

# Beyond Telehealth: Use, Evidence, and Informed Decision Making around Smartphone Apps for College Mental Health



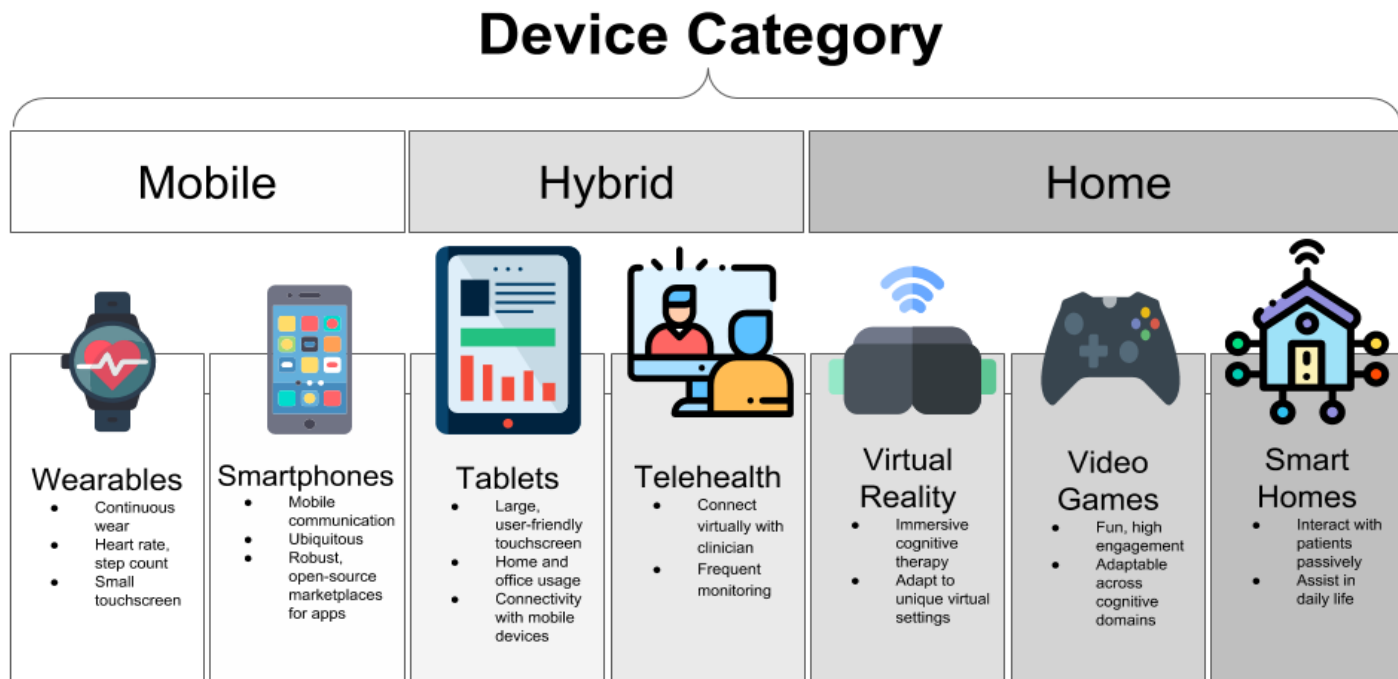
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# Finding Focus in Digital Mental Health



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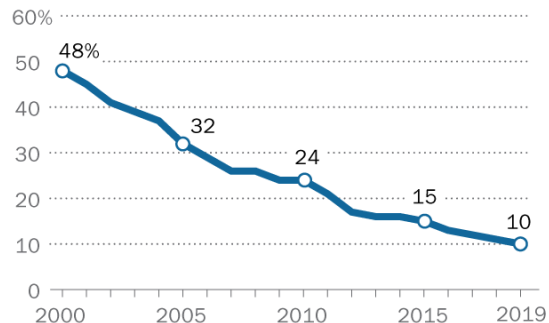


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# Access, Disparities, and Technology

## Offline population has declined substantially since 2000

*% of U.S. adults who say they do not use the internet*

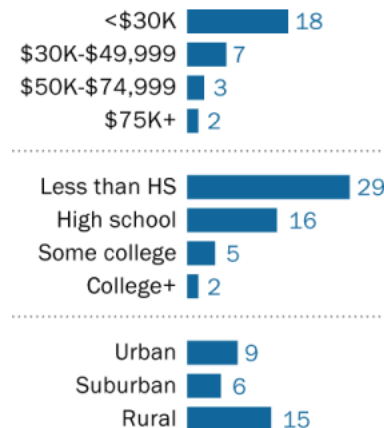
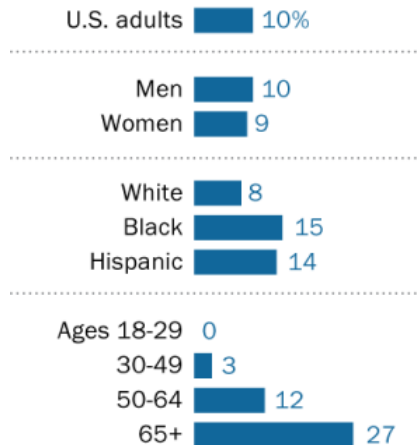


Source: Survey conducted Jan. 8-Feb. 7, 2019. Trend data from previous Pew Research Center surveys.

PEW RESEARCH CENTER

## Who's not online in 2019?

*% of U.S. adults who say they do not use the internet*



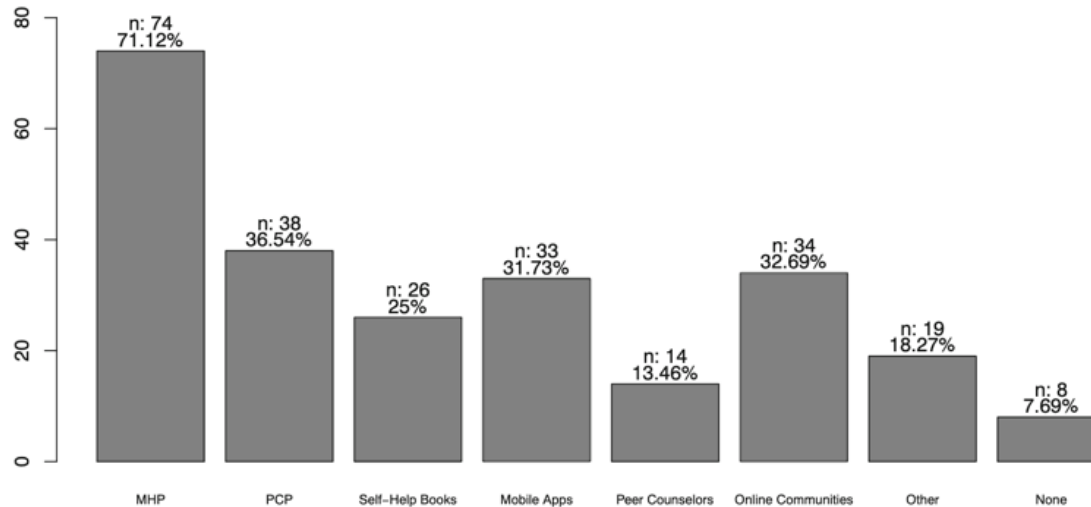
Note: Whites and blacks include only non-Hispanics. Hispanics are of any race.  
Source: Survey conducted Jan. 8-Feb. 7, 2019.

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# Just Before COVID-19 (Dec 2019)

**Figure 1**

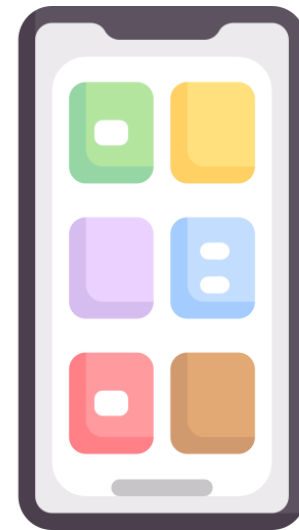
Methods used within the last 6 months to treat and/or manage mental health conditions. PCP primary care providers, MHP mental health professionals



# Apps for Mental Health

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- There are currently an estimated 10,000 mental health apps on app marketplaces.
- Given the dynamic nature of the digital health app space, it is difficult for service users, peer support specialists, and clinical providers alike to stay updated and ensure that apps are safe, evidence based, usable, and clinically meaningful.
  - For example: A clinically relevant app for depression becomes unavailable and deleted from the app stores every 2.9 days



# Potential of mental health apps for college students

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- College campus mental health services are overwhelmed.
  - The percentage of students with diagnosed mental health conditions increased from 22% to 36% between 2007 to 2017, although there has not been a concomitant increase in services offered.
  - Between the beginning of the 2009 academic year and the end of the 2015 academic year, counseling center utilization by college students increased on average by 30% - 40% per school while the enrollment for these schools increased by only 5%.
- Mobile applications show potential to improve student mental health through teaching mental health interventions or providing skill- building instructions for struggling students and may be cheaper than traditional face-to-face counseling.
- 96% of US adults aged 18-29 own a smartphone.

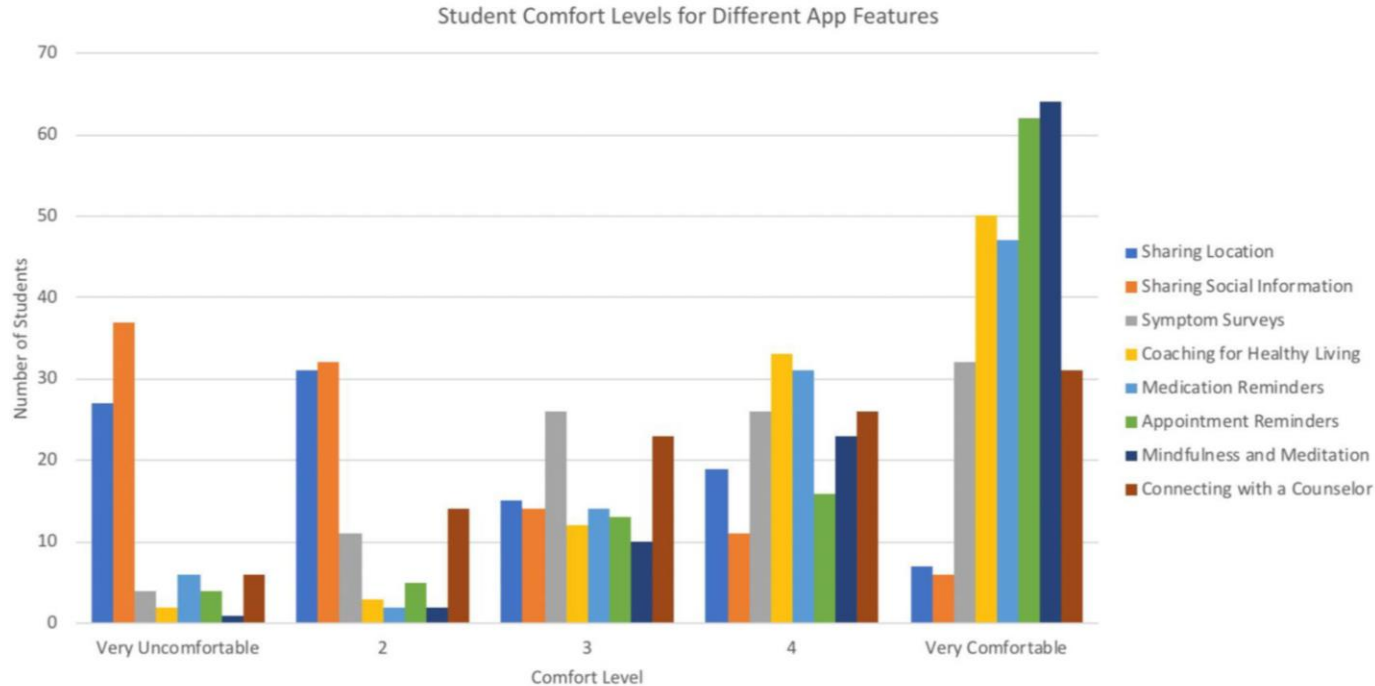


# Now during COVID...

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- The need for mental health resources has only increased
- Survey of 2,031 college students in spring 2020
  - 48.14% (n = 960) showed a moderate-to-severe level of depression.
  - 38.48% (n = 775) showed a moderate-to-severe level of anxiety.
  - 18.04% (n = 366) had suicidal thoughts.
  - 71.26% (n = 1443) indicated that their stress/anxiety levels had increased during the pandemic.

# Would students feel comfortable using mental health apps?



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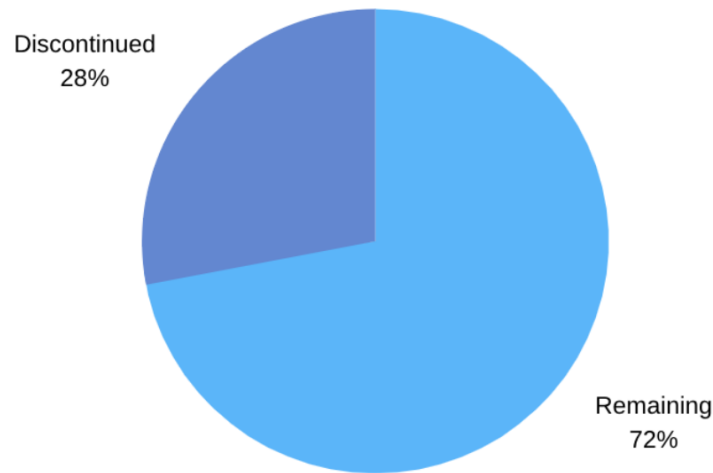
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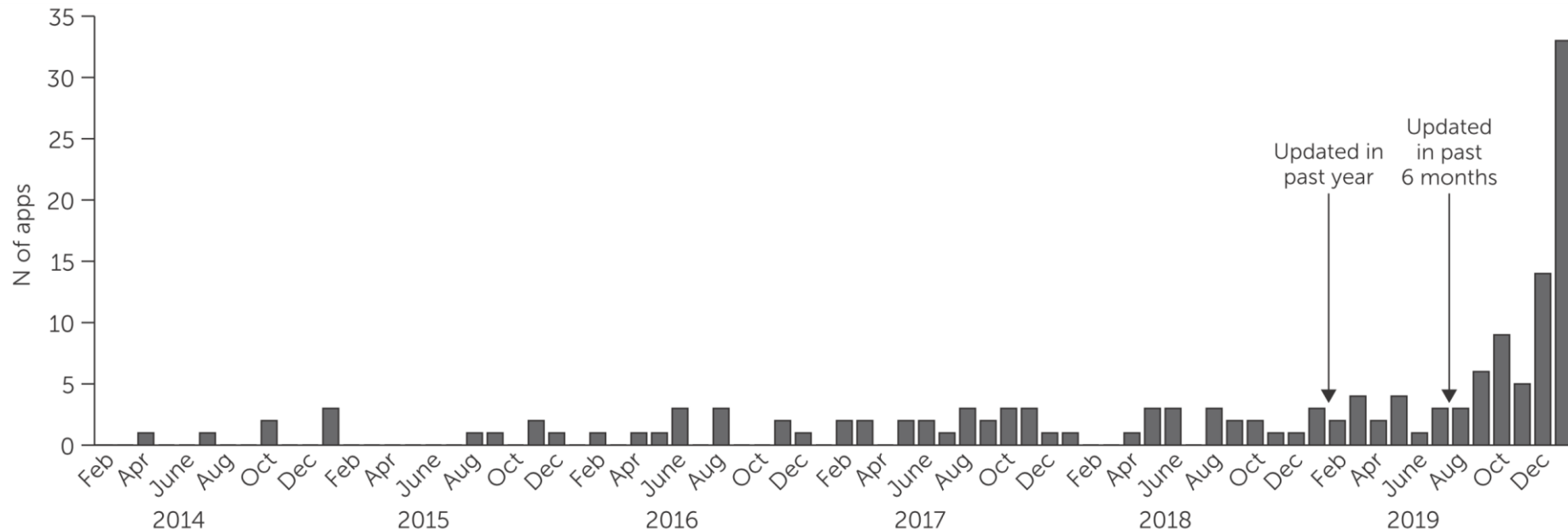
# What are colleges currently offering to students?

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- An analysis of the mental health apps advertised to students by 60 college counseling centers revealed that a total of 218 unique apps were suggested to students. Of these, many apps were out of date, unsafe, or even discontinued.



# What are colleges currently offering to students?



<sup>a</sup> Four apps were not included because their last update occurred before March 2014.



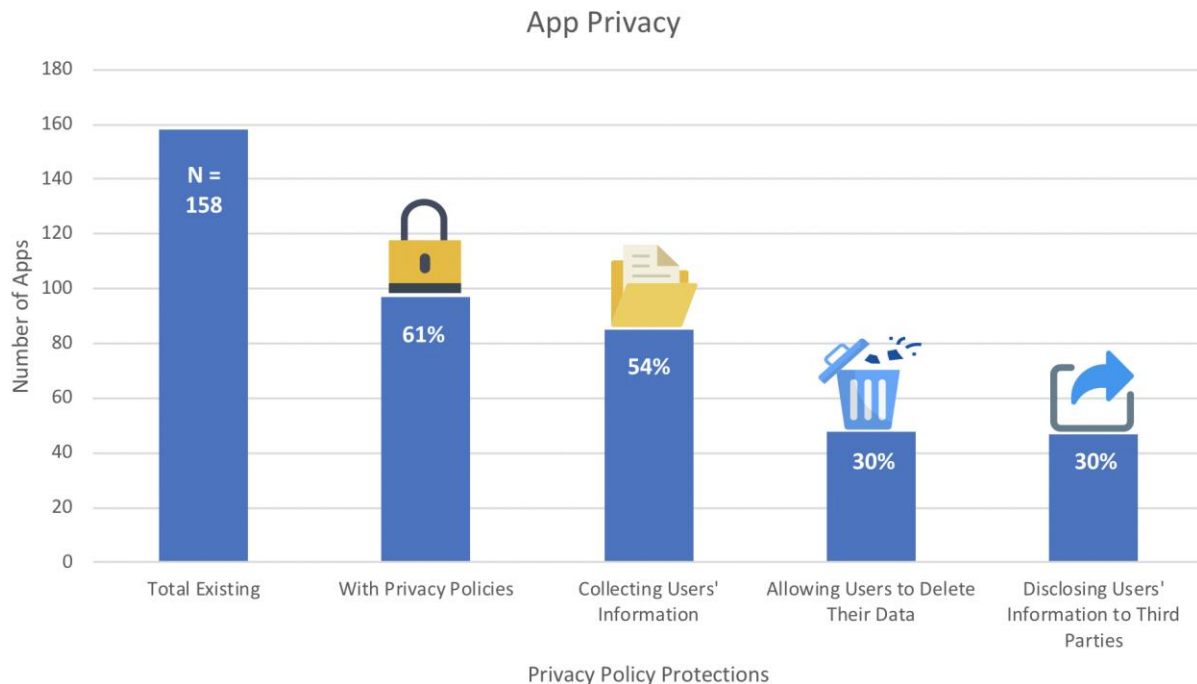
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# What are colleges currently offering to students?



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# What do students want in a mental health app?

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- A series of 100 interviews with college students explored why students are not using mental health apps and their suggestions for features that would improve their engagement.
- Students' desires for more engaging apps fell into a few categories:
  - data privacy
  - modern user interfaces
  - credible and useful information
  - customizable functionality.



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# How can colleges suggest apps that work for students?

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- Many good apps exist and can augment care.
- But there are also many dangerous apps, including those that expose or sell personal health data.
- Most are not tightly regulated (categorized as “Health & Fitness,” not as medical devices) and many make false claims about effectiveness.



# Who is keeping track of all these apps?

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- The US Food and Drug Administration (FDA) released a set of guidelines for regulating mobile medical apps in 2015. The guidelines impose a thorough set of standards, including those for labeling, medical claims, safety, and effectiveness.
- However, most apps are categorized as “**health and wellness**” apps, so they fall outside the purview of these FDA guidelines.

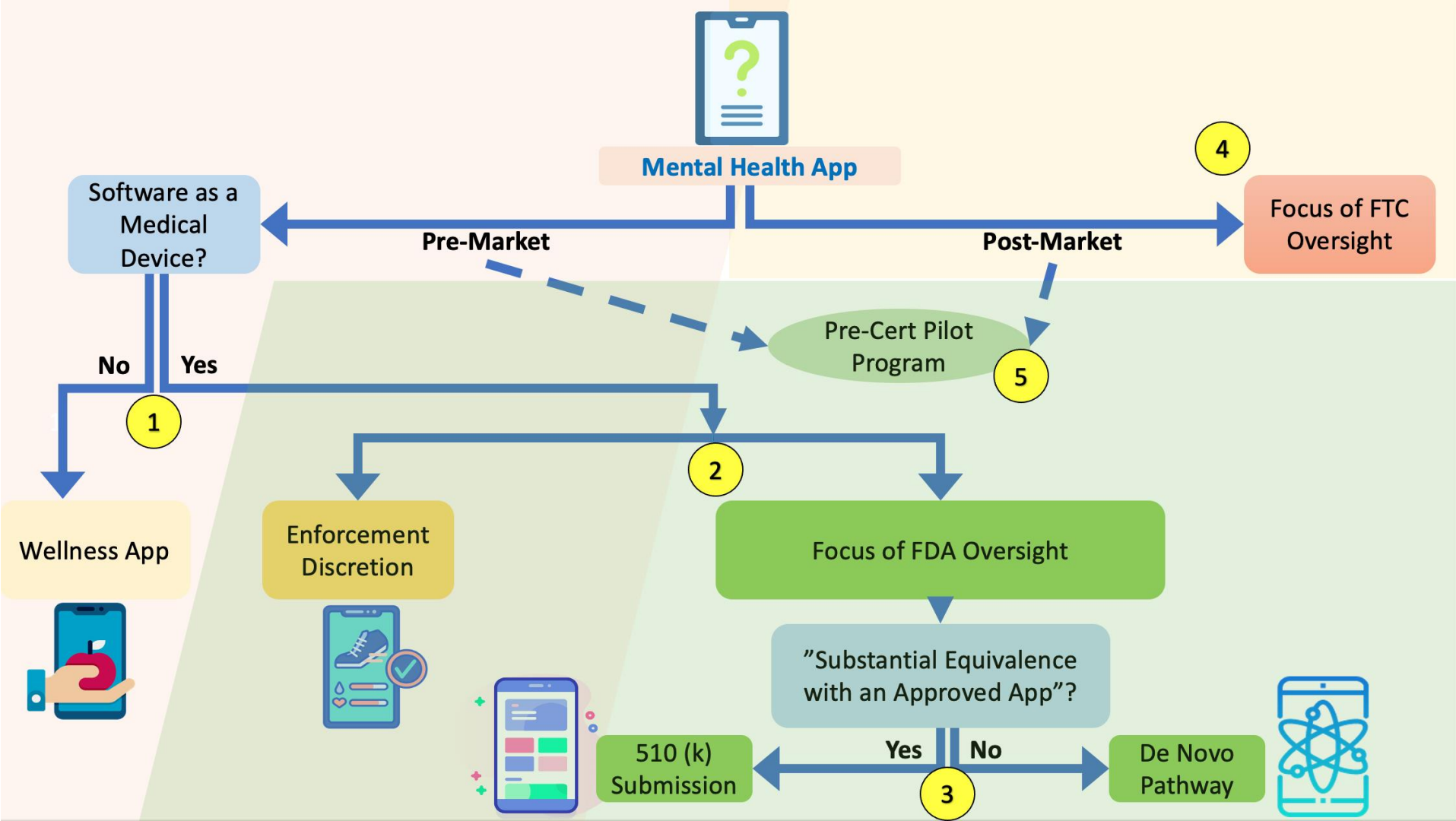


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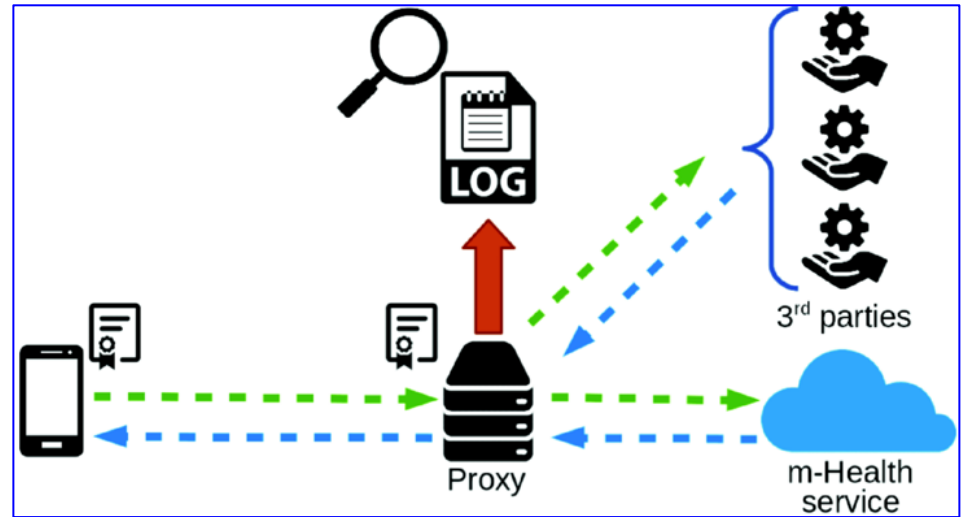


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# Privacy Concerns

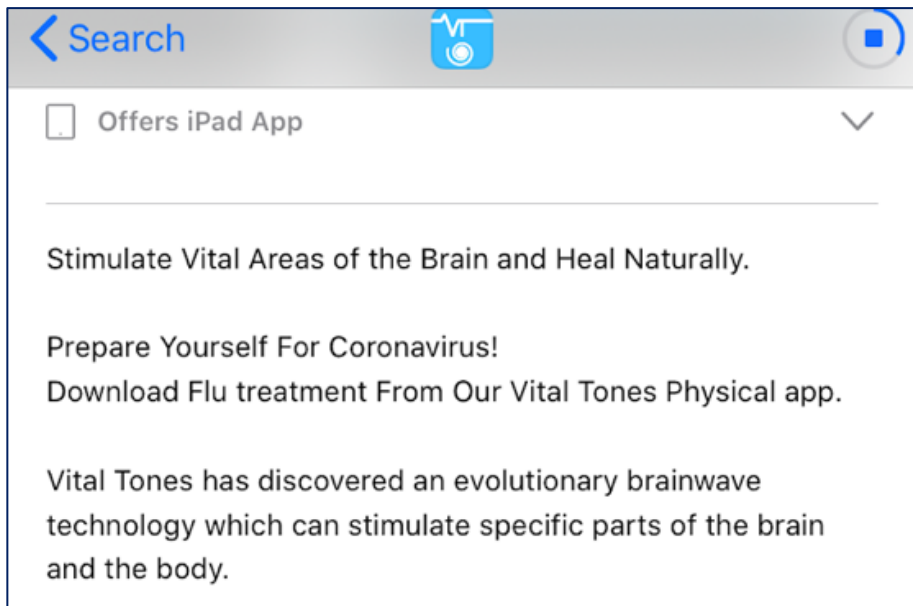
- Most apps do **NOT** claim to be HIPAA compliant
- In one study, only 50% of apps shared data securely.
- 80% shared health-related data to third parties, with the remaining 20% storing data on the phones.





# Exaggerated Claims of Effectiveness

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- This app purports to provide treatment for Depression, Bipolar Disorder, and Schizophrenia
- It provides no content or links related to COVID-19, despite its app store claim.

# The Perils of Misinformation

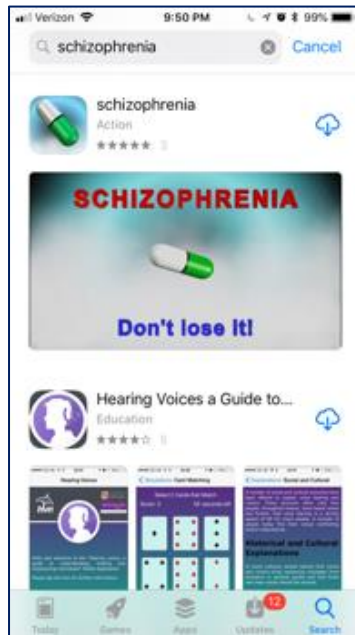
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- “Nonexistent or inaccurate suicide crisis helpline phone numbers were provided by mental health apps downloaded more than 2 million times.”
- Only 5 of 69 apps offered all 6 evidence-based strategies for suicide prevention.
- Few consequences for releasing health apps containing inaccurate or non-evidenced based information.

# App Store Rank is Not Enough

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Of the 27 apps that appear in a search on the app store for “schizophrenia”...

- 3 have been updated in the last 180 days.
- The second result on the list describes itself as a “game that will make you lose your mind”
- 26 have fewer than 100 ratings, and 24 have 10 or fewer.



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# Stars and Download Metrics are Misleading

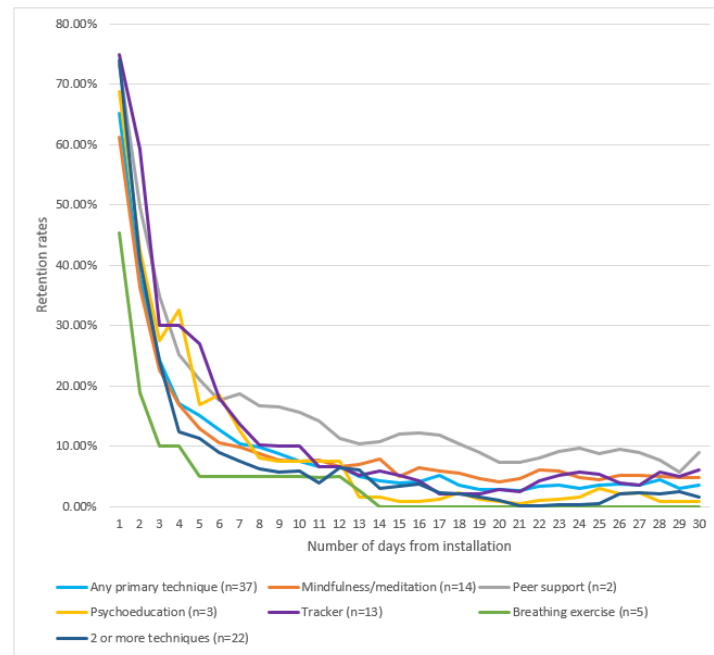
## EXHIBIT 3

### Correlations of mHealth app store ratings with apps' clinical utility and usability, 2014–15



**SOURCE** Authors' analysis of study data. **NOTES** The points were slightly randomly shifted horizontally and vertically to minimize overlap. Store ratings (on a scale of 0–5) are explained in the Notes to Exhibit 1. Clinical utility (on a scale of 0–10) refers to whether clinician reviewers (identified in the text) would recommend the app to a friend or colleague, with a rating of 0 meaning they would never recommend it. Usability (on a scale of 0 to 100, with a rating of 0 meaning the poorest usability) refers to nonclinician reviewers' (identified in the text) evaluations of how easy it would be for a consumer to use the app according to the System Usability Scale (see Note 20 in text).

K Singh et al. Many Mobile Health Apps Target High-Need, High-Cost Populations, But Gaps Remain. Health Affairs. 2016



Baumel A, Muench F, Edan S, Kane JM. Objective user engagement with mental health apps: systematic search and panel-based usage analysis. Journal of medical Internet research. 2019;21(9):e14567.



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# Numerous App Evaluation Schemes Already Exist!



Table 1. Description of Frameworks

Author, date	Intended audience	Type of mobile application	Source affiliation <sup>1</sup>	Scoring system in framework	Country of origin <sup>1</sup>
Albrecht, Von Jan & Pramann (20), 2013	Patients	MMA	Institute	No	Norway
Anxiety and Depression Association of America (ADAA) (38), 2016	Quality assurance for user protection	MMA	Private organization	Yes	USA
Amhold, Quade & Kirch (57), 2014	Quality assurance for research setting	MMA	University	Yes	Germany
Aungst et al. (32), 2014	Health professionals	MMA	University	No	USA
Basilio et al. (41), 2016	Quality assurance for research setting	MMA	University	Yes	Italy
Beatty, Fukusaka & Whalley (15), 2013	Patients, health professionals	MMA	University	No	USA
BinDhim et al. (58), 2015	Regulators	mHealth	University	Yes	Australia
Brooks et al. (39), 2015	Patients	MMA	University	No	USA
Chan et al. (18), 2015	Patients, health professionals	MMA	University	No	USA
Chomutare et al. (59), 2011	Quality assurance for research setting	MMA	University	No	Norway
Demidowich et al. (60), 2012	Quality assurance for research setting	MMA	Medical school	Yes	USA
Drincic et al. (16), 2016	Patients	MMA	University	No	USA
Fairburn & Rothwell (33), 2015	Quality assurance for research setting	MMA	University	No	UK
Ferrero-Alvarez-Renteria (36), 2013	All stakeholders in mHealth	mHealth	Governmental organization	No	Spain
Gautham, Iyengar, & Johnson, C. W. (30), 2015	Health professionals	MMA	University	No	UK
Gibbs et al. (25), 2016	Quality assurance for research setting	MMA	University	No	UK
Grundy et al. (26), 2016	Patients, health professionals, and app developers	MMA	University	Yes	Australia
Hacking Medicine Institute (HMI) (34), 2016	Quality assurance for user protection	MMA	Institute	Yes	USA
Hoppe, Cade & Carter, (61) (2016)	Patients	MMA	University	Yes	UK
Huckvale et al. (27), 2015	Quality assurance for research setting	MMA	University	Yes	UK
IMS Institute for Healthcare Informatics (62), 2013	Quality assurance for user protection	mHealth	Institute	Yes	USA
Jin & Kim (63), 2015	Health professionals	mHealth	University	Yes	Republic of Korea
Kaciopas et al. (21), 2015	Quality assurance for research setting	mHealth	University	No	UK

And many more here and more since 2018

# Potential for Harm with Lists and Static Ratings

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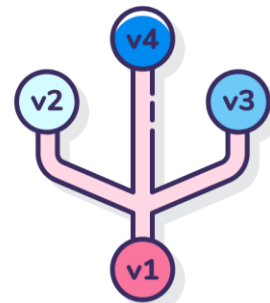
No “A+” or top medication or therapy



Different People React and Use Apps Differently



Different Clinical Needs for the Same App at Different Times



Apps are Constantly Updating. Which Version was Rated?



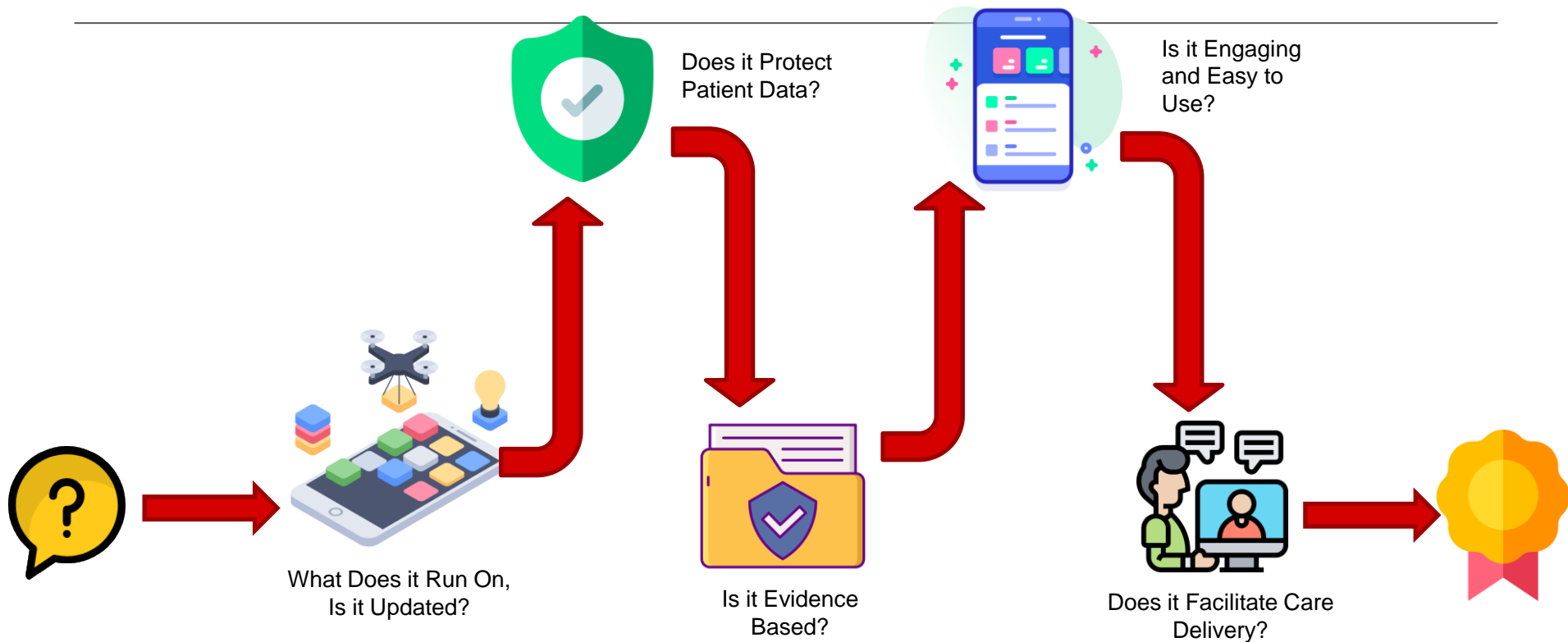
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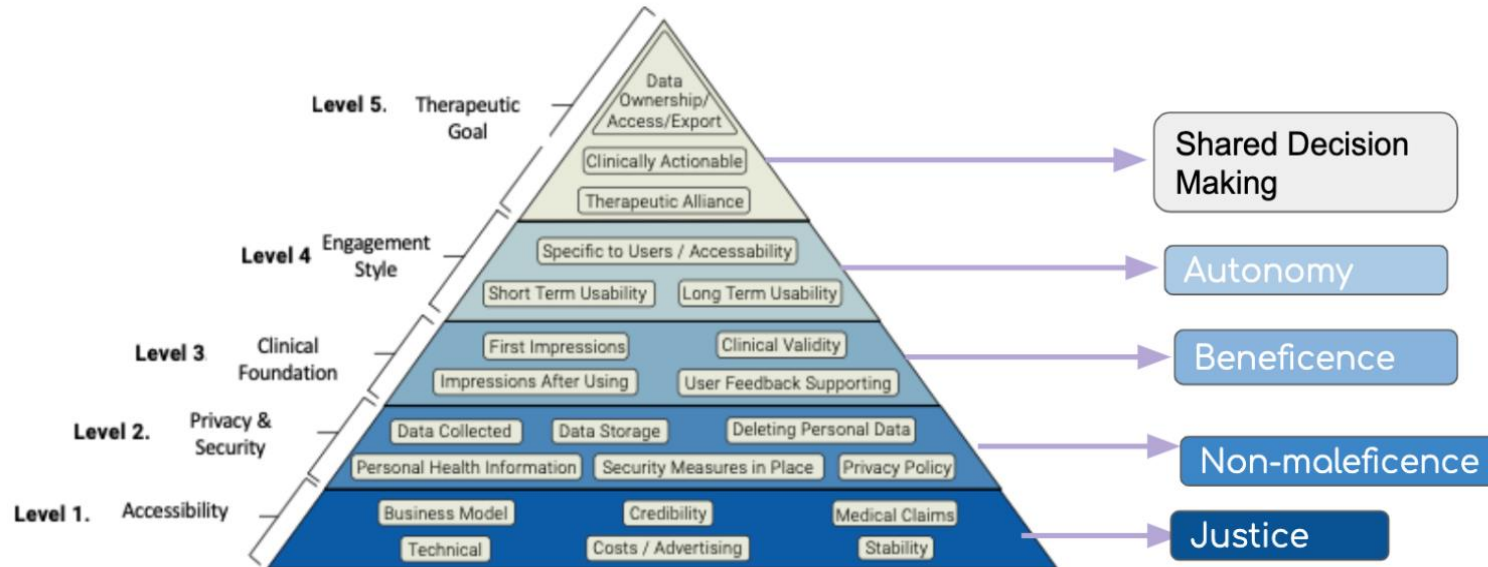


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# What is the Solution to Navigating this Journey ?



# One Framework

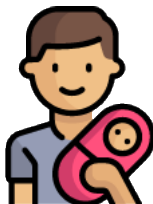




# Actionable and Objective App Database

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- **Individual preferences and value** guide app choice, making subjective metrics less standardized.
- What is a set of **objective** and **replicable** questions about an app?
- What does “Ease of Use” even mean? Whose value judgements are being imposed. What cultural assumptions are being made?



# 100+ Objective Questions

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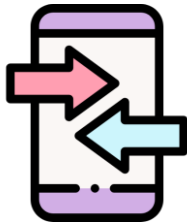
The questions are aligned with the levels of the APA pyramid but are designed for you to pick which matter when and where



Origin and  
Functionality



Privacy and  
Security



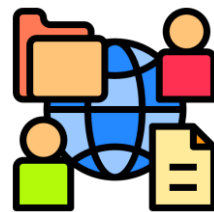
Inputs and  
Outputs



Clinical  
Foundation



Engagement  
Style



Interoperability  
and Sharing



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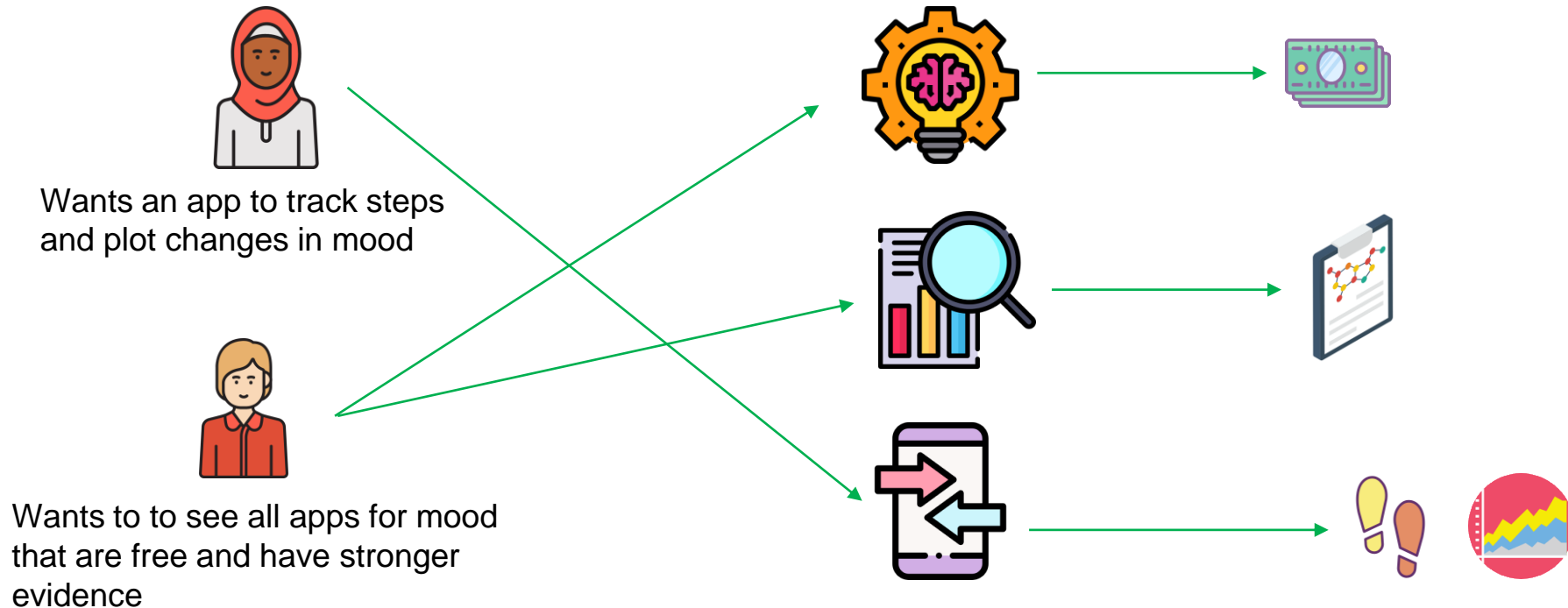
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# User Pick What Matters to Them Today

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# Apps.digitalpsych.org

**MIND** M-HEALTH INDEX & NAVIGATION DATABASE

Application Library My Ratings Framework News

**Search Filters**









































- Cost
- Developer Types
- Supported Conditions
- Functionalities
- Uses
- Features
- Engagements
- Evidence & Clinical Foundations
- Privacy

Reset Filter Load Filter Save Filter Delete Filter

## App Library

Search by name, feature or platform

All Platforms

Application	Last Updated	Rating	Platforms
			Android iOS Web
 Intellect: Create a Better You by The Intellect Company	Wed Mar 23rd 2021 8:35 AM	   	<input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/>
 PE Coach 2 by US Department of Veterans Affairs (VA)	Fri Mar 11th 2021 2:39 PM	   	<input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/>
 The Breathing App by The Breathing Gang (Eddie & Sergey & M)	Thu Mar 31st 2021 3:47 PM	   	<input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/>
 Mindpax.me by MINDPAX	Thu Apr 7th 2021 11:02 PM	   	<input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>
 Moody - Daily Mood Tracker by Pixel Mafia LLC	Thu Apr 7th 2021 11:04 PM	   	<input type="radio"/> <input checked="" type="radio"/> <input type="radio"/>
 TF-CBT Triangle of Life by Allegheny Health Network	Thu Apr 7th 2021 11:29 AM	   	<input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>
 CBT-i Coach by US Department of Veterans Affairs (VA)	Thu Apr 7th 2021 6:22 PM	   	<input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/>
 iMoodJournal by Inexika Inc.	Fri Dec 24th 2020 11:17 PM	   	<input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>

On the homepage of the database, the user can filter mental health apps according to what characteristics matter to them: Cost? Privacy settings? Available features? YOU decide.



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# A New Way of QUICKLY Finding a Clinically Relevant App

The database then returns the list of apps that meet the user's criteria.

The screenshot displays the MIND M-Health Index & Navigation Database interface. The top navigation bar includes the MIND logo, the text 'M-HEALTH INDEX & NAVIGATION DATABASE', and links for 'Application Library', 'My Ratings', 'Framework', 'News', and a user profile icon. The left sidebar contains 'Search Filters' with 4 active filters: 'Cost' (Free to Download, Totally Free, Payment, In-App Purchase, Subscription), 'Developer Types' (+), 'Supported Conditions' (+), and 'Functionalities' (Spanish, Offline, Accessibility, Own Your Own Data, Email or Export Your Data, Send Your Data to a Medical Professional). The main 'App Library' section features a search bar, a dropdown for 'All Platforms', and filter buttons for 'Totally Free', 'Self Help', 'Email or Export Your Data', 'Has Privacy Policy', and a 'Reset all filters' link. Below this is a table of applications with columns for Application, Last Updated, Rating, and Platforms (Android, iOS, Web, Google Play). The table lists six apps: CBT-i Coach, Personal Mood Journal, Woebot: Your Self-Care Expert, OCD Test Y-BOCS, myStrength, and Minds of The Culture. The bottom right corner indicates 'Viewing 31 Applications'.

Application	Last Updated	Rating	Platforms
			Android iOS Web Google Play
CBT-i Coach by US Department of Veterans Affairs (VA)	Thu Apr 7th 2021 6:22 PM	4.5	Android iOS Web Google Play
Personal Mood Journal by Think Discount, LLC	Tue Jan 25th 2021 8:59 AM	4.5	Android iOS Web Google Play
Woebot: Your Self-Care Expert by Woebot Health	Tue Mar 22nd 2021 8:23 AM	4.5	Android iOS Web Google Play
OCD Test Y-BOCS by Baris Sarer	Fri Dec 24th 2020 11:22 PM	4.5	Android iOS Web Google Play
myStrength by myStrength, Inc.	Thu Apr 7th 2021 5:58 PM	4.5	Android iOS Web Google Play
Minds of The Culture by Chanda Reynolds	Thu Apr 7th 2021 11:13 PM	4.5	Android iOS Web Google Play
SuperBetter by SuperBetter, LLC	Tue Feb 1st 2021 3:13 PM	4.5	Android iOS Web Google Play



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# Crowd-Sourced, Up-to-Date App Ratings

Cost

Is the app free to download? ☐ Yes ☒ No

Is the app totally free? ☐ Yes ☒ No

Is there a one time payment? ☐ Yes ☒ No

Are there in-app purchases? ☐ Yes ☒ No

Is there a subscription (recurrent/monthly/annual)? ☐ Yes ☒ No

Application Origin

Every app will be in at least one of these categories but can be in more than one of them (a university-affiliated hospital, for example, could be both academic, healthcare, and non-profit). When in doubt, put for profit. Refer to app store description and app itself (i.e. is there a logo on the interface) and developer website.

Does it come from the government? ☐ Yes ☒ No

Does it come from a for-profit company? ☐ Yes ☒ No

Does it come from a non-profit company? ☐ Yes ☒ No

Does it come from a trusted healthcare company? ☐ Yes ☒ No

Does it come from an academic institution? ☐ Yes ☒ No

By answering the 100 questions, a trained rater can submit app metrics, allowing the app's entry in the database to be regularly updated and responsive to changes in the app overtime.



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# Let's try it...

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## Apps.digitalpsych.org

- A college student is looking for an app to help with their mental health. They want to write down their thoughts and feelings in an in-app journal. They do not want to pay at all for the app. They would like the app to have some foundation in research. They are also wary of their data being shared with other companies and would like their app to have some privacy guarantees. Finally, they have an iOS device (an iPhone).
- Can we find a good app for them?
- What options do we have?



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# What filters did you choose?

## App Library

List View

Table View

Search by name, feature or platform



iOS Platforms

Totally Free































Has Privacy Policy

App Declares Data Use and Purpose

Journaling

Supporting Studies

[Reset all filters](#)

Application	Last Updated	Rating	Platforms			Developer Type					
			Android	iOS	Web	Government	For Profit	Non-Profit	Healthcare	Academ	
 Woebot: Your Self-Care Expert by Woebot Health	Tue Mar 22nd 2021 8:23 AM	   	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
 myStrength by myStrength, Inc.	Thu Apr 7th 2021 5:58 PM	   	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
 Schizophrenia Storylines by Health Storylines	Fri Apr 1st 2021 9:37 AM	   	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
 T2 Mood Tracker by T2	Thu Jan 13th 2021 2:41 PM	   	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
 NOCD: OCD Treatment App by NOCD INC	Tue Nov 9th 2020 8:32 AM	   	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
 PatientsLikeMe by PatientsLikeMe	Sat Nov 13th 2020 11:15 AM	   	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	



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# Let's try it...

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- Another college student doesn't mind paying, but they want to find a good CBT app. They feel most comfortable with an app from a non-profit company, or the government. They would like to complete self-assessments within the app, and they insist on being able to delete their data from the app.
- Can we find a good app for them?
- What options do we have?



# What filters did you choose?

## App Library

[List View](#)[Table View](#)

iOS Platforms


























Assessments/Screenings

Can Delete Data

CBT

Government

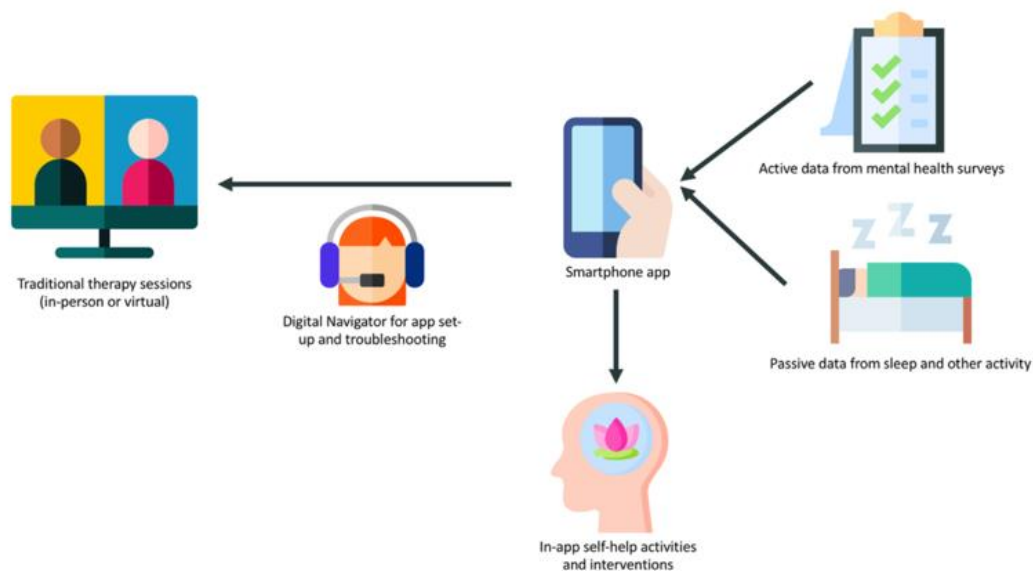
[Reset all filters](#)

Application		Last Updated	Rating	Platforms			Developer Type				
				Android	iOS	Web	Government	For Profit	Non-Profit	Healthcare	Academic
	CBT-i Coach by US Department of Veterans Affairs (VA)	Thu Apr 7th 2021 6:22 PM	   	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	COVID Coach by US Department of Veterans Affairs (VA)	Fri Dec 24th 2020 11:55 PM	   	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Insomnia Coach by US Department of Veterans Affairs (VA)	Tue Mar 15th 2021 1:05 PM	   	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	CPT Coach by US Department of Veterans Affairs (VA)	Thu Apr 7th 2021 3:49 PM	   	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	eQuoo: Emotional Fitness Game by PsycApps Ltd. (UK)	Tue Feb 8th 2021 11:28 AM	   	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

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LIFE & ARTS | JOURNAL REPORTS: RETIREMENT

## How to Stay on Top of Your Health From Home During Covid-19

You may not want to go to the doctor. There are plenty of proactive steps you can take—without leaving the house.

For those struggling with issues such as anxiety, depression and substance abuse, video consults offer an effective way to stay in close contact with mental-health professionals, says John Torous, director of the division of digital psychiatry at Beth Israel Deaconess Medical Center in Boston. Dr. Torous and his team offer face-to-face sessions over a videoconferencing platform and train patients to use a smartphone app called mindLAMP between appointments to take anxiety surveys, monitor their medication regimens and keep a mood journal.

Psychiatrists, social workers and other mental-health professionals use data collected through the mindLAMP app to gain better insight into the patient experience between sessions and to help customize treatment, such as assigning mindfulness exercises.



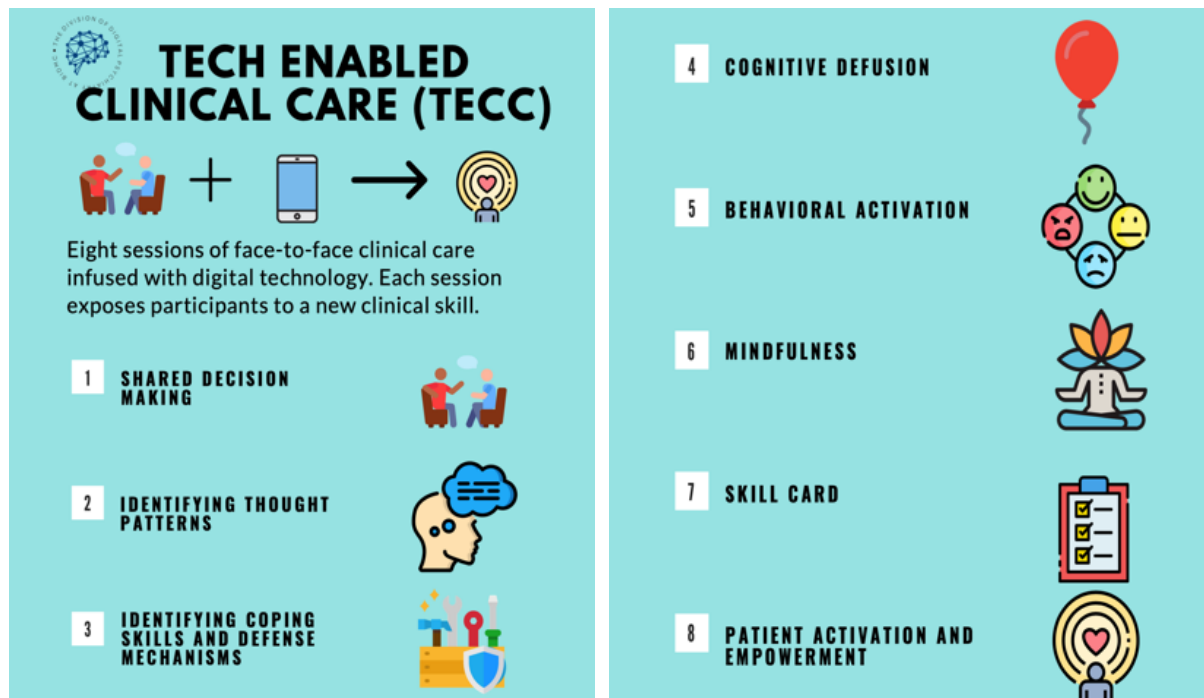
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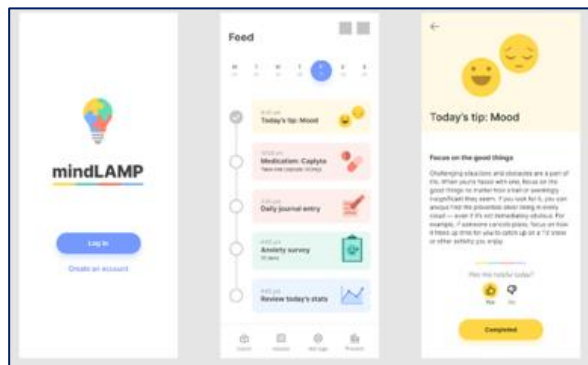
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Learn  
and  
Manage



Assess  
and  
Prevent



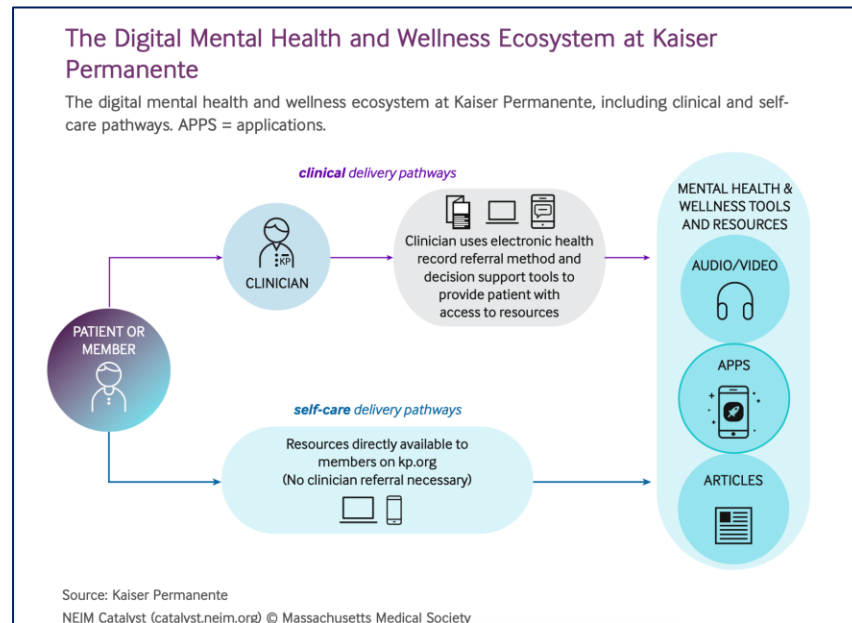
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# Clinical Implementation: Kaiser



# Clinical Implementation: Kaiser

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“To support a sustainable approach to broad spread, we also developed a “train the trainer” model for clinicians.”

“We used the American Psychiatric Association (APA) app evaluation model and an expert clinical review team ....”

**Table 1. Clinician Engagement Before and During Covid-19**

	January 2020	May 2020
Trained clinicians	562	1,678
Referrals to apps	20,906	44,277
Trained clinicians referring to apps	72%	60%

apps = applications. Source: Kaiser Permanente.



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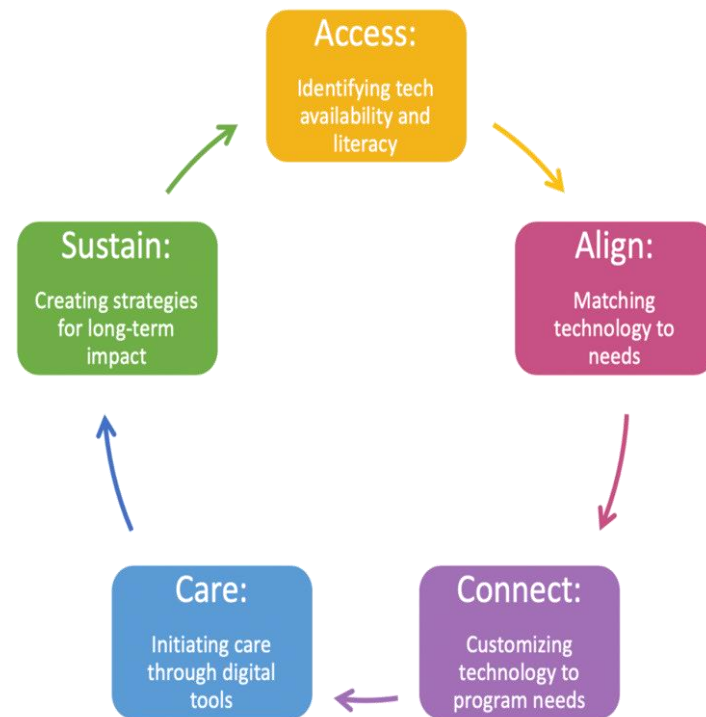
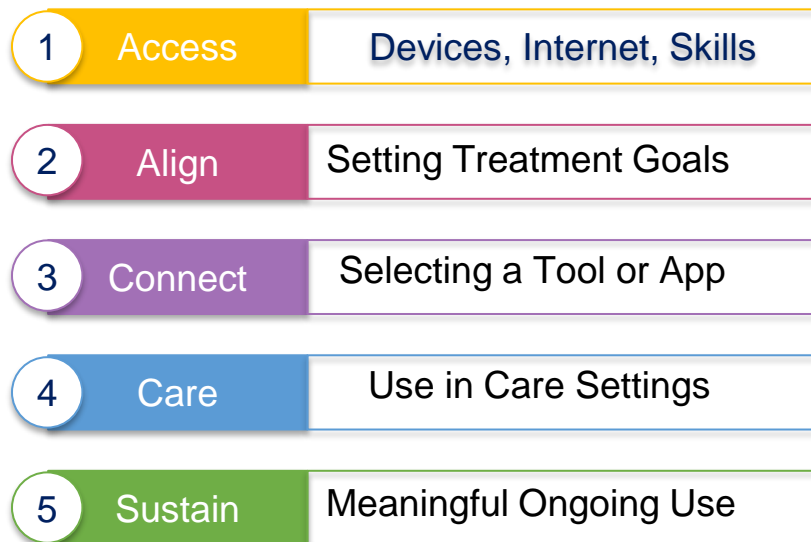
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# Successful Efforts



# THANK YOU!

[digitalpsych.org](https://digitalpsych.org)



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MIND

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