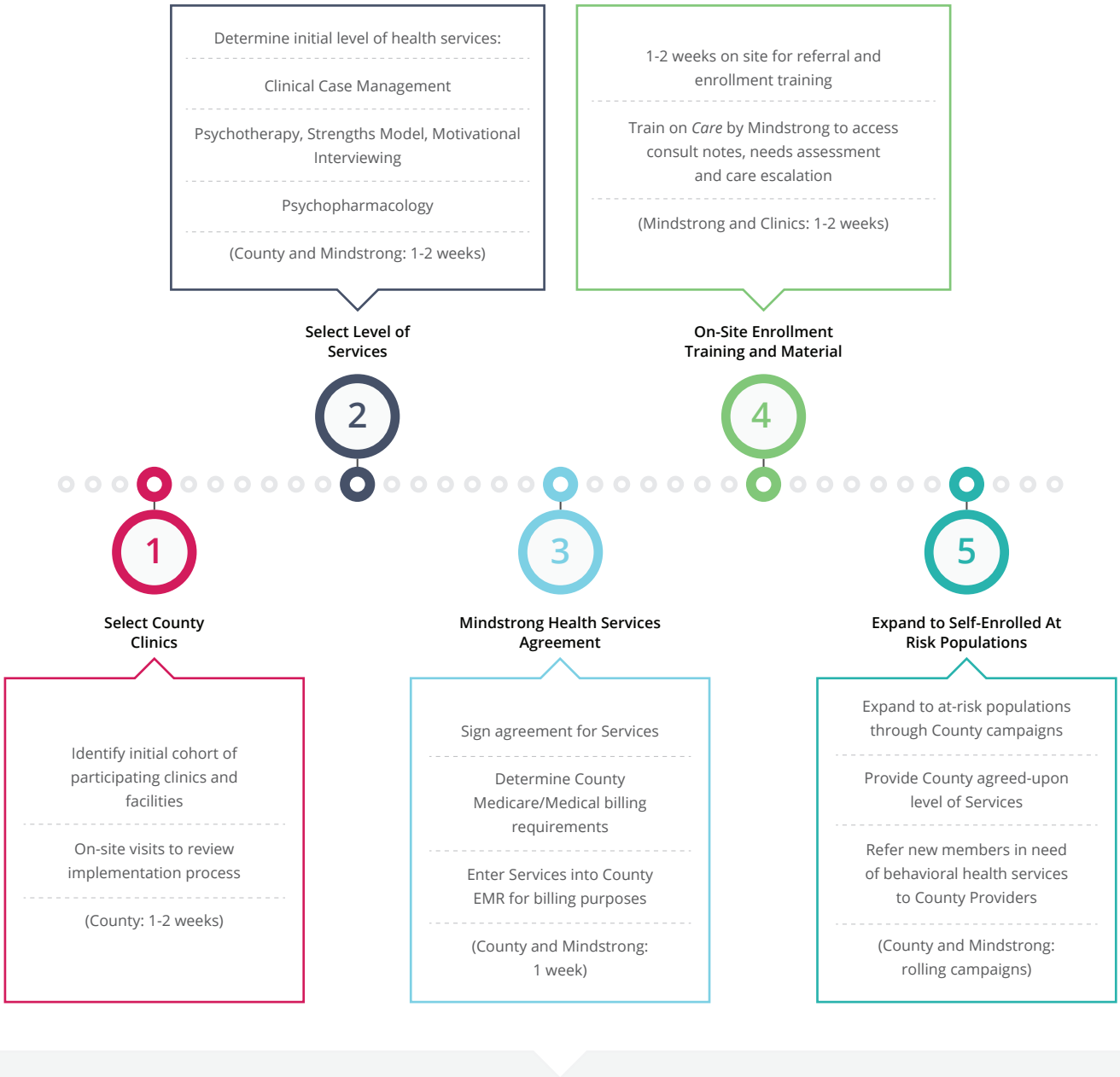
Structurally, the assessment determines the intervention needs. For example, if a patient reports non-adherence to medication, a medication adherence intervention is initiated. If the patient reports adherence to his or her medication regimen, a prompt to positively reinforce this behavior is initiated.

Areas of assessment and intervention are hierarchically structured from most important to least necessary. Clinicians are prompted to opt out of assessment and intervention modules that are deemed to be unnecessary. Whenever appropriate, the clinician is prompted to provide positive reinforcement of treatment-consistent behavior and to provide motivation in response to treatment-inconsistent behavior. Finally, upon completion, a patient contact report is generated from the assessment and/or intervention encounter to fully document the interaction for the patient's full clinical team.

03

Clinical, Compliance and IT Implementation Work Streams

Clinical Work Stream



Mindstrong Health Clinical Implementation Process

Timeline: 4-6 weeks

Compliance and IT Work Streams

Mindstrong & County IT Implementation Process

Timeline: 6-8 weeks

Marketing Collateral Examples

County/RS-E Generated “tent card”

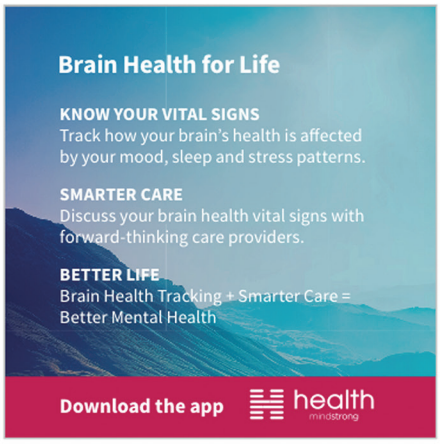
Tech Suite Draft Materials

Tent Cards

Front

Back

Interior



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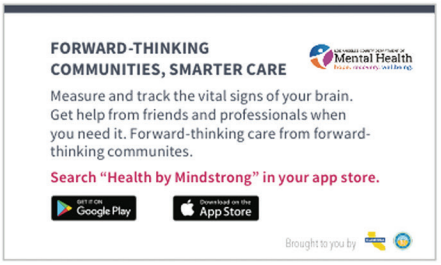

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BRIEF COMMUNICATION OPEN

Digital biomarkers of cognitive function

Paul Dagum[1]

To identify digital biomarkers associated with cognitive function, we analyzed human–computer interaction from 7 days of smartphone use in 27 subjects (ages 18–34) who received a gold standard neuropsychological assessment. For several neuropsychological constructs (working memory, memory, executive function, language, and intelligence), we found a family of digital biomarkers that predicted test scores with high correlations ($p < 10^{-4}$). These preliminary results suggest that passive measures from smartphone use could be a continuous ecological surrogate for laboratory-based neuropsychological assessment.

npj Digital Medicine (2018)1:10 ; doi:10.1038/s41746-018-0018-4

INTRODUCTION

By comparison to the functional metrics available in other disciplines, conventional measures of neuropsychiatric disorders have several challenges. First, they are obtrusive, requiring a subject to break from their normal routine, dedicating time and often travel. Second, they are not ecological and require subjects to perform a task outside of the context of everyday behavior. Third, they are episodic and provide sparse snapshots of a patient only at the time of the assessment. Lastly, they are poorly scalable, taxing limited resources including space and trained staff.

In seeking objective and ecological measures of cognition, we attempted to develop a method to measure memory and executive function not in the laboratory but in the moment, day-to-day. We used human–computer interaction on smartphones to identify digital biomarkers that were correlated with neuropsychological performance.

RESULTS

In 2014, 27 participants (ages 27.1 ± 4.4 years, education 14.1 ± 2.3 years, M:F 8:19) volunteered for neuropsychological assessment and a test of the smartphone app. Smartphone human–computer interaction data from the 7 days following the neuropsychological assessment showed a range of correlations with the cognitive scores. Table 1 shows the correlation between each neurocognitive test and the cross-validated predictions of the supervised kernel PCA constructed from the biomarkers for that test. Figure 1 shows each participant test score and the digital biomarker prediction for (a) digits backward, (b) symbol digit modality, (c) animal fluency, (d) Wechsler Memory Scale-3rd Edition (WMS-III) logical memory (delayed free recall), (e) brief visuospatial memory test (delayed free recall), and (f) Wechsler Adult Intelligence Scale-4th Edition (WAIS-IV) block design. Construct validity of the predictions was determined using pattern matching that computed a correlation of 0.87 with $p < 10^{-59}$ between the covariance matrix of the predictions and the covariance matrix of the tests.

Table 1. Fourteen neurocognitive assessments covering five cognitive domains and dexterity were performed by a neuropsychologist. Shown are the group mean and standard deviation, range of score, and the correlation between each test and the cross-validated prediction constructed from the digital biomarkers for that test

Cognitive predictions	Mean (SD)	Range	*R* (predicted), *p*-value
Working memory			
Digits forward	10.9 (2.7)	7–15	0.71 ± 0.10, 10^{-4}
Digits backward	8.3 (2.7)	4–14	0.75 ± 0.08, 10^{-5}
Executive function			
Trail A	23.0 (7.6)	12–39	0.70 ± 0.10, 10^{-4}
Trail B	53.3 (13.1)	37–88	0.82 ± 0.06, 10^{-6}
Symbol digit modality	55.8 (7.7)	43–67	0.70 ± 0.10, 10^{-4}
Language			
Animal fluency	22.5 (3.8)	15–30	0.67 ± 0.11, 10^{-4}
FAS phonemic fluency	42 (7.1)	27–52	0.63 ± 0.12, 10^{-3}
Dexterity			
Grooved pegboard test (dominant hand)	62.7 (6.7)	51–75	0.73 ± 0.09, 10^{-4}
Memory			
California verbal learning test (delayed free recall)	14.1 (1.9)	9–16	0.62 ± 0.12, 10^{-3}
WMS-III logical memory (delayed free recall)	29.4 (6.2)	18–42	0.81 ± 0.07, 10^{-6}
Brief visuospatial memory test (delayed free recall)	10.2 (1.8)	5–12	0.77 ± 0.08, 10^{-5}
Intelligence scale			
WAIS-IV block design	46.1(12.8)	12–61	0.83 ± 0.06, 10^{-6}
WAIS-IV matrix reasoning	22.1(3.3)	12–26	0.80 ± 0.07, 10^{-6}
WAIS-IV vocabulary	40.6(4.0)	31–50	0.67 ± 0.11, 10^{-4}

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Frequently Asked Questions

About the Mindstrong App

How does the Mindstrong app work?

Mindstrong developed the first continuous measurement system of cognition and mood. Brain functions such as memory and attention are reflected in the way you use your phone. Using swipes, taps and other touchscreen events on your smartphone, Mindstrong measures biomarkers of cognition and emotion that provide information about your brain health.

Mindstrong does not collect the content of your typing, or any personally identifiable, credit card, and other sensitive information such as voice calls, locations, passwords, or browser searches.

What data is collected by the Mindstrong application?

We collect data about the patterns in your smartphone use such as swipes, taps, and other touchscreen activities, and the timing of those patterns.

Mindstrong does not collect any personal information, including what you type or who you talk to, your location, passwords or browser searches. More information can be found in Mindstrong's Privacy Policy, see here: https://mindstronghealth.com/privacy/

What data is collected from other applications?

We don't collect data from other applications.

Will the app affect how my phone works or cause overage of my data plan?

The Mindstrong app does not interfere with your phone's normal functionality. It has no noticeable effect on battery consumption or data usage.

Where can I find a copy of the web address/URL for the web-site's authentication portal?

Mindstrong end users access the applications through a download from the Apple App and Google Play stores.

What is the consent process for the app?

Users will be provided the terms of service and consent information after initial login. Upon acceptance of the login and consent by clicking "I agree", they will be able to access the application content and features.

Data Storage & Security

How safe is my data?

Your data is encrypted at all times using gold standard industry security standards. The data are deleted from the phone when they are uploaded to a secure server.

Are the data from my phone collected and stored securely?

Your data is encrypted at all times using gold standard industry security standards. This applies to data in-transit and at rest.

Could the app be "hacked", and my data be accessed by unauthorized individuals?

The data collected by the app and stored in Mindstrong's HIPAA-compliant servers are secured using gold standard industry standard encryption technologies. The data that the app collects does not include personally identifiable information.

How long is information stored on the vendor servers? (chats, phenotype etc)

Historical information will be retained on Mindstrong's servers for a period of at least 8 years following the end of active enrollment for a user as required by state law.

What happens if someone loses their device and someone else accesses the information on the device?

Mindstrong's application requires PIN or biometric security to be enabled on the phone, and offers additional security at the application level. In addition, Mindstrong requires that the user be authenticated with username and password to the Mindstrong account. A user may change his/her password which will disable access from any device which was previously logged in.

iOS Questions

Is there a way to remove predictive text from the keyboard?

This feature can be turned on or off. You can find it in the "Settings" tab in the Mindstrong App.

Is there a way to disable keyboard click sounds?

This feature can be turned on or off. You can find it in the "Settings" tab in the Mindstrong App.

Can I switch languages with the Mindstrong keyboard?

Currently the Mindstrong keyboard supports American English. Additional languages will be available in August 2018.

Currently the Mindstrong keyboard supports American English. Additional languages will be available in August 2018.

On iPhones, data about brain health are only collected when the keyboard is installed and in use. As a result, you should use the Mindstrong keyboard. On Android phones you can use any keyboard.

05

Troubleshooting and Technical Questions

I tried logging in several times, but after many failed attempts I was locked out of the system.

Please let your clinician or a Mindstrong team member know that you have been locked out. They will work with the Mindstrong technical team to unlock your account.

Do I need to do anything to stay enrolled in the Mindstrong App if I get a new phone?

If you get a new phone, please re-download the Mindstrong Health App from the App store. You can log in with the same information you used on your old phone.

Peer Chat

Are the peer chats encrypted?

All Mindstrong communications are encrypted. Chats between Health Users and between Health and Care users are stored in a database and are encrypted on the device, during transmission, and when stored. All communications are sent through a HIPAA compliant messaging channel.

Are the chats recorded?

Chat message content is stored in a database. Access to the content is only provided to the user with an active account. Any user will only see his/her chat history and the chat history of any peer connection where the peer has given informed consent for the sharing.

05

Authentication, Data Storage & Security

Where can I find a copy of the web address/URL for the web-site's authentication portal?	Mindstrong end users access the applications through a download from the Apple App and Google Play stores.
How is information stored on individual devices and the vendor's servers? How long is information stored for?	Information is stored on vendor devices only while the user is logged into the application in an authenticated state. Historical information will be retained on Mindstrong's servers for a period of at least 8 years following the end of active enrollment for a user as required by state law.
How long is information stored on the vendor servers? (chats, phenotype, etc.)	Historical information will be retained on Mindstrong's servers for a period of at least 8 years following the end of active enrollment for a user as required by state law.
What happens if someone loses their device and someone else accesses the information on the device?	Mindstrong's application requires PIN or biometric security to be enabled on the phone, and offers additional security at the application level. In addition, Mindstrong requires that the user be authenticated with username and password to the Mindstrong account. A user may change his/her password which will disable access from any device which was previously logged in.

06

Glossary for INN Tech Suite Project

Brain health is fundamental to our mental health and overall health. Mindstrong Health developed and validated a new ability to measure brain health on a daily basis, much like we measure weight and blood pressure as basic health metrics.

Patterns generated from touchscreen interactions like swipes and taps on your smartphone reflect the way your brain processes and responds to the world around you. Modern neuroscience shows that millisecond-scale touchscreen interactions reflect the function and integrity of neural circuits that drive cognition and mood, and can give insight into the interplay between brain health, and overall health and disease. These signals allow for the early detection of brain health deterioration, and the opportunity for early interception and early intervention, in order to improve clinical and health outcomes.

Mindstrong's solution includes a patient-facing app (*Health* by Mindstrong), a provider-facing product (*Care* by Mindstrong), and Mindstrong *Health Services*, comprised of licensed providers who augment existing care capabilities and infrastructure to deliver evidence-based assessment and intervention.

See below for useful terminology:

Terminology	Definition
Algorithm	An algorithm is a procedural set of steps that a computer follows to solve a problem. Mindstrong generates digital biomarkers through proprietary algorithms that convert patterns of gestures on a smartphone into meaningful signals related to brain function.
Amazon Web Services (AWS)	AWS is Amazon.com's HIPAA-compliant cloud computing platform. Cloud computing enables scalable data storage and computing. All data that Mindstrong collects is securely stored and processed in AWS.

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Terminology	Definition
Artificial Intelligence	Artificial Intelligence is an umbrella term for the concept of machines being able to carry out tasks in a way that humans would consider "smart", i.e. the capability of a machine being able to imitate intelligent human behavior.[1]
Attention	Attention is the cognitive process that your brain uses to select and prioritize sensory information. This cognitive process filters information so you don't get overwhelmed.
Augmented Intelligence	An alternative to "artificial intelligence" that focuses on AI's assistive role, emphasizing the fact that it is designed to enhance human intelligence rather than replace it.[2]
Cognitive Control	Cognitive control is the ability to control your thoughts and actions. It allows you to override an impulse and instead make a decision based on your goals, rather than habit. Cognitive control helps you concentrate, and to stay on a diet, as examples. It can be impacted by mood.
De-identified data	Data that is anonymous, and disconnected from a person's personal information. It can't be used to trace back to an individual.

1 https://www.forbes.com/sites/bernardmarr/2018/02/14/the-key-definitions-of-artificial-intelligence-ai-that-explain-its-importance/#a0e937f4f5d8

2 https://whatis.techtarget.com/definition/augmented-intelligence

06

Terminology	Definition
Digital Biomarkers	Digital biomarkers are user-generated physiological and behavioral measures collected through connected digital tools. Mindstrong discovered and patented digital brain biomarkers in psychiatric and neurologic disorders[3]. These biomarkers are generated via machine learning techniques from patterns in smartphone use such as swipes, taps, and other touchscreen activities, and are scientifically validated to provide measurements of cognition and mood. For an introductory overview of Mindstrong's digital biomarkers see this overview from Rock Health. Mindstrong's digital biomarkers are collected passively, continuously, objectively and quantitatively through smartphone use. The analysis of these biomarkers enable the monitoring of brain health, and makes timely medical interventions possible. Mindstrong's digital biomarkers do not rely on the content of typing, any personally identifiable, credit card, or other sensitive information such as voice calls, locations, passwords, or browser searches. Instead, they are based on patterns like "delete-delete" or "scroll-scroll-click".
Digital Biomarkers	Digital phenotypes are patterns of digital biomarkers.
Encryption	Security measures that protect the privacy of personal data, and other data. All data collected by Mindstrong is encrypted at all times.

[3] Dagum, npj Digital Medicine; 1:10 (2018)

Terminology	Definition
Executive Functions	Executive functions refer to a set of cognitive processes responsible for the cognitive control of behavior. This includes functions such as attentional control, cognitive inhibition, inhibitory control, working memory, and cognitive flexibility. Executive functions gradually develop and change as we age.
HIPAA	Health Insurance Portability and Accountability Act of 1996 is United States legislation that provides data privacy and security provisions for safeguarding medical information. As a healthcare company, Mindstrong Health is HIPAA compliant and abides by all state and federal regulations in how data is managed and accessed.
HIPAA covered entity	Your physician and health insurance plan are HIPAA covered entities, as well as their partners who provide care or services on their behalf. They have access to medical and other personal information, and are required to protect it under HIPAA Privacy and Security rules.[4] Mindstrong is a HIPAA covered entity and operates under gold standard encryption and security practices.
Human Computer Interactions (HCI)	The design and use of computer technology, focused on the interfaces between people and computers. Mindstrong has demonstrated that swipes, taps and other activities on the smartphone touchscreen can be used to create digital biomarkers that measure brain health and cognitive processing. Mindstrong is also investigating other modalities of human computer interactions, including augmented reality.

[4] https://privacyruleandresearch.nih.gov/pr_06.asp

Terminology	Definition
ISO 27001	An internationally recognized cyber security best practice specification for information security management system. This framework of policies and procedures includes all legal, physical and technical controls validates that patient and user data is secure. Mindstrong complies with ISO 27001 regulations.
Machine Learning	Machine learning is a subset of artificial intelligence (AI) in the field of computer science that uses statistical techniques to give computers the ability to "learn" (i.e., progressively improve performance on a specific task) with data, without being explicitly programmed.
Memory	Psychologists consider many different types of memory, such as short-term memory, long-term memory and working memory. Short-term memory is often defined as information that is currently held 'in mind' and has limited capacity, whereas long-term memory refers to information that is stored in the brain. See Working Memory below.
Mindstrong Solution (*Health*, *Care*, and *Health Services*)	Mindstrong's solution includes a patient-facing app (*Health* by Mindstrong), a provider-facing product (*Care* by Mindstrong), and Mindstrong *Health Services* that leverage its telehealth enabled measurement science and engagement platform. The solution augments existing care capabilities and infrastructure.

Terminology	Definition
Negative mood	Negative mood is similar to negative valence, but refers specifically to a negative emotional state, such as anger, frustration, sadness, and fear. Long term disturbances of mood can sometimes indicate a mood disorder. Someone with clinical depression may experience a state of abnormally low mood and aversion to activity for a prolonged period of time.
Negative valence	Negative valence is how you respond to negative events or situations. It sounds like negative mood, but it's a little different. The word valence means the direction of the response: anger and fear are emotions with a negative valence. Behaviors can also have a negative valence such as avoiding a situation due to fear. If you've experienced loss or grief, you might avoid places, people or activities that bring back difficult memories. Negative valence can affect your cognitive control, verbal fluency and working memory. Think about how hard it is to concentrate when you're feeling anxious or sad.
Personally Identifiable Information (PII)	PII is any data that can be used to identify a specific individual.
Positive mood	Positive mood is similar to positive valence, but refers specifically to a positive emotional state, such as contentment, elation or excitement.

Terminology	Definition
Positive valence	Positive valence is how you respond to positive situations or events. Positive valence is similar to mood, but not quite the same. The word valence describes the direction of the emotion or behavior: joy and pride are emotions that have a positive valence. These kinds of emotions are brought about by positive events, objects, or situations. Behaviors can have a valence too. Think about a time you threw yourself into a new project with enthusiasm. A person with high positive valence takes on new challenges, is eager to engage with the world and takes active care of themselves. When you have low positive valence you stop enjoying doing the things that usually make you happy, like being with friends and family or taking care of your health.
Processing speed	Processing speed is the time it takes your brain to understand, process and react to new information. Your processing speed varies from day to day. Think about a time when you felt sluggish, and it took you longer to do a task or an assignment than usual. Too much alcohol or not enough sleep slows your processing speed. It also varies over the course of our lives. Processing speed increases from childhood to adolescence, remains relatively stable until adulthood and then declines slowly from middle age. This rate of decline varies from person to person, and can be affected by physical health or chronic conditions.

06

Terminology	Definition
Protected Health Information (PHI)	PHI refers to all data that a healthcare professional collects to identify an individual and determine appropriate care. This can include demographic information, electronic healthcare records, medical tests, insurance information or information about health conditions.[5] PHI is protected under HIPAA laws. Mindstrong is HIPAA compliant and operates under gold standard encryption and security practices. We have strict policies on privacy, informed consent, transparency and accountability.
Verbal fluency	Verbal fluency involves accessing your mental vocabulary and selecting the appropriate words when speaking or writing. Think about a time when you failed to recall a word "on the tip of your tongue," which might indicate lowered verbal fluency. Stress and anxiety can impact verbal fluency. Age and experience are also important: children perform less well on tests of verbal fluency compared to adults.
Working memory	Working memory is how you temporarily store and actively manipulate information. You use working memory to think through problems, make decisions or do mental arithmetic, and to carry on a conversation since you need to remember the last thing a person said to appropriately respond. Your mood can impact your working memory. Think about a time you were deeply preoccupied. This can make it hard to concentrate, problem solve or engage in conversation.

[5] https://searchhealthit.techtarget.com/definition/personal-health-information

Founder Biographies

Paul Dagum, MD PhD

Founder & Chief Executive Officer

Paul Dagum, MD PhD is a computer scientist, physician and entrepreneur with a track record of creating and launching products in three successful venture-backed companies. Dr. Dagum's early pioneering research in AI is in use in many modern-day applications. He further developed and patented massively parallel algorithms for big data science in use by the world's largest data companies, and created and patented the first ever digital measures of central nervous system function based on human-computer interaction patterns. Dr. Dagum led NSF and NIH grants while at Stanford University, published over 75 peer-review articles and book chapters in computer science and medicine, and was awarded over 25 patents. Dr. Dagum received an MSc in theoretical physics, PhD in theoretical computer science both from the University of Toronto and an MD from Stanford University.

Tom Insel, MD

Co-Founder & President

Thomas R. Insel, MD, a psychiatrist and neuroscientist, is a co-founder and President of Mindstrong Health. From 2002-2015, Dr. Insel served as Director of the National Institute of Mental Health (NIMH), the component of the National Institutes of Health (NIH) committed to research on mental disorders. Prior to serving as NIMH Director, Dr. Insel was Professor of Psychiatry at Emory University where he was founding director of the Center for Behavioral Neuroscience in Atlanta. Most recently (2015 – 2017), he led the Mental Health Team at Verily (formerly Google Life Sciences) in South San Francisco, CA. Dr. Insel is a member of the National Academy of Medicine and has received numerous national and international awards including honorary degrees in the U.S. and Europe.

Richard Klausner, MD

Co-Founder & Executive Chairman

Richard D. Klausner, MD is founder and Director of Juno Therapeutics and founder and Director of GRAIL. He is the former Senior Vice President, Chief Medical Officer and Chief Opportunity Officer of Illumina. He currently chairs the Grand Challenges in Cancer program of Cancer Research UK. Previously, he has served as the Executive Director for Global Health of the Bill and Melinda Gates Foundation. Dr. Klausner was appointed by Presidents Clinton and Bush as the eleventh Director of the U.S. National Cancer Institute between 1995 and 2001. Dr. Klausner served as chief of the Cell Biology and Metabolism Branch of the National Institute of Child Health and Human Development, as well as a past president of the American Society of Clinical Investigation. He is a member of the National Academy of Sciences, the Institute of Medicine and the American Academy of Arts and Sciences.

Pravene Nath, MD

Chief Product Officer

Pravene A. Nath, MD previously served as Chief Information Officer and Chief Digital Officer of Stanford Health Care, where he led technology strategy and operations and launched the industry-leading Stanford MyHealth digital platform for patient and consumer engagement. Before Stanford, Dr. Nath was Chief Medical Information Officer at NYU Langone Medical Center in New York City. Dr. Nath has served on the boards of for-profit and not-for-profit health systems and has practiced emergency medicine as a member of the Stanford University and New York University medical school teaching faculty. He received his BSE in biomedical engineering from Duke University, his MD and MSE in biomedical engineering from The University of Michigan, and his residency training from NYU Langone and Bellevue Hospitals in New York City.

Greg Ryslik, PhD, FCAS

Vice President, Data Science

Greg Ryslik, PhD, FCAS, MAAA is a statistician, researcher and AI expert who has worked across a variety of industries including biotech, actuarial science and automotive. Greg led the Data Science team for Service at Tesla Motors and the Data Science & Analytics team at Faraday Future. Previously, Greg performed non-clinical machine learning and bioinformatics research at Genentech as well as actuarial analysis at PricewaterhouseCoopers. His research into cancer genomics, bioinformatics and structural biology has been published in journals ranging from Nature to BMC Bioinformatics and his textbook on actuarial science has been used to teach courses at several universities. He is a member of the American Academy of Actuaries, a Fellow of the Casualty Actuarial Society and has degrees from Yale, Columbia and Rutgers. He also holds an adjunct assistant professorship with the statistics department at Pennsylvania State University.

Leo Dagum, PhD

Vice President, Engineering

Prior to Mindstrong, Leo held executive positions in technology at a variety of privately held companies working on, amongst other things, IoT management and optimization solutions, vertical search, online marketing, and demand and supply chain optimization. Earlier in his career he worked on Linux kernel development, performance engineering and parallelization/ performance tuning of commercial scientific applications. He is one of the architects of the OpenMP language standard and original authors of the NAS Parallel Benchmarks. Leo has over 30 peer-reviewed publications in computer science, mathematics and rocket science and is inventor on 5 patents. He received his BSc in Engineering Physics from Queen's University, and MSc and PhD in Aeronautics/Astronautics from Stanford University.

Elaine Cheung, MS

Vice President, Marketing

Elaine was previously Head of Business Development at GRAIL, Inc. where she was a founding employee and implemented the strategy/transactions to execute the business plan, and strategic collaborations with pharma companies involved in its Series B $900M+ financing. Formerly, she was Director of Strategic Partnerships at Illumina. There, she led BD for the Oncology Business Unit, and also executed strategy and transactions/M&A in the fields of Non-Invasive Prenatal Testing and Transplant Medicine. Elaine spent 6 years at Genomic Health, where she focused on product pipeline and global commercial expansion. Elaine has a BS in Biological Sciences and an MS in Management Science & Engineering, both from Stanford University, where she was also a Mayfield Fund Fellow.

Robert Dougherty, PhD

Head, Translational Science

Bob is a scientist and engineer with expertise in measuring human behavior and the neural basis of cognitive function. Prior to joining Mindstrong, Bob was the Research Director of the Stanford Center for Neurobiological Imaging and has published over 50 peer-reviewed articles in the fields of psychology, neuroscience, and magnetic resonance technology. Bob completed his PhD in Experimental Psychology at the University of California at Santa Cruz, and postdoctoral fellowships at the University of British Columbia and Stanford.

09 Boards

Board of Directors

Rick Klausner, MD | Co-Founder and Executive Chairman, Mindstrong Health

Paul Dagum, MD PHD | Founder and Chief Executive Officer, Mindstrong Health

Virginia McFerran | Partner, Optum Ventures

Jim Tanabaum, MD | CEO and Founder, Foresite Capital

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Nicole Martinez, PhD, JD | Postdoctoral Fellow, Stanford Bioethics

Sharon Terry, MA | President & CEO, Genetic Alliance

Katherine Switz, MBA | Founder & Executive Director, The Stability Network

Monica Luke | Executive Director, Living Assistance Fund

RSE and Team

Runyon Saltzman, Inc. (RSE) is a leading communications firm known for its innovation and exceptional strength in the use of online outreach and traditional offline techniques to create positive social impact. Comprehensive array of services includes strategic planning, advertising, branding, digital marketing, public relations, community engagement and evidence-based social marketing — work that has taken us to all California counties and to other states.

After a public review process, RSE was selected based on their outstanding service, knowledge of mental health outreach, creativity, passion, enthusiasm and ability to quickly support counties launching the Innovation and Technology Suite.

RSE's 52 staffers are well versed in and deeply committed to CalMHSA's goals, having worked on many ground-breaking mental health efforts over the last six plus years. For CalMHSA's mental health stigma and discrimination reduction initiative, having created and launched Each Mind Matters: California's Mental Health Movement (SanaMente, Movimiento de Salud Mental de California.) RSE introduced the ReachOut Here/Busca Apoyo Forums in California that uniquely suit them to handle the branding and roll out of the Innovation and Technology Suite. These peer-guided online forums served California's 14-24-year-olds and provided an online community of support. ReachOut Here was visited by 423,266 young people who left more than 55,000 posts.

Other relevant work includes social impact campaigns to reduce childhood obesity, reduce teen pregnancy rates, reduce infant mortality rates in the African American community (Sacramento County), boost college attendance among key ethnic populations and reduce rates of suicide among gun owners in isolated rural communities (Oregon). RSE also developed and introduced CityLinkLA, an initiative sponsored by the City of Los Angeles to provide gig-speed broadband access to all city residents.

Equally impressive were the team members that RSE included to support counties in the development and introduction of the Innovation and Technology Suite, including:

Solsken Public Relations & Marketing has worked with RSE team on the Each Mind Matters campaign to develop and implement materials to reach Hmong, Cambodian, Laotian, Korean, Chinese, Vietnamese and Mien audiences. Capitalizing on their success, Solsken PR specialists will continue to reach critically important API audiences and contribute to developing strategy for this target group.

California Pan-Ethnic Health Network, which was established in 1992 as a forum for multicultural health advocacy in the wake of riots in South Central Los Angeles to advance health care needs of communities of color. It is the only statewide multicultural health advocacy organization dedicated to improving the health of communities of color through advocacy, research, communications, and community outreach and engagement. In 2010, CPEHN was awarded the contract from the Department of Mental Health Office of Multicultural Services to facilitate the process to create the strategic plan for the California Reducing Disparities Project (CRDP). Building on this critical CRDP work, they developed the Behavioral Health Equity

Collaborative which includes representatives from education, foster youth, immigrant and refugee, and organizations serving people of color in order to reach unserved and underserved populations. CPEHN has completed numerous mental health related projects for several southern California counties include Los Angeles and Kern and has access to networks that will prove invaluable to the successful roll out of the INN Tech Suite.

RTBiQ specializes in data-driven digital advertising utilizing vast amounts of consumer data to tailor messaging to the right audience at the right time. RTBIQ's partnerships with cutting edge technology partners result in 90%+ match rates of digital ads via IP address to household addresses allowing seamless digital advertising delivery against specific data targets. In addition, RTBIQ can leverage location data from top GPS data providers to measure where mobile users consistently spend their time, and can match this to US census block data to further determine ethnicity, income levels, and other pertinent data points to precisely target populations that will likely benefit from the Innovation and Technology Suite.

iHeart Amplify Division brings radio broadcast partnerships, Clear Channel Outdoor and partner agreements with Outfront, Lamar, Regency Outdoor companies. This network helps penetrate key neighborhoods to deliver Innovation and Technology Suite messaging. They can also deploy a team of grass roots activation specialists and two customizable Mobile Marketing Pavilions to travel the state to deliver Innovation and Technology Suite programs to the people and counties of California.

Evaluation of RSE communications programs will be conducted by **National Opinion Research Center (NORC)** at the University of Chicago, under the leadership of long-time RSE partner, Larry Bye. He and his team have provided invaluable formative and evaluation studies that guided many key decisions about CalMHSA's Each Mind Matters campaign and other RSE social impact campaigns.

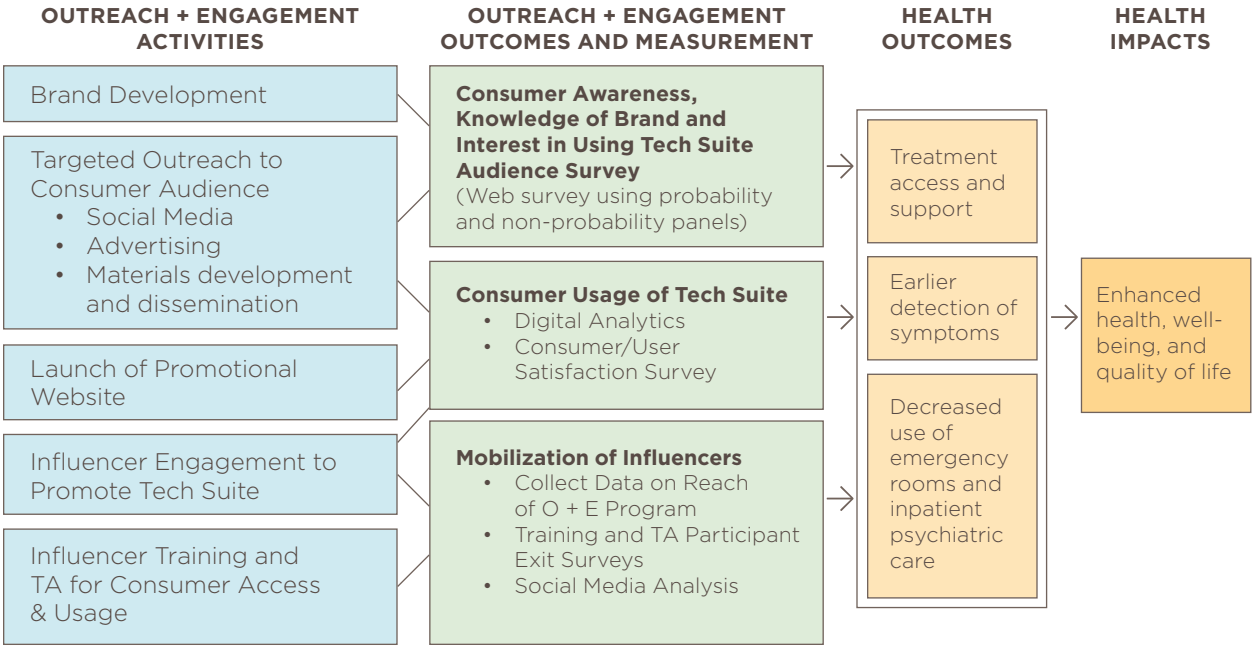
RSE Approach

The Innovation and Technology Suite is intended to be accessed via a wide range of mediums and devices by even wider and more diverse audiences. County behavioral health departments have intimate and insightful knowledge about the populations they serve and the delivery of mental health. However, these departments are not focused on cutting-edge technology or communications innovation. The RSE team is prepared to help fill this gap. They bring a wealth of data regarding technology adoption and usage in specific audiences, within a rapidly evolving landscape. In addition to resources such as Pew Research Center, American Community Survey and CHIS, RSE has access to multiple data source and tools, including Scarborough, Nielsen, Strata SBMS and View, Media Audit, SQAD, Keyword Planner, Radiant 6, Eleven and Google Analytics that will inform and influence the campaign to promote the Innovation and Technology Suite.

RSE has assembled a team drawn from the most successful and forward-thinking organizations working on mental health and disparity reduction to connect and engage communities with the Innovation and Technology Suite. Their campaign aims include: increasing access to care needed and desired; reducing time between recognition and acknowledgement that a symptom needs to be addressed and the time to receiving appropriate care; increase purpose, belonging and social connectedness for users; and reducing the stigma associated with mental illness by promoting wellness. Ultimately, the campaign will break down barriers and provide a path for people to receive the mental health care and support they deserve when they need it and where they need it. This pathway is best illustrated by the Logic Model developed by RSE for the campaign (See exhibit below).

Logic Model

CalMHSA Innovation Technology Outreach + Engagement



One of the reasons RSE was selected through the competitive public bid process was their demonstrated ability to mobilize team resources quickly to actualize the Logic Model and meet aggressive county timelines. Their immediate work has fallen into three objectives, to:

- Create a universal and person-centered brand for the campaign that will appeal to multiple audiences;
- Prepare and support the soft introduction of the Innovation and Technology Suite for the first five counties, and;
- Plan for the official hard launch of the brand and campaign which will include capacity to support added counties once approved by the MHSOAC.

In order to meet these objectives, the RSE team has deployed to complete a number of activities and deliverables in direct support of the counties and Innovation and Technology vendors. Highlights include:

- Identified Innovation and Technology Suite benefits, key supports and core benefits to create a Message Map to guide consistent communication with counties, vendors, peer navigators and others. The final Message Map will be vetted with peer groups and cultural ambassadors to ensure relevancy.
- Applied findings of the Message Map process to begin the exploration of a brand platform for the Innovation and Technology Suite that will guide the development of the name, logo, color pallet, style guide, language and tonality.
- Begun the development of a campaign website including development of wireframes and identification of key website functionalities. Suite vendors have been involved in this process.
- Informed the linguistic and cultural adaptation of the Innovation and Technology Suite for California's diverse audiences.
- Engaged directly with the initial counties to provide customized and direct support for their individual soft roll out needs.
    - Created initial collateral materials for the soft launch including tent cards explaining the component apps of the Innovations and Technology Suite and flyers customized for each county.
    - Development of a paid social media campaign to support LA County
    - TA available for each county as requested/needed for planning and logistics of soft launch events. Customized collateral materials to each county as requested/needed.
    - Development of an API specific outreach plan for Orange County.
    - Development of an API specific outreach plan for LA County.

See below for an approximate timing of activities.

Campaign Timeline

ACTIVITY	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Onboarding												
Strategic Council												
Brand Development												
Stakeholder Meetings												
Outreach Materials/Website												
Paid Advertising												
Technical Assistance												
Mini-Grant Program												
Systems Outreach												
Media Relations												

Tech Suite Draft Materials

Tent Cards

Front

mindstrong

Your Mental Health Matters

Back

FORWARD-THINKING COMMUNITIES, SMARTER CARE

Los Angeles County Department of Mental Health
hope. recovery. wellbeing.

Measure and track the vital signs of your brain. Get help from friends and professionals when you need it. Forward-thinking care from forward-thinking communites.

Search "Health by Mindstrong" in your app store.

GET IT ON Google Play Download on the App Store

Funded through the voter-approved Mental Health Services Act (Prop 63).

Interior

Brain Health for Life

KNOW YOUR VITAL SIGNS
Track how your brain's health is affected by your mood, sleep and stress patterns.

SMARTER CARE
Discuss your brain health vital signs with forward-thinking care providers.

BETTER LIFE
Brain Health Tracking + Smarter Care = Better Mental Health

Download the app health mindstrong

Alternate Attribution Statement

FORWARD-THINKING COMMUNITIES, SMARTER CARE

Los Angeles County Department of Mental Health
hope. recovery. wellbeing.

Measure and track the vital signs of your brain. Get help from friends and professionals when you need it. Forward-thinking care from forward-thinking communites.

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GET IT ON Google Play Download on the App Store

Brought to you by CalMHSA

Tech Suite Draft Materials

Tent Cards

Front

7 CUPS

Want to chat?

Back

COMMUNITIES THAT CARE

Los Angeles County Department of Mental Health
hope. recovery. wellbeing.

Increasing access to emotional support in our community is important. Thanks to our partnership with 7 Cups, this innovative support system is now available to anyone who needs support.

Search "7 Cups" in your app store.

GET IT ON Google Play Download on the App Store

Funded through the voter-approved Mental Health Services Act (Prop 63).

Interior

NEED TO TALK?
Dealing with tough times like a breakup, family or job stress? We'll connect you with caring people.

FREE
Our trained listeners are here to support at no cost to you.

CONFIDENTIAL
Privacy is our first policy. Seek support easily and anonymously.

CONVENIENT
Connect with caring people in a way that accommodates your comfort level.

Download the **app** or visit **7cups.com**

Alternate Attribution Statement

COMMUNITIES THAT CARE

Los Angeles County Department of Mental Health
hope. recovery. wellbeing.

Increasing access to emotional support in our community is important. Thanks to our partnership with 7 Cups, this innovative support system is now available to anyone who needs support.

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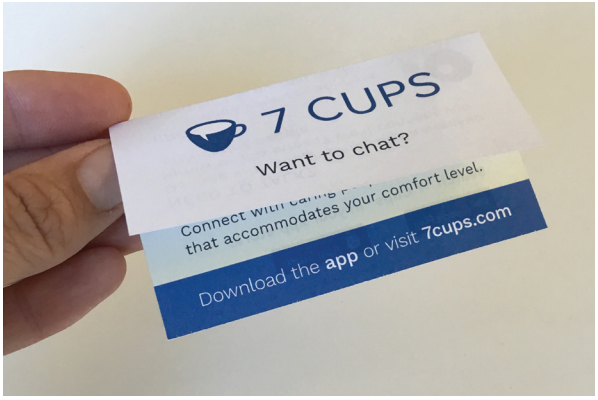
GET IT ON Google Play Download on the App Store

Brought to you by CalMHSA



YOUR MENTAL HEALTH ON YOUR TERMS

LOS ANGELES COUNTY DEPARTMENT OF Mental Health
hope. recovery. wellbeing.

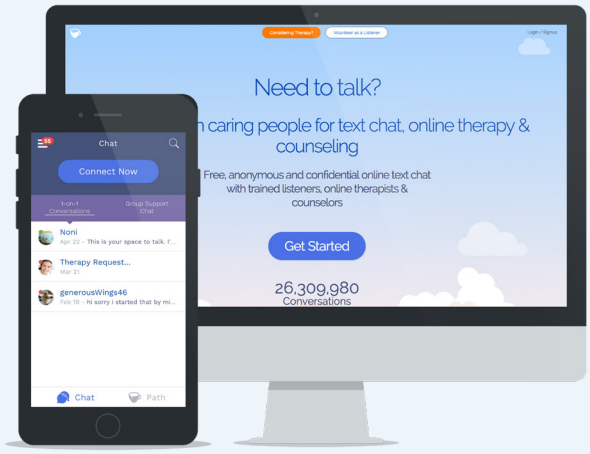
Through a statewide innovation effort, we're using technology to bring forward-thinking mental health services to our community. Get customized support, when you need it, on your terms. With a variety of **free, convenient and confidential** mobile services available, you now have access to a 24/7 support system.

NOW AVAILABLE

7 CUPS

7 CUPS ALLOWS YOU CONFIDENTIALLY CONNECT WITH CARING PEOPLE AND RECEIVE SUPPORT WHENEVER YOU NEED IT.

- Connect with trained listeners
- Free, anonymous and confidential help
- Experience community or one-on-one chat services



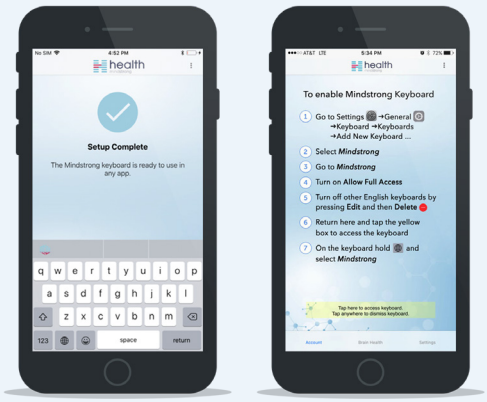
Download the **app** or visit **7cups.com**

COMING SOON

mindstrong

MINDSTRONG HEALTH USES ADVANCED TECHNOLOGY TO MEASURE YOUR BRAIN'S HEALTH.

- Get information based on your daily smartphone use
- Track your brain's response to mood, sleep, and stress patterns
- Use this information for better brain health



Download the app health mindstrong

Funded through the voter-approved Mental Health Services Act (Prop 63).

How Intrepid Ascent Offers Value

Intrepid Ascent guides organizations through the data management demands of value-based care, with extensive experience orchestrating large-scale collaborative initiatives. We equip clients with the knowledge to make informed decisions, the tools to execute their plans effectively, and the momentum to sustain change. We offer a broad spectrum of professional services including health IT assessments, strategic planning, stakeholder engagement, governance and policy development, vendor selection, workflow redesign, implementation, and outcomes monitoring.

Our team combines expertise in the following areas to lead our clients to success:

- **Health Information Exchange (HIE) –** Intrepid Ascent's team has led HIE planning and implementation projects in California and nationwide, guiding organizations to efficiently and appropriately share data to meet clinical, program, and business needs. We consider priority use cases, technical and operational infrastructure, and data protections to help organizations **establish successful connectivity** with key partners using national interoperability standards. Our team is skilled in convening stakeholders across sectors for HIE consensus-building in support of community-wide care integration projects.

- **Population Health Management –** With the health care system transitioning to a focus on health outcomes, thriving in this landscape requires proactive care of specific populations and the data infrastructure to support it. Through comprehensive services from needs assessments to systems selection to implementation and change management, **we help clients optimize analytics and care management tools** within and across organizations to deliver high-value care.

- **Patient-Centered Systems –** Our team **enables clients to implement strategies that put individuals and their families at the center of coordinated care systems,** with transparent access to their health information, clear communication with their providers, and integration of consumer-facing apps with health care IT infrastructure.

- **Data Quality –** Trustworthy data is critical for clinical, program, and financial performance. Intrepid Ascent's data quality services **leverage groundbreaking tools and techniques that assist in identifying and addressing data quality issues.** Our team combines expertise in workflow analysis, quality assessments, and data extraction to address immediate gaps and ongoing processes.

- **Clinical Quality Reporting & Improvement –** Smart approaches to data management form a foundation for clinical quality improvement. **We assist organizations with demonstrating data-driven improvement to meet the needs of clinical programs and changing funding structures.** Our team works closely with health care organizations on selecting measures for reporting and meaningful quality improvement over time.

- **Privacy & Security –** Intrepid Ascent provides guidance on the development and implementation of robust frameworks for health information privacy and security. Our approach goes **beyond focusing on technical infrastructure, addressing the relationships between organizational culture, information governance, and policy** to build a culture of compliance. We conduct assessments on privacy and security risks and organizational behavior; identify the privacy impacts of planned systems and services; and support the development of appropriate policies, governance, and technical infrastructure.

Our 2018 Clients Include:

California Department of Health Care Services • California Department of Public Health • California HealthCare Foundation • California Mental Health Services Authority • California Health Care Safety Net Institute • Marin County • Merced County • Placer County • San Joaquin County • Sacramento County • Sacramento Covered • San Joaquin Community Health Information Exchange • Santa Cruz Community Health Centers • Redwood Community Health Coalition • North Coast Health Improvement and Information Network • COPE Health Solutions • Object Health • Simi Group • Transform Health

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Clinical Integration and Data Sharing Continuum – A Working Draft

Overview: This Clinical Integration and Data Sharing Continuum describes the service models to support various levels of application integration within a county. It is intended to show a progression from limited integration (e.g. promotion of the application to clients in the county) to full integration with county behavioral health services to support care coordination, transitions of care, and clinical services within the application. For each level of integration, the continuum also identifies the types of data to be shared and the essential privacy and security requirements. The particular service model and progression within the continuum will be determined by each County depending on their stated project goals, objectives, and capabilities.

Informed Consent: The Technology Suite Integration Project Guiding Principles describe the overarching framework that governs the project to ensure the goals, objectives, and outcomes are met. A critical principle is *individual choice*, providing clients the opportunity and the means to make informed decisions about their participation in the program and how their data is collected, used, and disclosed to other Project participants. It is the intent of all Project Participants to protect the confidentiality and security of client information through the implementation of policies and procedures, including specifying when permission from the client is required to share Personally Identifiable (PII) and Protected Health Information (PHI). The approach to informed consent is intended to maintain the confidentiality of client information, while conforming to applicable State and Federal laws and integrating with county policies and workflows.

For the initial service model – limited integration through promotion of application availability – the informed consent process includes notification to the client upon initial use of the application on the vendor's terms of service and how data may be shared with the county. client acceptance of the terms of service and use of the application serves as consent to sharing aggregate data only, with no PII or PHI being shared outside of the application. counties have the option of providing additional education on the privacy practices within their existing workflows. As integration with county services progresses along the continuum, explicit consent from the client is required, in addition to the terms of service and user acceptance. Detailed functional requirements and workflows for consent management will be determined in advance of a County adopting a more integrated service model to ensure policies and procedures are in place for all Project Participants.

Level of App Integration: Activity/Role:	Promotion of App Availability	Referrals of Individuals / Cohorts for App-Delivered Services	Referrals of Individuals / Cohorts for Real-Time Clinical Services	Coordination of Services / Transitions of Care Between County and App	Coordination of Services, Plus County Clinical Services Provided via App
Service Model	Promotion of app with County-specific in-app branding	Promotion + referral of specific individuals / cohorts for app-delivered services (e.g., peer support/chat, AI, communities, digital phenotyping, etc.)	Same + referral of specific individuals / cohorts for clinical services	Same + referrals + coordinated transitions of care between app and County	Same + referrals + coordinated transitions + some County services provided in-app
Current App Vendors	7 Cups (Mindstrong eventually)	7 Cups Mindstrong	7 Cups Mindstrong	Mindstrong	Mindstrong
Data Sharing Model	Aggregate reporting only, no Personally Identifiable Information/ Protected Health Information	Aggregate reporting; PII in referrals	Aggregate reporting; PII in referrals	Aggregate reporting; PII in referrals; bi-directional sharing of PHI	Aggregate reporting; PII in referrals; bi-directional sharing of PHI
Privacy & Security Requirements	• Terms of Service with language on data sharing with Counties • Informed consent: User acceptance • Business Associate Agreement between CalMHSA/County and Vendors	• Terms of Service with language on data sharing with Counties • Informed consent: User acceptance + Authorization + County policies and Notice of Privacy Practices • Business Associate Agreement between CalMHSA/County and Vendors • Security controls (e.g. encryption, audit logs, secure file sharing, access controls, etc.)	• Terms of Service with language on data sharing with Counties • Informed consent: User acceptance + Authorization + County policies and NPP • BAA between CalMHSA/County and Vendors • Security controls (e.g. encryption, audit logs, secure file sharing, access controls, etc.)	• Terms of Service with language on data sharing with Counties • Informed consent: User acceptance + Authorization + County policies and NPP • Data Sharing Agreement between CalMHSA, Counties, and Vendors • Security controls (e.g. encryption, audit logs, secure file sharing, access controls, etc.)	• Terms of Service with language on data sharing with Counties • Informed consent: User acceptance + authorization + County policies and NPP • DSA between CalMHSA, Counties, and Vendors • Security controls (e.g. encryption, audit logs, secure file sharing, access controls, etc.)

Privacy and Security
Guiding Principles

Purpose

The Technology Suite Innovation Project is a multi-county, multi-vendor collaborative to increase access to mental health care and support and promote early detection of mental health symptoms that predict the onset of mental illness. The project includes offering a suite of virtual mental health care applications (Technology Suite) to counties, conducting outreach and marketing to increase access to care through Client use of the applications, and evaluating outcomes. The purpose of these Guiding Principles is to describe the framework for accomplishing project goals and objectives, as it relates to privacy and security of user data. These Guiding Principles are based on industry best practices, such as the Fair Information Practices, as well as approaches identified by CalMHSA and the Mental Health Services Oversight and Accountability Commission (MHSOAC).

The Guiding Principles are applicable across all Project Participants, which include:

- **Application Vendors** – Organizations contracted with CalMHSA to provide the suite of technology components to Counties
- **Counties** – Approved by the MHSOAC to implement Innovation projects
- **CalMHSA** – Joint Powers Authority providing oversight and management of the Technology Suite
- **Experts** – Organizations contracted with CalMHSA to provide technical assistance and subject matter expertise in carrying out the Project

Guiding Principles

Shared Services – Leverage economies of scale through the pooling of resources while ensuring flexibility to meet specific County needs.

Sustainability – Implement Innovation projects to meet intended goals and objectives while establishing a framework for long-term sustainability and growth.

Innovation – Promote and support Innovation to find new ways to improve access to mental health services, leverage new technologies, and improve client outcomes.

Communication and Collaboration – Promote open, timely communication with Project Participants and stakeholders and work collaboratively to support the goals and objectives of the Project.

Oversight and Accountability – Report and resolve issues in a timely manner; monitor overall program to ensure goals and outcomes are met; and provide regular reporting to stakeholders, including MHSOAC.

Shared Governance and Policies – Maintain a well-documented governance framework with clear policies supported and endorsed by all stakeholders that allows for the guiding principles to be implemented, and that can be easily accessed by and shared with other Project Participants and stakeholders.

Compliance – Ensure compliance with relevant federal and state laws, regulations, and contractual obligations, including taking all necessary steps to implement or modify policies and procedures to ensure ongoing compliance.

Health Information Technology Standards – Wherever possible, utilize widely accepted healthcare information technology standards for data content and transport.

Data Quality & Integrity – Ensure the accuracy, completeness, and timeliness of all data and facilitate the sharing of meaningful information across all Project Participants to improve care.

Security Safeguards & Controls – Protect the confidentiality of Client information through alignment with national best practices by implementing, or modifying as appropriate, all administrative, technical, and physical safeguards and preventing unauthorized or inappropriate access, use, or disclosure.

Openness and Transparency – Be open and transparent about policies, procedures, and technologies, particularly as it relates to how data is used, stored, and shared with and among Project participants. Use every opportunity to inform Clients about what information has collected about them, the purpose of its use, who can access and use it, where it resides, and how they may obtain access to and control who has access to their information.

Individual Choice – Provide the opportunity and the means for Clients to make informed decisions about their participation in the program and how their data is collected, used, and disclosed to other Project participants.

The following table further delineates the roles of each type of entity to assure these principles are applied and adhered to throughout the design and conduct of the project.

	App Vendors	Counties	CalMHSA	Experts
Shared Services	Work to standardize service offerings, integration deployments, and product customizations across Counties	Work to co-develop and keep each other informed of special projects, services, and app service offerings	Coordinate sharing of information on services between Vendors and Counties, helping all to stay informed on innovative and/or successful strategies	Assist Participants in adopting successful strategies for shared services and evaluating effectiveness
Sustainability	Develop customizations and	Develop sustainability plans and allocate	Develop sustainability plan for shared	Evaluate sustainability plans to

	App Vendors	Counties	CalMHSA	Experts
	service offerings that fit into sustainability plans	resources at appropriate level to succeed	services in alignment with individual County plans	ensure success and support the cross-pollination of promising approaches between Counties
Innovation	Suggest innovative approaches that have worked in other environments and implement innovative solutions developed by Counties	Develop innovative approaches to services and technologies that fit local use-cases and target populations	Coordinate among Participants to drive real tests of change and share outcomes	Determine how innovations can be expanded and/or improved, and evaluate innovations to ensure they fit into overall Project framework
Collaboration	Collaborate with Participants and communicate in a clear and timely manner	Collaborate with Vendors and internal County stakeholders and communicate in a clear and timely manner	Foster collaboration among counties and between counties and vendors and establish a mechanism for reporting issues	Find new ways for Participants to collaborate, building on past successes and fostering open communication
Oversight and Accountability	Work with Counties and CalMHSA to develop standardized methods for reporting	Submit reports to CalMHSA	Design reporting requirements and provide project oversight	Assist participants in using standardized technologies and processes for reporting, working to ensure limited burden on participants
Shared Governance & Policies	Adopt standard policies and governance developed by Counties	Work to co-develop and keep each other informed of governance and policies	Coordinate governance for shared decision-making and develop associated policies	Assist CalMHSA and Participants in adopting successful strategies for shared governance and decision-making
Compliance	Follow relevant laws, regulations, and policies	Evaluate customizations and innovations for compliance with statutes, share information between counties on strategies for compliance	Develop Project policies; share information between counties on strategies for compliance	Evaluate customizations and innovations for compliance with applicable laws, regulations, and policies
Health Information	Implement customizations and new services using	Suggest uses of common Health IT standards by	Evaluate and, as appropriate, require use of Health IT	Evaluate proposals for use of Health IT standards, suggest

	App Vendors	Counties	CalMHSA	Experts
Technology Standards	common Health IT standards whenever possible	Vendors; support standards-based data-sharing capabilities in County systems if integrating with apps	standards by app vendors and/or Counties	innovative approaches that leverage standards
Data Quality & Integrity	Implement safeguards to ensure data quality and integrity	Manage data quality and integrity, especially where local county IT systems are sharing information with Vendors	Help Counties and Vendors share strategies for managing data quality and integrity, evaluate integrity of reporting data	Assist Participants in identifying strategies for data quality and integrity management, assist in evaluation processes
Security Safeguards & Controls	Implement customizations and new services using common Health IT standards for security whenever possible	Suggest use of common Health IT standards for security by vendors whenever possible	Evaluate and, as appropriate, require use of Health IT standards by app vendors and/or Counties	Evaluate proposals for use of Health IT standards for security, suggest innovative approaches that leverage standards
Openness & Transparency	Adopt standard terms of service and privacy policy to inform Clients about how their data is used and with whom their data will be shared	Establish clear policies and procedures to inform Clients how County is integrating with applications and how data will be used	Help Counties and Vendors share strategies for managing policies and procedures	Assist Participants in finding strategies for implementing policies and procedures
Individual Choice	Implement an informed consent process within the app consistent with standard terms of service and privacy policies	Provide notification to Clients about how their data will be shared with Vendors	Identify minimum requirements for informed consent; Assist Vendors and Counties with implementing an informed consent process	Assist Participants with implementing an informed consent process and evaluate effectiveness

Evaluation

Overview & Selection Process

The Tech Suite Collaborative Innovation Project has selected a single qualified vendor (University of California, Irvine) to conduct formative evaluations of the statewide implementation of the suite, as well as for each participating county.

A formative evaluation is the chosen approach as it is a "rigorous assessment process designed to identify potential and actual influences on the progress and effectiveness of implementation efforts." The goals of the formative evaluation approach which match the needs of the Tech Suite evaluation include:

- Developmental: plan for successful uptake of an intervention by clearly defining the problem and understanding its context, designing or adapting an intervention to address a problem and utilizing an implementation framework to anticipate negative unintended consequences, and understanding the organizational context (e.g. readiness) and stakeholder perspectives on a planned intervention;
- Implementation: help ensure a project is successfully implemented by monitoring key indicators, work with stakeholders to pivot/change/adapt as need arises to respond to both internal and external factors;
- Interpretation: create generalizable knowledge for how to successfully implement the intervention in other settings.

Tech Suite Outcomes to be Evaluated: The health and clinical outcomes to be assessed through the Tech Suite evaluation include:

- Adherence to a treatment protocol (which may be pre-programmed into an app, such as daily maintenance exercises; or developed by a professional, such as medication adherence).
- Improving safety (e.g. reduce adverse events)
- Increasing quality (e.g. on patient-reported outcome measures)
- Increasing access (to technology products, or to traditional medical services)
- Increasing treatment-seeking behaviors (e.g. utilizing previously unused services)
- Reducing utilization (e.g. ED visits, hospitalization, frequency of in-person visits)
- Improving recognition of and treatment outcomes for vulnerable or at-risk patients
- Increasing community engagement and target population(s) reach

Evaluator Selection: The evaluator selection process had two phases: pre-qualification and competitive selection.

1. Pre-Qualification: Through an RFSQ solicitation, CalMHSA received qualifications to evaluate the three-year innovation Tech Suite project from a variety of organizations. An independent panel reviewed these organizations' proven ability to evaluate the following impacts:

- Changes in user's utilization of inpatient and emergency service.
- Changes in the duration of untreated or under-treated mental illness.
- Changes in ability for users to identify cognitive, emotional and behavioral changes and act to address them.
- Changes in quality of life, as measured objectively and subjectively (by user and by indicators such as activity level, employment, school involvement, grades, etc.).
- Measurement and evaluation of user wellbeing and social connectedness.
- Comparative analyses of population level utilization data in participating counties over the life of the project to determine impact on various types of service utilization.
- Changes in how users with particular biomarkers (characteristics identified either through history or digital phenotyping analysis) respond to treatment options identified through this project.

In addition, the panel assessed their capabilities to:

- Analyze how the technology suite is used as a source of information and is guiding interventions provided by mental health professionals.
- Conduct an analysis of retrospective and prospective utilization of hospital resources from claims data and medical records data. The analysis shall incorporate disease risk stratification, digital phenotype and digital biomarker measurement, type of intervention, and delay in receiving care. Quality of like impact will include, where applicable, school grades, graduation rates, job retention, and absenteeism.
- Track and report number of users, including ethnicity, gender and preferred language.

Review of the qualifications of respondents led to the selection of two "pre-qualified" evaluator candidates.

2. Competitive Selection: The second step leading to final selection of the innovation evaluator was a competitive comparison of the pre-qualified agencies based on:

- Applicable Experience and Staffing: Experience with formative evaluation methods, including qualitative interviewing, participant observation, surveys, analysis of secondary data, and integrating data collected using mixed methods;

- Previous Evaluation Projects: Description of actual projects involving formative evaluations, with emphasis on those involving mental health interventions, health IT/informatics interventions, and interventions involving participatory research

- Proposed Evaluation Framework: Conceptual frameworks for implementation research and formative evaluation used in previous work and description of how they were applied to address the research question(s).

- Data Collection: Types of research questions, conceptual frameworks, data needed to be

collected, formative evaluation approaches, clinical and health outcomes (from list above), and anticipated challenges that might be relevant to the Tech Suite Innovation project.

Evaluation Panel Credentials

A panel of highly experienced professionals convened to evaluate the proposals of the two 'pre-qualified' vendor candidates using the above criteria. This panel represented or had lived experience with/in:

- County and State behavioral health planning, advocacy, and evaluation (executive level)
- CBO and CBO board experience
- Health IT Innovation design, development, and research
- African American Perspectives
- Lived experience; have received mental health treatment
- Rural counties: implementing and evaluating behavioral health programs
- Large (urban) counties: implementing and evaluating behavioral health programs
- Engaging diverse communities in mental health or other social causes
- Completed graduate degree

MHSA Evaluation Requirements

In order to adhere to MHSA regulations (per Section 3580.010) and assure a thorough evaluation of the innovation's impact on target populations, each application vendor is required to gather the demographic information (listed below) about end users. In turn, the selected evaluator will aggregate, analyze and report on impacts to individuals served in the following attributes:

- Age
- Race
- Ethnicity
- Primary language used by threshold languages for the individual county
- Sexual orientation
- Disability
- Veteran status
- Gender

Evaluation and Performance Monitoring
Selected Evaluator

Based on qualification criteria described previously, **University of California, Irvine** was selected to conduct the Tech Suite evaluation as the proposing team exhibited competence and excellence in the following areas:

- **Applicable Experience and Staffing**: UCI's staff includes a diversity of personnel with a wide array of experience and subject matter expertise including clinical, informatics, and program evaluation. Additionally, their staff has previously been involved in participatory research grounded in cultural anthropology.

- **Previous Evaluation Projects**: In their proposal, UCI detailed a history of very relevant mental health projects including innovate mobile and web-based technologies, digital products and apps, and digital phenotyping. Projects included extensive development and evaluation of self-developed projects as well as those developed by others.

- **Proposed Evaluation Framework**: UCI demonstrated an impressive depth and breadth of thinking related to frameworks involved in the project; they did not just mention appropriate frameworks, they advanced and applied frameworks with obvious care and forethought. The suggested implementation strategy utilizing the frameworks demonstrated similarly careful consideration.

- **Data Collection**: In applying the above frameworks, UCI provided a wide range of interesting questions and ideas for evaluation. They convey an understanding of and willingness to adapt to the program's evolving needs, identifying and anticipating several potentially important challenges.

About the UCI Evaluation Team: The following are key personnel who are part of UCI's team to develop and implement the evaluation for the Tech Suite. Additional personnel will be added as needed to accommodate the changing needs and focus of the project.

Dara H. Sorkin, PhD Associate Professor Department of Medicine University of California, Irvine	AREAS OF EXPERTISE: Lifespan Development Psychologist; Program Evaluation (Needs Assessment, Process and Outcome) Expertise in Mental Health/Trauma-Informed Care, Behavioral Health and Health Behavior Change; Development and testing of decision aids and preference elicitation; Chronic disease management; Clinical care and outcomes; Quality improvement and evaluation; Working with underserved and/or multi-ethnic/racial and multi-language populations; and Multi-method approaches to research design. EXPERIENCE WITH FORMATIVE EVALUATION: I have direct experience in survey development and administration, working with diverse populations using a variety of modalities of administration, including web-based survey design. I also have experience analyzing secondary data, including the California Health Interview Survey.

Dana B. Mukamel, PhD Professor of Medicine, Public Health and Nursing Department of Medicine Director, Translational Technology Enhancing High Quality Care (iTEQC) Research Program University of California, Irvine	AREAS OF EXPERTISE: Health economist and health services researcher with over 20 years' experience in research and evaluations, economic and statistical studies of big data, claims and administrative data (e.g. national Medicare and Medicaid claims), quality measurement based on structure, process and risk adjusted outcome measures, development of quality report cards, studies of health services utilization and access by vulnerable populations (including those with mental health diagnoses), studies of response to incentives, market structure and regulations by patients and providers, and development of technology based decision aids aimed at patients, providers and policy makers. EXPERIENCE WITH FORMATIVE EVALUATION: Integrating big data with survey data: Many of my projects are designed to include data from two main sources: big data typically purchased from governments (state or federal), which include claims data (including Medicare, Medicaid, private FFS and managed care insurers), hospital and ED discharge datasets (including CA data), or assessments data collected nationally (like the national MDS data) and survey data from patients or providers.
MENTAL HEALTH INFORMATICS EXPERTISE	
Stephen M. Schueller, PhD* Assistant Professor Department of Psychology and Social Behavior University of California, Irvine	AREAS OF EXPERTISE: Clinical Psychologist; Expertise with development, deployment, and evaluation of digital mental health Interventions; participatory design; digital phenotyping; community-engaged research; implementation science; working with underserved and/or multi-ethnic/ racial and multi- language populations; qualitative research methods; Executive Director of PsyberGuide, a project that identifies and evaluates digital mental health products and the Director of the Behavioral Intervention Technologies sub-core for a NIH P30 funded by NIAMS. EXPERIENCE WITH FORMATIVE EVALUATION: Direct experience in qualitative interviewing and participant observation with regards to the development and evaluation of digital mental health interventions. This includes work in homeless youth shelters and community-based mental health clinics. I have also developed surveys for use in RCTs of digital mental health interventions focused on the treatment of depression and anxiety. I lead a project that does independent evaluations of mental health apps and provides that data publicly through a non-profit.

Gloria Mark, PhD* Professor Department of Informatics University of California, Irvine	AREAS OF EXPERTISE: Evaluation of information technology; human-computer interaction; technology adoption; analysis of big data; qualitative evaluation; ethnographica techniques; interviewing; participatory research; mental health app design EXPERIENCE WITH FORMATIVE EVALUATION: 20+ of experience in qualitative interviewing, particularly related to use and adoption of information technology. Designed, conducted, and analyzed interview transcripts with a wide range of user groups: e.g. young adults, citizens in war zones (who experience mental health issues). 20+ years experience with participant observation with a focus on understanding information technology use in situ. Designed, deployed, and analyzed large-scale surveys in a variety of population groups, and analyzed secondary data, mostly social media data of Facebook, Twitter and blogs, using data mining and text-mining techniques. Mixed methods approach integrating data from biosensors, computer & phone logging, experience sampling, SenseCams, and daily and general surveys. Data is time-stamped and synced together, providing an in-depth snapshot of time of people's activities.
Nicole A. Stadnick, PhD, MPH* Assistant Professor Department of Psychiatry University of California, San Diego	AREAS OF EXPERTISE: Clinical psychologist/ implementation scientist with content expertise in community-partnered child and adolescent mental health services and implementation research conducted in publicly funded service settings that provide care to families from diverse racial/ethnic and SES backgrounds. My program of clinical research has spanned the translational science pipeline from mental health intervention development and effectiveness testing to large-scale implementation and sustainment evaluation to examine multi-level (system, organizational/clinic, service provider and family) outcomes. EXPERIENCE WITH FORMATIVE EVALUATION: Direct experience leading: 1) quantitative survey development & online administration, 2) secondary analysis of system-level administrative mental health claims data, 3) development and administration of key informant interviews and focus group instruments and 4) establishing community-partnered advisory groups and evaluating the collaborative process. Extensive experience in development and conduct of behavioral observational coding of mental health therapy sessions conducted within publicly funded mental health agencies in Southern CA to assess quality indicators of evidence-based care. Majority of my research projects have applied a mixed-methods approach, particularly during the developmental and evaluative phases in service of maximizing public health impact.

Kai Zheng, PhD Associate Professor Department of Informatics and Associate Adjunct Professor, Department of Emergency Medicine Director, Center for Biomedical Informatics, Institute for Clinical and Translational Science University of California, Irvine	AREAS OF EXPERTISE: Health informatics; Human–computer interaction and human factors; Usability; Interaction design; Cognitive engineering; Technology adoption and acceptance; Diffusion of health information technology; Technology effectiveness evaluation; Socio-technical integration; Social network analysis; Computerized clinical decision-support; Personal health informatics; Informatics-based interventions for mental health; Natural language processing of medical text and patient-generated content on social media. EXPERIENCE WITH FORMATIVE EVALUATION: I have extensive experience in survey design, administration, and data analysis. I also have extensive experience in qualitative research using methods such as ethnographic observation, context inquiry, and focus group and semi-structured interview. I also have extensive experience in secondary analysis of data. These include structured data such as claims and audit trail logs, and unstructured data such as clinician notes, app reviews, and patient-generated content on social media.
Elizabeth V. Eikey, PhD* Postdoctoral Fellow Department of Informatics University of California, Irvine	AREAS OF EXPERTISE: Expertise in evaluating unintended emotional, psychological, and social consequences of technologies and mobile application (app) design; Experience conducting research with individuals with mental illness and on sensitive health topics; Developing mental health interventions via smartphone apps; Working with diverse and underrepresented populations; Experience with mixed methods research; Research focuses on 1) how to anticipate adverse consequences of technology to mental health and 2) designing technology with mental health at the forefront. EXPERIENCE WITH FORMATIVE EVALUATION: I have direct experience developing and administering qualitative interview protocols and surveys (quantitative, qualitative, and experimental) for studies with diverse and underrepresented populations (e.g., women with eating disorders, immigrant undergraduates with depression). I have conducted and analyzed qualitative interviews, think-aloud exercises, and focus groups; surveys; and secondary data, such as profile data, forums, and online community posts.

CLINICAL EXPERTISE	
Jessica L. Borelli, PhD Associate Professor Department of Psychology and Social Behavior University of California, Irvine	AREAS OF EXPERTISE: Developmental psychopathologist; Licensed clinical psychologist (specialization: children and families); study of psychotherapy outcome, fidelity, and process; integration of technology (mHealth, ecological momentary interventions) in psychosocial & intervention research; experience with community participatory research; working with underserved populations (particularly Latino/a families); and psychophysiological assessment. EXPERIENCE WITH FORMATIVE EVALUATION: Direct experience in community participatory research in the development, implementation, and evaluation of psychosocial interventions for the prevention and treatment of mental health problems in youth and parents. Experience assessing intervention fidelity, appeal, dissemination, and adoption within community and community mental health settings. Conducted studies in which I developed and validated survey and interview assessments for youth and parents. Recent work involves focus on serving marginalized communities in a culturally sensitive way, most notably for use with Latino/a and African American low income families. Routinely integrate technology (including mHealth, ecological momentary intervention, life logging, psychophysiology) as tools in the assessment and intervention arms of my work.
COMMUNITY ENGAGEMENT/LIASION EXPERT	
Jacqueline Tran, DrPH, MPH* Independent Consultant Jacqueline Tran Consulting	AREAS OF EXPERTISE: Program Evaluation (Needs Assessment, Process and Outcome); Community Based Participatory Research around health disparities; Landscape analysis of available and accessible mental health programs and services in Orange County (addressing gaps for services at the intersection of mental health – domestic violence and substance use); working with diverse multi-ethnic/racial and multi-lingual (particularly underserved and under-represented) communities; and multi-method approaches to research design. EXPERIENCE WITH FORMATIVE EVALUATION: I have direct experience in survey development and administration, working with diverse populations using a variety of modalities of administration, including web-based survey design. I also have extensive experience with the design and implementation of tools for qualitative interviewing and data analysis and have worked with community-based organizations to analyze their program data helping to inform and design stronger evaluation protocols to assess program effectiveness.

CONTENT EXPERTS	
Belinda Campos, Ph.D. Associate Professor Department of Chicano/Latino Studies; School of Medicine PRIME-LC; Department of Psychology and Social Behavior University of California, Irvine	AREAS OF EXPERTISE: Social-Personality Psychologist, post-doctoral training in Health psychology and the interdisciplinary study of families. Expert on culture, relationships, and physical and mental health; Latino culture, social support processes, health relevant physiology, and physical and mental health outcomes in ethnic majority and minority groups. EXPERIENCE WITH FORMATIVE EVALUATION: I have direct experience with qualitative interviewing, survey development and administration, participant observation (e.g., emotion display and non-verbal behavior), and integrating data across multiple methods. I have extensive experience working with diverse, underserved, and underrepresented populations. Recent projects have included implementing CBPR approaches to evaluate patient /family experience and physical and mental health outcomes following pediatric surgery.
Dan M. Cooper, MD Professor of Pediatrics Associate Vice Chancellor for Clinical Translational Science University of California, Irvine	AREAS OF EXPERTISE: As PI of the UCI CTSA, I have led an organization that emphasizes evaluation and metrics at all levels of activities. EXPERIENCE WITH FORMATIVE EVALUATION: Working in close collaboration with the National Institutes of Health, we are part of the Common Metrics development plan for all 60 CTSAs throughout the country. The Common Metrics include data targeting IRB, contracting, participant recruitment in clinical trials and, and implementation of novel health care approaches.
Alpesh Amin, MD Thomas & Mary Cesario Chair of Medicine, Professor & Executive Director, Hospitalist Program, University of California, Medical Center	AREAS OF EXPERTISE: Health promotion and health behavior change, chronic disease management, clinical care and outcomes, quality improvement and evaluation, electronic health information, health care delivery, healthcare integration, value-based care. EXPERIENCE WITH FORMATIVE EVALUATION: Familiarity with retrospective and prospective utilization of hospital resources from claims & medical records data.

EVALUATION/METRICS EXPERTISE	
Margaret Schneider, PhD Researcher Department of Urban Planning and Public Policy University of California, Irvine	AREAS OF EXPERTISE: Program Evaluation: Results-Based Accountability, Process, & Formative Evaluation; Logic Models; Integration of information from multiple methods (i.e., qualitative and quantitative); Community-based health promotion research; School-based intervention research. EXPERIENCE WITH FORMATIVE EVALUATION: Extensive experience in formative evaluation, including key informant interviews, focus groups and surveys. I have employed these methods to inform the design of intervention and research methods to be deployed in the community as well as within academia.

Evaluation

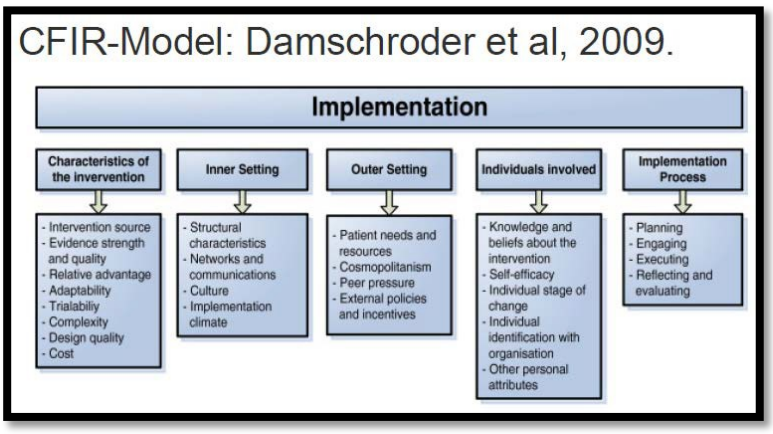
Proposed Approach: Framework and Data Collection

The UCI evaluation team has proposed the following framework and data collection strategy for the evaluation.

There are a number of conceptual frameworks for implementation research and formative evaluation (see http://dissemination-implementation.com/viewAll_di.aspx) that can address evaluation with regards to effectiveness and implementation. Conceptual frameworks are useful because they provide a systematic structure to guide the development and evaluation of implementation efforts. Frameworks have been broadly classified into five categories: process models, determinant frameworks, classic theories, implementation frameworks, and evaluation frameworks. We opted to use a determinant framework, which can help understand the factors that contribute to outcomes, and an evaluation framework, which can help guide what aspects of the implementation should be measured. Our determinant framework is the Consolidated Framework for Implementation Research (CFIR) and our evaluation framework is Glasgow's RE-AIM. Below we describe each framework and highlight how they can be integrated to contribute to a detailed understanding of an implementation effort.

The Consolidated Framework for Implementation Research (CFIR) – Determinant

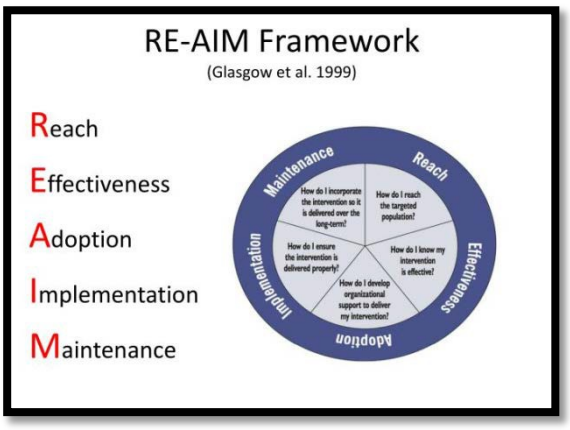
The Consolidated Framework for Implementation Research (CFIR) describes an overarching typology to describe whether and why interventions work across multiple contexts. CFIR, with its emphasis on both qualitative and quantitative data collections, is particularly useful for promoting theory development and verification around the impact of an intervention and considering why an intervention does or does not work. There are five domains emphasized in this framework: 1) the intervention, 2) inner setting, 3) outer settings, 4) individuals involved, and 5) the implementation process. The intervention is characterized based on factors that might impact the implementation. The inner and outer settings describe the contexts where the implementation process will occur. The inner setting often includes the specific local sites where the intervention is delivered (e.g. medical centers, community-based organizations), whereas the outer setting often includes the larger geo-political context in which the intervention is taking places (e.g. variation in regional/County-level policies and programs, factors that influence considerations of race/ethnicity). The individuals involved are the various stakeholders who have the power and influence to seek, experiment with, evaluate, and improve or design interventions. The implementation processes refer to the activities that support



the integration of the intervention into the proposed setting. There are additional constructs that further articulate each of these five domains, which will be described in more detail in our integrated model.

RE-AIM Framework - Evaluation

The CFIR model's strength is in its utility for understanding the factors likely to impact whether the implementation succeeds or fails. As an evaluation framework, the RE-AIM's strength is to understand the impact of an implementation by specifying the outcomes that need to be examined and the data that needs to be collected. The RE-AIM framework includes five domains: reach, effectiveness, adoption, implementation, and maintenance. In this framework, reach characterizes the potential penetration of the program – it refers to an individual-level measure of participation (e.g. the percentage and risk characteristics of persons who receive or are affected by a policy or program), and well as a system-level measure of participation (e.g. the extent to which multiple organizations or systems are affected by a policy or program). Effectiveness refers to the impact of the intervention itself, rather than the implementation efforts. Adoption refers the proportion and representativeness of settings that adopt a given policy or program.



Implementation means the extent to which a program is delivered as intended. And lastly, maintenance measures the extent to which innovations become an enduring part of the behavioral repertoire of an individual, organization or community.

Our Combined Approach

We believe that determinant and evaluation frameworks are both necessary to guide the proposed Formative Evaluation of the Innovation Technology Implementation (see https://www.fic.nih.gov/About/center-global-health-studies/neuroscience-implementation-toolkit/Pages/methodologies-frameworks.aspx). As such, we propose to integrate the RE-AIM framework, to help determine what to measure, with CFIR, to systematically assess the factors that influence the implementation and dissemination process. Our integration of these frameworks is displayed in **Figure 3** below. Each component is described in full in **Data Collection Options (see Table 3)**.

DATA COLLECTION OPTIONS

General Data Collection Options Across all Technology Interventions: Our proposed evaluation plan will be informed by the theoretical framework identified in the prior chapter (see **Figure 3**). **Table 4** presents a generalized list of constructs that are recommended to be included in the proposed evaluation. For each construct, a short description and set of sample

questions are included.

Overlay of Proposed Constructs with Conceptual Framework & Sample Questions

Construct	CFIR REAIM	Short Description/ Definition	Sample Questions to be Answered in Proposed Evaluation	Proposed Data Collection
ADOPTION (REAIM) **Examining the factors that influence the proportion and representativeness of settings and**				
I. INTERVENTION CHARACTERISTICS				
Evidence Strength & Quality	CFIR	Stakeholders' perceptions of the quality and validity of evidence supporting the belief that the intervention will have desired outcomes.	To what extent do stakeholders value a mobile app/health solution for addressing mental health and believe these mobile app/mental health solutions will improve the mental health of all Californians? Of particular groups of Californians?	Semi-structured interviews and/or focus groups
Relative Advantage	CFIR	Stakeholders' perception of the advantage of implementing intervention versus alternative solution.	What other some advantages of using a mobile app/health solution relative to other solutions? What are some of the disadvantages?	Semi-structured interviews and/or focus groups
Adaptability	CFIR	Degree to which an intervention can be adapted, to meet local needs.	To what degree can the mobile app/health solution(s) be tailored to meet local needs (e.g. regional, ethnic/racial, SES, age, language, mental health condition)? What adaptations are being made to improve delivery? What 'work-arounds' were developed to promote success in a given setting?	Interviews with mobile app design teams

Construct	CFIR REAIM	Short Description/ Definition	Sample Questions to be Answered in Proposed Evaluation	Proposed Data Collection
Complexity	CFIR	Perceived difficulty of implementation, reflected by duration, scope, disruptiveness, centrality, intricacy & number of steps required to implement.	What are the potential barriers that might impact full implementation? How do potential users access the mobile app/health solutions? What are the steps, and how difficult is the perceived process from the various stakeholders'	Semi-structured interviews and/or focus groups
Design Quality & Packaging	CFIR	Perceived excellence in how the intervention is bundled, presented, and assembled.	To what extent to various stakeholder (e.g. clinical experts, technical experts, and service users) find the design/utility of high quality and appealing? [NOTE: Would also work with the group leading the effort to evaluate Cal MHSA: Outreach and Engagement]	Heuristic evaluations to give indepen. ratings of design quality packaging using various stakeholders
Cost	CFIR/ REAIM	Costs of the intervention and costs associated with implementing the intervention including investment, supply, and opportunity costs.	What are the costs associated with developing the mobile app/mental health solutions (this may or may not be part of the evaluation)? What is the cost for recruiting/enrolling the target audiences? Cost of delivering the mobile app/health solutions? What populations require more resources, and thus higher cost?	Cost-benefit analysis

Construct	CFIR REAIM	Short Description/ Definition	Sample Questions to be Answered in Proposed Evaluation	Proposed Data Collection
II. OUTER SETTING				
Patient Needs & Resources	CFIR	The extent to which patient needs, as well as barriers and facilitators to meet those needs, are accurately known and prioritized by the organization.	How well do implementers, particularly those designing the mobile app/mental health solution(s) understand the various needs of their target audiences? Do implementers have specific areas of specialty? What efforts have implementers engaged into understand	Survey/Semi-Structured Interviews of mobile app design teams
Cosmopolitanism	CFIR	The degree to which an organization is networked with other external organizations.	What is the nature (depth, formal relationship structure) of the network of outreach and support services for mental health in a particular County from the perspective of the Public Health Care Agency? How loose/tight are their connections to other service/provider organizations?	Semi-structured interviews and/or focus groups
External Policy & Incentives	CFIR	External strategies to spread interventions, including policy and regulations	What are the policy and/or regulatory structures (including reimbursement models) in the State of California, and/or the Counties that likely influence ability to respond and/or treat mental illness?	Environmental scan
III. INNER SETTING				
Structural Characteristics	CFIR REAIM	The social architecture, age, maturity, and size of an organization.	What settings or organizations types are being targeted for outreach and engagement? How many of these settings and organizations estimate they will use these mobile app/mental health solutions?	Organizational Survey

Construct	CFIR REAIM	Short Description/ Definition	Sample Questions to be Answered in Proposed Evaluation	Proposed Data Collection
Networks & Communications	CFIR REAIM	The nature and quality of webs of social networks and the nature and quality of formal and informal communications within an organization.	Who will deliver the program? Do they have the skills and time? What expertise is necessary to deliver digital tools and who should be doing it? Does state of California need new licensing/training requirements, CEs, etc.?	Organizational Survey Observation
Culture	CFIR	Norms, values, and basic assumptions of a given organization.	What are the efforts of senior leadership to established clear goals/feedback to staff? What are the staff member effort and responsibilities to deliver mobile app solutions?	Organizational Survey Observation
Implementation Climate	CFIR	The absorptive capacity for change, shared receptivity of involved individuals to an intervention, and the extent to which use of that intervention will be rewarded, supported, and expected within their organization.	To what degree do stakeholders perceive the current state on meeting Californians mental health needs as requiring change? Do stakeholders share perceptions of the importance of these solutions relative to other competing County needs? What are the incentives (e.g. goal-sharing, increased stature)? To what degree are goals clearly communicated & acted upon, and there is alignment of that feedback with goals?	Organizational Survey Semi-structured interviews and/or focus groups Observation

Construct	CFIR REAIM	Short Description/ Definition	Sample Questions to be Answered in Proposed Evaluation	Proposed Data Collection
Readiness for Implementation	CFIR	Tangible and immediate indicators of organizational commitment to its decision to implement an intervention.	What are the available resources to support implementation of digital mental health? [NOTE: Would also work with the group leading the effort to evaluate Cal MHSA: Outreach and Engagement]	Organizational Survey Observation
IV. PROCESS- PLANNING				
Planning	CFIR	The degree to which a method for implementing an intervention are developed in advance, and the quality of the methods.	How detailed is the implementation plan, and is there a theoretical model guiding the implementation? Who is developing the plan, and what is the buy-in from stakeholders?	Organizational Survey/ Semi-structured interviews
REACH (REAIM) **Examining the factors that influence the number, proportion and representatives of the individuals who are willing to participate in the mobile app/mental health solution(s)**				
I. CHARACTERISTICS OF INDIVIDUALS (CFIR)				
Knowledge & Beliefs about the Intervention	CFIR	Individuals' attitudes toward and value placed on m-health solutions.	What are common beliefs on the potential strengths/weaknesses of m-health solutions? For whom/why might they be more/less effective?	Semi-structured interviews and/or focus groups Individual survey
Self-efficacy	CFIR	Individual belief in own capabilities to execute actions to achieve implementation goals.	How confident are users in their ability to use and benefit from the proposed mental health app? Have they used these kinds of apps before and experienced any failures/successes early-on?	Ideally added to assessment in mobile app. If not, through individual survey

Construct	CFIR REAIM	Short Description/ Definition	Sample Questions to be Answered in Proposed Evaluation	Proposed Data Collection
Individual Stage of Change	CFIR	Characterization of the phase an individual is in, as he or she progresses toward skilled, enthusiastic, and sustained use of the intervention.	How willing, and enthusiastic is the user throughout the engagement process (e.g. from early engagement all the way through continued use)?	Ideally added to assessment in mobile app, coupled with dose data. If not, through individual survey
Other Personal Attributes	CFIR REAIM	A broad construct to include other personal traits such as tolerance of ambiguity, intellectual ability, motivation, values, competence, capacity, and learning style.	Who will the initiative appeal to? How and where will they be reached? What adaptions or modifications will be necessary to help implement the initiative to fit with different settings? What are some of the anticipated obstacles to consistent implementation	Semi-structured interviews and/or focus groups and/or individual user survey
II. PROCESS - ENGAGING				
Engaging	CFIR	Attracting and involving appropriate individuals to use of the intervention through a combined strategy of social marketing, education, role modeling, training, and other similar activities.	[NOTE: Would also work with the group leading the effort to evaluate Cal MHSA: Outreach and Engagement]	Meeting with Cal MHSA: Outreach and Engagement

Construct	CFIR REAIM	Short Description/ Definition	Sample Questions to be Answered in Proposed Evaluation	Proposed Data Collection
IMPLEMENTATION (REAIM) **Examining the extent to which the mobile app/mental health Solution(s) are delivered as intended.**				
I. Fidelity	REAIM	The degree to which mobile app/ health solutions was delivered as intended	What changes were made to the software (e.g. changes between versions) over time or to the way it was delivered? What prompted these changes? How is the app being used by consumers? Is the consumer usage in-line with the expectations of the developers?	Fidelity monitoring with data mining Focus groups and/or individual user survey
II. Cost	CFIR REAIM	Cost of implementing intervention	[NOTE: Would also work with the group leading the effort to evaluate Cal MHSA: Outreach and Engagement]	Financial reports
III. Executing	CFIR	Carrying out or accomplishing the implementation according to plan	[NOTE: Would also work with the group leading the effort to evaluate Cal MHSA: Outreach and Engagement]	Meeting with Cal MHSA: Outreach and Engagement

EFFECTIVENESS (REAIM) Examining the intended benefits Examining the unintended consequences or outcomes that are anticipated and reported ‡ Indicates Institute of Medicine Domain of Health Care Quality				
Effectiveness‡	REAIM IOM	Providing services based on scientific knowledge to all who could benefit and avoiding underuse and misuse, respectively.	To what extent does mobile app/mental health solution(s) deliver the 'right' care, in the 'right' way, for the 'right' user/patient, at the 'right' time?' To what extent does user/patient report improvements in mental health outcomes (e.g. increase quality of life, improve mental well-being, reduce mental illness, reduce suicide)? Clinically meaningful improvement? Over what period of time are these improvements maintained?	Individual survey and/or data from app users Potential comparison group with California Health Interview Survey (CHIS)
Equity‡	REAIM IOM	Providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location, and socioeconomic status	To what extent are particular groups of traditionally disenfranchised individuals differentially benefited or harmed by this tech innovative initiative? To what extent do the mobile app/health solution(s) reduce known inequities?	Potential comparison group with California Health Interview Survey (CHIS)
Patient-centeredness‡	REAIM IOM	Providing care that is respectful of and responsive to individual user/ patient preferences, needs, and values .	To what extent are the mobile apps delivered in a way that is culturally-sensitive and in-line- with patient and user values and needs?	Individual survey and/or data from app users Potential comparison group with CHIS

Safety‡	REAIM IOM	Avoiding harm to users/patients from the care that is intended to help them	Are there any anticipated or unanticipated harms associated with use of the mobile app/health solution(s)?	Individual survey and/or data from app users Potential
Health Behaviors	REAIM	Improving sleep, diet, and physical activity; Reducing alcohol, drug, and tobacco	To what extent does engagement with the mobile app/health solution(s) increase healthy behaviors and reduce unhealthy behaviors?	Individual survey and/or data from app users and/or w/CHIS
Mental Health Seeking Behavior	REAIM	Improving seeking medical support for mental health concern	To what extent does engagement with the mobile app/health solution(s) increase mental health seeing behavior?	CHIS (self-report); California DHCS &/or OSHPOD
Receipt of Mental Health Guideline Care	REAIM	Improve receipt of guideline mental health care	To what extent does engagement with the mobile app/health solution(s) increase receipt of guideline mental health care?	Individual survey and/or data from app users and/or w/CHIS
Healthcare Utilization	REAIM	Reducing unnecessary healthcare utilization	To what extent does engagement with the mobile app/health solution(s) decrease unnecessary healthcare utilization?	CHIS (self-report); California DHCS &/or OSHPOD
Reported Use of Comp. and Alternative Medicine (CAM)	REAIM	Increasing use of evidence- based CAM modalities (e.g. meditation, mindfulness)	To what extent does engagement with the mobile app/health solution(s) increase in evidence-based alternative modalities?	Individual level survey and/or w/CHIS CAM USE
Satisfaction with mobile app/ health solution(s)	REAIM	High levels of satisfaction	To what extent are users satisfied with their experience using the mobile app/health solution(s)?	Individual survey and/or data from app users
MAINTENANCE (REAIM) **Examining the resources needed to maintain the program, and barriers and facilitators**				
Maintenance Cost	REAIM	Cost of maintaining intervention engagement	[NOTE: Would also work with the group leading the effort to evaluate Cal MHSA: Outreach and Engagement]	Meeting with Cal MHSA: Outreach and Engagement

Reflecting & Evaluating	CFIR	Quantitative and qualitative feedback about the progress and quality of implementation accompanied with regular personal and team debriefing about progress and experience.	What are some of the lessons learned through the evaluation process? What evidence is there for success and areas of improvement around implementation of the mobile app/mental health solution(s)?	Research logs: reports, graphs. Qualitative feedback & anecdotal stories of success/ failures
NOTE: CFIR Constructs taken from http://www.cfirguide.org/constructs.html and integrated with RE-AIM and adapted for use with CalMHSA Program on Innovative Technology.				

Forming a State-Wide Advisory Board

As part of our evaluation process, we propose to create a single, state-wide, Expert Advisory Board (EAB). This board would be led by Dr. Mukamel and myself, with support from Dr. Schueller. The board would be comprised of community leaders and professionals (e.g. representatives from Behavioral Health Services in each county's Public Health Departments; Social Workers, Psychiatrists, RNs with specialization in mental health), as well as representatives from some of the national and local service based and/or advocacy organizations), patients/clients, families, and caregivers. We would ask that each community-advisory board (CAB, described below in greater detail) would select one member to participate in the EAB semi-annually (or more if needed) for 1-day. For all participants, their travel costs will be covered and participants will receive compensation of $200 per session (if they are allowed to receive compensation).

Creating/Working with Local Community Advisory Boards

We also recommend the establishment of a series of Community Advisory Boards (CAB) across the different counties to provide regular (1-2 hours per month) advice and feedback about the design and implementation of research protocols in their own communities. This board would be comprised of local community leaders, medical and mental health professionals, patients/clients, families, and caregivers, as well as staffed by members of the evaluation team. We would propose to work with all-ready established CABs, if they were willing to participate. We anticipate developed groups of about 10-12 people. For all participants, their travel costs will be covered and participants will receive compensation of $50 per session (if they are allowed to receive compensation).

Proposed Data Collection Methods

Our team has extensive experience using a variety of qualitative, quantitative and mixed methods approaches for data collection. Some of the anticipated data collection strategies and

data sources include the following:

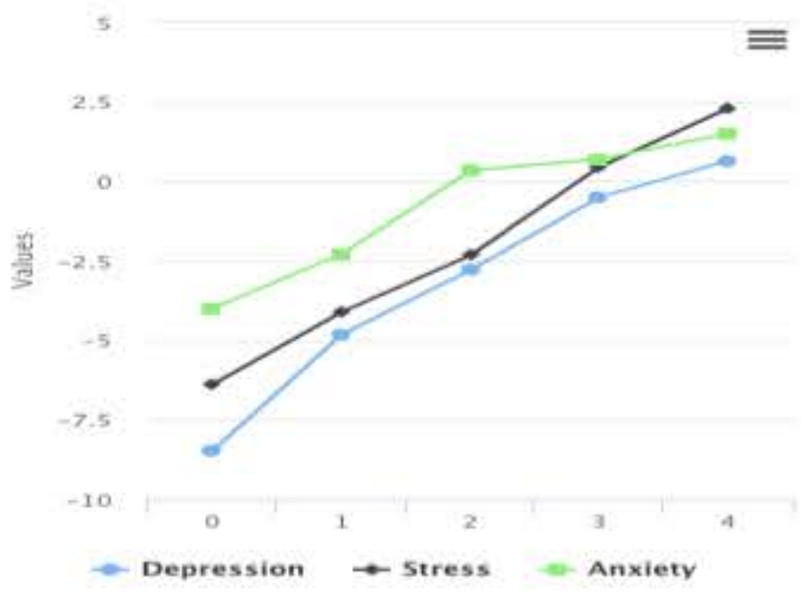
Structured Interviews/ Focus Groups	Structured interviews/focus groups will be used assess to understand the stakeholders perceptions of the intervention prior to implementation. Stakeholders include the following: ***Community Leaders.*** Individuals who are well known and respected leaders in the communities that the organization serves. ***Informal Opinion Leaders***. Individuals in an organization who have formal or informal influence on factors that influence mental health services or outcomes, including national and local service based and/or advocacy organizations. ***Formally Appointed Implementation Leaders – Decision Makers***. Individuals from within an organization who have been formally appointed with responsibility for implementing the mobile app/health solutions as coordinators, project managers, team leaders, or other similar roles. ***Consumers and their Families/Caregivers.*** Individuals and their supportive others with either diagnosed and/or undiagnosed mental illness or low quality mental health care. ***Healthcare Providers.*** People who provide healthcare; general & specialty services.
Survey – Individual Level	Individual level surveys can be widely used to assess a number of different evaluation processes and outcomes, including but not limited to ADOPTION (e.g. obtaining the sociodemographic characteristics of consumers and caregivers who are more or less likely to adopt the program); EFFECTIVENESS (e.g. use of validated instruments to compare the effectiveness over time and across people who may or may not use the tech suite).
Survey - Organizational	Organizational level surveys can used to assess a number of different evaluation processes at the local, state, or national level, including but not limited to ADOPTION (e.g. obtaining organization leaders' views of the importance of the m-health program and willingness to devote organizational resources toward disseminating the program to the organization's consumers), and IMPLEMENTATION (e.g. obtaining information on the actual processes that were involved in delivering the program, and determining the extent of adherence to the program protocol).

Data Mining/ Partnership with mobile app/health solutions vendors	Ideally data will be made available from the mobile app/health solutions vendors to evaluate the following: ADOPTION (e.g. adoption rate and location over time); REACH (e.g. inclusion/exclusion criteria, participation rate, demographics of audience, representativeness); EFFECTIVENESS (e.g. results for at least one follow-up, percent attrition, quality of life or potential negative outcomes); IMPLEMENTATION (e.g. changes to software over time); MAINTENCE (e.g. assessing outcomes over time, individual-level maintenance, and measures of cost maintenance).
Cost Analysis	Dana Mukamel, PhD (Health Economist) is a national expert in cost, cost-benefit, and cost-effectiveness analyses. We, therefore, have the ability to assess cost related to implementation of the innovative technology program (not the research activities, which would be estimated separately) in partnership with the Cal MHSA: Outreach and Engagement Group. Fixed intervention implementation-related costs include personnel recruitment/ training, development of marketing materials, office space/furniture, and equipment (e.g. telephones, copier lease). Variable intervention costs include material and supplies, telephone and mailing expenses and transportation costs. To increase the accuracy of variable cost estimates, we will document costs over three weeks interspersed throughout the project and will average these costs. Intervention-related cost savings will be assessed in terms of potential reduction of routine and non-routine health service utilization (e.g., reduced medication expenses, fewer hospitalizations, fewer emergency room visits) and reduction in loss of productivity (i.e., reduced cost of absenteeism from work based on time and wages reported by participants in paid employment; for participants not in paid employment, imputed wages from census data on average local wages stratified by gender, age, and education).191 We will compare the average program cost per participant to the average cost savings (without discounting). The proposed collection and analysis of cost data are not meant to provide a comprehensive evaluation of cost-effectiveness, but will provide valuable preliminary data on potential costs and savings associated with the Innovation Technology program.
Heuristic Analysis	Heuristic analysis refers to independent evaluation of technological products to determine issues related to the usability, user experience, and content. Dr. Schueller will lead independent review of all products incorporating views of clinical and technological experts as well as representative users. We will use established methods including the Mobile App Rating Scale and the User version of the Mobile App Rating Scale, formal usability procedures, and qualitative synthesis and data mining of user feedback.

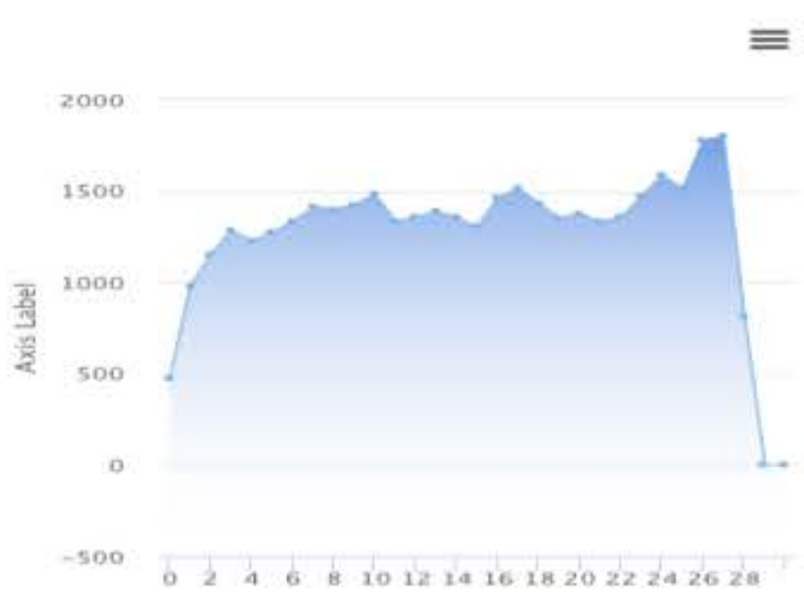
Observations	We will conduct no less than 4 hours of observations within each setting to create tailored observational methods of data collection to address behaviors within each setting related to implementation climate and processes. We will use the Stages of Implementation Completion (SIC) as well as the associated Costs of Implementation New Strategies (COINS) to structure observation of behaviors related to implementation.
OSHPOD Data Office of Statewide Health and Planning	OSHPOD Data will allow us to examine changes in emergency department using diagnosis codes for mental illness and/or other conditions. Data is available for from 2005-2016 for emergency department encounters by patient county of residence. Data will be made available annually over the course of the evaluation period.
California Department of Health Care Services (DHCS)	The California Department of HealthCare Services also collected data on an annual basis on claims, including Medi-Cal Managed Care Claims and Encounter Data Reporting and Substance Use services. This data is not publicly available, but can be accessed through a Data Use Agreement process. http://www.dhcs.ca.gov/dataandstats/data/Pages/AccessingProtectedData.aspx
California Health Interview Survey (CHIS)	The California Health Interview Survey is an annual, California population-based, telephone survey of non-institutionalized children, teenagers and adults. The annual survey already includes self-report measures of mental health (distress), mental health access and utilization, stigma, suicide ideation and attempts, health behaviors, and socio- demographic characteristics (e.g. race/ethnicity, age, gender, language, insurance). This data set could be leverage to compare at a county level the penetration of the technology suite. Additionally, for a fee, it would be possible to add questions into the survey. http://healthpolicy.ucla.edu/chis/Pages/default.aspx

GENERAL
Dashboard
REPORTS
Overview
Traffic
Users
Time
Location
Sources
Language

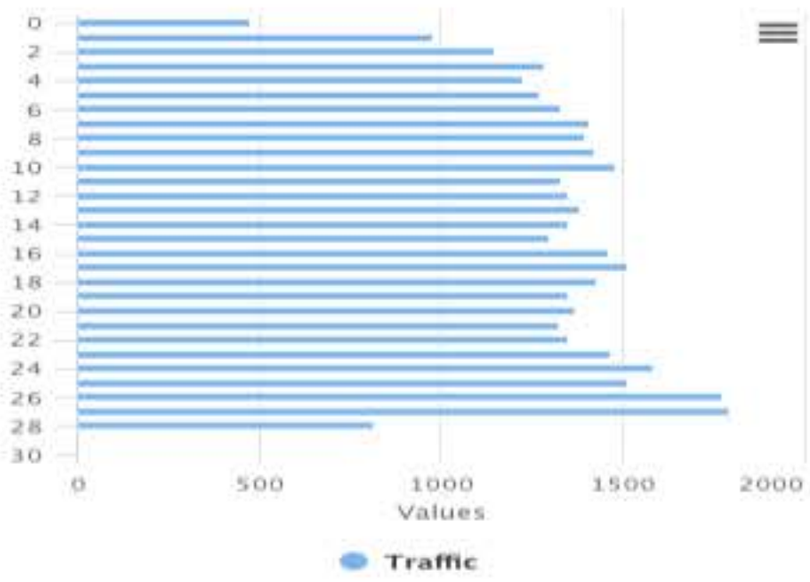
Wellness Test Results (Outcomes)



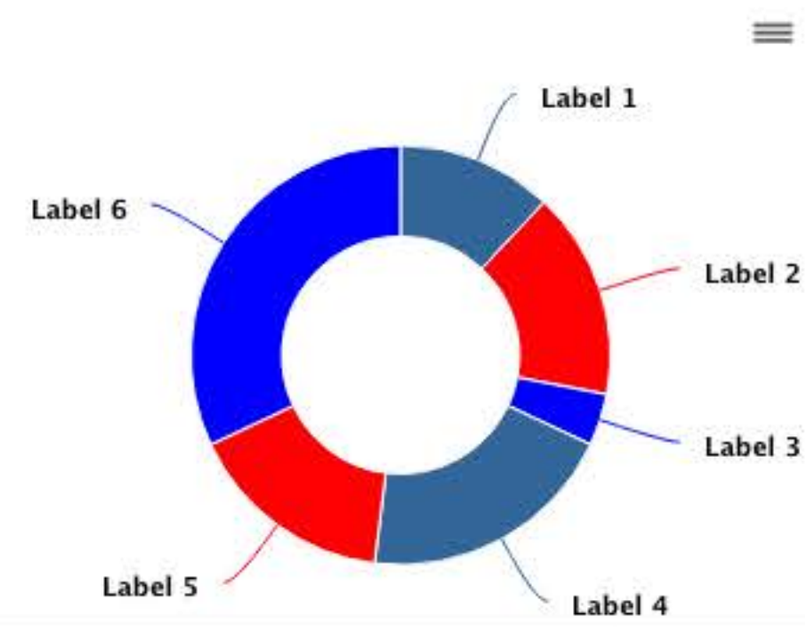
Active Users in LA County



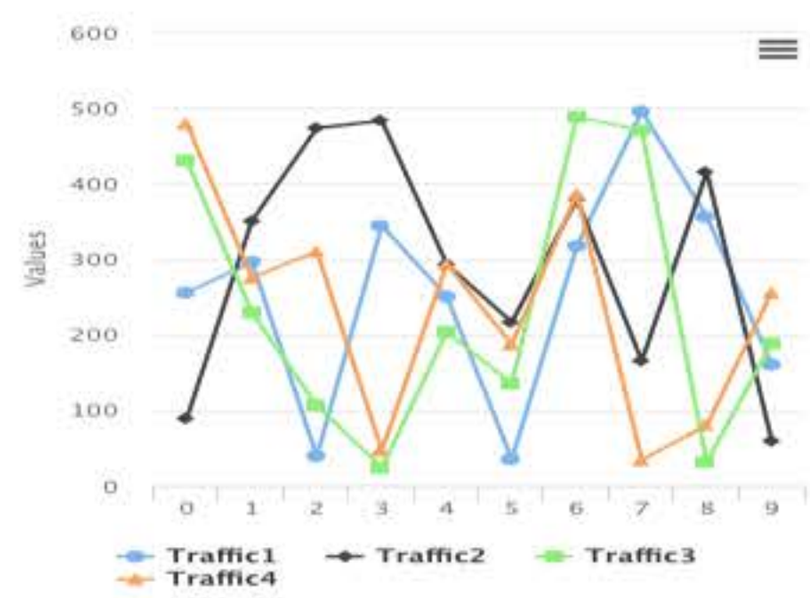
Top Locations in LA County



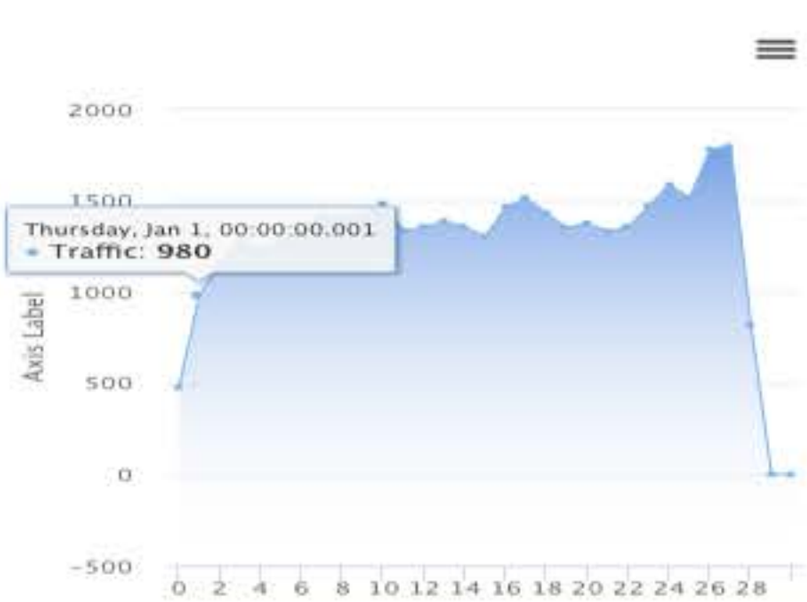
Top Languages in LA County



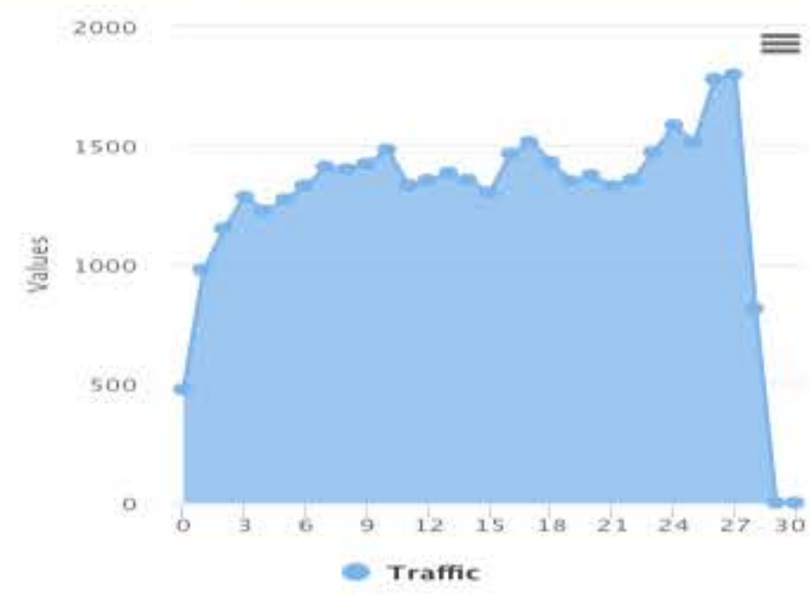
Traffic by Referral Source



All Traffic



Session Length / Time on Site



Percentage of Users in Treatment Before