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Precision Behavioral Health Integration

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Chair, Psychiatry and Behavioral Health

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Behavioral health care today: outgunned, outmanned, outnumbered, out-planned.

Demand outpacing supply, care efficacy is wanting, and costs are growing at an unsustainable pace



Access

Inadequate network supply leaves majority of BH patients untreated

70% Of PCP visits are partially driven by patient BH needs¹

2/5 Patients referred to networks get connected with BH care²



Efficacy

Psychotherapy effectiveness has not changed in 50 years

38%

Of patients experience clinically meaningful improvement from psychotherapy⁴



Cost

Mounting patient needs and pressure to increase access driving ballooning costs

16% Commercial multi-payer BH cost trend YOY³

\$1,955 Average commercial cost per therapy episode⁵

1) American Psychological Association. (2014). Briefing Series on the Role of Psychology in Health Care: Primary Care. <https://www.apa.org/health/briefs/primary-care.pdf>

2) 2019-2021 all-payer claims analysis

3) Observed industry-wide multi-payer statistic, excluding ABA therapy costs.

4) 38% benchmark based on Cuijpers et al., 2021 meta-analyses of psychotherapy effectiveness in naturalistic settings.

5) Commercial average cost per therapy episode (excluding episodes with \$0). Episode defined as an initial evaluation followed by a BH follow-up claim in the next 2 months.

Our approach to-redesigning BH is centered on Real-World, Wet-Lab Engine

Deployment via Health System enables proprietary, continuous learning for optimal program performance



It starts with the right inputs

Patient Data

- *Mutli-dimensional PRO Data*
- *EMR Clinical history*
- *Demographics*
- *Past claims*

Vendor/Provider Data

- *Treatment utilization*
- *Vendor-specific outcomes*
- *Unpublished and published research*



Learning Health System engineered to evolve with new BH care models

Enabling Capabilities



Research & Data
Analytics Team



In-house CDS
Development Team



Implementation &
Operations Team



Creation of value-add assets

Differentiated Program Offerings

- *Precision BH (in progress)*

Validated by Evidence

- *HCE studies*
- *Peer-reviewed publications*

PBH Evaluated Rigorously by Practice-Embedded Research Team

Program Evaluated by Dedicated Academic-Quality Research Team, Integrated into Provider Setting

Administration and Policy in Mental Health and Mental Health Services Research
https://doi.org/10.1007/s10488-023-01202-9

ORIGINAL ARTICLE

Leveraging Implementation Science to Integrate Digital Mental Health Interventions as part of Routine Care in a Practice Research Network

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Abstract
The supply / demand issue in behavioral health care is a well-established fact, and the mental health toll of the COVID-19 pandemic continues to add challenges to an already taxed system. Existing healthcare models are not set up to adequately address the increasing mental health related needs. As such, innovative models are needed to provide patients with access to appropriate, evidence-based behavioral health care within routine clinical care. This paper introduces Precision Behavioral Health (PBH) as an example of such a model. PBH is an innovative, digital first care delivery model that provides an ecosystem of evidence-based digital mental health interventions to patients as a frontline behavioral health treatment within routine care in a large multispecialty group medical center in the United States. This paper describes the implementation of PBH within a practice research network setup as part of an integrated behavioral health department. We will present how our team leveraged the RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance; "What is RE-AIM?" n.d.) implementation science framework, which emphasizes the design, dissemination, and implementation processes at the individual, staff, and organizational levels, to prioritize key implementation constructs to enhance the successful integration of PBH within routine care. We describe how each of these constructs were operationalized to aid data gathering for rapid evaluation and lessons learned. We discuss the benefits of these types of initiatives across multiple stakeholders including patients, providers, organizations, payers, and digital intervention vendors.

Keywords Practice oriented research · Implementation science · Digital mental health interventions · Rapid evaluation · Practice research network

Introduction

There is a global mental health crisis, with an increasing demand for mental health services without adequate providers to meet this need (Abrams, 2020; Manquez et al., 2020). In the United States, 163 million Americans live in a designated mental health provider shortage area and over 8,000 providers are needed to fill this gap (Health Resources and Services Administration, 2022). Even in well-resourced areas, only 41% of referrals to behavioral health care are successfully filled within six months of referral (Nordberg et al., 2023). The mental health provider supply problem is

not new, and numerous attempts to increase the supply of providers have proven ineffective (Sattani et al., 2018). Recently, digital mental health interventions, evidence-based mental health applications that can be accessed on smartphones and other devices (Substance Abuse and Mental Health Services Administration, 2022), have been proposed as an innovation with the power to radically improve access to effective interventions through its scalability, flexibility, accessibility, and potential to reduce the stigma around utilizing mental healthcare (Webb et al., 2010). With the growing rise of technology and ubiquity of cell phones (Pew Research Center, 2019), digital therapeutics can facilitate access to care at the moment that care is needed (Busci et al., 2018). For example, digital therapeutics typically include self-directed apps for skills building or intervention application in the moment (Fairburn & Patel, 2017). In this way, they provide unique opportunities for patients to seek

Soo Jeong Youn and Brittany Jaso share first authorship.
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Research Manager

Clinical Psychologist with expertise in experience sampling methodology and analytics, digital health interventions, statistical software development, and efficacy trials



Pratha Sah, PhD

Data Scientist

Quantitative Epidemiologist with over 10 years of experience in data analytics, data visualization, advanced and complex statistics



Keke Schuler, PhD

Qualitative Researcher

Experimental Psychologist with expertise in mixed methods (including large data analysis, ML, NLP), data visualization, and trial designs



Soo Jeong Youn, PhD

Sr Implementation Scientist

Clinical Psychologist and Implementation Scientist internationally recognized expert in practice-oriented research, psychotherapy research, and large-scale deployment of real-world solutions

Combined publication expertise across PBH research team members

140+

Peer-Reviewed Publications Produced

5

PBH specific Manuscripts submitted for peer review in 2023

8

Academic PBH Conference Presentations in 2023

Program Development Sites: Atrius and Reliant

PBH was adopted and integrated into the existing care models of its development partner sites



CQI Orientation

The PBH offering was funded to solve a pressing, patient-facing problem: access to evidence-based care. It offers several advantages for program development:

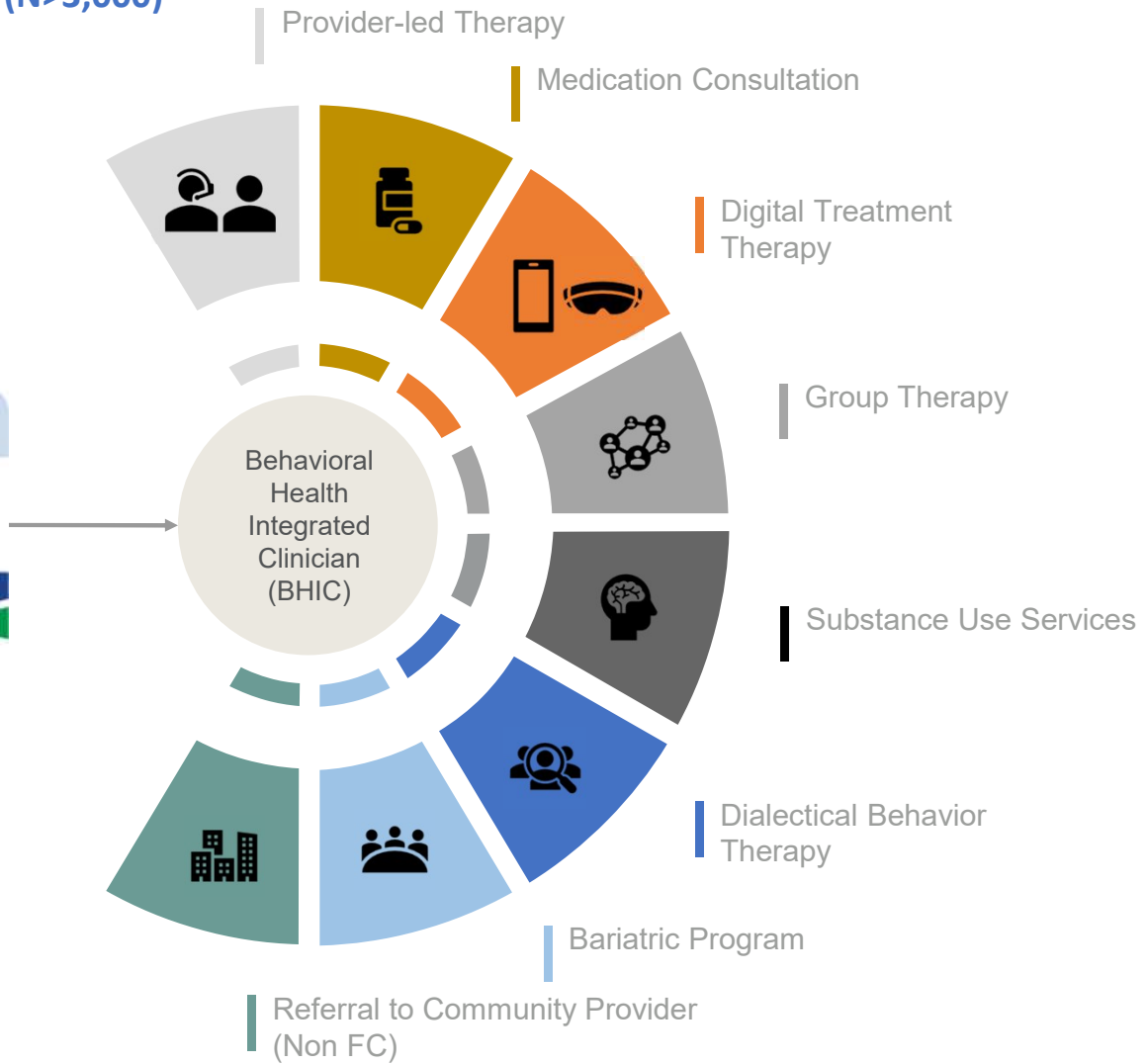
- Results are representative and reflective of real-world adoption and impact vs. a biased research sample
- CQI enables more rapid program integration into routine care and increased responsiveness to patient and provider feedback to maximize acceptability
- Expands potential program benefits to a larger patient population vs. consented research
- Full wrap-around services are offered to all patients, and is an additional care pathway to address waitlist issue

	Reliant Largest Integrated BH Provider in MA	Atrius Health Co-located BH Provider in MA
<i>BH FTE</i>	110+	120+
<i>Patients Served</i>	300K	700K
<i>% of Patients Empaneled in VBC</i>	50%	60%

Developed inside the Reliant Integrated BH Program (N>3,000)

- BHICs trained in and demo-ed every selected tool
- BHICs used clinical judgement to triage for 1 year
- Research team built an algorithm to replicate
- BHICs used algorithm and CDS for 1 year
- Approved to expand CDS to primary care

Engage Behavioral Health
via Consult Behavioral
Health Order



Precision Behavioral Health¹

A digital-first, primary care-integrated clinical program for patients with mild / moderate BH needs



Multi-dimensional Profiles inform treatment focus

- Enhanced psychometric screenings prior to office visit defines patient BH profile
- Profile determines program eligibility, informs digital care recommendations
- Closed-loop learning refines profile-specific recommendations over time

1

Over **12K patients** evaluated and **4K referred** To PBH



PCPs refer via an EHR-integrated treatment recommender

- Clinical Decision Support application dynamically surfaces program enrollment, digital intervention recommendations
- App facilitates shared decision-making for top 3 options
- PCP Training complete in 1 hour; Referral complete with 2 clicks

2

1-4 minute average for PCP referral

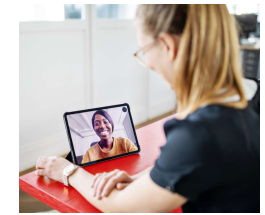


Patients matched with digital BH intervention from diverse, proven ecosystem

- 9 differentiated, evidence-based digital mental health interventions (VR, mobile apps, biofeedback)
- All interventions tested in naturalistic primary care setting to outperform psychotherapy improvement rates
- Tools added iteratively, once proven at development sites

3

<**10%** Vendors evaluated admitted to ecosystem



Programmatic support via virtual BH care team

- Digital Care Navigator supports onboarding via virtual visit following patient referral
- Program clinicians manage ongoing PRO measurement, monitoring, escalation, and conduct mid-treatment virtual check-in

4

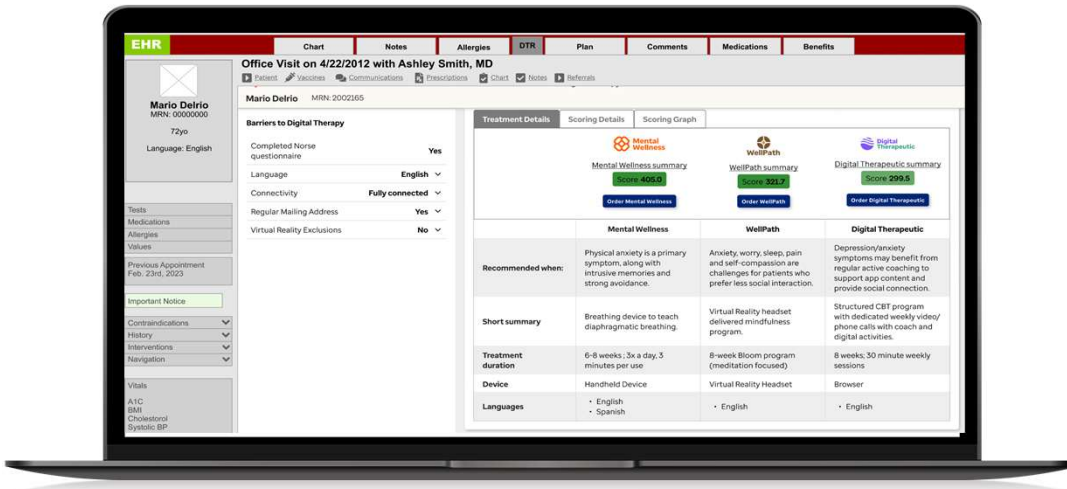
6-12 weeks average intervention length

¹Youn, S. J., Jaso, B., Eyllon, M., Sah, P., Hoyler, G., Barnes, J. B., ... & Nordberg, S. S. (2024). Leveraging implementation science to integrate digital mental health interventions as part of routine care in a practice research network. *Administration and Policy in Mental Health and Mental Health Services Research*, 51(3), 348-357.

Deep Dive: Clinical Decision Support Platform

Data-driven recommendations in real-time within the EHR

[Link to demo](#)



Providers confirm ease of use and willingness to adopt¹

1 to 4 Minutes to complete referral

73% Eligible patients offered PBH

“So far it's been great...very user friendly to start off and was pretty easy.”

“It was way smoother than I expected it to be.”

“I've done it so often or talked about the different options so often that I feel really comfortable with it.”

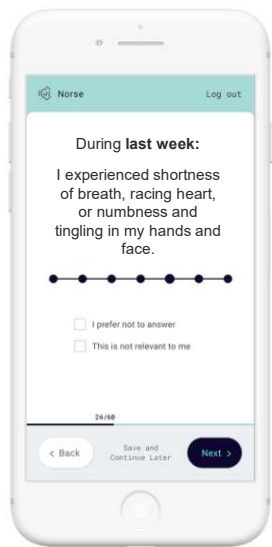


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¹Youn, S.*, Schuler, K.*, Sah, P., Jaso, B., Pennine, O'Dea, H., Eyllon, M., Barnes, J.B., Murillo, L., Orth, L., Hoyler, G.H., & Nordberg, S.S. (Accepted for publication). Scaling out a digital-first behavioral health care model to primary care. *Administration and Policy in Mental Health and Mental Health Services Research*

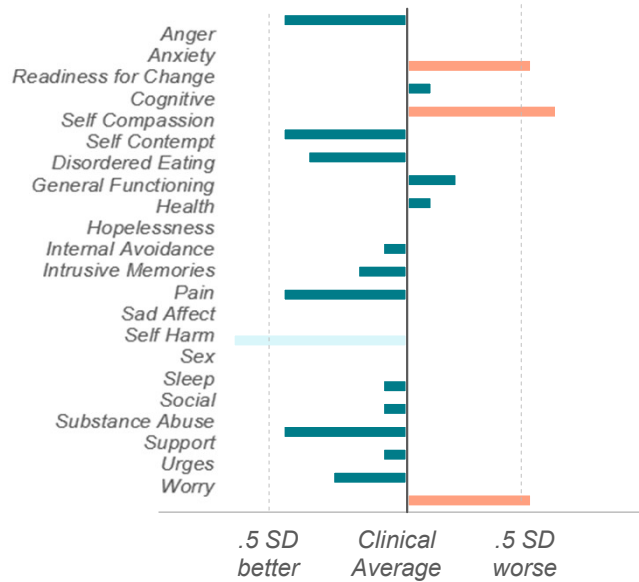
In progress: Continuing to learn

Patient survey responses...



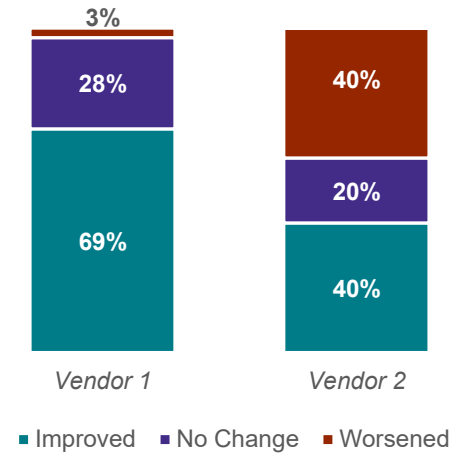
Validated patient-adapted PRO surveys completed prior to scheduled visit

...define distinct, ML-derived symptom classes...



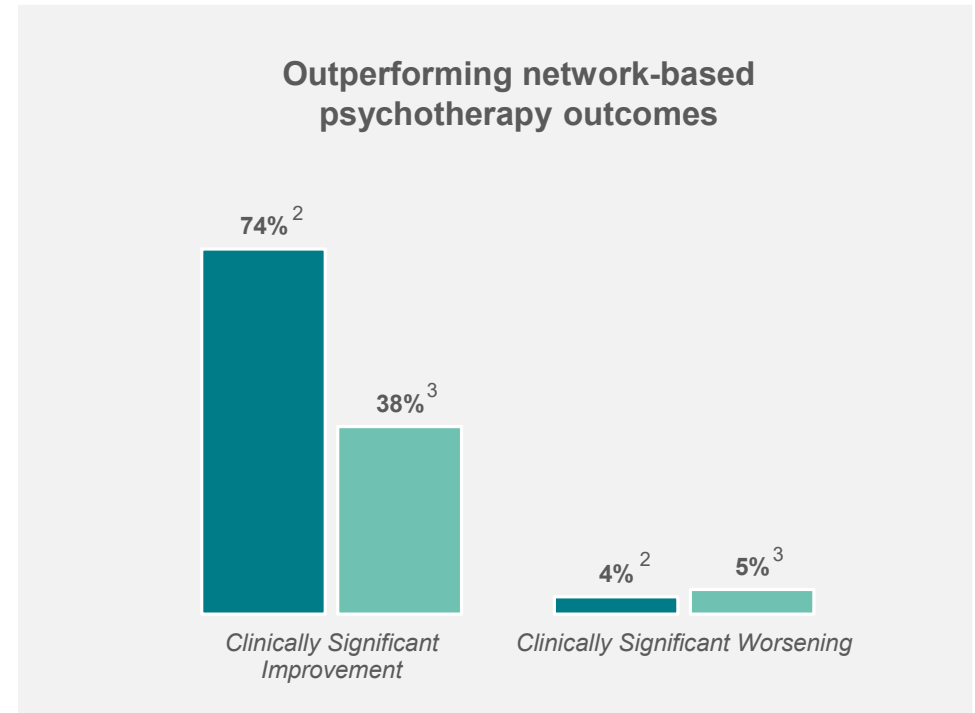
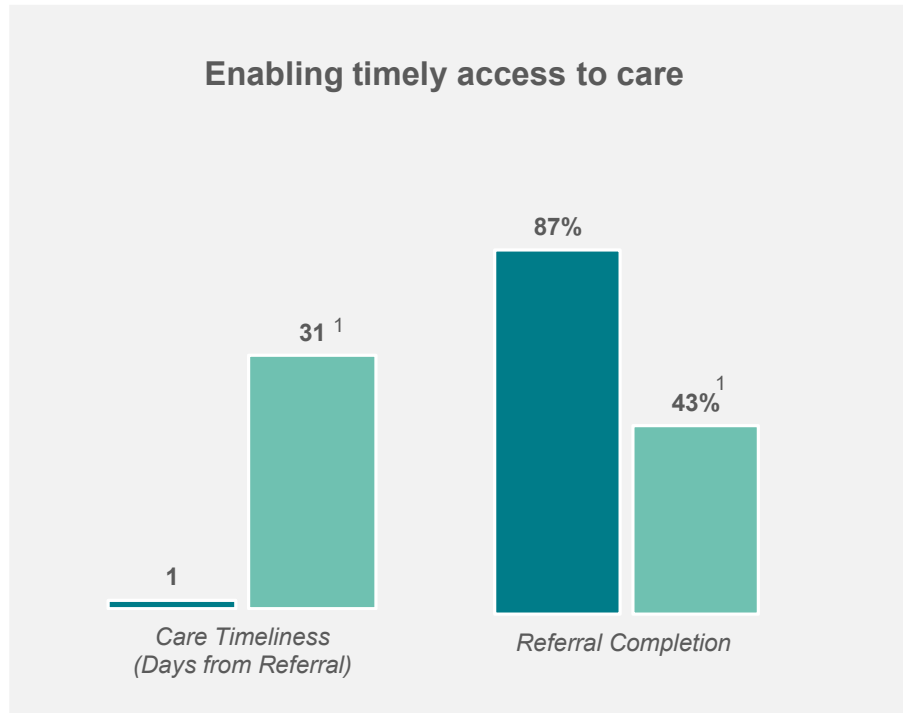
39 distinct symptom classes derived to date
Example: Class #12 (8% of sample)

...that can predict optimal treatments



Early trends showing predictive promise
Example: Class #12 outcomes, N=45

Outcomes: Access and Quality



■ Precision Behavioral Health

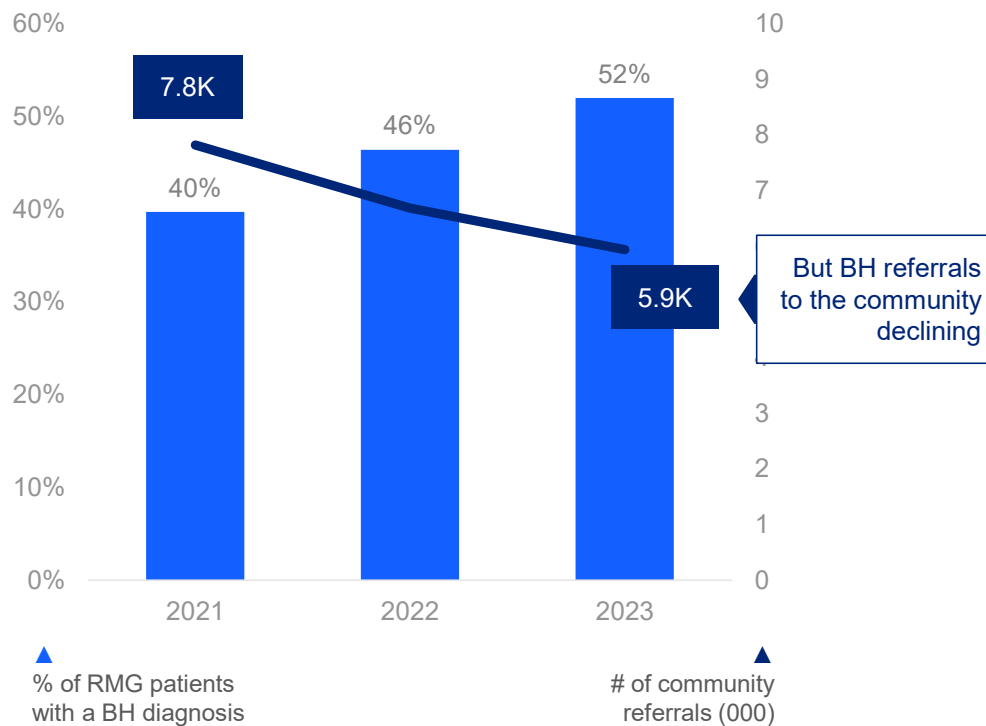
■ Network-based psychotherapy



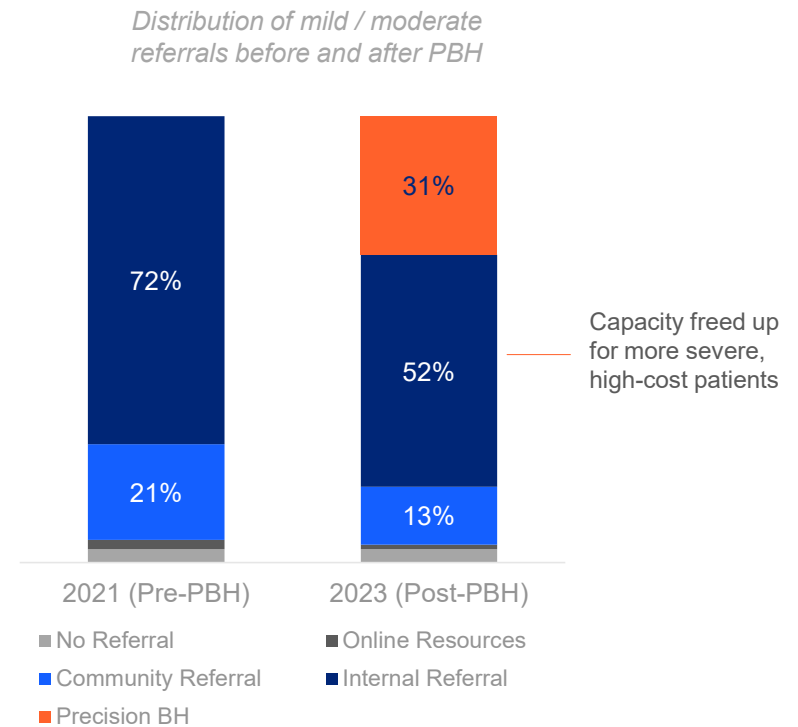
- 1) Nordberg et al. (2023). Harnessing the power of data to enact real-time clinical and operational decision making. Presented at the Society for Psychotherapy Research 54th International Annual Meeting, Dublin, Ireland, June 21-24, 2023.
- 2) Nordberg, S. S., Jaso-Yim, B.A., Sah, P., Schuler, K., Eyllon, M., Pennine, M., Hoyler, G. H., Barnes, J. B., Murillo, L., O'Dea, H., Orth, L., Rogers, E., Welch, G., Peloquin, G., & Youn, S. (in press). Evaluating the Implementation and Clinical Effectiveness of an Innovative Digital First Care Model for Behavioral Health Using the RE-AIM Framework: Quantitative Evaluation. *Journal of Medical Internet Research*.
- 3) Benchmark informed by peer-reviewed meta-analyses conducted by Cuijpers et al., 2021. Reflects improvement rates observed from psychotherapy in naturalistic settings.

PBH expanding capacity and leverage of Reliant's Behavioral Health department

Prevalence of behavioral health need rising steadily at RMG



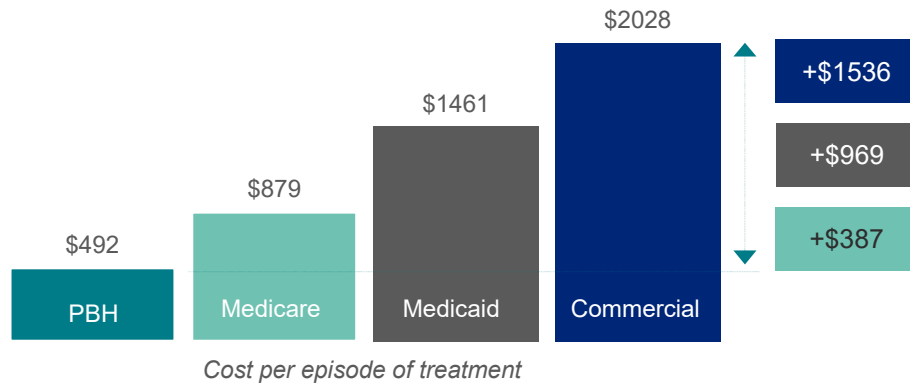
Availability of PBH has enabled RMG to keep patients in house, shift patient mix



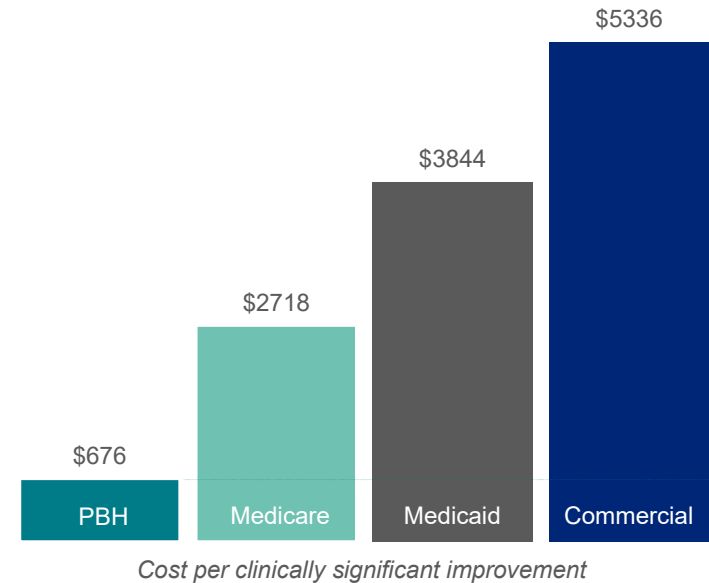
Ability to deploy lower-cost care, instead of therapy

Treatment costs of PBH vs. traditional psychotherapy

BH spend per patient for 12-month period following start of episode¹



Cost differentials when viewed as cost per significantly improved patient²



Peer Reviewed Papers:

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Abstract
The supply / demand issue in behavioral health pandemic continues to add challenges to an already address the increasing mental health related use to appropriate, evidence-based behavioral health care (PBH) is an example of such a an ecosystem of evidence-based digital mental within routine care in a large multispecialty practice research network. We present how our team leveraged the RE-AIM framework to address the implementation science from process at the individual, staff, and organization level. We describe the successful integration of PBH within routine care and the challenges we encountered during the implementation process. We discuss the implications for rapid evaluation and lessons learned for stakeholders including patients, providers, and practice research network.

Evaluation of the impact of a digital care navigator on increasing patient registration with digital mental health interventions in routine care

Brittany Jaso-Yim^{1,2}, Mara Eyllon^{3,4}, Pratha Sah⁵, Mariesa Pennine⁶, George Welch⁷, Robin Schuler⁸, Laura Orth⁹, Heather O'Dea¹⁰, Elizabeth Rogers¹¹, Lily H. Murillo¹², J. Ben Barnes¹³, Georgia Hoyler¹⁴, Gabrielle Peloquin¹⁵, Kevin Jarama¹⁶, Samuel S. Nordberg¹⁷, Soo Jeong Youn¹⁸

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Introduction

There is a global mental health crisis, with an estimated 264 million people living with a mental health condition worldwide (World Health Organization, 2022). In the United States, 163 million Americans live with a mental health condition (Mental Health Services Administration, 2023). Even in rural areas, only 41% of referrals to behavioral health were filled within six months of referral (Hoyler et al., 2023). The mental health provider supply

ARTICLE INFO

Keywords: Digital care navigator (DCN), behavioral health interventions (BHIs), patient registration, telehealth, implementation science, practice research network.

ABSTRACT

Background: Less than half of adults with mental health disorders in the United States receive appropriate or timely care. Digital mental health interventions (DMHIs) have the potential to bridge this gap. However, real-world adoption of DMHIs is impeded by patient and provider-level technological barriers. Care navigators have the potential to address these challenges by providing technical support and enhancing patients' experience with DMHIs.
Objective: This study explores the effect of a digital care navigator (DCN) on patient registration latency and rates of DMHI implementation as part of a digital first behavioral health care model integrated within routine care in a large multispecialty group medical practice.
Methods: Data were collected from electronic medical records and DMHI registration data were obtained from the DMHI vendor. Descriptive statistics were used to describe the DCN's effect on help patients register with their DMHIs. Mixed median tests evaluated differences in registration latency and weekly registration rate pre- and post- DCN implementation. Change in registration likelihood as a function of DCN outreach letters was investigated using a Kaplan-Meier plot.
Results: During the first eight months, the DCN made 1306 phone calls to 680 unique patients, successfully connecting with 46%. DCN implementation also increased the median registration rate from 63.9% to 76.9%. Results showed that the expectancy by which the DCN contacted patients directly impacted registration rate such that those who were contacted by the DCN on the day of their referral to a DMHI, 96.8% registered. This number was reduced to 76.3% if the DCN reached them 1-day following referral, and 62.3% 5-days after their referral.
Conclusions: Use of a DCN shows promise for enhancing patient registration rates with DMHIs in routine healthcare settings.

1. Introduction

In the United States, nearly 58 million adults are diagnosed with a behavioral health condition annually (National Institute of Mental Health, 2023), yet fewer than half can access appropriate behavioral

health care (Centers for Disease Control and Prevention, 2023). Digital mental health interventions (DMHIs) provided through smartphones and other electronic devices are designed to address behavioral health symptoms and optimize patient healthcare outcomes (Centers for Disease Control and Prevention, 2023).

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Shared first authorship.
Shared senior authorship.

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Thank you!

Questions?

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