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Behavioral Health

CONTENTS

In this report, we review the following challenges in behavioral health and indicate how digital health technologies can reduce costs and improve outcomes.

Why Behavioral Health?

Patients with behavioral health issues are some of the most expensive groups of patients to manage. Unlike the management of many physical illnesses, behavioral health may be more easily managed with digital health interventions. Moreover, the declining stigma of behavioral health treatment, increased willingness of patients to use telehealth for behavioral health services,[1] and the high cost of managing chronic physical conditions complicated by behavioral health comorbidities make this space ripe for disruption.

Defining Behavioral Health

Behavioral health is defined as mental, emotional, psychological, mood / affective, developmental, personality, and substance use disorders. Behavioral health issues range in severity from short-term struggles arising from life events to chronic, disruptive behavioral health disorders that inhibit daily function without proper, active, and consistent management.

Examples of behavioral health conditions include:

- **Depression**
- **Anxiety**
- **Post-traumatic stress disorder (PTSD)**

- **Schizophrenia**
- **Developmental disorders, such as autism and attention deficit hyperactivity disorder (ADHD)**
- **Substance abuse**

According to the National Institute of Mental Health (NIMH), the most common behavioral health disorders among adults over age 18 are major depression and social phobias. In addition, based on findings from the Substance Abuse & Mental Health Services Administration (SAMHSA), the most prevalent substance use disorder among people over age 12 is alcohol use disorder. For the purposes of this report, behavioral health does not include chronic medical conditions that may require behavior changes (e.g. diabetes, chronic cardiopulmonary conditions), neurological diseases (e.g. epilepsy, stroke), or diseases of aging (e.g. Alzheimer's) that may also be comorbid with mental illness.

Stakeholders in Behavioral Health

- Specialists (e.g. psychiatrists, psychologists, counselors, psychiatric nurses)
- Primary Care Physicians (PCPs)
- Social workers
- Patients
- Family and caregivers
- Community organizations (e.g. National Alliance on Mental Illness)

[1] *2015 survey conducted by PWC*

Spend and Financing

In 2009, behavioral health treatment expenditures from all public and private sources totaled $171.7 billion in the US; those costs are forecasted to grow to a total of $280.5 billion by 2020.[2]   Among behavioral health service providers, hospitals spent $37.8 billion on behavioral health treatments in 2009.[3]   Further, in 2013, approximately 13% of behavioral health discharges and 10% of substance use discharges were readmitted within 30 days.[4]

Depression is the most costly behavioral health disease and is the sixth most costly disease in the US, accounting for $71B in spending in 2013, with the majority of spending going towards ambulatory care (53.1%), pharmaceuticals (32.1%), and inpatient care (11.6%).[5]   Other high-expenditure behavioral health diseases are anxiety disorders ($29.7B), ADHD ($23.2B), schizophrenia ($17.6B), drug use disorders ($13.5B), and bipolar disorder ($13.1B).[6]

Behavioral health services are primarily funded by public sources, with 61% of expenditures in 2010 attributed to Medicaid, Medicare, and/or other federal, state, and local programs.[7]   Private insurance generally offers some coverage for behavioral health services but compared to medical services, the level of coverage has historically been much more limited in terms of the number of visits or inpatient days provided; it often requires a higher level of cost-sharing from members as well. To make private insurance coverage more equitable, Congress passed the Mental Health Parity Act of 2008, which requires group plans covering 50 or more employees to provide comparable benefits for behavioral health services as they do for medical services, preventing treatment limitations and the imposition of more restrictive financial requirements for behavioral health services. Nevertheless, despite growing bipartisan support and after nearly a decade since the original legislation, denials of coverage remain a challenge.

In December 2016, the US Senate passed the landmark $6.3 billion "21st Century Cures Act," the most significant behavioral healthcare legislation in 20 years, by a vote of 94-5. The bill represented a notable shift away from the existing system of crisis intervention to one focused on early identification and intervention, along with continuity of and access to care.[8]

Another major financier of behavioral health treatment is employers. Employers report five missed workdays and 11.5 days of reduced productivity every three months for an individual with depression, resulting in 200 million lost workdays per year and $17-44B in lost productivity.[9]   Researchers calculated that for every $1 invested in behavioral health programs, a return of $3-$5 in recovered economic contributions would be realized as well as a gain in the number of healthy years in the patient's life.[10]   Investment in behavioral health is key for cost savings.

[2] SAMHSA, 2014.
[3] SAMHSA, 2014.
[4] HCUP National Inpatient Sample (NIS), 2013, Agency for Healthcare Research and Quality (AHRQ).
     http://hcupnet.ahrq.gov/HCUPnet.jsp?Id=950EC07F11A888AF&Form=DispTab&GoTo=SelDXPR&JS=Y
[5] US Spending on Personal Health Care and Public Health, 1996-2013. JAMA. 2016;316(24):2627-2646.
[6] US Spending on Personal Health Care and Public Health, 1996-2013. JAMA. 2016;316(24):2627-2646.
[7] Kaiser Family Foundation 2011. Mental Health Financing in the US.
[8] Paulson, "In Rare Bipartisan Success, Congress Passes Major Mental Health Bill."
[9] https://www.cdc.gov/workplacehealthpromotion/evaluation/topics/depression.html
[10] http://thelancet.com/journals/lanpsy/article/PIIS2215-0366(16)30024-4/abstract

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Challenges in Behavioral Health

Access

Providing access to care due to the shortage of behavioral health specialists

Lowest hanging fruit for providers to solve

Treatment

Improving treatment with better patient engagement or collaborative care models

Can be achieved after access is provided

Triage

Identifying and segmenting riskiest populations for intervention

Best suited to providers in risk-based contracts

Poor access to behavioral healthcare:

Digital health models, such as telemedicine, may overcome the shortage of behavioral health practitioners, stigma surrounding behavioral health conditions, and geographic scarcity of resources in rural environments.

Barriers to evidence-based treatment:

New care models, such as collaborative care models and measurement-based care, can improve treatment outcomes if more broadly adopted. Growing academic evidence indicates that behavioral healthcare administered remotely via web-based and mobile platforms may be just as effective as care administered in-person for some conditions. Healthbox predicts that these tools can result in improved care coordination and easier tracking of disease progress, which results in better outcomes and lower costs.
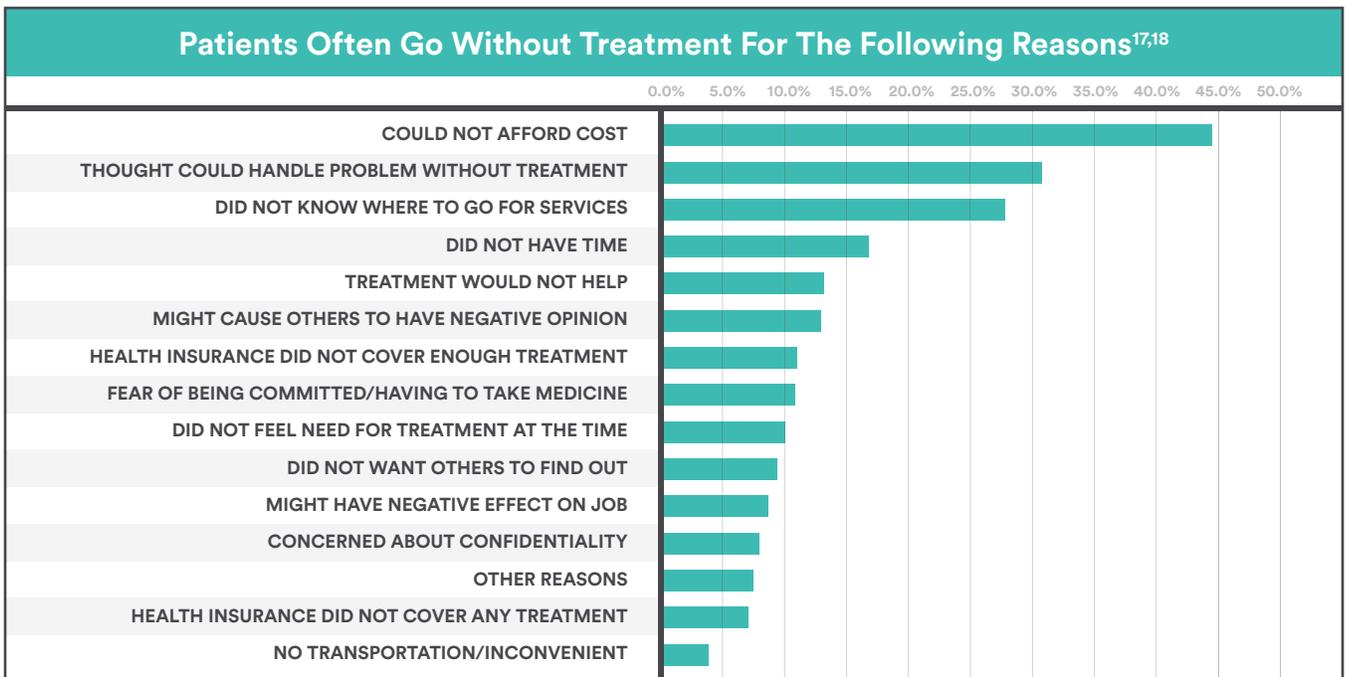
Limited triage:

Technology can be used to identify patients for intervention based on behavioral health condition and severity in order to treat the most risky populations. For patients with a chronic physical condition, treatment may be more complex and costly if it is complicated by a behavioral health comorbidity. Since behavioral health conditions are often comorbid with other chronic diseases, identifying these patients and managing their behavioral health conditions can also result in better compliance in managing physical conditions, therefore further reducing avoidable costs. Triage also serves the purpose of matching the competencies of a range of behavioral health professionals and facilities to the unique needs of specific patients, resulting in more cost effective deployment of professional resources.

Challenges in Behavioral Health

Understanding the challenges in diagnosing and treating behavioral health conditions is key to defining and selecting the best digital health solutions.

Challenge: Access

- Lack of access to treatment due to limited supply of behavioral health specialists, especially in low resource and remote areas[11,12]

- Stigma associated with having a behavioral health condition and reluctance to seek help for those conditions[13]

- Higher ED usage and shortage of inpatient psychiatric beds[14]

- Serious mental illnesses and substance abuse disproportionately affect the impoverished, uninsured, homeless, and incarcerated populations. Due to these groups' lack of insurance coverage, these populations[15] are more likely to use the ED to access care, resulting in higher costs to the healthcare system.

- Poor follow-up from ED visits (i.e. referrals to providers)[16]

Patients Often Go Without Treatment For The Following Reasons[17,18]

	0.0%	5.0%	10.0%	15.0%	20.0%	25.0%	30.0%	35.0%	40.0%	45.0%	50.0%
COULD NOT AFFORD COST											
THOUGHT COULD HANDLE PROBLEM WITHOUT TREATMENT											
DID NOT KNOW WHERE TO GO FOR SERVICES											
DID NOT HAVE TIME											
TREATMENT WOULD NOT HELP											
MIGHT CAUSE OTHERS TO HAVE NEGATIVE OPINION											
HEALTH INSURANCE DID NOT COVER ENOUGH TREATMENT											
FEAR OF BEING COMMITTED/HAVING TO TAKE MEDICINE											
DID NOT FEEL NEED FOR TREATMENT AT THE TIME											
DID NOT WANT OTHERS TO FIND OUT											
MIGHT HAVE NEGATIVE EFFECT ON JOB											
CONCERNED ABOUT CONFIDENTIALITY											
OTHER REASONS											
HEALTH INSURANCE DID NOT COVER ANY TREATMENT											
NO TRANSPORTATION/INCONVENIENT											

[11] Interview with Dr. Eric Kuhn, Clinical Psychologist, National Center for PTSD, March 2017
[12] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5076486/pdf/pop.2016.0114.pdf
[13] http://apt.rcpsych.org/content/6/1/65
[14] http://ihssf.org/PDF/foundationbhpatientboarding.pdf
[15] https://www.hudexchange.info/resources/documents/2010HomelessAssessmentReport.pdf
[16] Interview with Dr. Christine Moberg, Pacifica Labs
[17] SAMHSA, 2014.
[18] Statista

Challenge: Treatment

- High readmission rates: 13% of behavioral health discharges and 10% of substance abuse discharges readmitted within 30 days[19]

- Suicide risk and provider liability[20]

- Treatment problems – patients, in part due to the underlying psychopathology, have challenges with:[21]
  - Remembering how to manage their condition and knowing what to do
  - Accountability and attendance at medical appointments
  - Adherence to medication
  - Disenfranchisement and inadequate engagement[22]
  - Cognitive impairment and difficulty focusing on and understanding clinician instructions[23]

- Clinician burnout[24]

- Barriers to receiving information due to:[25]
  - Increased information sensitivity for behavioral health making it difficult to share EHR data across providers
  - Lack of information on medical, behavioral, and socioeconomic factors

- Lack of integration, communication, and coordination between Primary Care Providers (PCPs) and behavioral health specialists[26]

Example Treatments

- Medications: antidepressants, mood stabilizers, anti-anxiety, antipsychotics, stimulants

- Psychotherapy (talk therapy[27]): Cognitive Behavioral Therapy (CBT), Dialectical Behavioral Therapy (DBT), Exposure and Response Prevention Therapy (ERP), Behavior Therapy, Humanistic Therapy, Integrative Therapy

- Electroconvulsive therapy for the most severe cases (e.g. psychosis, severe depression)

- Vagus Nerve Stimulation

- Transcranial Magnetic Stimulation

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[19] http://hcupnet.ahrq.gov/HCUPnet.jsp?Id=950EC07F11A888AF&Form=DispTab&GoTo=SelDXPR&JS=Y
[20] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3074199/
[21] Interview with Dr. Eric Kuhn, Clinical Psychologist, National Center for PTSD, March 2017
[22] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5076486/pdf/pop.2016.0114.pdf
[23] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5076486/pdf/pop.2016.0114.pdf
[24] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3156844/
[25] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5076486/pdf/pop.2016.0114.pdf
[26] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5076486/pdf/pop.2016.0114.pdf
[27] http://www.apa.org/topics/therapy/psychotherapy-approaches.aspx

Challenge: Triage

- Difficult to measure behavioral health status: While other conditions have measureable vital signs, there are not many behavioral health metrics for either quantitative measures of the severity of the problem or qualitative evaluations of the diagnosis and the underlying mechanism of the disorder, which can affect the selection of target patients and appropriate matching with the provider. However, a trend towards measurement-based care is increasing.[28]

- Higher costs for chronic conditions and poor identification of patients with chronic diseases and comorbid behavioral health issues

Opportunity to Improve Chronic Physical Conditions Outcomes

68% of adults with a mental illness have one or more chronic physical conditions.[29] This is especially relevant to providers in risk-based contracts, as evidence has found that these patients face higher costs and poorer outcomes; specifically, those with behavioral health comorbidities have healthcare costs that are 75% higher than those without a behavioral health diagnosis.[30] However, only 20% of patients with a behavioral health comorbidity receive treatment for their behavioral health condition. The presence of a depressive or anxiety comorbidity increases medical utilization and is associated with poorer adherence to treatment plans, greater chronicity, slower recovery, increased rates of reoccurrence, and greater psychosocial disability.[31]

In particular, Chronic Kidney Disease has the greatest value opportunity as patients with comorbid depression have a two-fold increase in the likelihood of hospitalization or death. Other conditions with the greatest potential for savings are COPD, hypertension, and circulatory conditions (per-patient basis) as well as arthritis and asthma (population basis). Estimates across diseases in commercial, Medicaid, and Medicare markets suggest $26-48B can be saved with CCMs (or approximately 5-10% of total healthcare costs).[32]

[28] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5076486/pdf/pop.2016.0114.pdf
[29] MHFA
[30] CDC
[31] Hirschfeld, Robert. The Comorbidity of Major Depression and Anxiety Disorders: Recognition and Management in Primary Care. Primary Care Companion J Clin Psychiatry 2001;3(6)
[32] Economic Impact of Integrated Medical-Behavioral Healthcare: Implications for Psychiatry. Milliman, Inc.

Digital Health's Potential to Impact Behavioral Health

As outlined in the previous section, there are a multitude of problems facing the behavioral health space, creating opportunities for a variety of digital health solutions to address these challenges.

In the past 10 years, over 50 RCTs have consistently shown that digital interventions, especially those that have a human component such as a care manager, can be effective, with the size of the effect being similar to psychotherapy or medication.[33]

Below are examples of how technologies are addressing some of the aforementioned challenges.

CHALLENGE	POTENTIAL DIGITAL HEALTH SOLUTION	CAPABILITIES REQUIRED
Access to Care: Lack of behavioral health specialists, especially in rural areas, and fear of others knowing about a behavioral health condition	• Telemedicine (telepsychiatry, teletherapy, bi-directional clinical texting)	• Connect patients to specialists via telephone, video, or text at home or in the primary care setting
Barriers to Effective Treatment: Adherence to medication and, treatment plans as well as monitoring between sessions	• Patient engagement with web and mobile applications • Digital therapeutics, including CCBT, virtual reality (VR), gamification, and wearables • Collaborative Care Models: Coordinating care and communication between various stakeholders	• Measure and monitor stress and anxiety, sleep quality, mood, and enjoyment • Provide coaching and education on behavioral health self-care • Adherence to medication • Coordinate between inpatient, outpatient, and community-based organizations
Lack of Screening and Segmentation Tools for Patient Triage: Identifying vulnerable populations and intervening at the right points in care	• Big data, predictive analytics, artificial intelligence, and machine learning • Assessment tools	• Identify patients that are at-risk for behavioral health conditions • Measure effectiveness of interventions in terms of clinical outcomes and costs • Ability to synthesize large volumes of data, identify patterns, and predict triggers based on patient's app, wearable (e.g. GPS), and self-reported data

[33] *Interview with Dr. David Mohr, CBIT, Northwestern March 2017*

Care Models in Behavioral Health

Collaborative Care Models (CCMs)[34]: The CCM model, which integrates behavioral health to allow for better communication and collaboration between PCPs and behavioral health specialists, result in improved care coordination. Patients receive specialized attention and treatment for their behavioral health conditions to promote patient engagement for all their medical care. This is particularly effective for patients with co-morbidities, with 68% of adults with a mental illness also experiencing one or more chronic physical conditions.[35,36,37,38] Delegation of responsibility for behavioral health conditions to specialists also enables PCPs to focus on other aspects of patient care. Widespread adoption of this model has not yet occurred due to barriers such as physical separation of care for physical and behavioral health, different payment systems with limited reimbursement, and sensitivies for sharing behavioral health information. Telemedicine is making an impact by connecting PCPs and behavior health specialists across care settings. Also it is also used for real-time referrals and allows patients to attend a telepsychiatry consult in a nearby exam room at the point of care. CCMs Evidence from over 80 randomized control trials (RCTs) demonstrates strong result in cost savings and improved outcomes.[39]

Measurement-Based Care (MBC) Model: The MBC model is defined as the systematic administration of symptom rating scales and use of the results to drive clinical decision making at the level of the individual patient.[40] A literature review conducted at the University of Washington of multiple RCTs showed that MBC improved outcomes. With the advent of smartphones, additional patient data can be mined to determine a patient's health status via direct approaches (i.e. clinician-facing dashboards based on patient-reported outcomes, assessment tools, and text message exchanges) and in-direct approaches (i.e. leveraging passive data collection, including patient condition based on voice, light sensors, accelerometers, and GPS to determine if the patient is spending a lot of time at home which can be an indicator for depression. Based on this data collection, behavioral health technologies may offer outreach to the patient and the clinical team if there is evidence of a deteriorating condition. This is especially useful in a value-based care environment.

Employee Behavioral Health Wellness Program: An example of a successful rollout of employee-facing behavioral health initiatives is that of tire manufacturer, Michelin, which has seen a 30% reduction in related outpatient claims spending. Partnering with Beacon Health Options, a digital health company providing behavioral healthcare solutions, Michelin's program has Employee Assistance Program (EAP) counselors at its on-site health centers, a digital cognitive behavioral therapy (CBT) tool, and telepsychiatry services for its campuses in areas with a shortage of psychiatrists. Additionally, the programs offered to employees should integrate with the patient's larger healthcare ecosystem, either connecting them with in-network or employer-supported therapists or offering online tools that patients can use independently. In 2014, overall utilization of Michelin's EAP was 19% and the company's behavioral health program boasts a return on investment of 182%.[41]

[34] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5076486/pdf/pop.2016.0114.pdf
[35] https://aims.uw.edu/collaborative-care
[36] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5076486/pdf/pop.2016.0114.pdf
[37] http://www.chcs.org/media/HH_IRC_Collaborative_Care_Model__052113_2.pdf
[38] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3810022/
[39] http://ps.psychiatryonline.org/doi/abs/10.1176/appi.ps.201500439
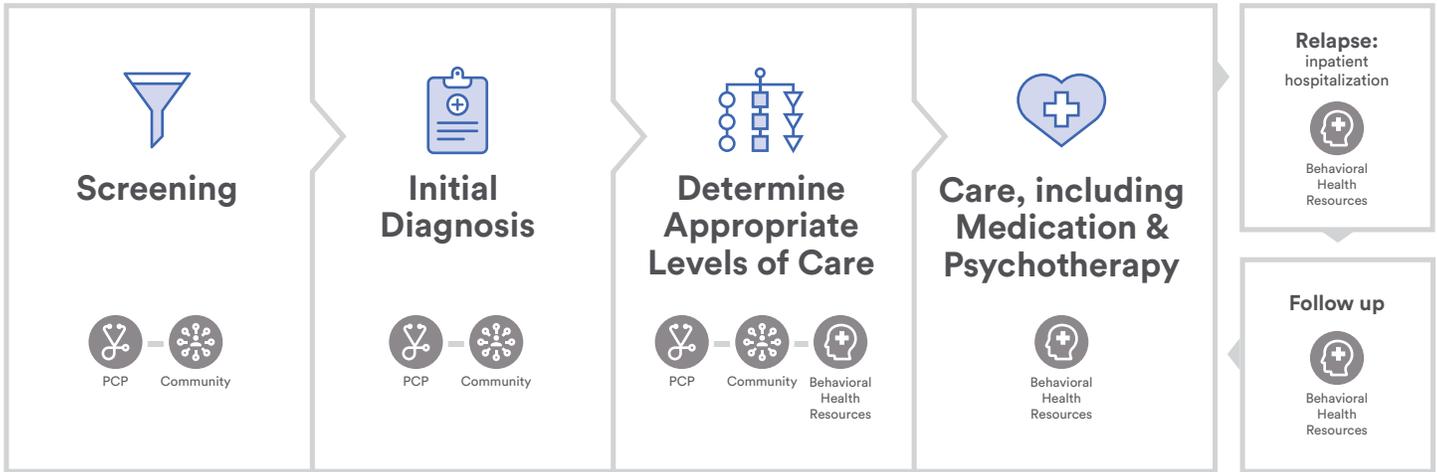[40] Interview with Dr. Dror Ben-Zeev, University of Washington, March 2017
[41] http://files.ibiweb.org/uploads/general/Michelin_Employee_Life_Services_Program_.pdf

Example Program – Severe Depression Patient Journey[42]

Screening	Initial Diagnosis	Determine Appropriate Levels of Care	Care, including Medication & Psychotherapy
PCP — Community	PCP — Community	PCP — Community — Behavioral Health Resources	Behavioral Health Resources

Relapse: inpatient hospitalization

Behavioral Health Resources

Follow up

Behavioral Health Resources

Digital Health Intervention:

Triage
PATIENT SCREENING & SEGMENTATION
(Analytics, Assessment Tools)

Access
ACCESS TO SPECIALISTS
(CCBT, Educational Modules, Collaborative Care)

Treatment
IMPROVED PATIENT ENGAGEMENT
(Telemedicine)

Key:

PCP:
Primary Care Practitioner

Community:
Family & Caregivers
Employer
Law Enforcement

Behavioral Health Resources:
Psychiatrist
Therapist / Clinical Psychologist / Counselors
Psychiatric Nurses
Medical Assistants
Clinical Social Worker
Lay Support
Advocacy Groups

This patient journey map illustrates how a patient with severe depression may interact with the healthcare system and stakeholders. The patient, initially interacting with the PCP, will be screened and diagnosed for disease. Once diagnosed, the patient may be triaged based on severity and potentially referred to a behavioral health specialist to be treated.

The easiest intervention level for providers to utilize digital health technologies is to provide access to behavioral health specialists using solutions such as telemedicine. Once access is established, the healthcare provider may consider improving or supplementing treatment with patient engagement apps or digital therapeutics or by better coordinating care between PCPs and specialists. Finally, for providers taking on risk, screening methods to identify high-risk patients, especially those with chronic physical comorbidities, may lead to cost savings.

[42] This infographic is an illustrative example for severe depression. Patient journeys vary for other types of conditions (e.g. substance use, behavioral health as a co-morbidity, PTSD).

Success Factors for Digital Health Solutions in Behavioral Health[43,44,45,46]

Access: Continuity of Care

IMPACT: Behavioral health patients can get the specialist care they need when they need it.

Treatment: Engagement

IMPACT: A more engaged patient will be more involved with and adherent to their treatment plan, thus avoiding preventable costs and optimizing the types and timeliness of care.
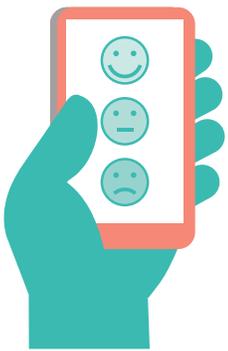
- Simple & intuitive design; Patient-centric
- App-like interactions
- Proactive selection of motivated patients
- Patient education to reduce suicide risk

- Integration into practice and workflows
- Facilitate actionable physician-patient communication
- Deterioration detection

- Customizable approach based on disease and severity
- Flexible to different populations
- Adjustments for age or cognitive impairment

- Track symptoms
- Aggregate information for reporting
- Proactively identify and address triggers

Triage: Population Health

IMPACT: The correct types of population receive the correct modalities and types of treatment, which in turn benefits the population health metrics of the organization using the right technology

43 *Interview with Dr. David Mohr, CBIT, Northwestern, March 2017.*
44 *Healthbox Innovation Rising Podcast Episode 10. Chris Novak, COO Behavioral Medicine Service Line at AMITA Health.*
    https://soundcloud.com/healthbox/episode-10-chris-novak-coo-behavioral-medicine-service-line-at-amita-health
45 *Healthbox Analysis*
46 *Strategies for mHealth Research: Lessons from 3 mobile intervention studies*

Success Factors in Behavioral Health

Access and General Considerations: Connect Patients to Behavioral Health Specialists

Telemedicine solutions can extend care and access to remote or vulnerable populations. The best solutions will consider cross-state licensing and reimbursement challenges associated with virtual care. Telemedicine gives patients access to care when they need it, despite the shortage of providers. Tools that connect patients to other resources and ensure continuity of care in clinical and non-clinical settings are also attractive. Finally, specific considerations for behavioral health include overcoming interoperability challenges for more dated EHRs in open notes formats and managing the numerous stringent rules for protecting sensitive patient data.

Treatment: Improve Patient and Provider Engagement

Once patients with behavioral health conditions receive access to a behavioral health tool, the next step is involving patients and providers in proper engagement. For patients, engagement requires simple and intuitive design in a way that is patient-centric and will fit into the context of their lives. Studies have shown that solutions that mimic the way the user interacts with other apps, as opposed to their interactions with the therapist in-person, have been found to be more effective in promoting engagement. If the app takes more than a few minutes to use, it will likely not be adopted. Moreover, proactive identification of patients who are more motivated and more likely to utilize the tools can be helpful. For patients who are less motivated, providers may consider other solutions to promote patient activation. A more engaged patient will be more involved with and adherent to the treatment plan, thus avoiding preventable costs and optimizing the types and timeliness of care.

For clinicians, better engagement will ensure that the technology is utilized and given to patients. To achieve clinician engagement, the tool must integrate into the clinician's workflows and practice. Additional data and patient communication resulting from the technology should provide new information that allows earlier or more effective intervention without being burdensome and increasing liability concerns. Some applications may require 24 hour / 7 days a week availability of provider responsiveness to mitigate risk such as information about suicidality. Care managers may therefore play an important role in first contact patient interaction and triage, escalating to clinician when necessary and reducing rather then increasing provider burden. Ideally data presented to the clinician should be actionable and timely, with limited alerts.[47]

Triage: Implement Population Health Solutions

The best digital health solutions will create a personalized approach to care, as behavioral health patients have a wide variety of diseases and severity requiring intervention customized to their needs. The tool should be flexible to adapt to patient populations and evolving reimbursement models. Solutions should adapt patient-facing materials from written formats to styles for visual and auditory learners as well as making adjustments for age, healthcare literacy, and cognitive impairment as patients with behavioral health conditions may also have these cognitive issues. On the clinician side, the most successful tools will track symptoms, aggregate information for dashboard and reporting, and proactively analyze, identify, and address potential triggers and early deterioration – especially tools that passively collect and analyze self-reported data. The result of utilizing these tools will be that the correct segments of population receive the correct modalities and types of treatment, which will be reflected in improved population health metrics for the organization.

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[47] *Interview with Dr. Evan Goulding, Northwestern Medicine, April 2017*

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Key Questions

Determining the behavioral health solution that will be most successful within an organization depends on the many idiosyncratic needs and conditions within that particular organization. The following sets of questions will help establish the specific factors that should be considered when implementing a digital health solution, with considerations specific to behavioral health highlighted.

TIME TO IMPLEMENT:
- How long will it take to design and implement this program?
- How much effort is required to add an additional patient to the program? An additional facility?
- What approval is required within the healthcare organization in order to use the solution?

WORKFLOW CONSIDERATIONS:
- Which staff members will interact with this solution?
- How might workflows change if this solution is implemented?
- Are there any healthcare workers whose current roles may change dramatically or face elimination with the implementation of this solution? If so, how can those concerns be alleviated?
- Do the tools easily fit in with existing practices and workflows?
- Can the solution's interface be integrated into the EHR?
  If not, how will this impact the care manager's workflow?
- Are physicians adequately protected from excessive communication or liability related to suicide risk?
- Is sensitive patient data protected?
- How will target patients be enrolled in the program?

CLINICAL RELEVANCE:
- Which patient population(s) will you focus on? How will you identify these patients?
- Are relevant metrics collected, such as symptom tracking, aggregated information for reporting, and proactive identification of potential triggers and early deterioration?
- What analytics are performed on the data collected?
- How is data presented to care managers and clinicians?
  How and when are providers alerted about concerning patient data?

COST EFFECTIVENESS:
- What is the ROI potential for this solution?
- Are the benefits accruing to the same group that will be paying for the solution?
  If not, how might you align incentives?

PATIENT QUESTIONS:

- Does the solution interact directly with patients?

- What amount of additional effort do patients need to take in order to participate in the program?

- Does this solution require either an internet or mobile connection? If so, is that a problem for any of the participating population? Does the company provide a solution to this challenge?

- Is the user interface (UI) easy to navigate? What format is the interface (i.e. SMS texting, smartphone, desktop, tablet)?

- Does the UI mimic that of other apps as opposed to the type of interaction the patient has in in-person treatment?

- Are the target patients motivated to use the solution?
If not, does the patient population require further segmentation or alternative modes of activation?

- Are patients proactively identified by their conditions and needs?

- Is the solution customized to the patient's individual needs, including type of disease, severity of disease, and adjustments for age or cognitive impairment?

Metrics in Behavioral Health Programs[48,49,50]

Healthbox has identified key metrics to help providers assess their access to care and treatment efficacy (via clinical outcomes, cost savings, and patient and provider engagement).

CATEGORY	METRIC	GOAL	DEFINITION/SIGNIFICANCE
Access to Care	Medication Management by Psychiatrist	Increase access to psychiatrists for medication management	A number of factors may influence waiting times for medication management visits with psychiatrists, including geographic variation in the availability of psychiatrists and the inclusion of psychiatrists on health plan provider panels. Increased waiting times can be associated with higher "no-show" rates.
	Convenience of Appointment Times	Increase appointment availability times and hours of operation	Appointment availability times impact patient satisfaction, continuity of care, and no-show rates.
	Convenience of Location of Services	Increase the locations and accessibility of behavioral health services	Reducing the geographic variation in the availability of behavioral health practitioners can be associated with lower no-show rates, improved patient satisfaction, and increased continuity of care.
	Appointment Wait Times for Behavioral Health	Decrease the wait times for the next available behavioral health appointment	Reducing the number of days for the next available appointment with a behavioral health practitioner can positively impact no-show rates, patient satisfaction, and continuity of care.
Clinical Outcomes	Reduction of Symptoms	Decrease the number of symptoms a patient experiences	Reducing symptoms experienced by patients can result in improved overall wellness and improved effectiveness of the treatment plan.

48 https://www.samhsa.gov/data/national-behavioral-health-quality-framework
49 http://www.cqaimh.org/quality.html
50 Healthbox analysis

Metrics in Behavioral Health Programs

CATEGORY	METRIC	GOAL	DEFINITION/SIGNIFICANCE
Clinical Outcomes	Remission Rate	Increase the remission rate	The remission rate is the rate at which a patient is no longer experiencing clinical levels of symptoms related to the behavioral health condition. It is also used as an indicator of wellness. The greater the functional and symptomatic improvement, the less likelihood of relapse after achieving remission.
	Mortality Rate	Decrease the mortality rate	Mortality is significantly higher among patients with behavioral health conditions. Reduction in mortality rates demonstrates improved treatment effectiveness and clinical outcomes.
	Depression & Anxiety Scales • Beck Depression Inventory (BDI) • Patient Health Questionnaire (PHQ-9) • Depression Anxiety Stress Scale (DASS-21)	Decrease depression, anxiety, and stress scale scores	These assessment tools evaluate the severity of depression and anxiety symptoms expressed in patients. The scores can also reflect progress/effectiveness of treatment plans. BDI: 0-9 minimal depression, 10-18 mild depression, 19-29 moderate depression, 30-63 severe depression PHQ-9: 0-4 none, 5-9 mild depression, 10-14 moderate depression, 15-19 moderately severe depression, 20-27 severe depression DASS-21: • Normal: 0-4 (depression), 0-3 (anxiety), 0-7 (stress) • Mild: 5-6 (depression), 4-5 (anxiety), 8-9 (stress) • Moderate: 7-10 (depression), 6-7 (anxiety), 10-12 (stress) • Severe: 11-13 (depression), 8-9 (anxiety), 13-16 (stress) • Extremely Severe: 14+ (depression), 10+ (anxiety), 17+ (stress)

Metrics in Behavioral Health Programs

CATEGORY	METRIC	GOAL	DEFINITION/SIGNIFICANCE
Clinical Outcomes	Medication (Non-Psychiatric & Psychiatric) Adherence	Increase medication adherence	Adherence is the extent to which the patient takes the medicine as prescribed. Increased medication adherence can improve the clinical effectiveness of the medication and the treatment plan.
	Relapse Rate	Decrease the relapse rate	Relapse occurs when patients experience symptoms after a period of time with reduced symptoms. Relapse may also refer to the return to substance use following a period of voluntary abstinence.
	Suicide Risk Score (SBQ-R)	Decrease the risk score	This assessment tool evaluates the risk of suicide in a patient expressing suicidal thoughts or presenting with self-harm or a suicide attempt. The risk score attempts to prevent deaths. For adults in the general population: People with a score of 7 or greater are considered at risk of suicide. For adults in a psychiatric inpatient program: People with a score of 8 or greater are considered at risk of suicide.
	Response Rate	Increase the response rate	The response rate is a 50% decrease in scores on depression scales. It indicates the patient has improved symptomatically, but the patient may not have improved overall wellbeing.
Continuity of Care	Communication Between Behavioral Health Specialists & PCPs	Increase the coordination and communication between providers	Patients with psychiatric conditions have higher rates of physical illness and higher mortality rates than the general population. Improved care coordination can potentially improve outcomes for both the physical and behavioral health illnesses.

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Metrics in Behavioral Health Programs

CATEGORY	METRIC	GOAL	DEFINITION/SIGNIFICANCE
Continuity of Care	Continuity of Visits: • Post-discharge • After hospitalization/ behavioral health related hospitalization	Increase the continuity of visits	Most patients receiving inpatient treatment for a psychiatric disorder require follow-up ambulatory care to promote further recovery and prevent relapse.
	Follow-Up Care: • Attendance at first appointment post-discharge • Timeliness of visit after hospitalization • After behavioral health related hospitalization (within 7-30 days) • Appointment offered after hospitalization • Appointment attended after hospitalization • After emergency visit • For medication management post-discharge	Increase the attendance rate and timeliness of follow-up appointments after hospitalizations	Scheduling outpatient appointments proximally to discharge is generally recommended to address side effects that can result from inpatient medication changes and to support compliance with the treatment plan. Shorter gaps between discharge and aftercare may contribute to greater continuity of care and lower risk of relapse. Measures that examine "offered" visits rather than "attended" visits may better reflect quality of care because they separate the clinician's action from the patient's compliance. Subsequent outpatient visits can continue the treatment plan initiated at the inpatient unit, assess for medication response and side effects, provide support and education, and encourage compliance.
	Behavioral Health Appointment No-Show Rate	Decrease the appointment no-show rate	No-show rates adversely impact clinical outcomes and healthcare productivity. Appointment no-show rates are correlated with treatment length of stay and abstinence of substance use.

Metrics in Behavioral Health Programs

CATEGORY	METRIC	GOAL	DEFINITION/SIGNIFICANCE
Cost	ER Utilization	Decrease unnecessary ED utilization	Seeking behavioral health care in the ED demonstrates the challenge of accessing behavioral health in the community. Care from an ED is costly, especially for unnecessary usage. Reducing ED utilization may demonstrate accessibility to more appropriate behavioral health treatment settings and behavioral health specialists and improved treatment plans for behavioral health patients.
	Readmission Rates: • Within 7, 14, 180 days • For psychiatric/substance abuse treatment • For medical conditions	Decrease readmissions to the hospital	Readmissions predominantly represent negative clinical outcomes, which may be due to lack of access to community-based care, medication adherence, and self-care.
Patient Engagement	Participation in Treatment Decisions & Planning	Increase patient participation in care	Receiving information about treatment options and the opportunity to participate in clinical decision-making are fundamental patient rights. Research has shown that this right is highly valued by many recipients of behavioral health services. Patients who are provided a choice among treatment options are more likely to remain in treatment and express satisfaction with services.
	Patient Satisfaction	Increase patient satisfaction	Improved patient satisfaction indicates the quality of care and positively impacts clinical outcomes, patient retention, and success rates of treatment.

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Metrics in Behavioral Health Programs

CATEGORY	METRIC	GOAL	DEFINITION/SIGNIFICANCE
Patient Engagement	Substance Use: Patient Adoption & Retention	Increase the number of patient users and retain patients in the treatment	This measure demonstrates effectiveness of treatment. For example, many individuals with substance use disorders leave treatment prematurely. However, patients who leave prior to completing a prescribed treatment course have a greater likelihood of relapse and lower levels of functioning than those who complete the course.
Provider Engagement	Provider Adoption, Retention, & Engagement	Increase provider usage, engagement, and retention	Increasing the provider adoption of technologies and alternative treatment methodologies can improve the overall effectiveness of behavioral health treatments and clinical outcomes.
	Behavioral Health Provider Burnout Rate	Decrease the provider burnout rate	Provider burnout is very high in the behavioral health field. Technologies and alternative treatment methodologies may impact provider productivity and satisfaction.
	Behavioral Health Provider Satisfaction	Increase provider satisfaction	Provider burn out is very high in the behavioral health field. Technologies and alternative treatment methodologies may impact provider productivity and satisfaction.

Conclusion

Patients with behavioral health conditions are increasingly costly to care for because of their medical complexities, limitations for coverage and access, and suboptimal treatment options. Behavioral health patients can be effectively managed with digital health interventions. These solutions are shaping new models of care to provide access, treatment, and triage for behavioral health patients.

Investments in behavioral health technologies are essential for reducing the cost of care and improving outcomes. Healthcare organizations can expand their behavioral health resources reach by offering telemedicine to connect behavioral health patients with specialists. Patient engagement applications and digital therapeutics supplement and enhance treatment plans by seamlessly integrating and coordinating care across the continuum, monitoring progress, and early intervention. Tools can be deployed to screen, identify, and segment high-risk patients to proactively address and manage all co-morbidities and develop patient-specific care plans.

As there is greater parity between behavioral health and medical health care, there will be increased avenues for reimbursement, reduced stigma, and improved care models. This evolving landscape presents a solid opportunity to leverage digital health solutions to innovatively care for behavioral health patients by improving access and reducing cost, resulting in better outcomes.

About Healthbox

Healthbox is a healthcare innovation services firm that leading organizations trust with decisions on when and how to build, buy, or partner. Founded in 2010, we were the first to combine investing experience and consulting services in a way that is strategic, objective, and actionable for providers, payors, and others across the industry. Our unique perspective and expertise drives innovation from inside organizations and out to to produce lasting impact with our partners. We are proud to work with healthcare leaders who share our passion for building, harnessing, and advancing solutions to empower the reinvention of healthcare.