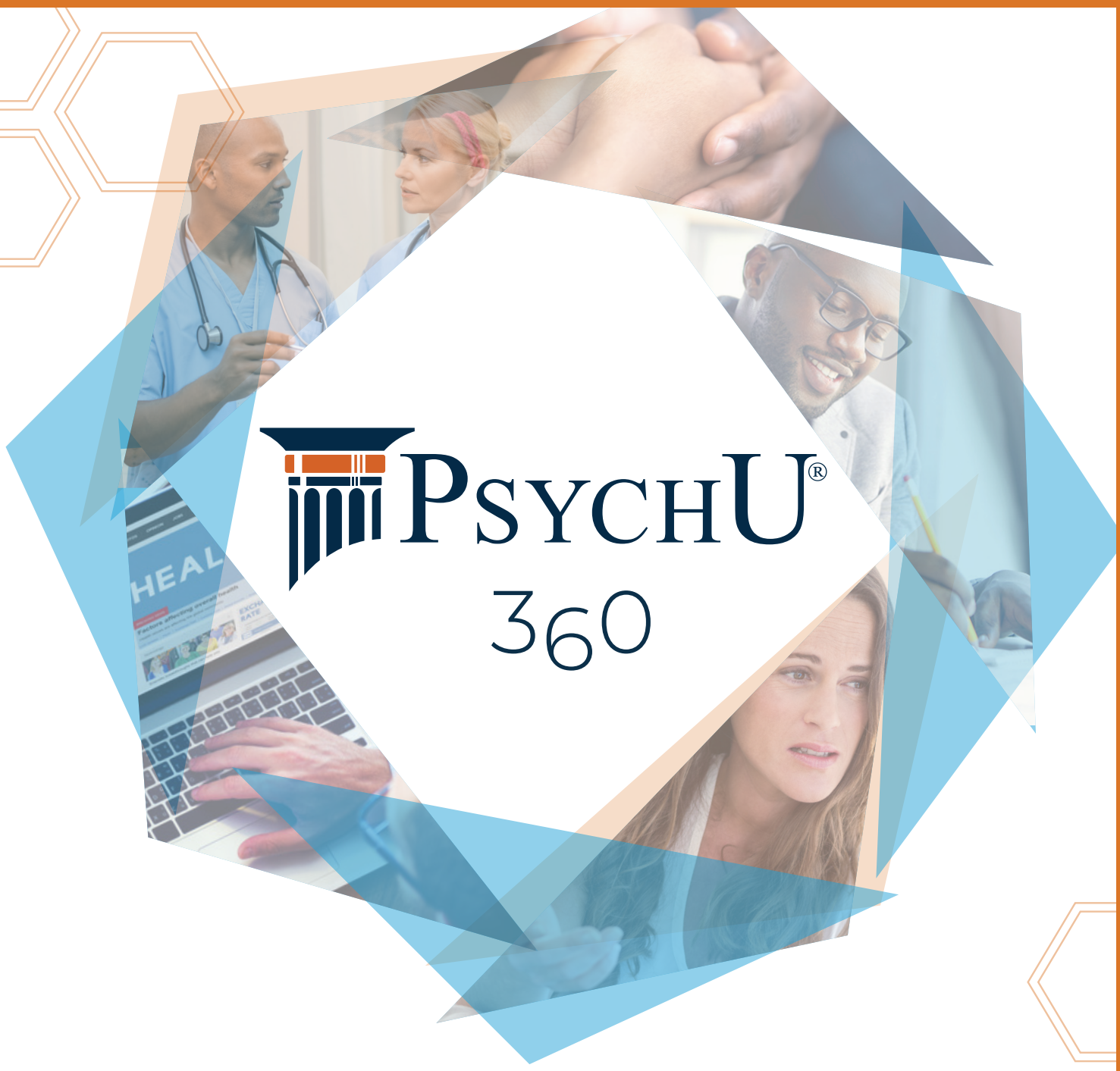

PsychU® 360

2020 01 IMPROVING MENTAL HEALTH WITH DIGITAL TECHNOLOGY

A 360° VIEW OF THE MENTAL HEALTH INFORMATION THAT MATTERS TO YOU

2020
01

December 2019 MRC2.CORP.X.04113

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LEVERAGING DIGITAL TECHNOLOGY FOR BETTER MENTAL HEALTH CARE

Despite vast improvements in diagnosis and treatment over the last half-century, mental illness is underdiagnosed and undertreated.

The reasons are many and varied. Among them: a lack of access for individuals amid a shortage of care providers, the interference of social determinants of health such as transportation problems, and social stigma. All play a role.

But technology offers a route to improvement that skirts these and other barriers.

Consider just a few of its more recent contributions. As a McKinsey & Company paper points out, technology applied in health care settings has helped prevent adverse drug events, including medication errors, allergic reactions, and overdoses. Technology has been deployed successfully to increase individuals' compliance with care recommendations, such as preventive checkups and medication refill information, improving their health.

And it has served to streamline diagnostic testing and other processes, saving significant cost.[1]

Today's advanced technology aids mental health care via disparate approaches and tools that have the capacity to:

- Aid clinical decisions.
- Streamline processes, both on the back end and consumer facing. Examples include blood utilization and appointment scheduling.
- Expand access to care and increase its timeliness.
- Enhance transparency and communication between physician and patient.
- Collect and interpret health data in real time, complementing that recorded in the doctor's office.
- Reduce costs.
- Improve outcomes.

In short, technology—from telepsychiatry to wearable health devices to artificial intelligence–aided clinical decision support—may accelerate the drive toward the Triple Aim: a better care experience, improved population health, and reduced costs.

And the benefits of better mental health care accrue to individuals who are suffering, to care providers who want to alleviate that suffering, and to health systems and insurers that seek to improve care quality while decreasing costs.

All that translates to increased reach and enhanced value.

1 in 5 American adults
lives with a mental illness.

Why is mental illness, despite its undeniable human and societal burden, so undertreated?

PREVALENCE OF MENTAL ILLNESS

One in five American adults lives with mental illness. That prevalence is more concerning when one considers that fewer than half of individuals with mental illness—only 43%—received any treatment for their illness in the previous year, according to a 2018 Substance Abuse and Mental Health Services Administration (SAMHSA) study. And about one in 25 U.S. adults has a serious mental illness (SMI), such as schizophrenia, bipolar disorder, or major depressive disorder. Among individuals aged 18–25 years with an SMI, nearly half—46%—received no treatment in the previous 12 months.[2]

In addition to the human cost of untreated mental illness, there is an economic one as well: lost earnings due to SMI cost the economy around $193 billion yearly.[3]

BARRIERS TO CARE

Why is mental illness, despite its undeniable human and societal burden, so undertreated? Many factors come into play, such as underdiagnosis, stigma, a worrisome shortage of psychiatrists and other mental health care providers, and individuals' personal logistical challenges.

Among these barriers, one of the most significant is wide geographical variation in the availability of mental health care providers. Countrywide there is an average of one mental health provider for every 536 individuals. But that average disguises a dramatic difference in access: the ratio in Massachusetts is 1:200, whereas in Alabama, it is 1:1260. More than 4,000 areas across the U.S., mostly rural and low-income locales, are designated mental health care professional shortage areas.[4]

Technology facilitates mental health care in multiple ways:

- Mobile health (mHealth) sensors that collect health data.
- Digital interventions and assessments.
- Clinical-decision support systems.
- Mobile apps for mental health.
- Medication adherence technology.
- Telepsychiatry and teletherapy.

OPENING ACCESS, INCREASING TIMELY CARE

According to a 2019 Pew study, 96% of U.S. adults have a smartphone.[5] The prevalence of internet usage and the ubiquity of smartphones offer individuals an abundance of mental health care sites, functions, and apps. Estimates vary widely as to number, but internet sites and mobile apps number well into the thousands.

Their advantages are plain to see. Most are low-cost or free. They overcome access barriers, both spatial and temporal. Given societal stigma, some consumers with mental illness wish for anonymity; apps can provide that. They are convenient to access and use. Some even offer games and other fun ways to manage mental health.

Some examples of the types of apps available for use in managing mental wellness:

Self-management apps: The user inputs personal data manually, and the app provides feedback of some kind. Apps in this category can prompt consumers to practice deep breathing when their anxiety climbs or take medication on schedule. Indeed, apps that support medication adherence can be very helpful, as it is well established that poor compliance with pharmacological therapy compromises treatment and results in poorer outcomes.

Apps that seek to alter thought patterns and improve thinking skills, using CBT principles, tend to be targeted at people with more serious mental illness.

Apps for improving thinking skills: Cognitive behavioral therapy, or CBT, relies on the recognition that thoughts, feelings, and behaviors are intertwined; change thoughts, and feelings and behaviors will follow suit. Apps that seek to alter thought patterns and improve thinking skills, using CBT principles, tend to be targeted at people with more serious mental illness.

Attention-Controlling Games: According to the National Institute of Mental Health, apps in this category are being tested as a treatment for post-traumatic stress disorder (PTSD).

Video Games: One example of a video game accessible via app features a protagonist who confronts anxiety and depression. The user can identify with the game's central character as that person confronts challenges complicated by mental illness.

Experimental: A major research university is currently studying how facial recognition technology can be used to predict schizophrenia.

HEALTH INFORMATION TECHNOLOGY

Much has been written about how health information technology has impacted medical care for the better. In the wake of the passage of the Health Information Technology for Economic and Clinical Health (HITECH) Act in 2009 and the Patient Protection and Affordable Care Act (PPACA) in 2010, both of which incentivized the adoption of electronic health records, or EHRs, the majority of provider practices do now have patient records in digital form.

Among individuals with a serious mental illness, nearly half –46%– received no treatment in the past year.

Along with those digitized records is the capacity to automate messages to the individuals treated by a practice, such as reminders to set up appointments for preventive or specialist care. Polypharmacy review is more easily accomplished when all an individual's medical data from different providers is collected in the same place, thereby allowing analysis.

EHRs facilitate efforts to improve population health by allowing providers to identify all individuals with a particular condition, such as diabetes type 2, and target interventions at them.

One success story with health information technology is UCLA Health, which leveraged IT across the organization to improve processes and outcomes. For example, UCLA Health increased depression screenings performed by primary care physicians via automated notices to case management.

Another project UCLA Health tackled was blood utilization. Concerted national efforts and careful research have demonstrated that blood has been routinely overused in hospitals, compromising patient outcomes. What's more, blood is high in cost, so overuse of blood translates not only to patients receiving suboptimal care but also to increases in the cost of care without a concomitant increase in quality. Guided by clinical decision support that aided clinicians in real time, UCLA Health optimized blood utilization across its organization.

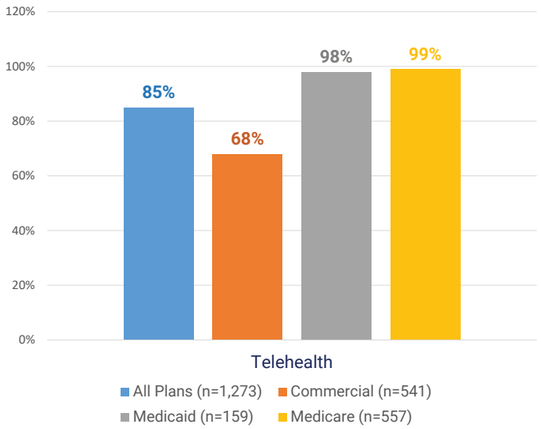
So far-reaching were its accomplishments that UCLA Health was awarded the 2018 HIMSS Davies Enterprise Award for leveraging HIT to improve outcomes, a McKinsey paper reports.[6]

THERAPY VIA MOBILE OR COMPUTER

Whether treatment occurs via smartphone or computer, telepsychiatry and other mental health services performed online open access to mental health care in resource-poor regions by offering consumers a way to videoconference with a psychiatrist or other mental health care professional in real time. This synchronous therapy can be augmented by asynchronous communication between consumer and care professional.

Certainly, televisits for mental health are now in wide use. Consider this graphic showing the degree to which different payers reimburse for them:[7]

REIMBURSEMENT FOR TELEHEALTH



But some question whether those with SMIs can use mHealth apps and other technologies appropriately. Does the Pew research that found widespread ownership of computers and smartphones and use of the internet mean that these individuals are comfortable with technology?

The answer would seem to be yes. One study of individuals with SMI found broad acceptance of technology-aided treatment.

Key characteristics associated with successful use of digital health tools as identified by the authors' research:

- Interest in using state-of-the-art technology.
- Resources, such as a smartphone or WiFi, that facilitate access to treatment.
- Positive expectations about using a digital health tool.
- Supportive social network.
- Good occupational functioning.

Substance use and chaotic living situations were two factors that worked against successful use of digital technology in this population.[8]

WHAT'S TO FOLLOW

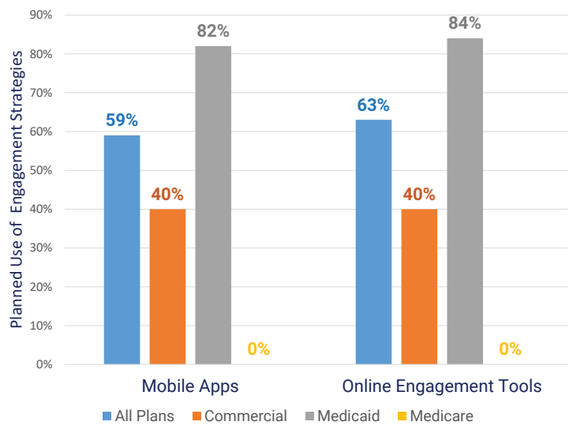
Gathered here are articles about digital health care featured on PsychU, grouped into these three categories:

1. Engagement and Diagnosis
2. Treatment
3. For Management

ENGAGEMENT & DIAGNOSIS

Getting things started is "Consumer Engagement Tech—No Reward Without Risk," which homes in on a key issue in health care today: how to engage consumers in managing their health.

ENGAGING THE CONSUMER

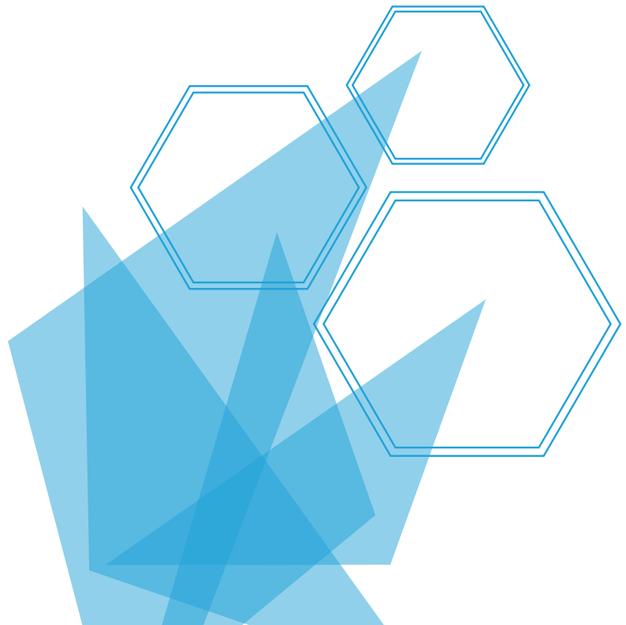


The fact is, investing in consumer-engagement technology is a must today. This article argues that the potential upside makes investment worth it, despite the short-term risk.

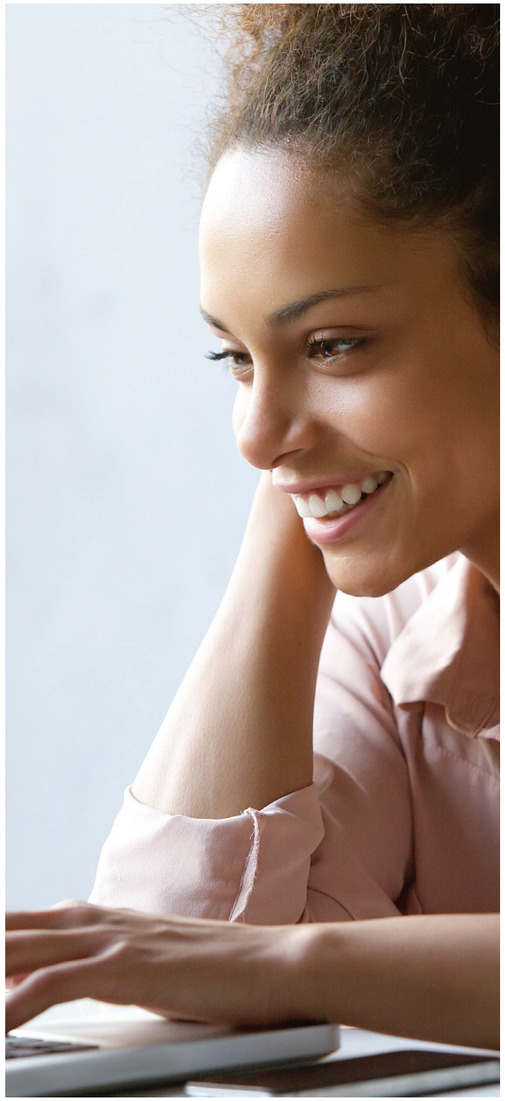
Next in line is a look at a research study about virtual visits: who used them and under what conditions. One notable finding was that those individuals who used virtual visits to receive health care were significantly more likely than the general population to be seeking care for a mental disorder. Another salient fact: The vast majority (93.2%) of those using virtual visits said the care they received was of high quality.

The age of digital health care offers hope for enhanced diagnosis, with artificial intelligence deployed to aid clinicians in identifying disease. In an Indian study, a telemedicine clinical decision support system was used successfully by non-psychiatrists to diagnose 18 mental health disorders. Read "'Virtual Psychiatrist' Telemedicine Decision Support System Effective In Diagnosing Mental Disorders" for more.

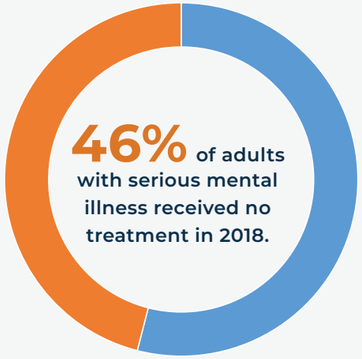
Suicide rates have increased notably in the last 15 years, by 33% from 1993 to 2017. Assessing suicide risk is a crucial aspect of mental health care. Identifying individuals most at risk for suicide is the aim of several programs highlighted in "Data and Decision Support for Suicide Assessment," among them efforts by Kaiser Permanente in different locations and the Department of Veterans Affairs' Recovery Engagement and Coordination for Health--Veterans Enhanced Treatment (REACH VET).

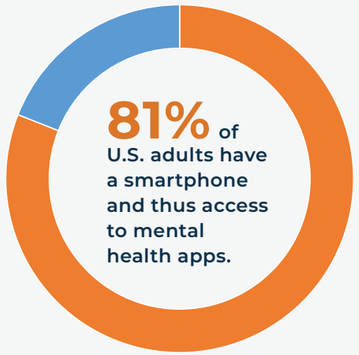


In an Indian study, a telemedicine clinical decision support system was used successfully by non-psychiatrists to diagnose 18 mental health disorders.



MENTAL ILLNESS & TECHNOLOGY





Key characteristics of patients with serious mental illness associated with successful use of digital health tools:

- Interest in using state-of-the-art technology
- Resources, such as a smartphone or WiFi, that facilitate access to treatment
- Positive expectations about using a digital health tool
- Supportive social network
- Good occupational functioning

Advantages of mental health apps:

Most are **low-cost** or **free**

They **overcome access barriers**

They can provide **anonymity**

Some offer **games and other fun ways** to manage mental health

TREATMENT

The popularity of smartphones, tablets, and computers generally offers hope in depression treatment, found another study highlighted in these pages. "A Web-Based Self-Help Intervention May Prevent or Delay Major Depressive Disorder in Adults with Subthreshold Depression" discusses a research study that found that those with subthreshold depression who used a guided self-help intervention were less likely to develop major depressive disorder (MDD) over a 12-month period compared with patients who had access to what the study defines as enhanced usual care. By the 12-month follow-up, only 27% of web-based intervention participants had developed depression, as compared with 41% of the control group.

"Electronic Self-Monitoring of Mood for Bipolar Disorder: Full-Speed Ahead or Proceed with Caution?" looks at individuals' electronic self-monitoring of symptoms. There are some indications that individuals are more apt to accurately assess depressive mood states than they are hypomanic or manic states.

The shortage of mental health care providers is especially acute in rural areas. An enterprising study of Medicaid consumers in rural Missouri found that when telepsychiatry was combined with in-person care, individuals seeking mental health care were seen seven days sooner than those who did not have a telepsychiatry option. Read more in "Telepsychiatry Improves Access to Mental Health Care in Rural Areas."

Participants in the research study outlined in the closing article in this section, "Virtual Physical Rehabilitation Is as Effective as In-Person Services," reported high satisfaction levels with virtual physical therapy after total knee arthroplasty.

FOR MANAGEMENT

Leveraging technology to deliver high-quality, high-value mental health care requires investment. The closing section of this publication delves into some of the challenges confronting health system administrators, payers, medical directors, and other stakeholders as the digital era reshapes health care as it has so many other industries. "Crossing the Digital Chasm," with its nod to the Institute of Medicine's signature *Crossing the Quality Chasm* report, looks at the fact that health care has lagged other industries in embracing the full range of digital's opportunities.

"Your Data Integration Checklist" lays out steps for using digital to enhance organizational performance, including defining success, vetting vendors, and partnering with the consumer.

What can companies offer in terms of better mental health? The ability to understand unstructured text, to act as a virtual medical assistant, to apply machine learning to understand a consumer's needs. That's for starters. See "Bot, Anyone? The Question—What Services Can You Automate?"

Next up is "FDA Finalizes That Fitness Apps, EHRs Are Outside Regulatory Scope for Medical Devices," which explains the reasoning behind the FDA's decision.

"Ready or Not, Cognitive Computing Will Change Your Organization" discusses the ways in which artificial intelligence is being deployed today to aid those delivering health and human services.

Closing this volume is a piece that showcases several organizations' successful use of predictive analytics, for instance for care coordination, for streamlining hospital operations, and for providing behavioral health support. The mini case studies in "Yes, There Are Organizations Using Augmented Intelligence" demonstrate that digital is remaking the landscape of health care at speed, offering unprecedented opportunities to expand access, optimize operations, and improve mental health care.

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This summation has been developed independently of the authors. Authors have declared the following: no conflicts.

CONSUMER ENGAGEMENT TECH– NO REWARD WITHOUT RISK

Two key issues loom large for any organization that serves consumers—what consumers want and how to engage them. The first is increasingly important to strategic positioning as provider organization executive teams plan their long-term strategies in the face of growing competition. The second, how to engage those consumers, is more about bending the cost curve in value-based payment arrangements—engaged consumers have better outcomes and use fewer resources. This is a mantra in health and human services, with good reason.

But the bad news is that engagement has room for improvement: some 70% of consumers drop out of treatment after their first couple of visits. There is some good news, however. Technology can be leveraged to get and keep consumers in treatment and managing their own wellbeing.

The opportunity is great. Today's consumers have been primed for using technology in their daily lives—most have a smartphone and spend four hours a day using it. The question for most executive teams is what type of improved consumer engagement fits with your strategy and what technologies are the best choice in that instance?

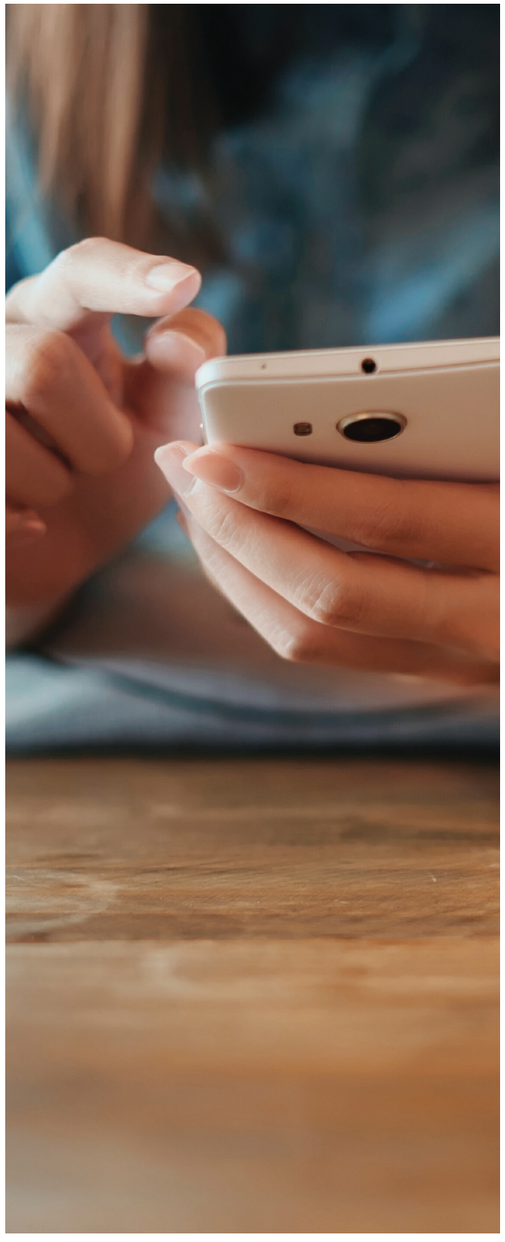
To invest in technology to increase consumer engagement, keep these three principles in mind:

ROI is where to start: Investing in technology should be framed as an investment within your organization. Start with your strategic plan and your organizational goals. Then, determine how your technology investments will support those goals and build a framework for measuring outcomes and monitoring costs. Before you implement any new technology, you should have clear expectations on the return on investment and how you will monitor that ROI.

Reinventing process and workflow is key to tech ROI: There are a lot of tech options out there and selecting the right one is important, but the key to successfully implementing and using the tech will come by building new processes and workflows to maximize the investment. The heavy lifting when it comes to tech adoption lies in building the infrastructure, training the staff, coaching consumers, designing data collection for outcomes, collecting the data, and moving on to data-based management of the project moving forward. Executive teams must budget both time and money accordingly.

Some pilots of new technology will fail: Funding, efficacy, and consumer adoption are often far from certain. Many pilots may fail, and even if the tech works you might not be able to prove it until it has been in use for a little while. Leadership must understand and accept that there can be no success without risk. This is not permission to avoid due diligence or ignore the importance of performance, but the opportunity to spend a smaller amount of money to build a long-term picture of success (which will be necessary to prove your case to funders) is one that can't be realized unless you make the investment. The key is to "fail fast"—pilot programs for technology should be short and to the point. Know exactly what you are looking for and the results the adoption must deliver. Only when you have successfully delivered on a small pilot can you look to scale.

Provider organizations—especially smaller, specialty organizations—must remember that adopting tech to improve consumer engagement is a strategy that can deliver big rewards despite the short-term risk.



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VIRTUAL VISITS IN PRIMARY CARE: WHO USES THEM & WHY?

Virtual care has been defined as technology-aided clinical interactions in health care where patient and provider are in different locales. These visits may be asynchronous—i.e., the patient answers clinical questions online and receives care from the physician at a later time. Or they may be synchronous–i.e., patients and physicians interact via telephone, videoconference, or text.

Some health systems are integrating virtual care into practice as a complement to routine care.

Virtual visits may be one way to address health care accessibility issues and can be seen as part of an increasing focus on patient-centered care. However, there is limited evidence regarding how patients view virtual visits in primary care. A study entitled "Virtual Visits and Patient-Centered Care: Results of a Patient Survey and Observational Study" used patient survey and administrative data to assess the effect of virtual visits from a primary care physician on primary care use and cost in British Columbia, Canada, where virtual visits have been publicly funded since 2012.

Methodology

The authors used data from fiscal year 2010–2011 through 2013–2014. They found that 144 of 5,598 (2.57%) primary care physicians provided at least one virtual visit, with younger providers more likely to do so than older providers. Physicians with practices categorized as "high responsibility" (i.e., providing comprehensive and full-service care) were less likely to provide virtual visits than those with practices characterized as "low responsibility" (i.e., care more consistent with a walk-in practice).

The patient cohort studied included 5,441 patients who had at least one virtual visit during the study period. A larger proportion of virtual visit users were younger (ages 20 to 44 years, 53.45%), and virtual visit use was lowest among those 85 years of age or older (0.77%). Approximately one-third (35.58%) of first virtual visits were with providers already known to the patient versus with a new provider. Those with more complex health conditions were most likely to have previously seen their virtual visit provider in a non-virtual setting.

Results and Implications

Compared with the general population, a significantly larger proportion of virtual visit users who were seen by a new provider were seeking care for a mental disorder. The likelihood of receiving a prescription after a virtual visit was higher than after an in-person visit, but referral for diagnostic imaging was lower, and laboratory testing was lower for virtual visits with new providers.

Diagnosis for Virtual Visits, 2011–2014	*n*	%	*n*	%
Symptoms, signs & ill-defined conditions	1,299	15.29%	4,914	19.86%
Mental disorders	1,262	14.86%	2,103	8.5%
Supplementary factors influencing health status & contact with health services	1,002	11.8%	618	2.5%
Diseases of the respiratory system	852	10.03%	3,337	13.49%
Diseases of the musculoskeletal system & connective tissue	540	6.36%	1,932	7.81%
Diseases of nervous system & sense organs	525	6.18%	1,600	6.47%
Endocrine, nutritional & metabolic diseases & immunity disorders	507	5.97%	1,387	5.61%
Infections & parasitic diseases	467	5.50%	1,317	5.32%
Diseases of the circulatory system	381	4.49%	1,418	5.73%
Diseases of the genitourinary system	376	4.43%	1,662	6.72%

In terms of primary care costs, the authors found that patients seeing a known provider had higher costs and a larger increasing trend in costs before their first virtual visit when compared with those who saw a new provider, but after the first virtual visit, the known-provider group showed a trend toward decreasing costs compared to the new-provider group, to the extent that the cost trend lines converged near the end of the follow-up period. Compared to individuals who did not have any virtual visits but did see a primary care physician during the study period, virtual visit users showed a lower cost trend and lower total expenditures by the end of the follow-up.

A subsample of 399 virtual visit users (71.4% female, 67.4% married) completed an online patient survey between April 17 and May 1, 2015. Most (93.2%) reported that their most recent virtual visit was of high quality, 95% expressed confidence in the security of their personal information, and 79% stated that the virtual visit was as thorough as an in-person visit. A large proportion (91.2%) of survey respondents described their most recent virtual visit as helpful in resolving the health issue for which they sought care. Nearly half (48.4%) reported that if a virtual visit had not been available, they would have sought care at a walk-in clinic, while 12.5% reported that they would not have sought care at all.

The authors described the trend of younger individuals with less complex medical conditions seeking virtual visits from new providers as positive and consistent with patient-centered care, in that this type of visit may reflect a desire for convenience over continuity. The authors also highlighted that virtual visits are well-liked by patients and appear to control costs.

In terms of study limitations, the authors acknowledged that patients were not randomized to receive virtual visits and that not all physicians chose to provide virtual visits, meaning that there might have been a selection bias. Nonetheless, the authors stated that virtual visits may be one strategy by which the health care system could become more patient-centered, but that further research is necessary to determine how best to integrate these technologies and methods into the existing system.

Source
McGrail, K.M., Ahuja, M.A., & Leaver, C.A. (2017) Virtual visits and patient-centered care: Results of a patient survey and observational study. *Journal of Medical Internet Research*, 19(5), e177.

'VIRTUAL PSYCHIATRIST' TELEMEDICINE DECISION SUPPORT SYSTEM EFFECTIVE IN DIAGNOSING MENTAL DISORDERS

A telemedicine clinical decision support system (CDSS) developed in India for use by non-psychiatrists in rural areas was able to diagnose mental health disorders with good validity and reliability. The CDSS had high sensitivity; it was able to identify nearly all those with one of the 18 mental health disorders included in the CDSS. There were a high number of false positives, but few false negatives.

These findings were reported in "Telepsychiatry Clinical Decision Support System Used by Non-Psychiatrists in Remote Areas: Validity and Reliability of Diagnostic Module," by Savita Malhotra et al. The researchers sought to assess the sensitivity and predictive value of a CDSS developed as part of a telepsychiatry project at the Department of Psychiatry of the Postgraduate Institute of Medical Education and Research (PGIMER), in Chandigarh, India.

The CDSS has two separate decision support systems, one for adults and one for children and adolescents. The diagnostic system is linked to the intervention modules.

The researchers tested the CDSS via a telemedicine network with 100 people visiting one of three remote health care sites. Each participant at the remote sites was interviewed face-to-face by non-specialists using the CDSS, and simultaneously assessed via video-conferencing by interviewers at the nodal center for the telemedicine network. The interviewers at the remote sites included general physicians and para-professionals with master's degrees in psychology or social work with no clinical psychiatry experience. At the nodal center, interviews were conducted by three

psychologists with master's level training, and they had been trained by psychiatrists in the use of the diagnostic application and the Mini-International Neuropsychiatric Interview (MINI).

To assess the inter-rater reliability, each participant actively assessed during the interview at the remote site was simultaneously assessed passively via video-conferencing by a specialist at the nodal center. During the video-conference session, a second interviewer at the nodal center rated the participant using MINI for diagnostic validation. At the end of the interview at the remote site, the passive assessor at the nodal center was allowed to ask clarifying questions because some of the disorders included in the CDSS application are not included in the MINI. The time taken for assessment by the core diagnostic tool averaged 20 minutes.

The researchers said the CDSS had the potential to help non-psychiatrist physicians and para-professionals diagnose psychiatric disorders accurately and reliably in remote settings.

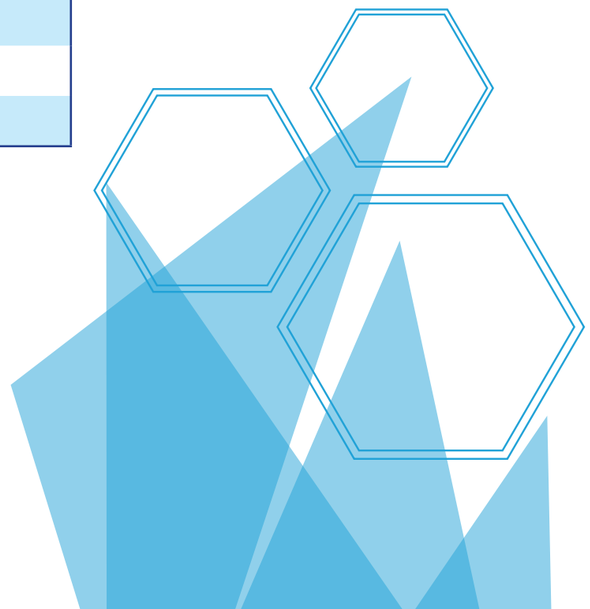
Diagnostic Correspondence Between CDSS & MINI

Condition	Share Diagnosed by CDSS	Share Diagnosed by MINI
Alcohol use disorder	19%	28%
Drug dependence disorder	25%	24%
Psychoses	23%	20%
Mood disorder, such as bipolar disorder, major depression, and dysthymia	49%	42%
Neurotic, stress-related, and somatoform disorders	12%	27%
Generalized anxiety disorder, panic disorder, and phobias	22%	20%
Obsessive-compulsive disorder	8%	5%
Somatoform disorder	5%	5%
Intellectual/developmental disorders	2%	1%

The researchers concluded that the CDSS had adequate diagnostic validity and reliability when the telepsychiatry application-based diagnostic interview was conducted by general physicians and other non-specialist professionals. The researchers said the CDSS had the potential to help non-psychiatrist physicians and para-professionals diagnose psychiatric disorders accurately and reliably in remote settings.

Source

Malhotra S, et al. *Indian J Med Res.* 2017 Aug;146(2):196-204.
Suicide rates increased by 33% between 1993 $ 0. / 5



DATA & DECISION SUPPORT FOR SUICIDE ASSESSMENT

Suicide is the 10th-leading cause of death in the United States, and the second-leading cause of death among Americans aged between 15 and 34. For every person who takes his or her own life, there are 30 suicide attempts.

These are stark numbers that paint a complicated picture. What drives these statistics?

There are known risk factors commonly associated with suicide—and screening tools that can help provider organizations and clinical professionals prevent it. One huge challenge with assessment tools is that assessment protocols are not standard across organizations and not practiced consistently across providers. The session reviewed two models for identifying those consumers using data to predict risk instead of relying only on assessments: the Recovery Engagement and Coordination for Health-Veterans Enhanced Treatment (REACH VET) and the Mental Health Research Network (MHRN) Suicide Risk Calculator Project. Common to both programs are components that ensure a review of treatment and an intervention if indicated for those individuals most at risk, and studies are under way to determine if these approaches reduce suicide attempts or deaths.

In 2017, the Department of Veterans Affairs (VA) launched REACH VET; the model analyzes data from veterans' health records to identify individuals with an elevated risk of suicide, hospitalization, or illness. More than 100 variables are weighed, including demographics, prior suicide attempts, diagnoses, utilization of Veterans Health Affairs' services, medications, and interactions.

In 2018, the Mental Health Research Network and Kaiser Permanente (KP) conducted the Mental Health Research Network (MHRN) Suicide Risk Calculator Project, which combined data from electronic health records with results from standardized depression questionnaires to predict suicide risk in the 90 days following either a mental health care visit or a primary care outpatient visit. The study was conducted in seven health systems (HealthPartners, Henry Ford, KP Colorado, KP Hawaii, KP Northwest, KP Southern California,

Suicide is the 10th-leading cause of death across the U.S. and the 2nd-leading cause of death among 15–34 year olds.

The suicide rate is increasing nationally, +33% between 1993 and 2017.

and KP Washington) using information from eight million members, and it identified 150 predictors. Among them: demographics, mental health and substance use diagnoses, mental health inpatient and emergency department utilization, psychiatric medication dispensing, co-occurring medical conditions, and PHQ8 item 9 score.

But while we have the information needed to identify those consumers most at risk for suicide and effective screening tools, those assessments don't happen routinely. In the month prior to a suicide attempt, 63% of individuals had a health care visit of some type and 44% of individuals had a mental health visit.

The reasons for this gap between science and practice are many. There is an absence of standardized assessment protocols across provider organizations. Non-mental health clinical professionals are concerned about their ability to find treatment services for consumers who are at risk. There is also a general lack of awareness and acknowledgement of critical assessment windows, which are the time periods when consumers are the most at-risk of suicide ideation.

These time windows include the week after a visit to the emergency department for substance abuse, the week after discharge from psychiatric hospitalization, and the first weeks after starting an antidepressant. These are crucial time periods, but there is no standardization of screening practice, which results in missing the opportunity to intervene.

For health and human services executives, there is a lot to take in when assessing suicide assessment capabilities. Do you have a screening protocol in place? Do you have data analytics tools to recognize risk factors and build a population health management strategy? Do you understand how to build, find, and/or adopt evidence-based practices for treating consumers with suicide ideation? Answering these strategic questions is essential to building a comprehensive suicide prevention program within your organization and across the market.

If you or someone you know is in crisis, please contact the Suicide Prevention Hotline / Lifeline at 1-800-273-TALK (8255), or text the Crisis Text Line at 741-741.

Critical Risk Assessment Windows

- Week after ED visit for substance abuse
- Week after discharge for psychiatric hospitalization
- First weeks after starting an antidepressant

TIME OF ACUTE RISK — TIME OF ACUTE RISK

Emergency Services → **Psychiatric Hospitalization** → **Discharge to Community**

Suicidal Behavior in 90 Days:
Top 15 Predictors

Suicide Attempt Following Mental Health Visit (of 110 selected)
Depression diagnosis in last 5 years
Drug abuse diagnosis in last 5 years
PHQ9 item 9 score = 3 in the last year
Alcohol use disorder diagnosis in last 5 years
Mental health inpatient stay in last year
Benzodiazepine Rx in last 3 months
Suicide attempt in last 3 months
Personality disorder diagnosis in last 5 years
Eating disorder diagnosis in last 5 years
Suicide attempt in last year
Mental health ED visit in last 3 months
Self-inflicted laceration in last year
Suicide attempt in last 5 years
Injury/poisoning diagnosis in last 3 months
Antidepressant Rx in last 3 months

Suicide Death Following Mental Health Visit (of 110 selected)
Suicide attempt in last year
Benzodiazepine Rx in last 3 months
Mental health ED visit in last 3 months
2nd-generation antipsychotic Rx in last 5 years
Mental health inpatient stay in last 5 years
Mental health inpatient stay in last 3 months
Mental health inpatient stay in last year
Alcohol use disorder diagnosis in last 5 years
Antidepressant Rx in last 3 months
PHQ9 Item 9 score = 3 with PHQ8 score
PHQ9 Item 9 score = 3 with Age
Depression diagnosis in last 5 years with Age
Suicide attempt in last 5 years with Charlson Score
PHQ9 Item 9 score = 2 with Age
Anxiety diagnosis in last 5 years with Age

A WEB-BASED SELF-HELP INTERVENTION MAY PREVENT OR DELAY MAJOR DEPRESSIVE DISORDER IN ADULTS WITH SUBTHRESHOLD DEPRESSION

A research study has found that patients with subthreshold depression were less likely to develop major depressive disorder (MDD) over a 12-month period using a web-based guided self-help intervention compared with patients who used enhanced usual care. Only 27% of web-based intervention participants had developed depression at the 12-month follow-up, as compared with 41% of the control group. The results of the study "Effects of a Web-based Guided Self-help Intervention for Prevention of Major Depression in Adults with Subthreshold Depression: A Randomized Clinical Trial" suggest that a web-based guided self-help intervention can prevent or delay the onset of MDD.

The randomized clinical trial placed participants into two groups: one that received enhanced normal care and another one that received a web-based guided self-help intervention. Participants for the study were mostly recruited through a German statutory health insurance company; participants learned about the study through an announcement in the company's member magazine. However, anyone interested in the study could participate regardless of what type of insurance they held. The opportunity to be in the study was also announced in newspaper articles, in on-air media, and on relevant websites. Individuals self-identifying as having a lower mood could apply online on the research website; a physician referral was not required.

Applicants for the study were asked to complete an online screening questionnaire to assess if they met the study's eligibility criteria, which included:

- Experience of subthreshold depression, as determined by the Center for Epidemiological Studies Depression Scale (CES-D).
- Being 18 years of age or older.
- Internet access.
- Not currently receiving psychotherapy.
- Not presenting a notable suicide risk, as determined by the Beck depression Inventory, item 9 Score <1.

Eligible individuals participated in a structured clinical interview to ensure that they did not meet the DSM-IV criterial for a major depressive episode, bipolar disorder, psychotic disorder, or a history of MDD in the past 6 months. All information collected from the participants was systematically randomized and masked to avoid skewed data analysis. Study participants were allowed unrestricted access to usual care, which included visits to a primary care clinician, but not to mental health specialists. In addition, participants were provided the following specific care based upon the study group in which they were placed:

- **Web-Based Intervention Group:** The web-based intervention was a multimedia, interactive online tool composed of 30-minute sessions, developed using psychoeducation and behavioral problem-solving therapy practices. Participants in this group were instructed to complete a minimum of two sessions per week. During the training, participants were supported by an online trainer who provided written individual feedback for each session that was instructional in nature and not therapeutic.
- **Enhanced Usual Care Group:** Participants who received the enhanced usual care received psychoeducational intervention based on the German S3-Guideline, which enhances usual care by providing information to patients that they may not normally receive. The participants were allowed to review this information at their leisure and were not required to consume it, nor were they monitored on how much of the information they consumed.

At six months and 12 months of care, trained psychologists conducted telephone interviews. Secondary outcome measures were also assessed at the 12-month follow-up; participants were asked to complete an online assessment that measured the following: functional impairment

Participants who received the web-based guided intervention were less likely to develop depression than those who received only enhanced usual care.

(12-item Short For Health Survey), anxiety (Hospital Anxiety and Depression Scale–Anxiety), problem-solving skills (Social Problem Solving Inventory-Revised), behavioral activation (Behavioral Activation for Depression Scale-short Form); mastery (Pearling and Schooler Master Scale); worrying (Penn State Worry Questionnaire); insomnia severity (Insomnia Severity Index); and health care service uptake.

Study results were collected between March 15, 2013, and March 4, 2014, from 335 German adults with subthreshold depression who were either privately insured (about 11% of the German population) or statutorily insured (about 89% of the German population).

The researchers' main finding was that participants who received the web-based guided intervention were less likely to develop depression than those who received only enhanced usual care. Additionally, participants in the web-based intervention group scored better on most secondary outcome measures at the 12-month follow-up.

Discussion

The authors cited several clinical implications to the study:

- It is the first study to find that those who have subthreshold depression and receive intervention can reduce their chance of developing MDD or at least delay onset.
- For all participants who did develop MDD within the 12-month trial period, the onset of MDD was delayed in the intervention group compared with the control group.
- The study showed a reduction of incidence of MDD is possible using web-based guided self-help intervention.
- Web-based intervention might attract people who may not use fact-to-face interventions.

While the researchers confirmed their hypothesis and identified several clinical implications for the results, there are several limitations to the

conducted study, including: a lack of assessment of lifetime history of MDD at baseline; limited time included in the study (12 months); thresholds for established risk reductions for clinical relevancy (10%); chronic medical conditions were not assessed; it was not possible to mask participants to their assigned study condition; replicability (not all individuals may benefit from this particular web-based intervention to the same degree); usual care was not standardized across primary care clinicians; study participants were not representative of the general population (large proportion of Caucasian females); and the control group received access to a web-based psychoeducation intervention as well. Future studies should address the previously mentioned limitations and further explore the benefits of guided web-based self-help interventions.

Source
Buntrock C, et al. *JAMA*. 2016 May 3;315(17):1854-63.

ELECTRONIC SELF-MONITORING OF MOOD FOR BIPOLAR DISORDER: FULL SPEED AHEAD OR PROCEED WITH CAUTION?

Research on the course of bipolar disorder has led to increased focus on inter-episodic mood instability, as many individuals with bipolar disorder exhibit significant day-to-day or week-to-week shifts in mood that are more severe than what is experienced by the general population. These subsyndromal mood swings have been shown to impair functioning and are associated with higher risk of relapse and hospitalization.

Close monitoring of mood instability could facilitate early intervention and perhaps prevention of relapse in some cases. Further, these tools may empower patients by enhancing insight and recognition of early warning signs of an impending mood episode. Typically, charting of mood has been accomplished through use of validated paper-and-pencil measures, but the usefulness of these questionnaires may be limited by low compliance and recall bias when patients batch their responses.

The use of e-tools instead of paper-and-pencil measures is on the rise, with the hope that these methods will increase usability and accuracy. However, it is not yet clear whether electronic self-monitoring tools are valid measures of mood when compared with paper-and-pencil measures. In an article entitled "Electronic Self-Monitoring of Mood Using IT Platforms in Adult Patients with Bipolar Disorder: A Systematic Review of the Validity and Evidence," Maria Faurholt-Jepsen and colleagues examined the existing literature on this topic with two goals:

1. To evaluate the validity of electronic self-monitoring tools compared with paper-and-pencil measures.
2. To evaluate whether electronic self-monitoring of mood affects clinical outcomes in randomized controlled trials (RCTs).

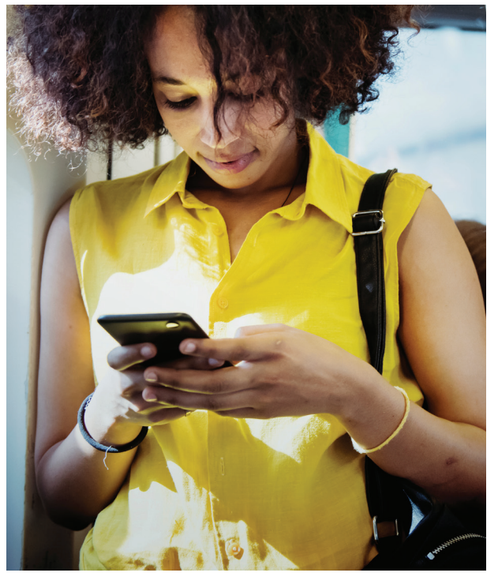
Methodology

The authors conducted their literature search and review according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement, including establishing inclusion criteria and other aspects of the review protocol in advance. Studies included in the review were written in English and conducted in the United Kingdom, the United States, Canada, or Australia. They involved use of computers, tablets, smartphones, or other Internet-connected devices to enable participants to self-monitor mood symptoms. The included studies were either:

1. Original studies of information technology (IT) platforms for electronic self-monitoring of mood, involving adult participants (older than 18 years of age) with bipolar disorder and presenting correlational analyses of electronic self-monitoring tools with validated clinical rating scales of mania and depression.
2. RCTs that included electronic self-monitoring of mood as part of broader interventions for bipolar disorder.

Results

The researchers' findings showed significant correlations between electronic self-monitoring of symptoms and paper-based, validated measures for both depressive and manic symptoms. Nonetheless, the authors concluded that it may be easier for patients to accurately self-report depressive symptoms than symptoms of mania, perhaps because hypomania and mania might result in decreased illness insight. However, they urged caution regarding interpretations of the studies' findings, as most of the studies included outpatients only, suggesting that the severity of symptoms may have been limited.



Seven of the thirteen included studies were randomized controlled trials (RCTs) that involved electronic self-monitoring of mood. The authors asserted that it was important to consider these studies, as it is possible that use of electronic self-monitoring could be an active intervention in and of itself. Two of the RCTs focused primarily on compliance rates for electronic self-monitoring versus paper-based measures, with one finding significantly higher compliance for electronic self-monitoring and one finding the opposite. Further, the latter study found that those who were using electronic self-monitoring reported higher variability in mood ratings compared with those completing paper-based measures. The authors stated that it is important to consider the effects of electronic self-monitoring as they enter into broader use, as it is possible that the act of monitoring and reporting one's mood in the moment could theoretically trigger a ruminative cycle that could lead to an increase in negative symptoms. The authors noted that these aspects of electronic self-monitoring should be considered alongside the possibility of the positive effects on individuals who use online tools to self-report and monitor their moods.

The five other RCTs included in the analysis involved electronic self-monitoring of mood as part of broader online interventions for bipolar disorder. Three studies involved different psychoeducational or self-management interventions, and one of the three was completed by the authors of the current analysis. These three studies found no differences in mood or other outcomes between the intervention groups, all of which submitted mood ratings electronically, and the control groups, at least one of which submitted mood ratings using paper-based measures. A fourth study involving an intervention based on the principles of cognitive behavioral therapy (CBT) reported improvements for the treatment group for clinical outcomes such as symptom severity and quality of life compared with the control group, and a fifth study, which involved both psychoeducation and CBT components, found decreases in the severity of manic symptoms but not depression symptoms.

Conclusions and Implications

The authors identified several limitations in their analysis, including the challenge of capturing all relevant scientific literature on this topic, particularly when some data may only be collected via commercial applications available through online stores. They also noted that the studies included in the analysis involved different interventions, different electronic self-monitoring tools, and different measured and reported outcomes, rendering comparison more difficult.

Furthermore, the authors noted that they found relatively few studies that evaluated the validity of electronic self-monitoring of mood for adult patients with bipolar disorder. Although they found that electronic self-monitoring of depressive symptoms appears to be a valid measure of mood, many questions remain regarding the validity of electronic self-monitoring of manic symptoms. As more individuals possess and use electronic devices such as smartphones that make this type of self-monitoring easier, the authors asserted that further research into both the validity and the potential effects of electronic self-monitoring is of vital importance.

Source
Faurholt-Jepsen M, et al. *BMC Psychiatry*. 2016 Jan 15;16:7.

TELEPSYCHIATRY IMPROVES ACCESS TO MENTAL HEALTH CARE IN RURAL AREAS

Telemedicine may be one way to open up access in rural areas to mental health treatment. A study found that when telepsychiatry is combined with in-person care, those seeking mental health care who live outside metropolitan areas are seen seven days sooner compared with those receiving in-person care only. They are also 34% more likely to have regular visits.

These findings were reported in "Increasing Access to Rural Mental Health Care Using Hybrid Care That Includes Telepsychiatry," by Sana Khalid et al. for Genoa Healthcare. The researchers analyzed data from 242 Medicaid consumers in rural Missouri following an inpatient admission or ED visit: 62 were given a telepsychiatry option in addition to in-person visits with their health care professionals. The goal was to determine the effect of telepsychiatry on care for this population.

When telepsychiatry is combined with in-person care, those seeking mental health care who live outside metropolitan areas are seen seven days sooner.

There were no statistically significant differences between groups for ED visits, antipsychotic medication adherence, and readmissions in the window studied. Additional findings include:

- On average, those consumers using telepsychiatry were seen within 16.4 days, compared with 23.6 days for the in-person-only control group.
- Approximately 67.0% of those using telepsychiatry had at least one outpatient encounter per month, compared to 50.3% of the control group.

The researchers conclude that hybrid care, or the use of telepsychiatry in conjunction with in-person psychiatry visits, can benefit health care consumers located in rural areas. These benefits come in the form of an increased number of visits with health care professionals, and timeliness of these visits for those in rural areas. The authors recommend additional studies that concentrate on the effect of telepsychiatry on antipsychotic medication adherence.

Source
Hughes, M. C., et al. Increasing access to rural mental health care using hybrid care that includes telepsychiatry. *Journal of Rural Mental Health*, 43(1), 30-37.

VIRTUAL PHYSICAL REHABILITATION IS AS EFFECTIVE AS IN-PERSON SERVICES

Virtual physical rehabilitation, facilitated by at-home video sessions and device-based apps, is as effective as in-person physical rehabilitation, according to a 12-week study. It also found no differences between in-person and virtual physical therapy in terms of six-week knee extension, flexion, and gait speed, or in 12-week pain scores and hospital readmissions.

Those who completed a virtual physical therapy (PT) trial saw a median cost reduction of $1,755 at 12 weeks post-discharge. Costs for those following a virtual rehabilitation program saw costs averaging $1,050 per person, whereas those following an in-person physical therapy program saw costs averaging $2,805 for in-person treatment.

Those who completed virtual physical therapy reported a high likelihood of recommending the program to others.

Outcomes were measured using six-week and 12-week Knee Injury and Osteoarthritis Outcome Score (KOOS) evaluations. KOOS is a questionnaire designed to assess short-term and long-term consumer-relevant outcomes following knee injury that assesses pain, symptoms, activities of daily living, sport and recreation function, and knee-related quality of life.

These findings were reported in "Virtual Exercise Rehabilitation In-Home Therapy: A Randomized Study (VERITAS)," by Janet Prvu Bettger et al. The researchers identified 306 home- and community-based health care consumers who had undergone total knee arthroplasty and were willing to participate in either traditional PT rehabilitation or virtual PT rehabilitation for 12 weeks after their surgery. A total of 287 individuals completed the PT trial: 143 in virtual PT and 144 in traditional PT. The goal was to determine the impact of a virtual physical therapy program versus usual care after total knee arthroplasty on health care costs and clinical outcomes.

Additional findings include:

- Falls were reported slightly more often for those using virtual PT (19.4%) versus those using traditional PT (14.6%).
- Those who completed virtual PT reported a high likelihood of recommending the program to others.

The researchers concluded that virtual physical rehabilitation is as effective as in-person PT after total knee arthroplasty. Virtual PT significantly lowered three-month health care costs relative to usual care, while effectiveness and safety were similar. Use of virtual PT could especially reduce costs and expand treatment in rural areas.

Source
Bettger, Janet, et al. Virtual Exercise Rehabilitation In-Home Therapy: A Randomized Study (VERITAS). *Archives of Physical Medicine and Rehabilitation*, Volume 99, Issue 12, e217–e218.

CROSSING THE DIGITAL HEALTH CHASM

Will digital technology reshape health care like it has book selling, travel, food delivery, and transportation? It should, but the health and human services field is not exactly like other areas of commerce.

What are the issues? What makes digital transformation less likely in health and human services (or at least slower and less sweeping)? Two factors come into play: leadership at many of the digital start-ups and a lack of digital dexterity in health and human services organizations. Together, these two factors create quite a chasm between early adopters and the majority.

Currently, many digital health ventures fail. Or at least, that is the message in "Why Do Digital Health Startups Keep Failing?" in *Fast Company*. The article's take: new digital offerings for health care are being designed by entrepreneurs and investors who understand technology but not the health care landscape. Complicated is an understatement when it comes to health and human services—the impact of consumers, caregivers, professionals, provider organizations, payers and health plans, regulators, and legislators at both the state and federal levels need to be considered. "Need-driven innovation" combining knowledge of technology with deep knowledge of specific sectors of the health and human services landscape is the winning (and rare) combination.

Then there is the organizational landscape in health and human services. Even for the best of digital innovations, it is often like—to quote the parable—sowing seeds on rocky ground. Health and human services organizations may lack good performance data to prioritize technology investments. And, even with the data, many organizations lack the digital dexterity to make digital yield results.

This situation is not unique to health and human services. Across all industries, 62% of organizations have failed to lay a strong foundation for IT transformation, and 44% have not taken any action to support IT transformation. Additionally, 51% of organizations report stalling or abandoning some IT transformations. One of the key challenges reported from these organizations was that they had the wrong tech, but there were several other problems cited by managers in the survey—including having multiple legacy systems (64% of organizations reported), data security issues (60%), tech silos (59%), inadequate tech budgets (54%), and competing priorities (53%).

A study examining the digital maturity of six industries found that the health care field ranked third in terms of overall digital maturity—typically lagging about a decade behind other industries in adopting business technologies that would help with customer engagement. Health care ranked second in data optimization, but it ranked last in self-service, digital marketing, and preparedness for disruptive business models.

There is no end in sight to investment in digital platforms for the health and human services field. The digital health market is predicted to grow to $379 billion by 2024, according to a Global Market Insights report.

These investments will likely continue, some of which will be directed at developing solutions for the big players: large tech firms, health plans, and health systems. Additionally, there will be further investment in health tech by pharmaceutical companies.

The health care field ranked third in terms of overall digital maturity–typically lagging about a decade behind other industries.

YOUR DATA INTEGRATION CHECKLIST

Thinking about implementing digital technology into your service lines? For most provider organizations, hybrid services (part face-to-face, part digital) will be essential—both to address consumer demands and to excel in value-based reimbursement arrangements, thereby both reducing costs and improving performance.

For management teams thinking about how to go from all face-to-face services to incorporating tech-enabled services, a new resource recently released by The American Medical Association provides a great framework—the Digital Health Implementation Playbook. The framework has twelve key steps in going to digital.

CHECKLIST

- ☐ **Step 1:** Identifying a need.
- ☐ **Step 2:** Forming the team.
- ☐ **Step 3:** Defining success.
- ☐ **Step 4:** Evaluating the vendors.
- ☐ **Step 5:** Making the (business) case.
- ☐ **Step 6:** Contracting.
- ☐ **Step 7:** Designing the workflow.
- ☐ **Step 8:** Preparing the service delivery team.
- ☐ **Step 9:** Partnering with the consumer.
- ☐ **Step 10:** Implementing.
- ☐ **Step 11:** Evaluating success.
- ☐ **Step 12:** Scaling.

Step 1: Identifying a need. Asked simply, where would digital health solutions help improve the performance of your organization? Most important to this step is understanding how making a digital adoption would bring improvements. Nothing is worse than putting a lot of time and effort into an unneeded investment.

Step 2: Forming the team. While the team isn't in charge of the entire process of tech selection, adoption, and use—that leadership belongs to the project's champion—the process is still a team effort. Identify the staff, from all levels of the organization, whose perspectives and competencies will drive the project to success.

Step 3: Defining success. Of course, what counts as success may be different from project to project, or from organization to organization. It is important to develop a set of performance metrics in your strategic planning and the subsequent tech strategy for tech investments.

Step 4: Evaluating the vendors. The field of vendor choices and technology solutions is vast. And with vendors routinely releasing new products, services, and purchasing options, making the decision on which one to go with will get more and more complicated. Before you begin, establish exactly what you need the new technology to do and what you're looking for in a vendor organization.

Step 5: Making the (business) case. A key part of evaluating technology and specific vendors is the likely return on investment (ROI). ROI comes in many quantitative and qualitative forms and should be evaluated from three perspectives: strategic, clinical, and business.

Step 6: Contracting. Good vendor relationships start with a good contract. Contracts should reflect the expectations of both parties and include remedies for disputes and performance gaps. Get it all in writing.

Step 7: Designing the workflow. The ROI of any technology is only as good as its deployment. Potential ROI can be lost due to poor implementation or poor integration into work processes. Take the time to make sure service delivery design is changed to incorporate and take full advantage of the new technology.

Step 8: Preparing the service delivery team. The right technology and the right process design will fail to produce results without a prepared service delivery team. Make sure your staff training program is up to the task.

Step 9: Partnering with the consumer. New technologies will affect how services are delivered and how consumers receive services. Keep the consumer in mind. Make sure that the new technologies make the experience better for consumers and, if possible, include more consumer control in the equation.

Step 10: Implementing. The implementation of anything new, including technology, sets the stage for how successful the innovation will be. Executive teams need to pay attention to implementation planning and execution to own their processes and their functional requirements. Lack of ownership or passive project management is a sure first step to a less than optimal launch of new technology.

Step 11: Evaluating success. Measuring and monitoring performance is a key to success in getting maximum returns from tech investments. Going back to how you defined success when you purchased the technology, measure those success metrics, and use them to make incremental adjustments to the tech deployment.

Step 12: Scaling. After the successful adoption of a new technology, its time to consider how you can take this tool to scale. Can the technology be expanded into other programs, or be utilized to serve other consumers? These developments are making tech-enabled services more than an experiment—they represent permanent changes in service delivery.

BOT ANYONE? THE QUESTION--WHAT SERVICES CAN YOU AUTOMATE?

A new group of organizations—Amazon, Apple, and Google among them—make up the new left flank in health care. These organizations are blurring the line between the tech field and the health care field. One of the key elements in this blurring of the line is the automation of health and human services functions that previously required human work.

This tech-enabled automation is frequently accomplished through bots, which are computer applications that perform automated and repetitive tasks; common examples include search engine bots, web indexing bots, text-reading algorithms, chatbots, and videogame bots. Some examples of health care service using bots include Amazon's Comprehend Medical machine learning service that extracts medical information from unstructured text in electronic health data; Woebot, a chatbot resembling an instant messaging service that poses questions about the user's moods and thoughts and uses the answers to learn about the consumer; and the Microsoft Healthcare Bot service that facilitates customizable messaging; and virtual health assistants.

So what is the advantage to health and human service delivery in a bot-enabled workforce? Speed, reliability, consistency, and cost-effectiveness all come to mind. An article in HIT Consultant, "5 Use Cases For Chatbots In Healthcare," shared some practical ideas about how to leverage bot technology in health and human service delivery-in customer services, consumer outreach, care coordination, triage, and treatment services.

Customer Service Administration: Which parts of your administration could be completely automated? This question often makes health care executives uncomfortable; however, there are an increasing number of functions that were previously done by staff that can now be handled by bots, including scheduling appointments, issuing appointment reminders, or automated hovering to manage things like prescription medications.

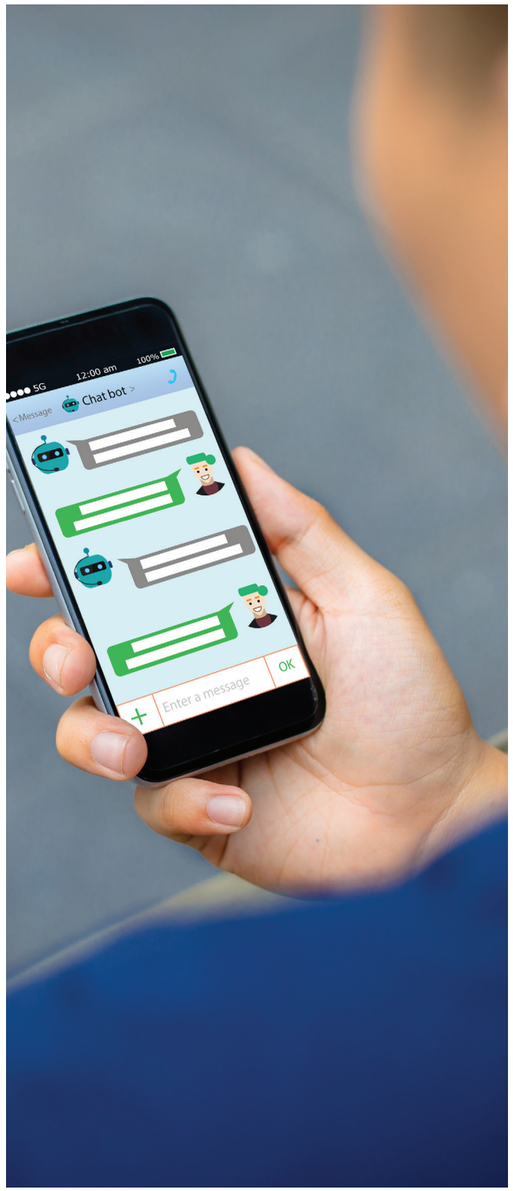
Consumer Engagement: It's unsustainable to hire staff to constantly keep consumers engaged in their own health care. Operating in an on-demand market with elevated consumer expectations and large consumer populations means successful organizations will need to leverage technology to keep consumers engaged, interested, and "activated" in their own care. Chatbots that use artificial intelligence to conduct "conversations" with consumers via auditory or textual methods can provide a steady stream of medical information that helps engage consumers.

Population Health Management/Care Coordination: How do you deliver value-based care in an accessible and scalable fashion? One solution getting more traction in the field is to automate the outreach and coordination education tools necessary to enhance consumer/provider communication, provider/provider communication, and better manage health care experiences across the whole continuum of care. Examples include consumer follow-up, referrals, and treatment planning.

Triage: When speed is a concerning factor in diagnoses and treatment, as might be found in an urgent care setting where consumers need to be managed depending on urgency, AI-powered chatbots can help speed the process by prioritizing population health management practices, and managing which consumers are seen and in what order.

Personalized Treatment Plans: Human service organizations are now repositories for a lot of data and turning that data into usable information and/or automated forms of treatment will rely on automating much of the analysis that is currently done by staff. Bots, along with other forms of AI and analysis programs, are at the heart of taking large chunks of data and turning it into actionable information and customized decision support that can help aid in consumer treatment planning.

Tech-enabled service automation has revolutionized many businesses—from travel arrangements and taxi rides, to gasoline pumps and cash dispensing. The health and human services field is just behind the curve. Executive teams need to think creatively about the how to apply these technologies to their services with an eye on improving value.



FDA FINALIZES THAT FITNESS APPS, EHRs ARE OUTSIDE REGULATORY SCOPE FOR MEDICAL DEVICES

On September 27, 2019, the U.S. Food & Drug Administration (FDA) finalized policy regarding fitness apps and electronic health records (EHRs). The FDA has determined that fitness apps (including trainers, step counters, exercise timers, food trackers, and others) will not be considered medical devices requiring FDA approval and oversight. The FDA has also determined that most EHRs are not medical devices requiring FDA approval and oversight. However, if an EHR provides clinical decision support, it may require some FDA review.

These findings were included in "Policy For Device Software Functions & Mobile Medical Applications: Guidance For Industry & Food & Drug Administration Staff," by the Division of Digital Health at FDA. The document contains guidelines clarifying which types of medical software systems do, and do not, fall under the agency's regulatory oversight.

The FDA contends that many software functions, that may be marketed as "medical software," do not meet the definition of a device under section 201(h) of the Federal Food, Drug, and Cosmetic Act (FD&C Act). Therefore, the FDA does not regulate these software as devices. Section 201(h) of the FD&C Act states that the term "device" means:

"…an instrument, apparatus, implement, machine, contrivance, implant, in vitro reagent, or other similar or related article, including any component, part, or accessory, which is:

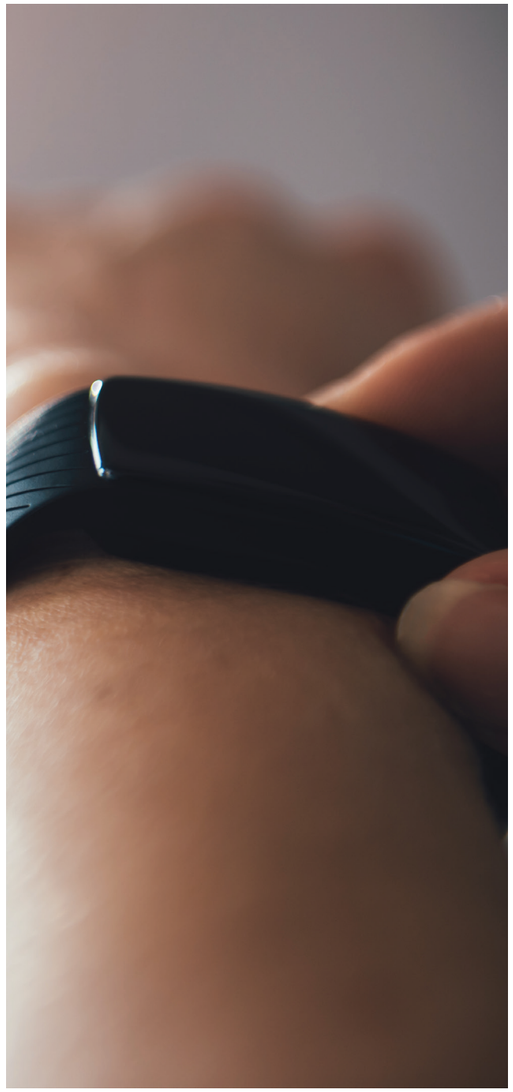
- **"recognized in the official National Formulary, or the United States Pharmacopeia, or any supplement to them,**
- **"intended for use in the diagnosis of disease or other conditions, or in the cure, mitigation, treatment, or prevention of disease, in man or other animals, or**
- **"intended to affect the structure or any function of the body of man or other animals, and**

Because most fitness apps and EHRs do not require a user to ingest a substance for use, and they do not function as an interface for a device inside the body, the FDA holds no oversight of these health-assistance mechanisms.

"which does not achieve its primary intended purposes through chemical action within or on the body of man or other animals and which is not dependent upon being metabolized for the achievement of its primary intended purposes."

Therefore, because most fitness apps and EHRs do not require a user to ingest a substance for use, and they do not function as an interface for a device inside the body, the FDA holds no oversight of these health-assistance mechanisms. Because the FDA considers functionality of the software rather than platform, the FDA intends to apply its regulatory oversight to only those software functions that are medical devices, and whose functionality could pose a risk to a consumer's safety if the device were to not function as intended.

For more information, contact: Stephanie Caccomo, Press Officer, Office of Media Affairs and Office of External Affairs, U.S. Food and Drug Administration, 10903 New Hampshire Avenue, Silver Spring, Maryland 20993; 301-348-1956; Email: digitalhealth@fda.hhs.gov; Website: https://www.fda.gov/



READY OR NOT, COGNITIVE COMPUTING WILL CHANGE YOUR ORGANIZATION

The development of tech applications is unleashing the power of cognitive computing. As applications gather vast amounts of previously unavailable information—the Big Data so frequently referenced—the next step is to analyze that data to facilitate tech-enabled decision support. Even more exciting is advancing those tech-enabled decisions using cognitive computing or machine learning, with the ability of the tools to make increasingly better decisions through self-learning thought processes like pattern recognition and natural language processing.

Applications of these decision-making technologies are starting to hit the field:

AI for schizophrenia diagnosis: The University of Alberta has tested the use of algorithms to diagnose schizophrenia, finding a 75% accuracy rate.

AI-supported physician collaboration: The Tiatros platform is being used to allow physicians to create private social networks around each consumer to foster collaboration and build longitudinal relationships among the entire care team. The platform uses natural language analytics to analyze the unstructured data, identifying when and how to best add behavioral health and social support services.

AI-facilitated juvenile court decision making: A judge in Ohio is now using IBM Watson to power digital case file management. The tool displays a dashboard of summary information for each juvenile case.

AI tools to discover new medications: The Mayo clinic has created partnership using artificial intelligence to aid in the discovery of new medicines, by mining large volumes of the medical literature and clinical data to identify opportunities for the development of new drugs.

AI prediction of relapse: The start-up Behavior will merge artificial intelligence with wearable devices to predict relapse danger for recovering opioid users. The device will gather data, such as elevated body responses or notifications of missed counseling appointments, to determine when a candidate might be in danger of a relapse using predictive models.

AI-managed robots to monitor consumers in their homes: A robot prototype using a number of technologies, including AI, will monitor consumers' vitals at regular intervals. In addition, the robot can detect if a consumer has fallen and can't get up, and monitor the consumer's living space for potentially problematic changes in physical and environmental conditions.

YES, THERE ARE ORGANIZATIONS USING AUGMENTED INTELLIGENCE

Artificial intelligence. Augmented intelligence. Machine learning. Big data.

So where are we seeing their practical uses in today's health and human services market? Health systems, payers, and employers are using AI for everything from predictive modeling and diagnostics, to precision medicine and care coordination—these are a few examples of how organizations are using AI to serve complex consumers.

There are multiple large health systems that are using AI and big data analytics for predictive modeling and care coordination. Montefiore Health System is using AI infrastructure and big data analytics for predictive modeling to recognize everything from consumers who are at increased risk of mortality, to those who are at risk of respiratory failure or sepsis. And Johns Hopkins' Center for Diagnostic Analytics has developed a new approach to big data analysis, called SPADE (Symptom-Disease Pair Analysis of Diagnostic Error), which utilizes big data analytics to scan multiple databases to help physicians recognize diagnostic error.

Tampa General has partnered with GE Healthcare to launch a care coordination command center that can process streams of real-time data from multiple sources. It helps the hospital track patient progression, promoting safety, and manage staff workloads.

CHI Franciscan Health launched a similar initiative with GE Healthcare, creating a AI-enabled and NASA-inspired command center that will leverage predictive analytics and machine learning to help manage hospital operations.

There are also many new tools that utilize big data analytics, which are currently being used by health plans and provider organizations. One example is Ginger.io, a mobile app that provides behavioral health support—including online cognitive behavioral therapy and mindfulness training—delivered by coaches, therapists, and psychiatrists. Using their AI technology, the app recognizes patterns in how consumers use their smartphones to tailor treatment models. Ginger.io is currently offered through the UnitedHealthcare and Optum networks; and by the SEIU 775 Benefits Group for community of home care workers. The app has also partnered with multiple large employers, including Buzzfeed and Pinterest, to provide Ginger.io to their employees.

NextHealth's predictive analytics platform is being used by provider organizations for population health management and to identify risk-reduction opportunities. Through the analytics platform, organizations can identify high-risk populations and develop personalized recommendations for consumers to improve outcomes and reduce costs. One Colorado-based provider organization was able to save $6 per member per month by reducing ED utilization among high-risk populations by using the analytics tool.

The AI market isn't small–and its reach in health care is only increasing.

Mindstrong is a mobile app that passively collects data on consumer smartphone activities such as scrolling, typing, and clicking. Using this data, Mindstrong can identify individuals whose mental health is changing and intervene via telehealth and messaging. Clinical professionals can also view the data 24/7 and are alerted when individuals may need intervention. Mindstrong is currently offered by five county mental health authorities in California as part of their Innovation Technology Suite.

Health Fidelity is a technology platform that integrates with electronic health records and extracts data using natural language processing to analyze and identify risk across populations as well as gaps in business functions. Executive teams and clinical professionals can then use this data to improve care and organizational performance. Currently Mount Sinai Health Partners in New York and UPMC have signed on to use the Health Fidelity model for provider organizations.

These examples show that while AI isn't yet in common use, its status is quickly shifting, making AI a strategic reality for many health and human service organizations. The AI market isn't small—and its reach in health care is only increasing. Grand View Research, Inc. estimates the global AI market will reach $36 billion in direct revenue by 2025. And Accenture estimates that AI in health care will reach $6.6 billion by 2021. McKinsey & Company estimates the potential annual savings at 0.7% ($300 billion) of gross domestic product, and ABI Research estimates that by 2021 the savings will grow to $52 billion. As the use of AI in health care expands, its ability to improve outcomes and increase efficiencies will reshape the expectations of consumers and payers. And when AI becomes a more common, everyday practice, the organizations that can leverage AI to improve performance will have the competitive advantage.

PSYCHU NATIONAL FORUM

PsychU's Theme for 2019

Data & Technology To Improve Mental Health

Informed. Engaged. Connected.

FUTURE OF TECHNOLOGY & MENTAL HEALTH

June 25, 2019 | Chicago, IL

For 2019, PsychU's annual theme was data and technology to improve mental health. In keeping with PsychU's goals of improving mental health care… together, PsychU hosted a National Forum: Future of Technology and Mental Health on June 25, 2019, in Chicago. The forum brought together top digital health clinicians and researchers in the mental health community in order to discuss the current landscape of technology in mental health and what the future may hold.

The full-day event was chaired by John Kane, M.D., the Senior Vice President for Behavioral Health Services at Northwell Health, and moderated by Chip Meyer, Ph.D., Otsuka Medical Science Liaison.

The key objectives of the forum were to:

- Understand the current use of technology in mental health and the barriers that may limit implementation.
- Discuss the future of implementing technology in mental health and advancing its use.
- Gather key insights from experts in technology and mental health to assist in the development of PsychU resources on how technology figures in mental health care today.

The discussion throughout the day centered on five key topic areas, and the takeaways from the meeting are included below:

Use of Technology in Mental Health	• Technology in mental health should fill a need for the patient or clinician and make some part of the job easier. • Utilizing technology to increase access to care may have the most immediate impact and benefit. • Conversations with payers are necessary as payers must be open to harnessing the technology we have. • Currently there is a role for both prescribed and non-prescribed applications, but the best tools are the ones patients have easy access to. • There is a potential for on-demand disease management and adherence in individuals who are chronically ill as well as increasing health literacy around psychiatric issues for those who don't know they are ill.
Barriers to Use of Technology in Mental Health	• For clinicians, barriers include security, risk, integration, and billing. How do you handle the incoming data, and when do clinicians intervene? How does that data fit into the workflow, and how do you bill and for what? • For patients, technology must provide them with value and demonstrate cultural and religious sensitivity. While privacy concerns also exist for patients, there appears to be less concern about the information shared. • Insufficient engagement on the part of the clinician is a problem. Patient will quickly lose interest in and motivation for using a digital health tool if the clinician isn't also engaged. • There is a need for an industry code of ethics, HIPAA, GDPR. Privacy policies need to be presented in plain language, and consent is always important.
Implementing the Use of Technology in Mental Health	• Implementation models will differ across diagnosed versus undiagnosed patients, disease severity, and phase of illness. • Technology opportunities are there, but there is currently not enough demand or financial coverage. • Companies developing the technology should identify super-users and empower them to help educate colleagues on implementation and use. • Training needs to be a part of the technology, with the burden falling on the company and not on the clinician. • Digital health courses should be included in training programs for health care professionals. • Technical troubleshooting needs to be available and on the most basic level. • Digital navigators or technology specialists may be beneficial. They need to be familiar with both the clinical and technology aspects and know how to evaluate the technology.

The discussion throughout the day centered on five key topic areas, and the takeaways from the meeting are included below:	
Future of the Use of Technology in Mental Health	• Still determining where technology is going to provide value, where all the data is going to go, and who should regulate it. • Early diagnosis would be key, but more validation studies are needed. • Key features of an ideal technology include having value to the patient and clinician, mobile functionality, easy user interface, self-assessment tools, sensors, real-time data exchange, and the ability to intervene if necessary. • Future technology needs to take into account the interests of clinicians, patients, and health systems to avoid conflict. • Regulation of technology in mental health is unclear and still developing. Digital therapeutics and applications are cleared by the FDA, but some legislation sees it falling under the FTC. • Organizations are primed to lead in the adoption of technology in mental health care. They will adopt various technologies, which their members will use. • All hands need to be on deck across the mental health care landscape.
Educating on the Use of Technology in Mental Health	• Start with the basics of digital health, explain the various domains, and provide guidance for sorting through options. • Educate on the cost and reimbursement landscape of digital health. • Guides on the various state policies on digital health would be beneficial. • Include clinician perspectives on the workflow of using digital health tools. • Provide patients' perspectives on the use of digital health tools.

Throughout the day, the forum attendees had lively discussions on the topic of technology use in mental health care, sharing their expertise. The group made several recommendations on key areas where PsychU could provide education and resources for health care professionals interested in the use of technology in mental health.

With the help of the forum attendees, PsychU plans to further develop the digital health section based on these recommendations. Plans are already underway for a webinar that begins by explaining the basics of digital health and defining the landscape. A future video series hopes to bring health care professionals inside the daily workflow of those using technology in their practice as well as share the patient's perspective on using these digital tools. Future on-demand presentations will focus on technology's effect on adherence and within specific disease states such as depression, schizophrenia, and bipolar disease. Keep your eye out for these exciting presentations as well as other future updates to the PsychU digital health section!

Attendees included:

- **John Kane, MD**, Senior Vice President Behavioral Health Services, Northwell Health
- **Timothy Aungst, PharmD**, Associate Professor of Pharmacy Practice, MCPHS University
- **Jake Behrens, MD**, CEO & Medical Director, Envision ADHD, & Regional Director, Brightside Health
- **Dror Ben-Zeev, PhD**, Professor of Psychiatry and Behavioral Sciences, University of Washington, & Co-Director, BRiTE Center
- **Megan Coder, PharmD, MBA**, Executive Director, Digital Therapeutics Alliance
- **Carmen Kosicek, MSN, APNP, PMHNP-BC**, Founder and National Collegiate Clinical Educator, Alay Health Team
- **David Mohr, PhD**, Professor of Preventive Medicine, Feinberg School of Medicine, Northwestern University, & Director, Center for Behavioral Intervention Technologies, Northwestern University
- **John Newcomer, MD**, President and CEO, South Florida Behavioral Health Network
- **Joe Parks, MD**, Medical Director, National Council for Behavioral Health, & CEO, HealthManagement LLC
- **Mona Sobhani, PhD**, Director of Research and Operations, USC Center for Body Computing
- **Dawn Velligan, PhD**, Professor, Department of Psychiatry, UTHSC, & Chief, Division of Community Recovery, Research, and Training, UTHSC
- **Chip Meyer, PhD**, Medical Science Liaison, Otsuka Pharmaceutical Development and Commercialization, Inc.
- **Fatima Sadat, PharmD**, Medical Science Liaison, Otsuka Pharmaceutical Development and Commercialization, Inc.
- **Mark Tacelosky, PharmD**, Medical Science Liaison, Otsuka Pharmaceutical Development and Commercialization, Inc.
- **Tony Rebelo, MBA**, Director, Strategic Planning & Operations – Field Medical Affairs, Otsuka Pharmaceutical Development and Commercialization, Inc.
- **Christina Van Derveer**, Senior Corporate Attorney, Otsuka Pharmaceutical Development and Commercialization, Inc.
- **Dapo Tomori, MD**, VP, Population Health, Proteus Digital Health

Why Join PsychU?

Scan Me To Join The PsychU Community Or Visit PsychU.org

Be A Part Of The Community That Shares One Simple Belief:

Shared information, increased collaboration, and ongoing discussion will lead to improved mental health care and better outcomes for individuals with mental illnesses.

Keep Up-To-Date On The Biggest Topics In Mental Health Care

Our passion is to increase access to information that can lead to improved outcomes for individuals with mental illness. PsychU's resources cover many of the clinical, management, and policy topics shaping the mental health care field, including:

- Bipolar Disorder
- Major Depressive Disorder
- Schizophrenia
- Co-Occurring Substance Use
- Wellness
- Stigma
- E-Health & Technology
- Health Care Policy & Legislation
- Care Coordination
- Payer & Financing Models
- Quality Standards & Performance Measures

Participate In Online Webinars & Live Events

Attend free educational live events and webinars that give you a platform for discussion and a place to share experiences. We host hundreds of programs each year, which you can participate in from the comfort of your home, office, or at a local meeting in your area.

Learn From Supporting Organizations

Access additional resources provided by our Supporting Organizations. These relationships facilitate the exchange of information, experiences, and ideas, as we stand together to shift the current trajectory of mental health care.

Gain Access To A Library Of On-Demand Mental Health Resources

Easily search the online library containing 6,000+ resources on the latest developments in mental health research, market trends, treatment best practice guidelines, innovative programs, decision support tools, and more.

Gather New Insights From Mental Health Thought Leaders

Hear from speakers and organizations helping to improve the lives of individuals with mental health needs. PsychU provides a platform to spotlight perspectives and experiences across the behavioral health field–from innovative clinical professionals and experienced executives to community leaders and advocates.

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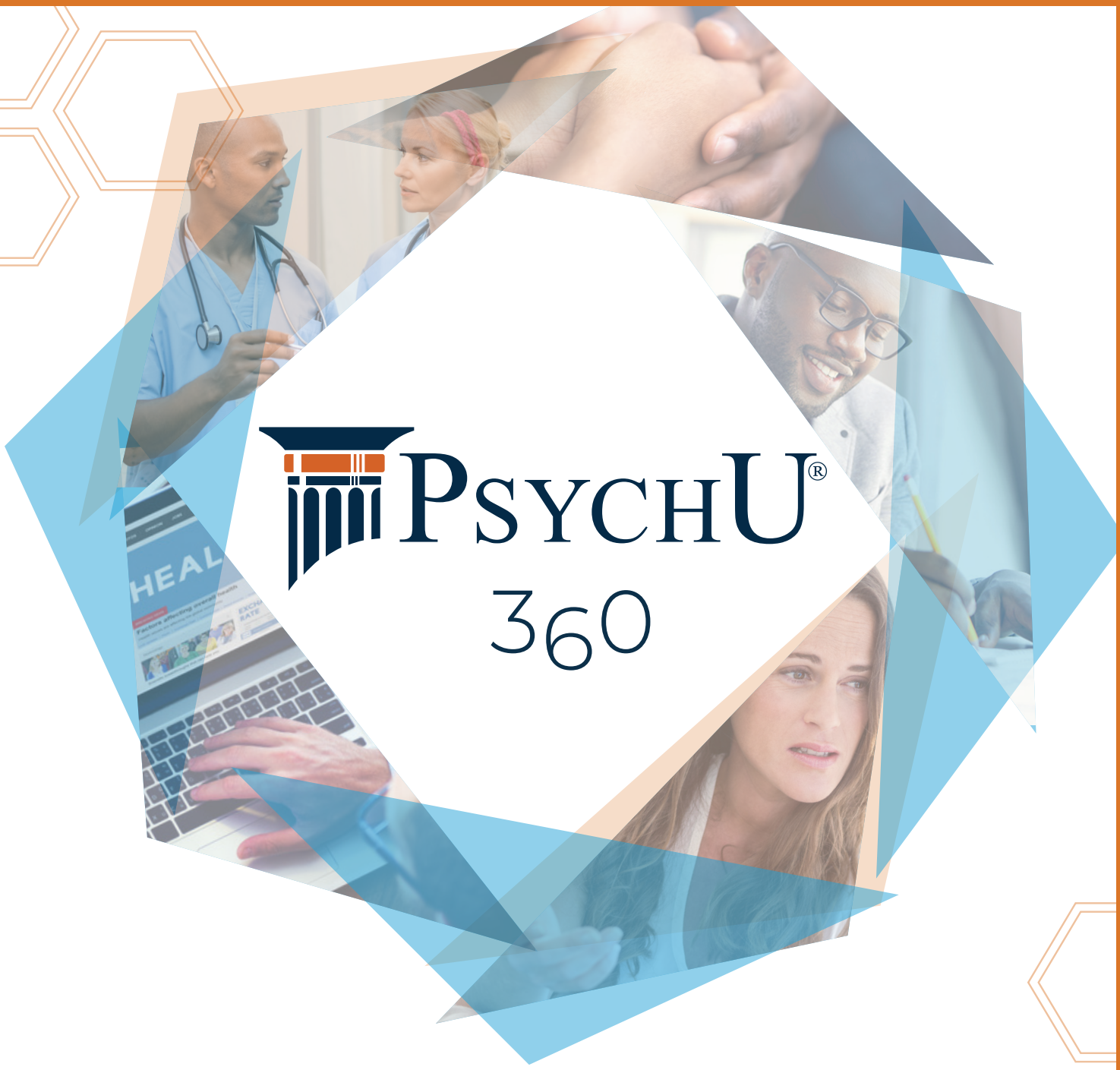

PsychU® 360

A 360° VIEW OF THE MENTAL HEALTH INFORMATION THAT MATTERS TO YOU

2020
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01 IMPROVING MENTAL HEALTH WITH DIGITAL TECH

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