

Integrating Digital Mental Health in the Behavioral Health Continuum of Care



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Addressing Workforce Challenges Across the Behavioral Health

Continuum of Care: A Workshop

**NATIONAL
ACADEMIES** *Sciences
Engineering
Medicine*



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Overview

1. State of the evidence for digital mental health
2. Evaluation considerations of digital mental health
3. Integrating digital mental health into care pathways



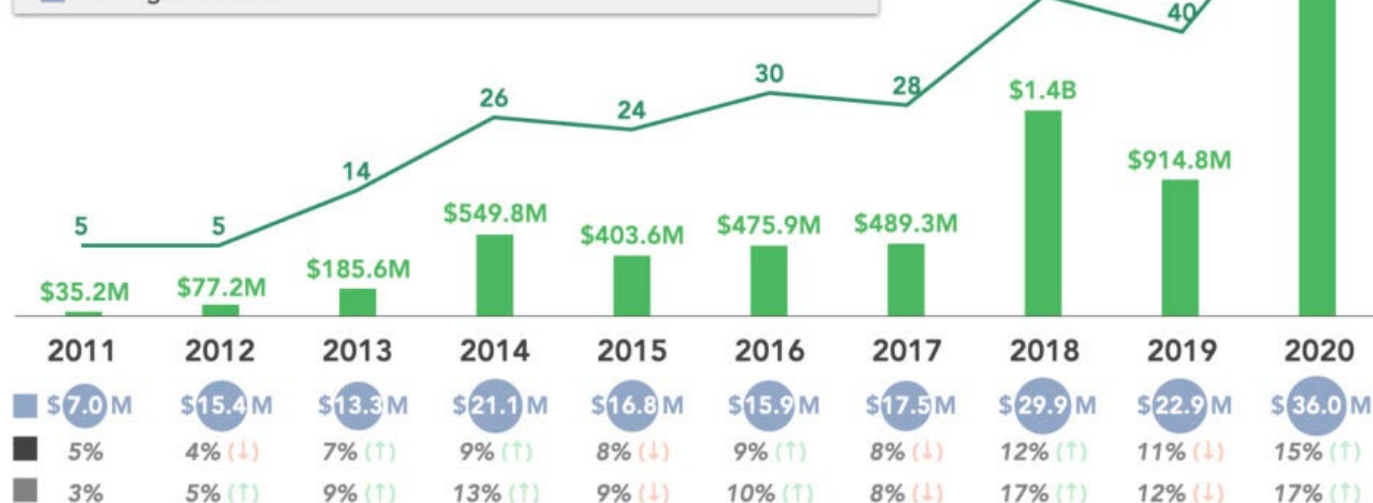
Digital Mental Health is Here

DIGITAL BEHAVIORAL HEALTH (BH) FUNDING AND DEALS

2011 - 2020

LEGEND

- # of Deals
- Venture Funding
- Average Deal Size
- BH Deals as % of Digital Health Deals
- BH Funding as % of Digital Health Funding



Note: Only includes U.S. deals >\$2M; data through December 31, 2020. For the purposes of this report, we define the digital behavioral health sector to include digitally-enabled startups in mental health, substance use disorders, and/or developmental disorders. We also define the digital behavioral health market to include companies that exclusively serve behavioral health needs, and companies that serve behavioral health in addition to other clinical needs. Source: Rock Health Funding Database



Gray report on lockdown parties frustrated by police secrecy

Steven Swintford Political Editor

Scotland Yard is refusing to give details about who it has fined over lockdown parties in Downing Street to Sue Gray, the senior Whitehall official investigating them.

The Metropolitan Police yesterday concluded its inquiry into a dozen gatherings, having issued a total of 126 fines to 83 people. The prime minister is understood to be confident about his own future after being told that he will not receive any further fines beyond the one he has already been given.

He faces uncertainty, however, over a separate inquiry carried out by Gray, a senior civil servant. Her report, which will be published next week, is said to be highly critical of him. The Times has been told that Gray's attempts to finalise the report are being frustrated by the refusal of the Met to identify individuals.

Gray had been planning to name more than a dozen officials, a process said to have been made more difficult by the police's secrecy. Johnson and others who are named will be allowed to read excerpts from the report detailing their conduct before it is published. They will have the opportunity to challenge the findings, which could lead to criticism being watered down and further delay the process.

Gray is also considering publishing anonymised photographs of lockdown-breaking events as part of her evidence. A source said that a range of options were being considered, from photos of people at parties to illustrative pictures of the rooms where events took place. Johnson will make a statement in the Commons next week after Gray's report is published. Allies said that he wanted to draw a line under it so that he could focus on cost-of-living issues and Ukraine. PM's position strengthened, pages 6-7

Doctors to give sleep app rather than pills

Digital therapy more effective and cheaper

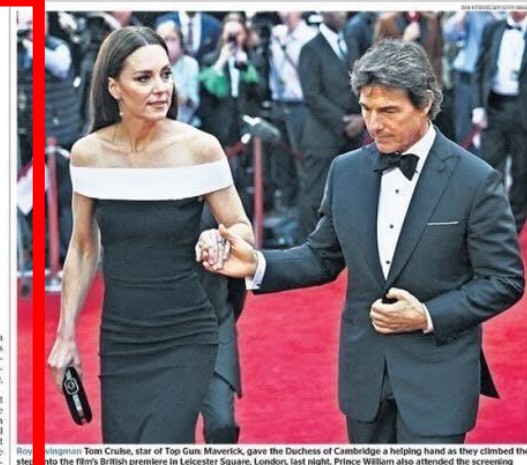
Eleanor Hayward Health Correspondent

Nearly one million patients with insomnia will be prescribed a self-help app instead of sleeping pills in a groundbreaking move by the NHS.

GPs have been told to offer Sleepio, a six-week digital therapy programme, as the first-line treatment. The advice will help to wean insomniacs off addictive hypnotic sleeping pills such as zopiclone and zolpidem, taken by about 500,000 Britons.

Sleepio is the first web-based treatment to be approved by the National Institute for Health and Care Excellence (NICE), the medicines watchdog, which said that it could benefit 800,000 patients in England. It will cost the NHS £45 a patient. Experts said NICE's decision heralded a new era of digital treatments on the NHS that could help to address the Covid-19 backlog and long waiting lists. Clinical trials show that the app is more effective at helping people to get to sleep than pills and saves money by sharply reducing the number of GP appointments and prescriptions.

Sleepio involves six weekly 20-minute sessions of cognitive behavioural therapy for insomnia (CBT-i) delivered by a virtual doctor called "The Prof". The therapy, tailored to individual needs using artificial intelligence, tackles the root causes of insomnia by challenging negative thoughts and anxiety that cause people to become trapped in a cycle of sleepless nights. It requires patients to keep a sleep diary and provides tips on how to stop their mind racing at night as well as lifestyle advice, such as not to use a phone in bed. A clinical trial found that 75 per cent of patients who completed the course experienced improvements and on average the time it took them to fall asleep was halved. Evidence shows that CBT-i, including Sleepio, decreases the amount of time insomniacs spend waking up in the night by about 30 minutes. They also fall asleep more quickly. At present, clinical guidelines, on insomnia say that patients should first be offered advice on sleep hygiene, such as limiting caffeine and sticking to the same bedtime routine. If their insomnia persists and they are in "significant distress", GPs can prescribe a short course of sleeping pills for up to seven days. Zopiclone and zolpidem can lead to severe withdrawal symptoms and side effects such as daytime drowsiness, which has been linked to car crashes. Long waiting lists mean few can access face-to-face CBT on the NHS. Professor Colin Espie, chief scientist at Big Health, which developed Sleepio, said that he was delighted by the decision. "With the surge in demand for mental health support over the past two years, scalable and clinically proven digital technologies simply must be part of the solution," he said.



Co-op deliveries reverse march of time

Pop Koronika

The common sight of a delivery boy pushing a trolley down a cobbled street has long since been replaced by the Co-op's "walk-in" service, for customers who live in rural areas. The Co-op's "walk-in" service, for online orders within a five-mile radius of shops, will allow the company to reach customers in smaller villages where on-demand delivery services are often unavailable. It is also likely to appeal to customers keen to reduce their carbon footprint.

The Co-op says it is the first modern supermarket to introduce deliveries on foot. Delivery boys were a common sight into the 1960s, taking small orders to their customers, but by the 1970s they had all but disappeared. During a trial in Cornwall, shoppers used the new service for items they had forgotten, top-ups between big shops, and treats. One person used the service after undergoing serious surgery, the Co-op said.

Deliveries will be available for online orders worth more than £15 and will cost between 99p and £1.99. Customers can expect their goods in less than two hours. The supermarket's online strategy also involves more sophisticated elements, with a pilot scheme for robot deliveries starting in Cambridge this week. The council hopes it will reduce short car journeys and improve air quality. The Co-op was founded in 1863 in Manchester and began online delivery services in 2019.



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Internet- and mobile-based digital mental health interventions have clear and consistent RCT evidence!

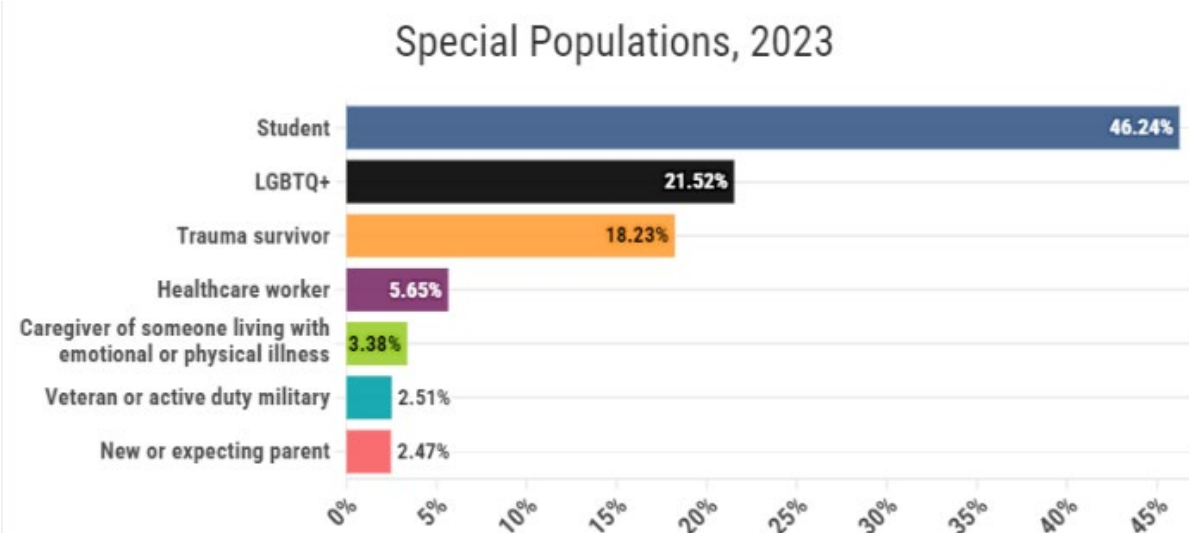
Condition	# of RCTs	Effects	Meta-Analysis
Depression	83	$g = 0.52$	Moshe, Psych Bull 2021: 147; 749-786
Anxiety	47	$g = 0.80$	Pauley, Psych Med 2023: 53; 567-579
Posttraumatic Stress Disorder (PTSD)	33	$g = 0.36$	Steubl, Eur J Psychotraumatology 2021: 12; 1879551
Sleep	54	$d = 0.39$ (ISI)	Hasan, Sleep Med Rev 2022: 61; 101567
Schizophrenia (as an adjunct to care)	58	$gs = 0.13-0.32$	Morales-Pillado, Psych Med 2022: 53; 6304-6315



Digital opportunities diversify access

Age Range	Percentage	Number
8-10	0.95%	N = 19,057
11-17	37.6%	N = 801,908
18-24	25.29%	N = 506,353
25-54	32.59%	N = 652,350
55+	3.86%	N = 70,103

- **Information** about mental health **48.55%**
- **Use at home** - worksheets or coping skills to **46.16%**
- **Online or mobile program** that can help you track or manage your symptoms **45.25%** ←
- **Referrals** to those that can help **18.80%** ←
- **Phone** number for immediate support **13.74%**



Banbury Forum Recommendations

1. Guided digital mental health intervention should be frontline interventions for depression, anxiety, and posttraumatic stress disorder
2. Digital mental health interventions should be reimbursable
3. An evidence standards framework should be created to support digital formularies and decision making



Technology-Enabled Services

Mohr, Weingardt, Reddy, & Schueller, 2017

- Most effective digital interventions include some blend of technology features + human support
- Might be most impactful for those most in need

Table 2. Case Examples of Individual Patient Response to Guided vs Unguided iCBT vs TAU

Case ^a	PHQ-9 BL	Age, y	Relationship status	Sex	Employment status	MD (95% CrI) ^b		
						Guided vs unguided	Guided vs TAU	Unguided vs TAU
1	25	35	Not in relationship	F	Unemployed	-2.2 (-3.6 to -0.8)	-3.3 (-4.8 to -1.8)	-1.1 (-2.2 to -0.1)
2	14	41	Not in relationship	F	Employed	-0.9 (-1.7 to -0.1)	-1.9 (-2.7 to -1.0)	-0.9 (-1.7 to -0.2)
3	10	55	In relationship	M	Employed	-0.2 (-1.2 to 0.7)	-1.3 (-2.3 to -0.4)	-1.1 (-1.9 to -0.3)
4	8	65	In relationship	M	Other	0.2 (-1.1 to 1.5)	-1.0 (-2.3 to 0.3)	-1.2 (-2.4 to -0.1)

Abbreviations: BL, baseline; CrI, credible intervals; MD, mean difference; PHQ-9, Patient Health Questionnaire-9 score; TAU, treatment as usual.

^b An MD less than 0 for the comparison of A vs B favors treatment A.

^a These are case examples of fictitious patients.

Karyotaki, Efthimiou, Miguel, Mass Genannt Bermphol, Cuijpers, & IPDMA-DE Collaboration, 2021



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The Good, The Bad, The Many

- Roughly 325,000 digital health interventions, ~15,000-20,000 for mental health
 - Only a small number of digital mental health interventions have rigorous evidence demonstrating efficacy - maybe 150 out of the ~15-20,000
 - Others are evidence-informed and have indirect evidence
-
- The vast majority of digital mental health interventions don't have efficacy data – some of these may at best be ineffective, and at worst damaging
 - This makes finding the right app a challenge (but not impossible!)



Evaluation Dimensions from One Mind PsyberGuide



Credibility



User
Experience



Data Security
and Privacy

Why three dimensions?

- No “magic number” for digital mental health interventions
- Different things will work for different people
- Different factors are important for different people

Why these dimensions?

- Although multiple efforts exist, considerable agreement on need for
 - Evidence-base (credibility)
 - User experience and engagement (user experience)
 - Data security and privacy
- Focus on the quality of the product rather than the features
 - Interoperability, accessibility, technical features



Evaluation of Mental Mobile Applications

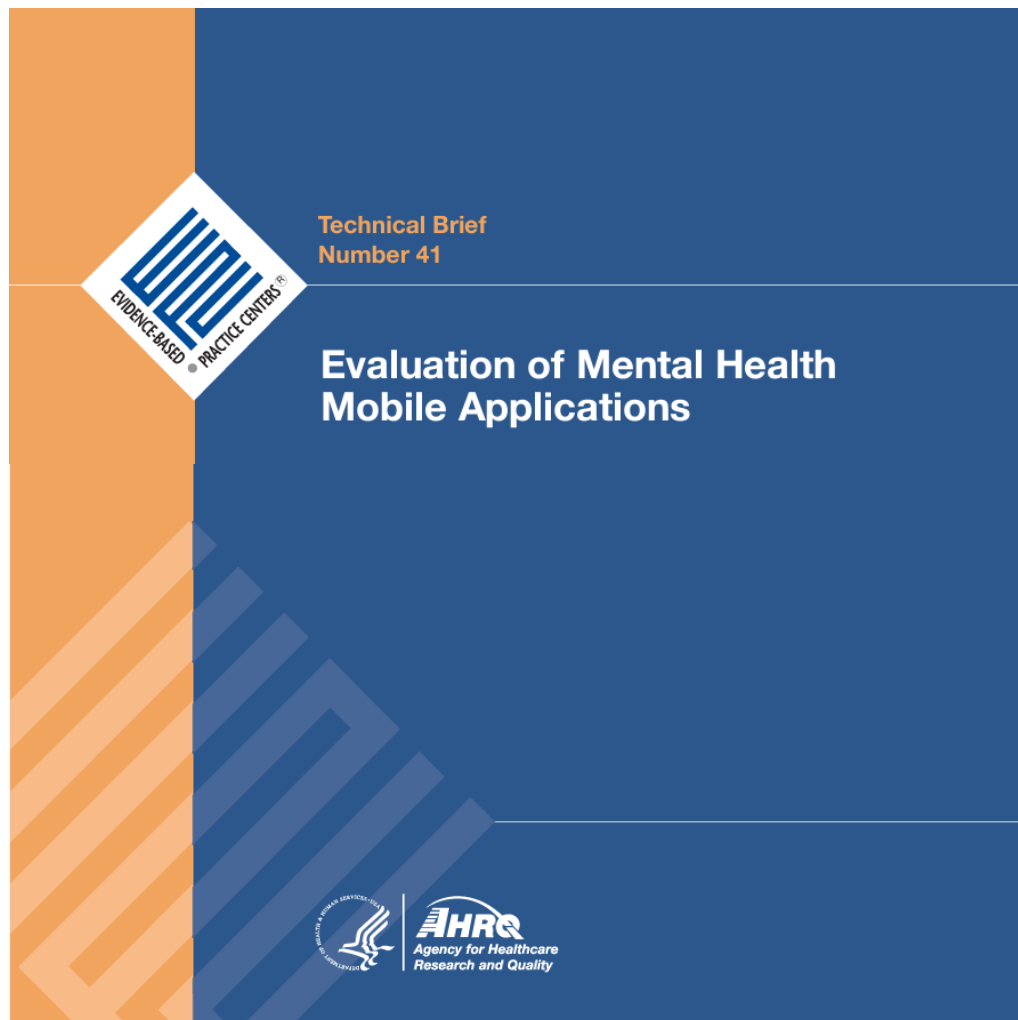


Figure 3. Framework to Assist Stakeholders in Technology Evaluation for Recovery (FASTER) to Mental Health and H

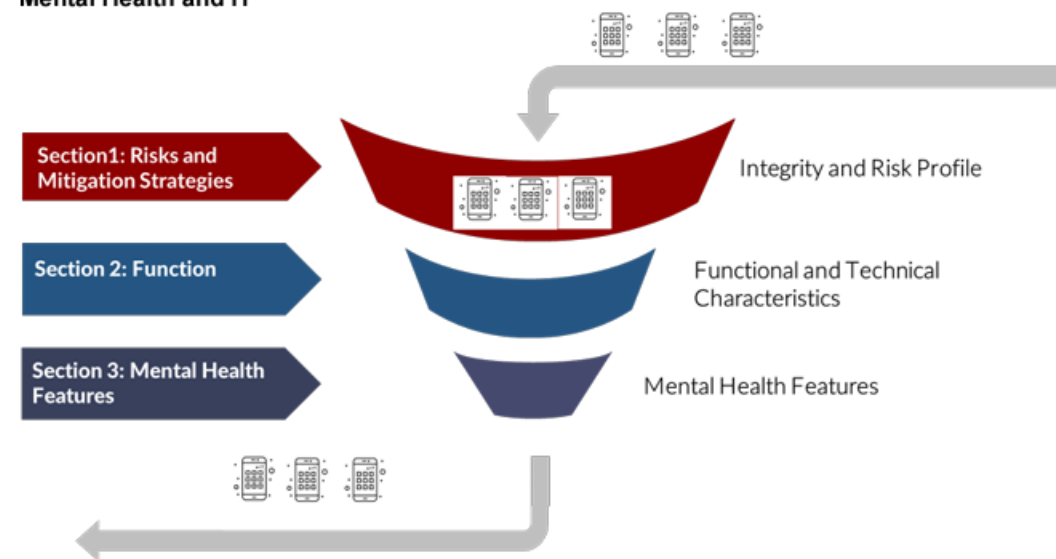
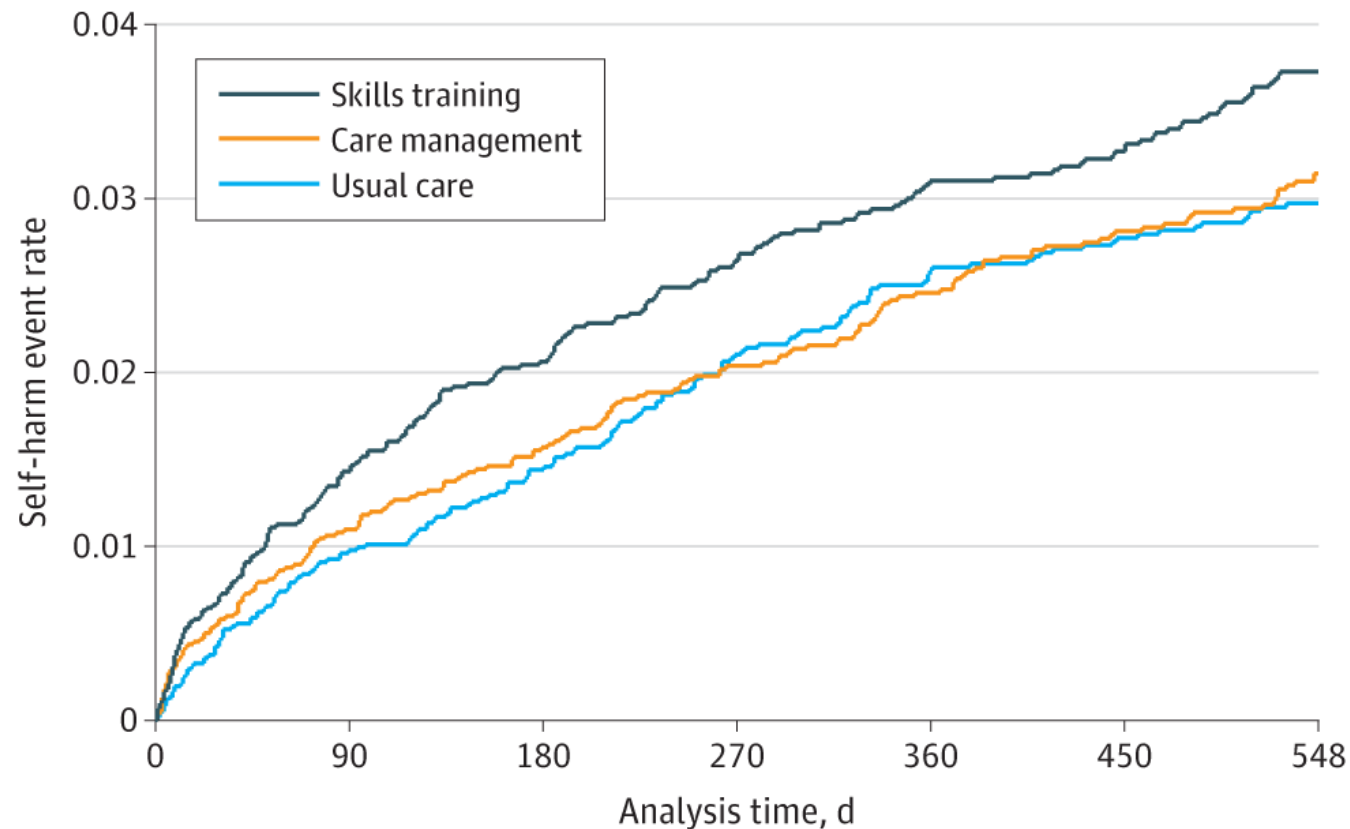


Figure 4. Categories of questions in each section

	Risks and Mitigation Strategies	App Integrity	Risk Assessment	Evidence	Linkage to Care	Access to Crisis Resources
	Function	Accessibility Features	App Info	Costs	Organizational Credibility	Evidence & Clinical Foundation
		Privacy & Security	Informed Consent	Cultural Competence	Usability	Remote Monitoring
		Access to Crisis Resources	Artificial Intelligence (AI)			
	Mental Health Features	Mental Health Features (e.g., facilitating social interaction, motivation enhancement, planning/alternative strategies/planning for high-risk situations, screening, self-help, skill building, safety planning, and promoting sleep hygiene)				



But digital mental health interventions are not harmless



No. at risk							
Skills training	6227	5773	5395	5043	4759	4543	4298
Care management	6230	5833	5422	5081	4788	4555	4302
Usual care	6187	5799	5388	5043	4763	4546	4294

	Months 1-3
Mindfulness Module	
Any Visit	901 (14%)
Beyond Introduction ^a	550 (9%)
Homework ^b	150 (2%)
Mindfulness of Current Emotion Module	
Any Visit	419 (7%)
Beyond Introduction ^a	247 (4%)
Homework ^b	83 (1%)
Opposite Action Module	
Any Visit	439 (7%)
Beyond Introduction ^a	262 (4%)
Homework ^b	72 (1%)
Paced Breathing Module	
Any Visit	296 (5%)
Beyond Introduction ^a	151 (2%)
Homework ^b	58 (1%)



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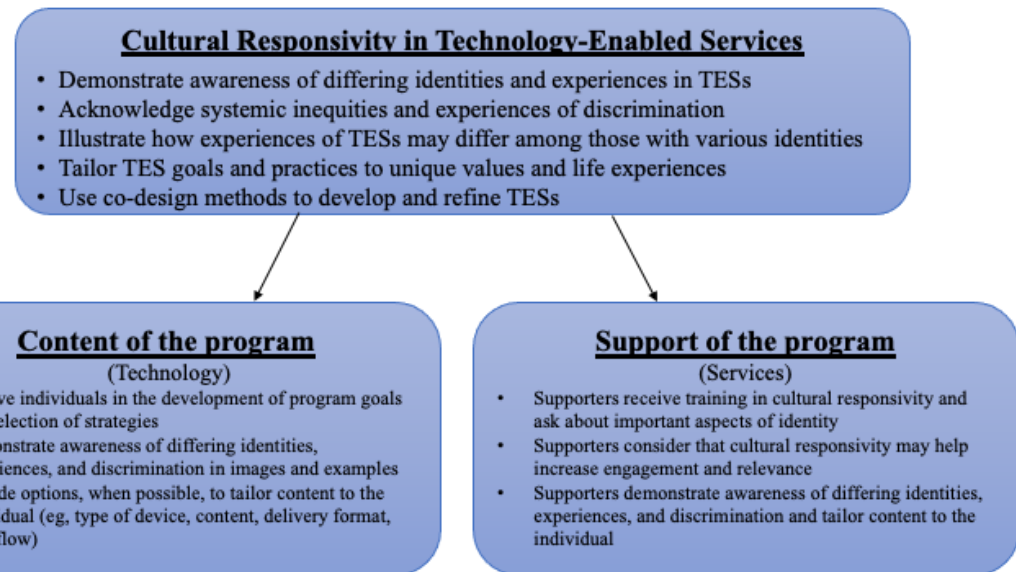
Unmet Promise of Digital Mental Health Interventions to Increase Access and Accessibility

“As it stands, DMH interventions still hold a lot of potential to help diverse groups, but now, that potential needs to be translated into reality and action.”

–Schueller, Hunter, Figueroa, and Aguilera, 2019

	Characteristic	n	%
Platforms	Number of Apps	32	100%
	iOS	31	96.9%
	Android	27	84.4%
	Companion website for App	8	25.0%
Supported conditions	Stress & anxiety	16	50.0%
	Mood disorders	14	43.8%
	Sleep	9	28.1%
	Phobias	6	18.8%
	Eating disorders	6	18.8%
	OCD	5	15.6%
	Personality disorders	5	15.6%
	Schizophrenia	4	12.5%
Engagement	Audio/music/scripts	16	50.0%
	Gamification	14	43.8%
	Videos	9	28.1%
Connection to other services	Link to formal care/coaching	10	31.3%
	Crisis management feature	8	25.0%

Muñoz, Camacho, & Torous, 2021

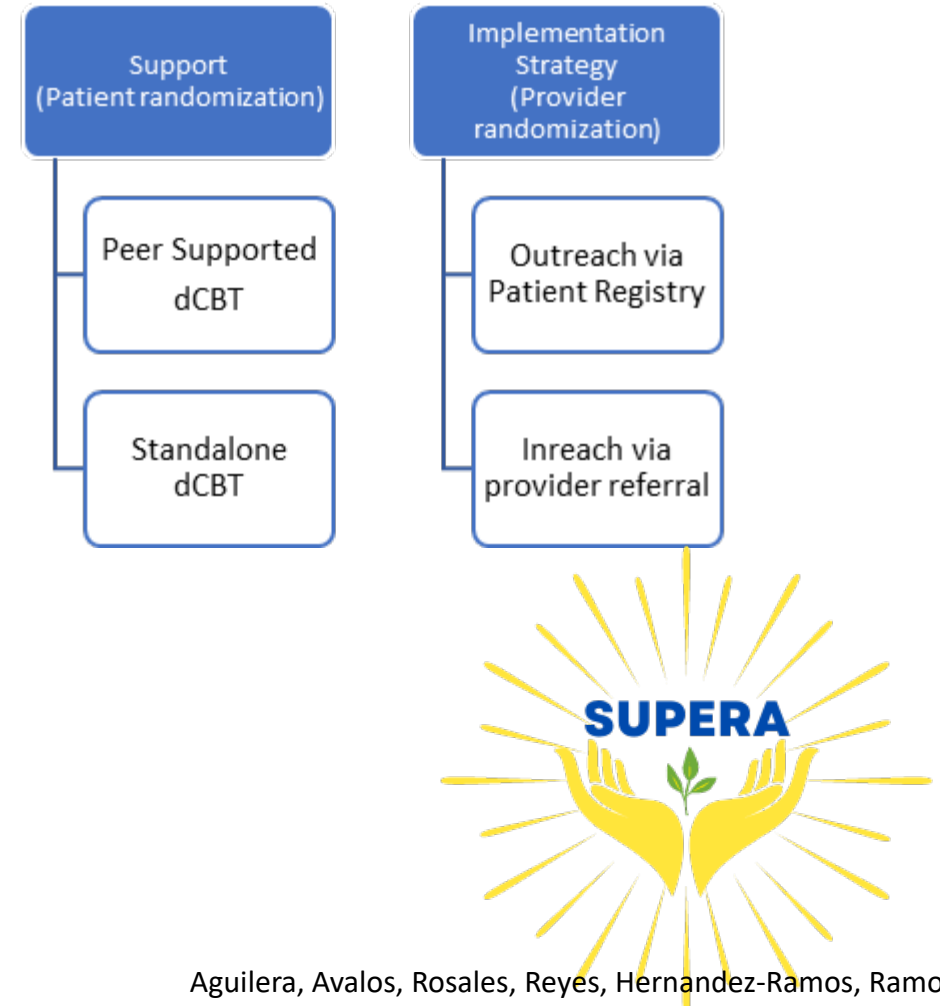


Eustis, LoPresti, Aguilera, & Schueller, 2023

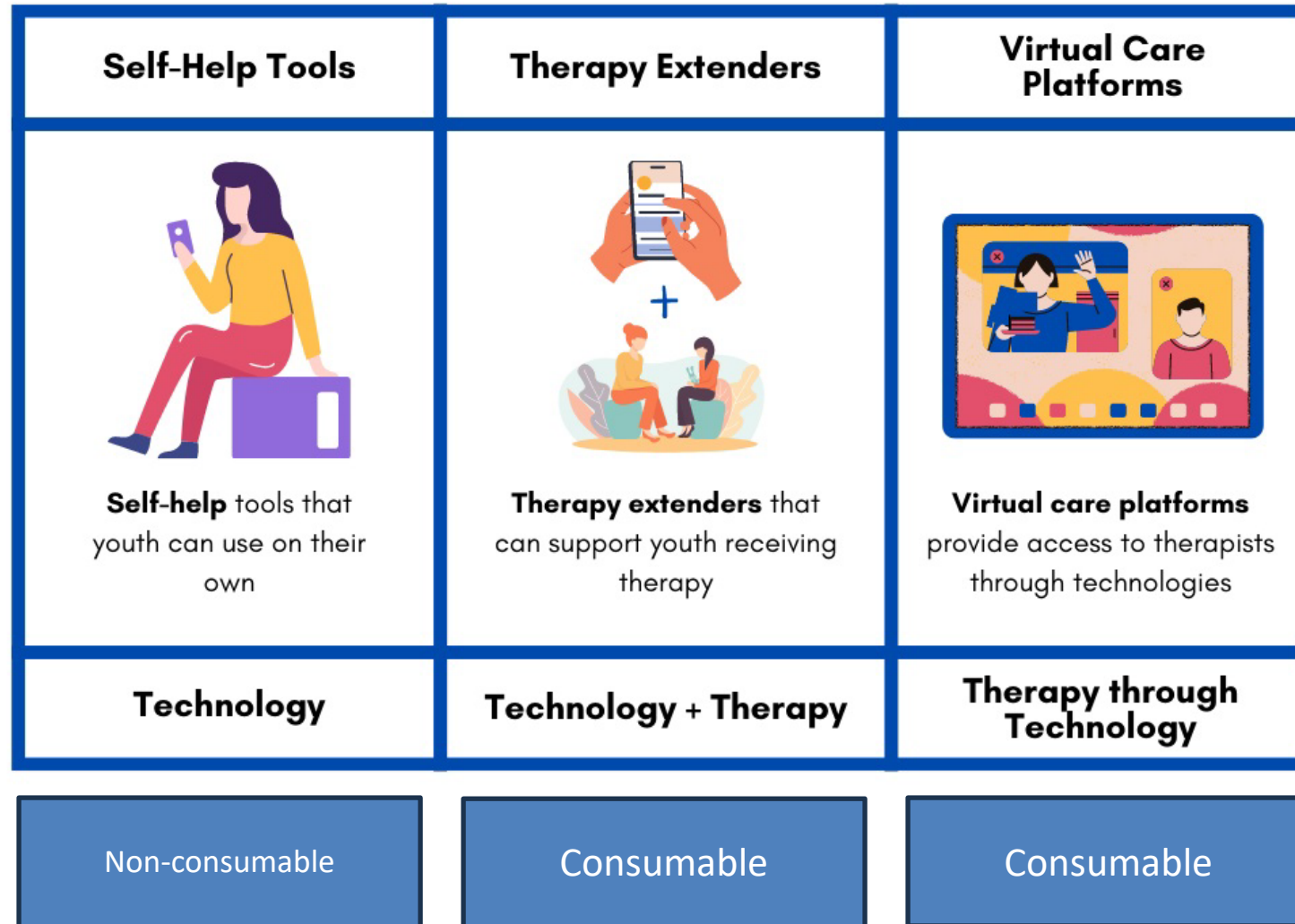


SUPERA: Supporting Peer Interactions to Expand Access (R01 MH126664, MPI: Schueller, Aguilera)

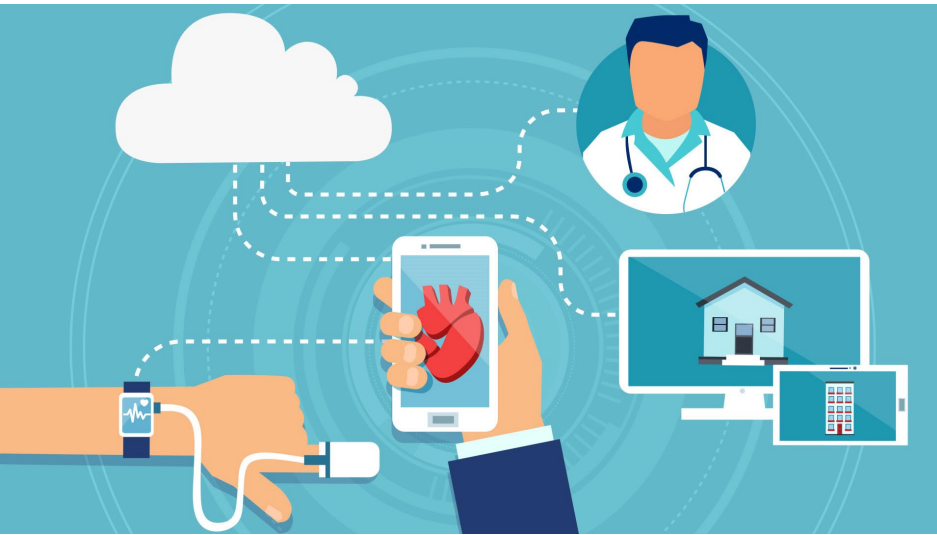
- Aim 1: Evaluate patient-level randomization on effectiveness of digital cognitive-behavioral therapy (dCBT)
 - Depression, anxiety, engagement
- Aim 2: Evaluate provider-level randomization on the effectiveness of implementation strategies
 - Reach, adoption, cost
- Aim 3: Evaluate putative mechanisms of change
 - Mixed-methods: surveys, interviews, and focus groups
 - Attitude towards intervention, implementation climate, clinical readiness, potential for sustainability



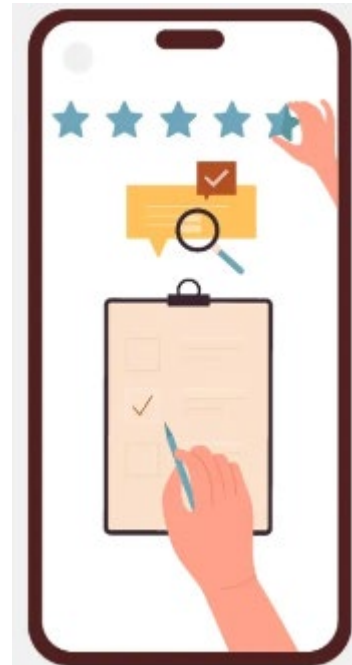
Technology-enabled services (and continuums of care)



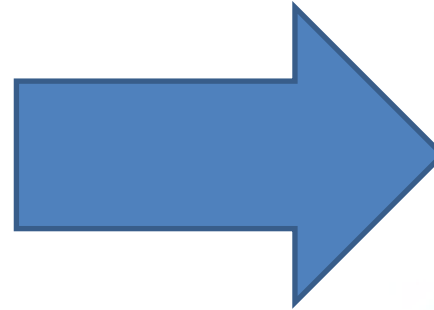
Reimbursement – What do we pay for? (And how?)



Remote Patient Monitoring



Onboarding:
Digital Literacy,
Patient Navigator



Human Support:
Coaches, Peers,
Therapists





Some takeaway thoughts

- Digital mental health interventions work
 - Supported or guided are more effective than self-guided
 - Self-guided still lead to reliable, but small, benefits
- Evaluation frameworks exist
 - Some agreement on overall dimensions
- Something is **NOT** always better than nothing
 - Need to consider deployment pathways, framing, alternatives
- Digital doors can increase access
 - But need to consider what we provide to people when they come through those doors
 - And to consider how to pay for these digital supports



Thanks!



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NIMH: R01MH126664



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