VENTURA COUNTY
BEHAVIORAL HEALTH
A Department of Ventura County Healthcare Agency

Ventura County Behavioral Health
Mental Health Services Act
Innovation (INN)

Push Technology
Final Evaluation Report
FY 18/19 – FY 20/21

Prepared for Ventura County Behavioral Health

by

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Measuring What Matters™

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Introduction

Project Overview

Ventura County Behavioral Health (VCBH) developed the Push Technology Project ("Push Tech") to provide supportive services for individuals leaving psychiatric inpatient facilities and residential crisis stabilization units. The project aimed to reduce psychiatric re-hospitalization rates by offering support to individuals discharged from county inpatient psychiatric hospitals residential crisis stabilization units. The number of psychiatric hospital beds in the United States has decreased dramatically over the past few decades. The Treatment Advocacy Center published estimates of state hospital bed needs identifying in 1955 there were approximately 337 state psychiatric hospital beds per 100,000 persons, and by 2016 there were less than 12 beds per 100,000 persons (La et al., 2016). Ventura County has been negatively impacted by the declining number of available psychiatric beds, which was further exasperated by the Thomas Fire in late 2017 that burned one of only two psychiatric hospitals in the County. The hospital that burned was the only facility in the County licensed to treat youth. This resulted in an increase in the number of youth hospitalizations out-of-county in which some youth were placed as far away from their families as the San Francisco Bay area.

This lack of available hospital beds can have a negative impact on the most vulnerable patients in crisis as they may be stuck waiting hours or days for a bed to become available, only to be released back into the community at faster rates than when there were more beds available. Individuals with a current or recent inpatient psychiatric hospitalization are at an increased risk of suicide. VCBH sought to explore innovative complimentary treatments with the goal of reducing the need for psychiatric hospitalization. The Push Tech project aimed to explore whether technology can aid in this goal by offering mobile support, post-discharge, to reduce rates of re-hospitalization. Utilizing technology platforms to support mental health is an emerging field with new applications and websites being developed with regularity. However, there is little research on the effectiveness of these support platforms.

VCBH developed the Push Tech project with the primary goal of strengthening the post-discharge outcomes of patients by using Ecological Momentary Intervention (EMI), a mobile automated push technology, provided in partnership with the local 211 services provider. The project made a change to an existing mental health practice by utilizing EMI to try to reduce re-hospitalization through repeated mini-assessments and appropriate follow up using mobile text engagement during the first 90 days post hospitalization. This is a critical time in which patients are at risk of re-hospitalization or attempted suicide. VCBH coordinated with local hospitals and crisis residential units to provide hospital site staff with information about the project encouraging them to invite patients to enroll in the program upon discharge from the hospital. Patients who enrolled received periodic automated (or "push") text messages requesting their participation in simple mini-assessments of their current mood. These assessments, known as EMIs, took place in real time and in the patient's natural setting. Each patient received appropriate follow-up depending on their answers to the assessment questions. The text messages also included reminders for follow-up appointments and rescheduling assistance. Clients in the Push Tech project were offered the option to include a support person, such as a parent, friend, or coach, in the text messaging support service. The support person would also receive texts reporting the assessed the mood of the patient as well as appointment reminders to support the patient. Research has found that family support is a determining factor in a patient's success upon discharge (Dixon et al., 2009).

The Push Tech project launched in four public and private hospitals throughout Ventura County (see Table 1) in the Spring of 2019, enrolling patients from April 2019 through January 2021. In May 2020, Push Tech was expanded to include high-risk youth enrolled in VCBH behavioral health services, providing them with a sense of connectedness and coping strategies during the COVID-19 pandemic. The Push Tech project officially ended in June of 2021.

Table 1. Participating Hospital Sites	
Hospital Site	**Population Served**
Hillmont Psychiatric Center Inpatient Unit (IPU)	Primarily Adults
Golden Ventura Crisis Residential Treatment (CRT)	Primarily Adults
Seneca Crisis Stabilization Unit (CSU)	Children
Vista Del Mar	Children and Adults

Project Components

The project goals are:
1. Reduce the rate of re-hospitalization
2. Increase follow-up appointment adherence
3. Increase treatment engagement
4. Assess client satisfaction and the perceived value of EMI technology in mental health recovery

The primary components of this project included enrolling patients via multiple methods, text message check-ins, support person enrollment, and appointment reminders (see Table 2).

Table 2. Overview of Project Components	
Enrollment	Patients were offered to sign up for the Push Tech service through self-enrollment or with the help of a clinician or social worker. Multiple methods of enrollment were available including paper forms, online forms, as well as text message enrollment. At the time of enrollment, patients were able to identify their preferred language to ensure that the texts sent to them were in their preferred language.
Text Message Check-ins	The texting platform was programmed by Community Connect Labs, who also housed the data. The 211 Supervisor served as the Push Tech Manager who was responsible for making edits to the text flows as well as monitoring results and responses to the check-in texts. The text service was set up for participant enrollment when discharged from the hospital. Participants were sent text message check-ins at regular intervals for 90 days. The check-in texts were sent out more frequently (three to four times per week) in the beginning and then became less frequent over time. The goal was to keep patients engaged in their treatment for 90 days after discharge. During the text check-ins, participants were asked to rate their mood using a four-point scale (see Figure 1). Participants were also sent mental health and wellness tips and resources, such as links to local and national websites. Participants with consistently low mood ratings were offered linkage to 211. After 90 days, the participants received a survey followed by cessation of texts. After six months, the participant received a final survey to inquire about outcomes including whether they were hospitalized or entered a crisis stabilization unit.
Support Person Enrollment	Participants were offered the option of including a support person (i.e., a friend, parent, sibling, spouse,

Figure 1. Text Check-Ins. How would you rate your mood today? Please reply with a letter:

A 😀 Doing Well
B 🙂 I'm Coping
C 😐 I'm Not Coping
D 🙁 Not Well

	etc.) to enroll in the program with them. The support person received similar check-in texts asking them to rate the mood of their loved one; they also received tips, resources, and appointment reminders.
Appointment Reminders	Participants were offered the option to sign up for appointment reminders.
Youth Expansion	In May 2020, Push Tech was expanded to include high risk youth enrolled in VCBH behavioral health services to provide them with a sense of connectedness and coping strategies during the COVID-19 pandemic.

Evaluation Methodology

A mixed methods approach was employed to evaluate the project from inception to completion. Data collection activities included text data, a survey, VCBH Electronic Health Records (EHR) data, as well as key stakeholder interviews. The text data, survey data, and feedback from key stakeholder interviews were analyzed to measure the impact of the project and to inform the project successes, challenges, and lessons learned. The evaluation team analyzed data from VCBH's EHR system referred to as "Avatar." Stakeholders were involved and engaged in the evaluation throughout the duration of the project in multiple ways. Stakeholders participated in surveys at 90-days and six-months after participating in the project to provide feedback. The Short Message Service texts and surveys were available in English and Spanish, with participants identifying their preferred language upon enrollment. Data collection activities took place in alignment with the language skills, literacy levels, and comprehension abilities of participants.

Evaluation Questions
The primary evaluation questions used to guide the assessment included:

1. Are clients satisfied with EMI technology?
2. Do clients find the Push Tech support valuable in their mental health recovery?
3. Do participants who receive text support attend their follow-up appointment more frequently than those without text support?
4. Does using mobile EMI increase treatment engagement?
5. Does using mobile EMI reduce the rate of re-hospitalizations?

The intervention used a personal cell phone to deliver daily and weekly assessments of participants' moods/feelings for the first 90 days post discharge from a hospital or crisis stabilization facility. At six months, the participants received a follow-up survey that asked about outcomes including hospitalizations, as well as their satisfaction and perceived value of the service.

Data Collection Strategies and Tools
A variety of data collection strategies were used to collect evaluation data and answer the research questions posed for the Push Tech evaluation. The evaluation plan called for quantitative and qualitative research methods, including: (1) collection and analysis of text data; (2) surveys; (3) collection and analysis of VCBH EHR data; and (10) key stakeholder interviews (see Table 3).

Table 3. Overview of Data Analyzed in Report	
Data Source	**Description**

Text Data	Community Connect Labs managed the text response data received from participants in the Push Tech Project. The following datasets were analyzed for this report:
	• Participants
	    ○ Enrollment
	    ○ Check-in text responses by participants
	• Support persons
	    ○ Enrollment
	    ○ Check-in text responses by support persons
	• High-risk youth enrollment data
	    ○ Enrollment
	    ○ Check-in text responses by participants

Surveys	Community Connect Labs also managed the text flow and text response data for the surveys that were implemented to both the program participants and support persons. Survey data analyzed included the following: • 90-day participant follow-up survey • Six-month participant follow-up survey • 90-day support person follow-up survey • Six-month support person follow-up survey • 30-day high-risk youth follow-up survey
VCBH EHR Data	Data from VCBH's Electronic Health Record Database, referred to as "Avatar", was obtained to analyze hospitalizations and follow-up appointment attendance for Push Tech participants as well as a control group for the duration of the project. It should be noted that the VCBH's EHR includes psychiatric hospitalizations for Medi-Cal beneficiaries and does not include psychiatric hospitalizations funded through private insurance. At the time of analysis, there was limited data available specific to Push Tech participants from VCBH's EHR.
Key Stakeholder Interviews	Ten key stakeholders were interviewed to obtain information about the project's successes, challenges, and lessons learned from implementation. Project stakeholders interviewed included the following: • Director of Clinical Services at Vista del Mar • Manager of Facilities and a Case Manager at Golden Crisis Residential Treatment (were interviewed together) • Social Work Supervisor at Hillmont Psychiatric Center Inpatient Unit • Assistant Director at Seneca Crisis Stabilization Unit • Two program participants (numerous attempts were made to contact additional program participants) • MHSA Innovations Program Administrator • Community Connect Labs Product Manager (individual who programmed the text flows on the backend) • 211 Supervisor who served as the Push Tech manager.

Summary of Findings

Push Tech Participants

There was a total of **211 individuals** who enrolled in the Push Tech Project (see Table 4).

Table 4. Timeline of New Participant Enrollment, by Quarter							
Quarter	Apr-June 2019	July-Sept 2019	Oct-Dec 2019	Jan-Mar 2020	Apr-June 2020	July-Sept 2020	Oct-Dec 2020	Jan-Mar 2021
Number of new participants enrolled	88	69	27	19	3	3	1	1

*Enrollment timeline only includes program participants and does not include support person enrollment.

Participant Characteristics

Demographic information (see Table 5) was obtained from three sources. Information on gender, race and ethnicity was obtained VCBH EHR records. Demographic information on age was obtained from VCBH for the participants who had a date of birth recorded on the enrollment form. Primary language was obtained from the participants' self-reported preferred language identified through the text data. The three sources of data for participant characteristics varied in the data available for each category.
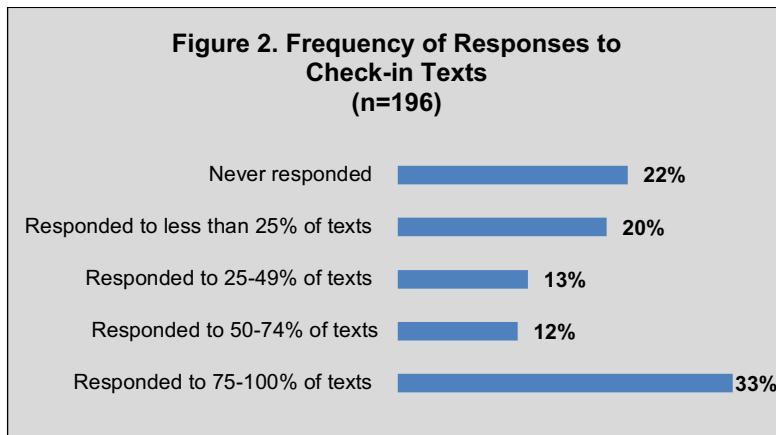
Table 5. Participant Characteristics			
Indicator	**Category**	**N**	**Percent**
Gender (n=62)	Male	25	40%
	Female	37	60%
Race (n=58)	White	24	41%
	Other Race	34	59%
Ethnicity (n=55)	Mexican/Mexican American	21	38%
	Mixteco	1	2%
	Not Hispanic	22	40%
	Other Hispanic/Latino Ethnicity	11	20%
Age (n=95)	11 to 13	11	12%
	14 to 17	42	44%
	18 to 24	15	16%
	25 to 44	19	20%
	45 to 64	8	8%
	65+	--	--
Primary Language (n=210)	English	195	93%
	Spanish	14	7%
	Other	1	<1%

In an attempt to collect demographic information from non-VCBH clients, questions on gender and race were added to the 90-day survey. Additional demographic information on race and gender was obtained from the 23 participants who responded to these questions on the 90-day survey (see Appendix A, Table 21 for the results).

Participant Engagement

The Push Tech texting platform engaged participants who enrolled by sending them check-in text messages. Individuals were given the option to opt-out of the texting service at any time as well as opting out from having their data analyzed for this study. Three individuals opted-out from the texting service upon receiving their first check-in text and 11 individuals opted-out from having their data included in the study. Individuals who opted-out when receiving their first text or from having their data being included in this study were not included in the participant engagement analysis.

After discharge from the hospital or crisis stabilization unit, check-in texts were sent to participants more frequently (three to four times per week) in the beginning, and then became less frequent over time. The goal was to keep patients engaged in their treatment for 90 days after discharge. See Figure 2 for a detailed breakdown of participant engagement.

Figure 2. Frequency of Responses to Check-in Texts (n=196)

Response Category	Percentage
Never responded	22%
Responded to less than 25% of texts	20%
Responded to 25-49% of texts	13%
Responded to 50-74% of texts	12%
Responded to 75-100% of texts	33%

EMI (mood) check-in data results

During the text check-ins, participants were asked to rate their mood using a four-point scale. See Figure 3 for the percentage of EMI check-in responses. Participants who indicated that they were not coping or were not doing well were provided with resources including the contact information for a mental health hotline as well as how to contact 211 via phone or text message.

Figure 3. EMI Check-in Text Responses

Response	Percentage
Doing Well	58%
I'm Coping	32%
I'm Not Coping	6%
Not Well	4%
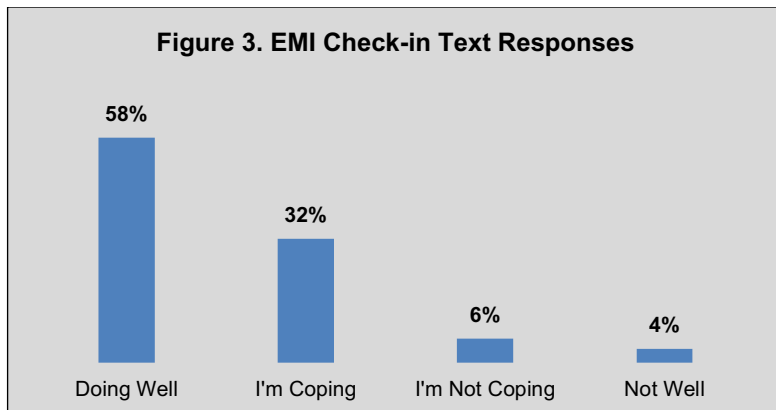
Ninety-day and six-month survey findings

One-hundred seventy-one participants were sent the 90-day survey and 45 individuals responded to at least one question for a response rate of 26%. The number of responses vary by question, but overall, respondents provided positive feedback about the text messaging service. One-hundred sixty-seven participants were sent the six-month survey, and 50 individuals responded to at least one question for a response rate of 30%. The number of responses vary by question, but overall, respondents provided positive feedback about the text messaging service.

Participant Satisfaction

Participant satisfaction with the texting service from the 90-day survey is in Table 6. When asked if they were satisfied with the text messaging service, 90% (n=37) of respondents indicated that they were either somewhat satisfied or very satisfied. When asked about how they felt about the frequency of the text service messages, 68% (n=15) of respondents indicated that they felt that the frequency of texts was "about right". When asked if they would recommend this service to a friend or a family member, 73% (n=22) of respondents indicated that they would recommend this service. Overall, Push Tech participants were satisfied with the texting service.

Table 6. Satisfaction with Text Messaging Service (n=22-41)		
	N	Percent
Satisfaction with texting service (n=41)		
Very satisfied	24	58%
Somewhat satisfied	13	32%
Not very satisfied	4	10%
Would you recommend this service to a friend or family member? (n=30)		
Yes	22	73%
No	8	27%
How would you rate the frequency of the texts? (n=22)		
About right	15	68%
Not often enough	5	23%
Too often	2	9%

Participant Outcomes

Participant outcomes from the 90-day participant surveys are in Table 7. Respondents were asked about the helpfulness of the text messaging system with their mental health recovery, and 76% (n=26) agreed or strongly agreed that it was helpful. Respondents were asked how often they took their medication as prescribed in the last 90 days, with 76% (n=16) of respondents indicating they took their medication "Always" and 95% (n=20) of the respondents indicated they take their medication "Always" or "Usually." Participant outcomes from the six-month survey are in Table 8. Respondents were asked about the helpfulness of the text messaging system with their mental health recovery with 8 out of 9 participants agreeing, or strongly agreeing, it was helpful. Overall, participants found the Push Tech texting service support to be valuable in their mental health recovery. Additional findings from the six-month survey are included in the Impact section.

Table 7. Participant Outcomes 90-day Survey Results (n=21-34)		
This text messaging system has helped my mental health recovery (n=34)		
	N	Percent
Strongly Agree	16	47%
Agree	10	29%
Disagree	8	24%
Strongly Disagree	0	--
If prescribed medication for mental wellbeing, how often have you taken medication as prescribed over the past 3 months? (n=21)		
Always	16	76%
Usually	4	19%
About half the time	0	--
Rarely	0	--
Never	1	5%

Table 8. Helpfulness of Text Messaging Service Six-month Survey Results (n=9) *		
This text messaging system has helped my mental health recovery	N	Percent
Strongly Agree	3	33%
Agree	5	56%
Disagree	1	11%
Strongly Disagree	0	--

*This question was added to the six-month survey in May 2020 after the survey had already been sent to several respondents.

Follow-up Appointment Attendance

One of the primary evaluation questions is whether or not Push Tech participants are more likely to attend their follow-up appointment with text support when compared to nonparticipants. In order to answer this question, client data were obtained from Avatar. Due to limitations with the data available at the time for analysis, it was not possible to determine if Push Tech participants were more likely to attend their follow-up appointment with text support than nonparticipants. However, data were analyzed for whether or not Push Tech participants attended their follow-up appointments more frequently following each episode of hospitalization that occurred across the project period when compared to nonparticipants for the participating hospitals. Follow-up appointment attendance rates were analyzed for all episodes of hospitalization within the dataset. The follow-up appointment attendance rate was analyzed for all nonparticipants included in the dataset (n=2,216) in order to obtain a benchmark. The follow-up appointment attendance rate for nonparticipants was 79% for nonparticipants across the project period. The follow-up appointment attendance rate for Push Tech participants was 98%, which is higher than the nonparticipants. It should be noted that due to the small sample size available for analysis for Push Tech participants (n=25 participants), one should use caution in drawing any conclusions.

Table 9. Follow-up Appointment Attendance Rate	
	Attendance Rate
*Push Tech Participants (n=25)	98%
*Control Group (n=2,216)	79%

*For follow-up appointment attendance, the attendance rate was calculated based on the number of episodes of hospitalization for both the Push Tech participants and the control group.

Variation in outcomes based on having a support person enrolled in Push Tech

To better understand the role of having a support person engaged in the program, select outcomes were analyzed comparing participants with a support person enrolled in the program to those without a support person enrolled. At the six-month follow up survey, 32% (n=9) of respondents without an identified support person reported re-hospitalization or involuntary hold compared to 5% (n=1) in the group with an identified support person (see Figure 4). At the six-month follow up survey, 29% (n=7) of respondents without an identified support person reported entering a crisis stabilization unit. None of the respondents with an identified support person reported entering a crisis stabilization unit (see Figure 5).

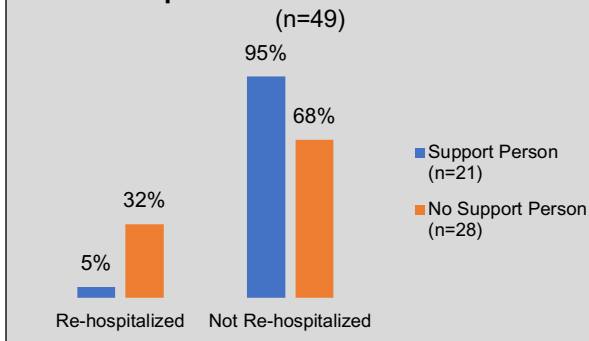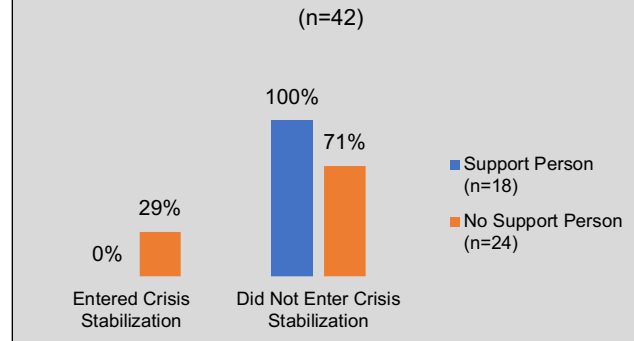Figure 4. Difference in Outcomes on Rehospitalization within Six Months (n=49)

Figure 5. Difference in Outcomes on Crisis Stabilization within Six Months (n=42)

Variation in outcomes based on age

VCBH Avatar data was analyzed to determine if there is a difference in rehospitalization rates by age group. Due to limited data available for Push Tech only participants, rehospitalization rates by age group was analyzed for all clients within the project period including six months after the project had ended to analyze trends in rehospitalization. Although the results are not specific to Push Tech program participants, the results can be used to guide future programming. The average Rehospitalization rate for all clients included in the dataset regardless of age was 38%. The ages of clients ranged from 11 years to 84 years old. Rehospitalization rates were put into age groups based on MHSA reporting standards. Clients under 16 years of age experienced the highest rate of rehospitalization at 48%, whereas clients over 60 years experienced the lowest rate of rehospitalization at 31%. See Table 10 below for the results.

Table 10. Rehospitalization Rates by Age Group (n=2,241)		
Age Group	Number Rehospitalized	Percent Rehospitalized
11 to 15 (n=177)	85	48%
16 to 25 (n=605)	222	37%
26 to 59 (n=1,336)	511	38%
60+ (n=123)	38	31%

Support Persons

Participants were offered the option of including a support person (i.e., a friend, parent, sibling, spouse, etc.) to enroll in the program with them. The support person received similar check-ins texts asking them to rate the mood of their loved one as well as tips, resources, and appointment reminders. A total of 156 support persons enrolled in the texting service by Push Tech participants. Out of the 156 support persons enrolled, 96 opted-in to receive check-in text messages to support their loved one. Of those who opted-in, 76% (n=73) engaged in the texting service by responding to at least one check-in text.

Support Person Characteristics

Data were collected on support person demographics including gender and race from the respondents who completed the follow-up survey. Primary language was obtained from the support person's self-reported preferred language identified through the text flow (see Table 11). Data on the support person's age was not collected.

Table 11. Support Person Characteristics (n=11-77)			
Indicator	Category	N	Percent
Gender (n=11)	Male	5	45%
	Female	6	55%
Race (n=11)	White	3	27%
	Latino/Hispanic	5	45%
	Black or African American	0	--
	Asian	1	9%
	More than one race	2	18%
Primary Language (n=77)	English	67	87%
	Spanish	10	13%

Support Person 90-day survey findings

Fifty support persons were sent the 90-day survey, and 18 individuals responded to at least one question for a response rate of 36%. The number of responses vary by question, but overall, respondents provided positive feedback about the text messaging service. Results are in Tables 12 and 13.

Support Person Satisfaction

When asked about their satisfaction with the frequency of check-in text messages, 15 out of 18 (83%) of support persons indicated that the frequency was about right. When asked about their satisfaction with the text messaging service, all of the 16 support persons indicated they were either very satisfied or somewhat satisfied. When asked if they would recommend this service to a friend or family member, 13 out of 14 (93%) of support persons indicated that they would recommend the texting service (see Table 12).

Table 12. Support Person Satisfaction with Texting Platform Findings from 90-day Survey (n=14–18)		
How would you rate the frequency of the texts? **(n=18)**		
	N	**Percent**
About right	15	83%
Not often enough	2	11%
Too often	1	6%
How satisfied were you with the text messaging service? **(n=16)**		
Very satisfied	12	75%
Somewhat satisfied	4	25%
Not very satisfied	0	--
Would you recommend this service to a friend or family member? **(n=14)**		
Yes	13	93%
No	1	7%

Support Person Outcomes

When asked how helpful they thought that the text messaging was with their loved one's mental health recovery, 13 out of 15 (86%) of the support persons indicated it was either very helpful or helpful (see Table 11). The findings from the six-month survey are included in Table 13, however; due to the small sample size, it is not possible to draw any conclusions from the results.

Table 13. Helpfulness of Text Messaging Service Findings From the 90-day Survey (n=15)		
How helpful would you say the text messaging was with your loved one's mental health recovery?	**N**	**Percent**
Very Helpful	8	53%
Helpful	5	33%
Neither Helpful nor Unhelpful	2	13%
Unhelpful	0	--
Very Unhelpful	0	--

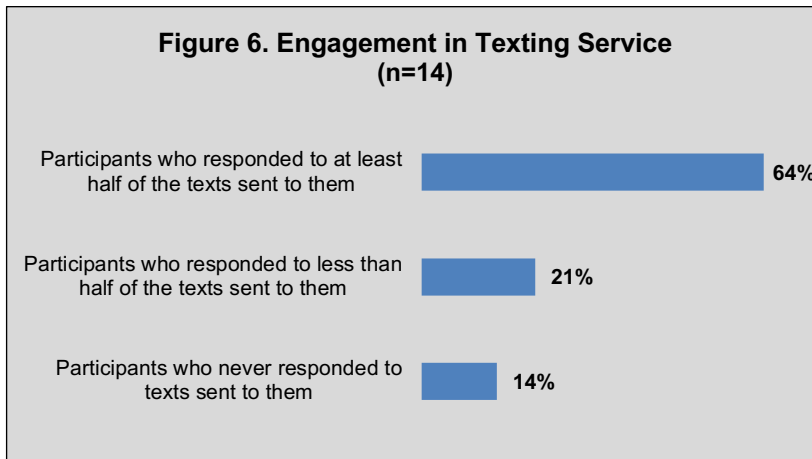### Support Person six-month survey findings

Seventeen support persons were sent the six-month survey, and five individuals responded to at least one question for a response rate of 29% (see Table 14).

Table 14. Findings From Support Persons Survey at Six Months (n=5)		
How helpful would you say the text messaging was with your loved one's mental health recovery? **(n=5)**		
	N	**Percent**
Very Helpful	0	0%
Helpful	2	40%

Neither Helpful nor Unhelpful		3	60%
Unhelpful		0	--
Very Unhelpful		0	--
Has your loved one been hospitalized voluntarily or placed on an involuntary hold in the past 6 months since enrolling? **(n=5)**			
Yes		2	40%
No		3	60%
Has your loved one entered a crisis stabilization facility in the past 6 months since enrolling? **(n=5)**			
Yes		2	40%
No		3	60%

Youth Expansion

In May 2020, Push Tech was expanded to include youth enrolled in VCBH services to provide them with a sense of connectedness and coping strategies during the COVID-19 pandemic. Sixteen individuals enrolled in the Youth Expansion component and 14 engaged in the texting service. The youth were given the option to also enroll a support person, and 11 support persons enrolled in the texting service.

Figure 6. Engagement in Texting Service (n=14)

- Participants who responded to at least half of the texts sent to them: 64%
- Participants who responded to less than half of the texts sent to them: 21%
- Participants who never responded to texts sent to them: 14%

Youth Expansion Participant Characteristics

Data collected on Youth Expansion participant's demographics included gender and race only from the respondents who completed the follow-up survey (see Table 15).

Table 15. Youth Expansion Participant Characteristics			
Indicator	**Category**	**N**	**Percent**
Gender (n=7)	Male	2	29%
	Female	5	71%
Race (n=7)	Latino/Hispanic	7	100%

Youth Expansion Outcomes

Findings from the 30-day survey

Thirteen participants were sent the 30-day follow-up survey and of those, 63% (n=8) participants responded to at least one question. Responses may include feedback from a support person, answering on behalf of his or her loved one (see Tables 16 and 17).

Youth Expansion Satisfaction with the Push Tech Texting Service

Table 16. Findings From 30-day Youth Expansion Survey (n=8)		
	N	**Percent**
How satisfied were you with the text messaging service? (n=8)		
Very satisfied	3	38%
Somewhat satisfied	5	63%
Not very satisfied	0	--
How would you rate the frequency of the texts? (n=8)		
About right	5	63%
Too often	0	--
Not often enough	3	37%

Youth Expansion Outcomes

Table 17. Findings From 30-day Youth Expansion Survey (n=8)		
	N	**Percent**
This text messaging system has helped my mental health recovery (n=8)		
Strongly Agree	2	25%
Agree	4	50%
Disagree	1	13%
Strongly Disagree	1	13%
How often have you taken your medication as prescribed in the past 30 days? (n=7)		
Always	6	86%
Usually	1	14%
About half the time	0	--
Rarely	0	--

Impact

The key evaluation question about the impact that the Push Tech project has had on program participants is whether mobile EMI support reduced the rate of re-hospitalization. In order to answer this question, two data sources were utilized included self-reported rehospitalizations from the participants on the six-month survey and VCBH EHR data on rehospitalization rates. Due to very limited Avatar data available, the crisis stabilization unit rates for Push Tech participants were not analyzed.

Rehospitalization and Crisis Stabilization Self-Reported Outcomes
Rehospitalization and crisis stabilization rates reported by participants six-months after participating in the texting service are provided in Table 18. For respondents who completed the six-month follow-up survey, 20% (n=10) reported being hospitalized or placed on an involuntary hold in the past six months. A study on reducing six-month inpatient psychiatric recidivism and costs through case management found that the baseline group, which did not receive any intervention, had a recidivism rate of 49.67% for rehospitalization (Kolbasovsky et al., 2010). The self-reported six-month recidivism rate for Push Tech participants was much lower than this rate at 20% (see Table 18).

Table 18. Rehospitalization and Crisis Stabilization Self-Reported Outcomes for Program Participants (n=42-49)		
	Yes	**No**
Have you been hospitalized or placed on an involuntary hold in the past 6 months since enrolling? (n=49)	20% (n=10)	80% (n=39)
Did you enter a crisis stabilization facility in the past 6 months since enrolling? (n=42)	17% (n=7)	83% (n=35)
Respondents who indicated that they were admitted to a hospital or crisis stabilization facility in the past 6 months: (n=42)	29% (n=12)	71% (n=30)

Rehospitalization Findings Avatar Data

Data was obtained from VCBH's Avatar database on hospitalizations during the project period for a small sample of Push Tech participants as well as a control group. The control group included VCBH clients who were hospitalized during the project period. It should be noted that VCBH's Avatar database only contains client data for those individuals who were discharged from county funded hospital and crisis stabilization programs. Avatar data does not include information on individuals who were discharged from privately funded hospitals. A large sample of individuals who were hospitalized during the project period was provided for the control group (n=2,216). The rehospitalization rate for the control group across the entire project period was 38% and can be used as a benchmark for comparison to Push Tech participants.

The rehospitalization rate within 90 days for Push Tech participants was 16% (see Table 19), which was lower than the control group's rehospitalization rate of 22%. It is important to point out that Push Tech participants received text support, including voluntary appointment reminders for 90 days following enrollment upon discharging from the hospital. The rehospitalization rate for the control within six months of the first hospitalization included in the dataset was 27%. The rehospitalization rate for Push Tech participants within six months of enrolling was 28% which is nearly the same as the control group.

Due to the small sample size available for Push Tech participants, it is not possible to draw any conclusions, but these findings are promising that the text support may have had an impact on rehospitalization rates. Should additional data be available for future analysis, it would be worthwhile to determine if there was a statistically significant difference in the rehospitalization rates for Push Tech participants within 90 days of enrolling in the texting platform when compared to the control group. The results below include the preliminary findings based on the Avatar data provided by VCBH in December, 2021.

Table 19. Rehospitalization Rates within Ninety days	
	Rehospitalization Rate
Push Tech Participants: Rehospitalization Rate for Push Tech Clients Within Ninety days of Enrolling in the Texting Service (n=25)	16%
Control Group: Rehospitalization Rate for Control Group Within Ninety Days of First Hospitalization Included in Avatar Data (n=2,216)	22%

Table 20. Rehospitalization Rates within Six Months	
	Rehospitalization Rate
Push Tech Participants: Rehospitalization Rate for Push Tech Clients Within Ninety days of Enrolling in the Texting Service (n=25)	28%
Control Group: Rehospitalization Rate for Control Group Within Ninety Days of First Hospitalization Included in Avatar Data (n=2,216)	27%

Implementation Challenges, Lessons Learned, and Successes

Information on the Push Tech project challenges, lessons learned, and successes was gathered through nine key stakeholder interviews.

Enrollment Implementation

Hospital site staff were very excited about the project, so it was easy to get people on board for the training. All sites interviewed reported enrollment processes consistent with instructions provided during training from VCBH, indicating that training was effective.

Enrollment Challenges

Primary difficulties with enrolling patients in Push Tech were logistical challenges, such as not enough staff or time to enroll patients, or patients not having an interest in the program.

- **Site and enrollment settings.** Sites reported different capacities for enrolling participants due to resource constraints such as available staff and time. Notably, one site reported not having adequate staffing to implement Push Tech due to mandated staffing levels. In addition to resource constraints, logistical difficulties included staff not having access to computers and patients not having access to their phones during discharge appointments.

> "The salient problem here is critical understaffing, so anything that takes more time is problematic."

> "The difficulty enrolling has nothing to do with the program,
> just lack of staffing and very high caseloads."

- **Continued engagement and outreach**. As time progressed, the enrollment numbers declined. An interviewee stated that the facilities needed a training plan to get the people in the hospitals more engaged. Follow-up with the facilities to discuss talking about the program with their clients was needed. If there was an enhanced outreach component the program would have been more successful.
- **The program was not appropriate for all patients.** Examples include patients moving to a higher level of care (e.g., psychiatric unit), instead of back into a community setting, or patients with severe mental illness, including paranoia, contributing to a fear of providing personal information via text.
- **Lack of access to phones**. Many patients do not have phones or consistent cellular plans. Additionally, youth patients sometimes have conflicts with parents/caregivers about independent phone usage. For example, in many cases, parents/caregivers perceive use of the phone and social media as a contributing factor to the mental health crisis experienced by their child and are reluctant to provide access to the phone immediately after discharge from an acute mental healthcare setting.
- **Patients need more information.** Examples of such information include who is on the other end of the text message, and what will happen when the patient responds. Parents/caregivers and participants are fearful of what could happen if they respond with a low mood rating or negative comments (e.g., police or crisis team will show up). Additionally, patients are wary of sharing personal information, including their medical history, protected health information, and personal cell phone number.
- **Timing of enrollment**. At the time of discharge there is already a lot of information shared with patients, so it is overwhelming to add more. Additionally, information about enrollment in Push Tech competes with other important information relevant to ongoing treatment and recovery.
- **Patients lack interest**. Some patients simply do not see value in enrolling. Some patients are motivated to leave the hospital as soon as possible, so do not want to take the time to get information about the service. In addition, patients often do not feel they have the need for additional support from Push Tech; they have family support or social support; or they already committed to going to an outpatient appointment.

Lessons Learned

Stakeholders described learnings on what made the program valuable or easier for patients to understand and enroll.

- **Explaining the benefits to patients and parents/caregivers** helped to encourage enrollment. Staff explained that this program is resource rather than just a study, and that it offers a connection to more information about local services in the patient's community. Staff found it more effective to explain the program during the after-care planning conversation than during discharge.

- **The online enrollment process** was easier to use and faster than the paper form. Patients found the paper form visually difficult to follow. Parents/caregivers were unsure if they should fill out the form for themselves or their child, and were intimidated by the information requested (e.g., medical history).

- **Having assistance during enrollment** also helped encourage some parents/caregivers and patients to join the program. Staff noted that parents/caregivers appreciated having someone to help the complete the enrollment form for them and answer questions.

- **Brochures were helpful** as an accessible and easy-to-read explanation of the study, giving participants an opportunity to sign up on their own time if desired.

- **Focusing on a lower level of care** may have been beneficial. Leaving a hospital may have been too high a level of care as it is a greater level of acuity. Having the focus be on a crisis stabilization unit may have made the program more successful.

Successes

Program Value

Across all interviews, stakeholders unanimously said Push Tech is a valuable program. Stakeholders identified it as particularly helpful for parents/caregivers who want to help their child, youth who are very comfortable using phones and technology to communicate, and patients who do not have family or social support. Stakeholders provided specific reasons for the program's value.

- Because the evening time is when most people struggle, having a text "come out of nowhere" in the evening is meaningful.
- The simplicity of the response (e.g., just one letter) is a strength of the program.
- When a child and caregiver are not communicating effectively, Push Tech functions as a form of communication, providing a status update to the caregiver, friend, or family member.
- It held people accountable for appointments and checking in on patients made them feel important and helped them stay focused.
- Some people do not like talking on the phone especially when it is mental health and very sensitive. Having a text message system was beneficial for keeping on task, checking in with the support team, and not missing appointments.
- It was helpful for people to have support, especially during the pandemic, as it is not easy to get through to the facility so having someone checking in was perceived as helpful.
- A big benefit is that patients released from a hospital are not forgotten or fall through the cracks of the system. It was reported that this was a great way of checking in with patients with a simple text message with "how are you today," or "here are these resources…", and reminding them they are not alone, or there is help, and where they can find help, resources, and tools. Also beneficial was reminding them they could call 211 for any type of need.
- For the patients who participated, they found benefit with the program, especially those who were younger participants.
- Sites that were trained were grateful for the service.

"A lot of people who are mentally ill burn their bridges, so they become estranged and isolated. They are not able to communicate with family or friends. This can really help with that."

"Sometimes youth aren't willing to reach out to primary caregivers. This gives them someone to reach out to."

> "So many people with mental illness are isolated and this project opens up communication between mental health providers and the mentally ill person."

> "Young people are very glued to phones and having immediate access to things is extremely helpful, particularly for those who find it difficult to reach out to support."

> "We can't get social or family support for people and it's one thing that they really need. This opens that up for them if they are willing."

Conclusion & Recommendations

Conclusion

VCBH developed the Push Tech project to provide support to patients being discharged from psychiatric inpatient facilities and residential crisis stabilization units with limited information from existing literature on previous projects that utilize technology platforms to support mental health recovery. Throughout the implementation of the project, VCBH learned several lessons that would be very useful for future projects that would be using similar technology to support patients during this difficult time. Valuable lessons learned from this project include the challenges with enrolling patients upon being discharged from a psychiatric hospital or crisis stabilization unit. Logistical challenges and resource constraints, such as not enough staff or time to enroll patients, or patients not having an interest in the program, were among the findings. Another important finding was that this type of support may not be appropriate for all patients, including patients who are moving to a higher level of care and patients with severe mental illness. Targeting patients receiving a lower level of care may be more successful as leaving an inpatient psychiatric hospital may have been too high a level of care as it is a greater level of acuity. Having the focus be on a crisis stabilization unit may lead to more success with implementation. Also, having assistance during enrollment, providing patients with the benefits of participating, and providing online enrollment options may help more patients enroll in a similar project.

The Push Tech project was successful at achieving outcomes towards the goals of 1) client satisfaction with EMI technology and 2) perceived value of EMI technology in mental health recovery. Overall, participants expressed a high level of satisfaction with the texting service and found it to be valuable in their mental health recovery. Results for the goal of reducing the rate of rehospitalization are promising based on self-reported rehospitalization rates within six months and findings from Avatar data for rehospitalization rates within 90 days of enrolling in Push Tech. Results from both data sources were found to be lower than the average based on the control group. Results for the goal of increasing follow-up appointment adherence based on the available data found that Push Tech participants attended their post-discharge follow-up appointments at a higher rate than the control group. An interesting finding was that participants who had a support person enrolled in the texting service experienced fewer rehospitalizations and crisis stabilization stays than those who did not have a support person enrolled. This finding may be very beneficial for similar projects in the future to emphasize the value of including a support person in the process to support their loved one's mental health recovery.

VCBH does not have any current plans to continue the Push Tech project but will utilize the findings in order to inform future projects that implement technology platforms to support patients in their mental health recovery. VCBH plans on sharing the results with the state as well as other interested parties.

Recommendations

The following are a series of recommendations that were informed by feedback obtained from project stakeholders. The following recommendations can be considered if VCBH should consider resuming the project or to assist other counties who are planning to implement a similar texting service.

1. **Create an informational website or webpage** in which patients can:
   a. Watch a video explaining the purpose of the program, what patients can expect during participation, and how personal information and texts are kept confidential.
   b. Access wellness information, community resources, the VCBH website, and other institutions.
   c. Call a phone number for help enrolling in the program.
2. **Add a website link** or **QR code** to the existing brochure so patients can easily enroll after they leave the hospital.
3. **Provide support to staff** in answering questions about the program, including how the service can be used by patients and parents/caregivers, and how their privacy will be maintained.
4. **Move the explanation of the program** to after-care planning conversation, rather than discharge, when possible.
5. **Continued engagement/outreach with the hospitals** is recommended to keep staff engaged and trained.
6. **Change the format of enrollment** to increase clarity, ease of completion, and to assuage concerns about privacy.
   a. Remove questions about history of hospitalization from enrollment form as they can be perceived as intrusive to participants. Move to the end of texting service information if needed.
7. **Emphasize the importance of including a support person** upon enrollment.
8. **Consider expanding the program** to lower levels of care and isolated individuals including:
   a. Individuals being served by behavioral health outpatient services.
   b. Individuals with a lack of support such as isolated individuals, those who are recently widowed, or house-bound individuals.
   c. Individuals with disabilities.

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Appendix A: Additional Demographic Information

Additional information on Push Tech participants demographics was obtained from the respondents who completed the 90-day survey. The results are below in Table 21.

Indicator	Category	N	Percent
	Table 21. Participant Characteristics Obtained From 90-day Survey (n=23)		
Gender (n=23)	Male	8	35%
	Female	12	52%
	Genderqueer	1	4%
	Other gender identity	2	8%
Race (n=23)	White	6	26%
	Latino/Hispanic	10	43%
	Black or African American	2	9%
	Asian	1	4%
	More than one race	4	17%