INTEGRATING DIGITAL APPROACHES FOR THE TREATMENT OF SUBSTANCE USE DISORDERS

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No relevant financial disclosures

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No relevant financial disclosures

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Zoom Poll

GETTING TO KNOW THE AUDIENCE!

- Please indicate your primary degree.
- How do you spend most of your time in practice?
- How many years have you been treating patients with addiction?
- What is your primary work environment?
- What primary population do you and/or your team serve?

Integrating Digital Approaches for the Treatment of Substance Use Disorders

This webinar provides an overview of the new digital approaches available that prescribing clinicians may find useful in the treatment of substance use disorder (SUD). It examines what the evidence says about their efficacy and explores strategies for integrating their use into practice as an adjunct to other evidence-based treatments in SUD treatment.

Agenda

KEY TOPICS DISCUSSED IN THIS PRESENTATION

- Evolution of Digital Approaches and Key Terminology
- Summary of Digital Solutions for SUD Treatment
- Best Practices for Integrating Digital Approaches into SUD Treatment
- Q&A Sessions

Learning Objectives

Define basic terminology related to digital approaches in SUD.

Understand the landscape of digital approaches for SUD treatment.

Evaluate digital tools that are evidence-based and differentiate the quality of various tools.

Identify patient characteristics that make use of digital approaches appropriate.

Examine best practices for implementing digital tools in your practices to supplement the current evidence-based treatments.

When poll is active, respond at **PollEv.com/asamlearning370**

Text **ASAMLEARNING370** to **22333** once to join

Please share a keyword or phrase that comes to mind when you think about digital interventions for substance use disorders.

Evolution of Digital Approaches

Presented by **MARIO SAN BARTOLOME**, MD, FASAM

Evolution of Digital Approaches

Digital Health – an Umbrella

According to the US Food and Drug Administration (FDA), “digital health” includes categories such as mobile health, health information technology, wearable devices, telehealth/telemedicine, and personalized medicine.

Applications include support for clinical decision-making, leveraging artificial intelligence (AI), general wellness, monitoring, adjunctive use to other medical products.

Source: Food and Drug Administration
https://www.fda.gov/medical-devices/digital-health-center-excellence/what-digital-health

Definitions Matter

Digital Therapeutic (DTx):

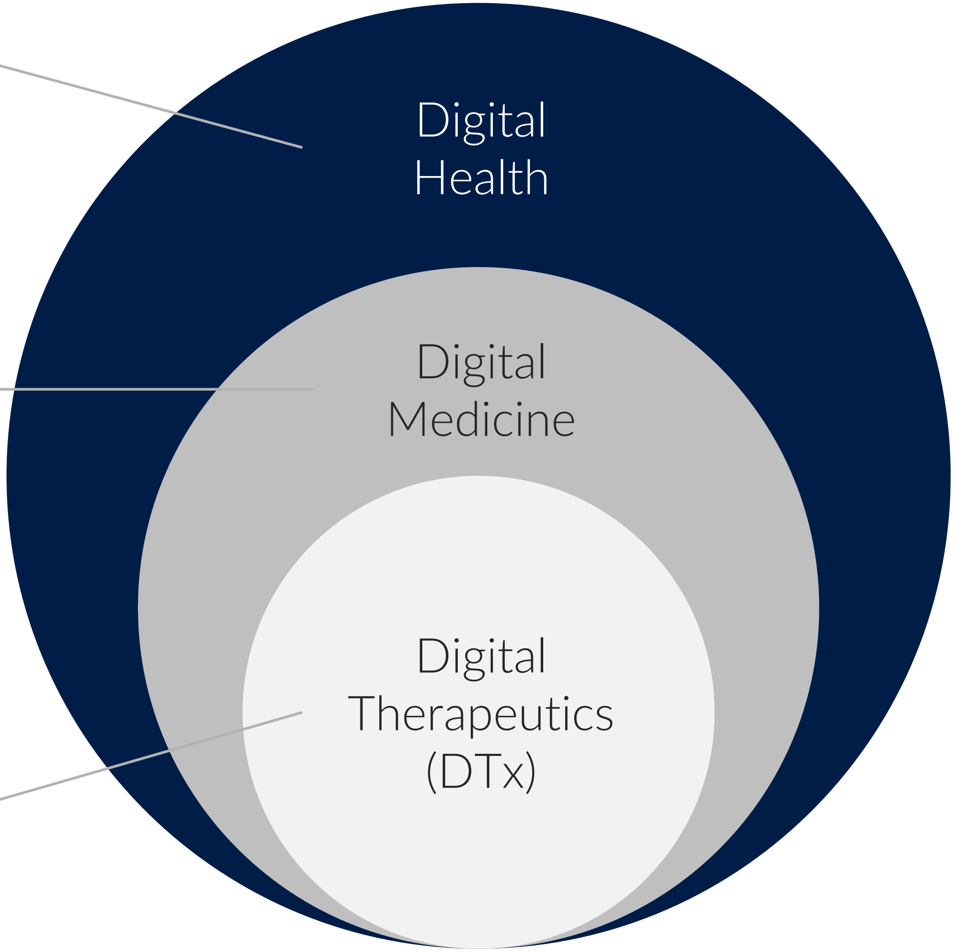
- Digital therapeutics deliver medical interventions directly to patients using evidence-based, clinically evaluated software to treat, manage, and prevent a broad spectrum of diseases and disorders. They are used independently or in concert with medications, devices, or other therapies to optimize patient care and health outcomes.

Source: Digital Therapeutics Alliance https://dtxalliance.org/understanding-dtx/what-is-a-dtx/

- Entities that engage consumers for wellness and health-related purposes by obtaining health data.
- Do not require clinical evidence.
- Do not meet regulatory definition of a medical device and hence, do not require regulatory oversight.

- Evidence-based software and/or hardware products measuring human health.
- Require clinical evidence.
- Requirements for regulatory oversight vary.
- Products classified as medical devices require regulatory approval, while those used as a tool to develop other drugs, devices, or medical products require regulatory acceptance by the appropriate review division.

- Products delivering evidence-based therapeutic interventions to prevent, manage, or treat a disease.
- Require clinical evidence as well as data on real world outcomes.
- All DTx products must be reviewed and cleared or certified by regulatory bodies as required to support product claims of risk, efficacy, and intended use.



Source: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7380804/

Digital Therapeutics in Behavioral Health

Defined:

Prescription digital therapeutics are software-based treatments delivered on mobile devices that address the behavioral dimensions of many diseases and conditions.

Including Substance Use Disorders.

Source: Adv Ther (2022) 39:5301–5306

Why are Digital Therapeutics Important?

Access to specialty SUD treatments with fidelity are limited

Eliminate **geographic** barriers to accessing treatment

Can be used as **adjuncts** to other, currently available treatments

Can be **self-paced**

Can be cost effective

Improves **engagement** often challenged by stigmatization

Empowering patients to be involved in their care

Allow for **personalization**

Source: Digital Therapeutics Alliance https://dtxalliance.org/understanding-dtx/what-is-a-dtx/

Digital Therapeutics in SUD Treatment

There is evidence that some digital therapeutics for SUD are safe, cost-effective, and can improve treatment engagement.

Digital therapeutic tools allow for:

- Reduced Variability
- Standardization

Patients & Clinicians

Patient

- Enrolled or engaged in SUD treatment
- Outpatient vs Inpatient
- Medications
- Open to Cognitive Behavioral Therapy
- Access to mobile device
- Access to internet/wireless connection for uploads

Clinician

- Licensed Healthcare Clinician
- Access to a computer (dashboards)
- Provide SUD treatment with evidence-based modalities such as CBT or contingency management
- Digital Therapeutics are not intended to substitute face-to-face encounters

Q&A

Summary of Digital Solutions for SUD

Presented by **Smita Das**, MD, PhD, MPH

Zoom Poll

Have you had experience with any of the following digital solutions for treating substance use disorders?

- Digital therapeutics
- Web Applications or Mobile Applications
- Guided Care with Apps
- Telehealth
- Social Media, Chatbots, Peer Support/Groups
- Wearables, Virtual Reality
- None of the above

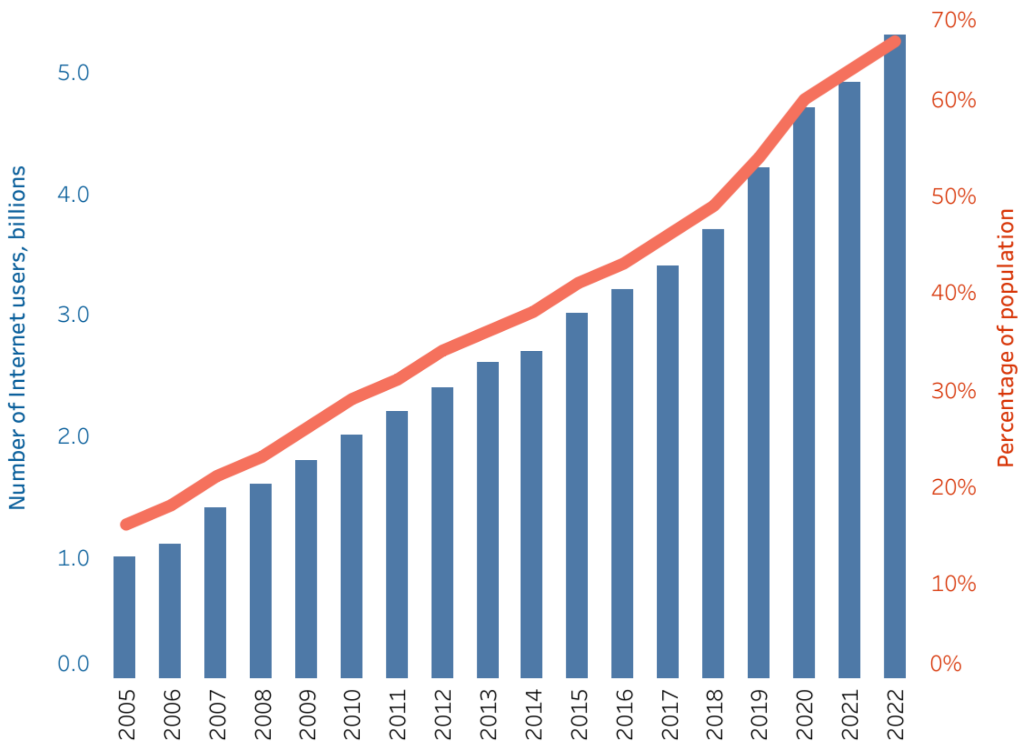
Categories of Digital Solutions

- Digital therapeutics also referred to as DTx
- Applications or mobile applications not subject to regulatory review of digital therapeutics
  - Guided
  - Self-Guided
- Technology to deliver standard care like telemedicine
- Emerging areas
  - Social media
  - Chatbots
  - Peer support/groups
  - Wearables
  - Virtual reality

Adoption of Internet and Mobile Technologies Has Skyrocketed

- 17% increase in internet usage since 2019
- 90% of population in developed countries uses internet
- 90% of population in ½ the countries owns a mobile phone

Individuals Using the Internet



Source: ITU

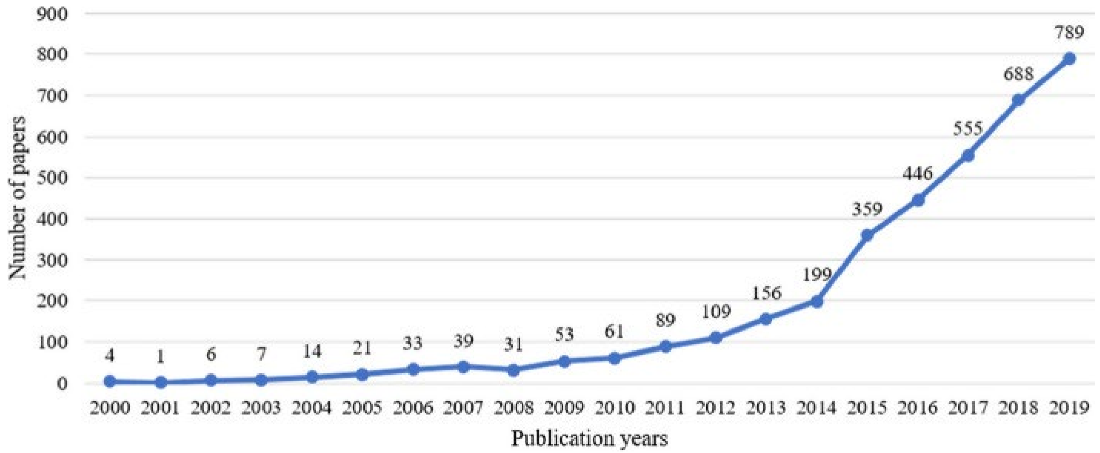
Importance of Technology with SUD

- “5000-hour problem”
  - Patients only spend a few hours a year in front of a clinician
  - No data on 5000+ other waking hours of that year
- SUD is intertwined with daily activities and life, so potential to
  - Log use in real time
  - Use a relapse prevention plan at one’s fingertips
  - Observe, discuss and influence choices in the moment
- Limited access and stigma with traditional treatment modalities

Asch DA, Muller RW, Volpp KG. Automated hovering in health care--watching over the 5000 hours. N Engl J Med. 2012 Jul 5;367(1):1–3.

Scientific Approach to Review

Number of published papers related to e-mental health between 2000 and 2019, indexed by Clarivate Analytics tools



- The number of papers published in the area of e-mental health has grown rapidly in the last 5-10 years
- There is industry interest in publishing papers and quality/n can vary
- Throughout this part of the presentation, primarily reviews will be referenced

Timakum T, Xie Q, Song M. Analysis of E-mental health research: mapping the relationship between information technology and mental healthcare. BMC Psychiatry. 2022 Jan 25;22(1):57. doi: 10.1186/s12888-022-03713-9. PMID: 35078432; PMCID: PMC8787445.

Scientific Approach to Review *(Cont.)*

- Effect sizes
  - 0.20, 0.50, and 0.80 for Cohen's d (also known as SMD or standard mean difference) and Hedges' g are commonly considered
  - Small, medium, and large effects
- Targets of interest
  - Decrease in substance use
  - Retention in treatment
- Presentation will attempt to capture the current transitory state of the field

Digital Therapeutics (DTx)

Digital Therapeutics

- Mobile, web, or other software-based platforms or devices that deliver treatments for medical conditions or diseases (general wellness apps or telehealth)
- Can complement or even replace prescription drugs for managing certain health conditions
- Can make medical claims and must be device specific
- Must complete superiority trials (RCTs) to demonstrate at least equivalence of existing products or modalities or de novo value and safety

Digital Therapeutics *(Cont.)*

- Subject to regulatory oversight since they get Food and Drug Administration (FDA) clearance
- Recent developments
  - Members of NIDA (National Institute of Drug Abuse) and the FDA support the development of safe and effective DTx for SUDs, noting they "offer unique treatment options and can deliver interventions with fidelity and state-of-the-art practices."
  - Legislation proposed to cover access to digital therapeutics in Medicare and Medicaid

Aklin WM, Walton KM, Antkowiak P. Digital therapeutics for Substance Use Disorders: Research priorities and clinical validation. Drug Alcohol Depend. 2021 Dec 1;229(Pt A):109120.
Lougheed T. How "digital therapeutics" differ from traditional health and wellness apps. CMAJ Can Med Assoc J. 2019 Oct 28;191(43):E1200–1.
Capito SM. S.3791 - 117th Congress (2021-2022): Access to Prescription Digital Therapeutics Act of 2022 [Internet]. 2022. Available from: http://www.congress.gov/

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Two SUD Prescription Digital Therapeutics

- Based on Therapeutic Education System (TES): Internet-delivered behavioral intervention that includes motivational incentives and serves as a clinician-extender in the treatment of substance use disorders

New York State Psychiatric Institute. NIDA-CTN-0044: Web-delivery of Evidence-Based, Psychosocial Treatment for Substance Use Disorders Using the Therapeutic Education System (TES) [Internet]. clinicaltrials.gov; 2017 Jul [cited 2022 Aug 7]. Report No.: NCT01104805. Available from: https://clinicaltrials.gov/ct2/show/NCT01104805

Campbell ANC, Miele GM, Nunes EV, McCrimmon S, Ghitza UE. Web-based, Psychosocial Treatment for Substance Use Disorders in Community Treatment Settings. Psychol Serv. 2012 May;9(2):212–4.

Commissioner O of the. FDA permits marketing of mobile medical application for substance use disorder [Internet]. FDA. FDA; 2020 [cited 2022 Aug 8]. Available from: https://www.fda.gov/news-events/press-announcements/fda-permits-marketing-mobile-medical-application-substance-use-disorder

Two SUD Prescription Digital Therapeutics *(Cont.)*

- Reset: 90-day program, FDA cleared in 2017 to treat alcohol, cocaine, marijuana, and stimulant SUDs
  - CRA or Community Reinforcement Approach
  - Patient mobile app with a clinician interface delivering cognitive behavioral therapy through 61 modules (30 min of treatment each) + quizzes
  - Use with outpatient therapy and in addition to a contingency management (CM)
  - Study: Multisite, unblinded, 12-week clinical trial (n=399) of TAU or desktop-based version of reSET®
    - Statistically significant increase in adherence to abstinence for the patients with alcohol, cocaine, marijuana, and stimulant SUD in those who used reSET® (40.3%) compared with patients who did not (17.6%) (p=0.0004)
    - Not effective for opioid use disorder
    - Sponsor: New York State Psychiatric Institute | Collaborator: National Institute on Drug Abuse (NIDA)

New York State Psychiatric Institute. NIDA-CTN-0044: Web-delivery of Evidence-Based, Psychosocial Treatment for Substance Use Disorders Using the Therapeutic Education System (TES) [Internet]. clinicaltrials.gov; 2017 Jul [cited 2022 Aug 7]. Report No.: NCT01104805. Available from: https://clinicaltrials.gov/ct2/show/NCT01104805

Two SUD Prescription Digital Therapeutics *(Cont.)*

- reSET-O®, 84-day program, FDA cleared in 2018 to treat opioid use disorder (OUD)
  - Pair with buprenorphine treatment (17)
  - Study: Unblinded, controlled 12-week clinical trial (n=170) buprenorphine treatment paired with a behavior therapy program, either with or without the addition of a desktop-based version of reSET-O® for use in the clinic
    - reSET-O® did not decrease illicit drug use
    - Statistically significant increase in retention in a treatment program for 12 weeks for the patients who used the desktop computer version of the reSET-O® program (824%) compared to those who did not (68.4%) (p=0.02)
    - This study was sponsored by a grant from NIDA and the Wilbur Mills Endowment.
- Of note, the research settings had many resources that may not always be in place including CM, 30 min of face-to-face counseling every other week and 3x a week urine testing

Christensen DR, Landes RD, Jackson L, Marsch LA, Mancino MJ, Chopra MP, et al. Adding an Internet-delivered treatment to an efficacious treatment package for opioid dependence. J Consult Clin Psychol. 2014 Dec;82(6):964–72.

Commissioner O of the. FDA clears mobile medical app to help those with opioid use disorder stay in recovery programs [Internet]. FDA. FDA; 2020 [cited 2022 Aug 8]. Available from: https://www.fda.gov/news-events/press-announcements/fda-clears-mobile-medical-app-help-those-opioid-use-disorder-stay-recovery-programs

Clinical and Economic Review's Midwest Comparative Effectiveness Public Advisory Council Review

- Independent appraisal committees convened by Institute for Clinical and Economic Review for public deliberation of the evidence on clinical and cost-effectiveness
- Review of reSET-O® and two other commonly compared programs that do not have FDA clearance
  - Program 1: reSET-O®
  - Program 2: Digital CBT with a program that enhances patient communication with addiction experts, peer support groups, and counselors
  - Program 3: CBT + CM app with substance use screening results, Bluetooth-enabled breathalyzer for alcohol testing, drug saliva testing, and appointment monitoring and reminders

Tice JA, Whittington MD, Campbell JD, Pearson SD. The effectiveness and value of digital health technologies as an adjunct to medication-assisted therapy for opioid use disorder. J Manag Care Spec Pharm. 2021 Apr;27(4):528–32.

Clinical and Economic Review's Midwest Comparative Effectiveness Public Advisory Council Review (*Cont.*)

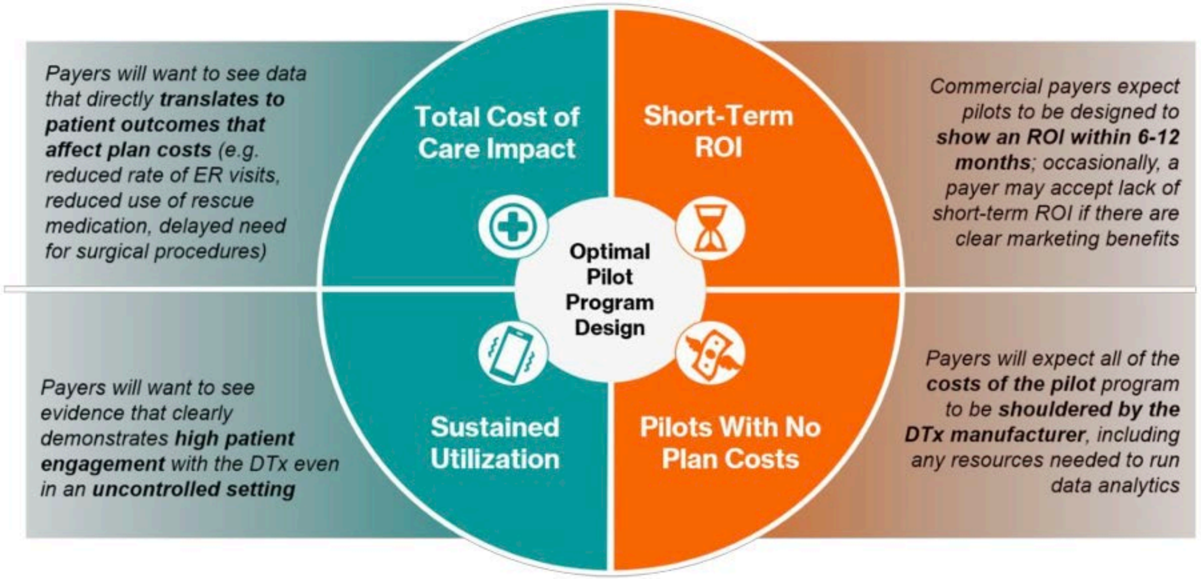
- Findings:
  - Council not confident in the effect on retention for reSET-O® and insufficient data for other two programs
  - Cost effectiveness analysis (only for reSET-O®): Cost per QALY ranged from approximately $50,000 to $500,000
  - Panel voted 10-3 that the clinical evidence was not adequate to demonstrate greater net health benefit for reSET-O® compared with best supportive care (13-0 for other two program)
- Take home: Due to the overwhelming value MAT (medications for addictions treatment) has, digital technologies must be carefully studied/implemented if used, to not negatively interfere with proven interventions; RCTs and better methodologies in development studies should be required

Tice JA, Whittington MD, Campbell JD, Pearson SD. The effectiveness and value of digital health technologies as an adjunct to medication-assisted therapy for opioid use disorder. J Manag Care Spec Pharm. 2021 Apr;27(4):528–32.

Key Considerations

Image from Council Report:

Figure 3.1. Components of Optimal Digital Therapeutics Uptake[43]

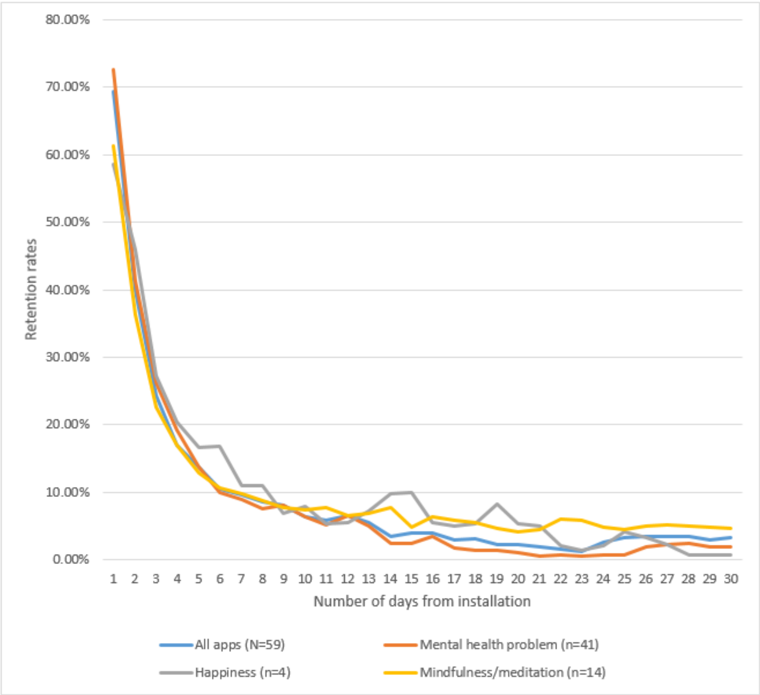


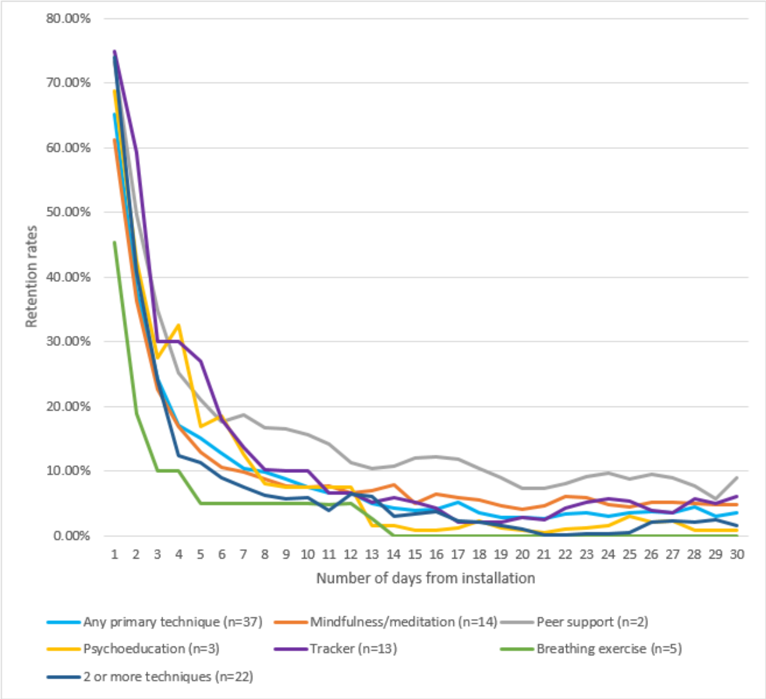
- Costs high to develop
- Friction to get payment
- Hard to get adopters
- More research is needed for successful implementation and dissemination

Applications or Mobile Applications

(Generally, not subject to regulatory review of digital therapeutics.)

>10K MH Apps *(Software for a Mobile Device)*





- Quality varies
- 2019 review: 93 apps with over 10,000 installs targeting anxiety, depression, or emotional well-being
- Median 4% daily active users, indicating possible low utility in practice and median 15–30-day retention in 3% range

Baumel A, Muench F, Edan S, Kane JM. Objective User Engagement With Mental Health Apps: Systematic Search and Panel-Based Usage Analysis. J Med Internet Res. 2019 Sep 25;21(9):e14567.

Lack of Reliable Research

- 2020 review: Only 2.08% (21/1009) apps for MH were supported by original research publications
  - 25 efficacy studies (8 from one vendor)
  - 10 feasibility studies
- Also included in this section are stand-alone websites, predecessors to mobile apps
- Can be guided or unguided

Lau N, O'Daffer A, Colt S, Yi-Frazier JP, Palermo TM, McCauley E, et al. Android and iPhone Mobile Apps for Psychosocial Wellness and Stress Management: Systematic Search in App Stores and Literature Review. JMIR MHealth UHealth. 2020 May 22;8(5):e17798.

Existing Reviews

- 2019 review and meta-analysis of stand-alone apps for mental health concerns
  - 3 smoking cessation apps and 3 alcohol app studies there were small effects of the apps compared to control for smoking, no significant effects for alcohol and no significant difference when pooled
  - Guided interventions may increase efficacy
  - Adherence less impressive in standalone
  - Take home: how to design effective mental health apps is in infancy.

Weisel KK, Fuhrmann LM, Berking M, Baumeister H, Cuijpers P, Ebert DD. Standalone smartphone apps for mental health—a systematic review and meta-analysis. NPJ Digit Med. 2019 Dec 2;2:118.
Staiger PK, O'Donnell R, Liknaitzky P, Bush R, Milward J. Mobile Apps to Reduce Tobacco, Alcohol, and Illicit Drug Use: Systematic Review of the First Decade. J Med Internet Res. 2020 Nov 24;22(11):e17156.

Existing Reviews *(Cont.)*

- 2020 systematic review of apps for tobacco (n=6), alcohol (n=11), illicit drug use (n=1) or combinations (n=1
  - Research muddied by diverse comparison groups (like assessment only or paper-based interventions)
  - Only 6 of the 20 apps reported significant reductions in substance use at post or follow-up compared with a comparison condition, with small to moderate effect sizes
  - 3 of those were low quality studies (Image)
  - Take home: trials are not well powered and follow up times are insufficient
    - They also emphasize study pre-registration, adhering to guidelines and using theoretical models to guide design.

Weisel KK, Fuhrmann LM, Berking M, Baumeister H, Cuijpers P, Ebert DD. Standalone smartphone apps for mental health—a systematic review and meta-analysis. NPJ Digit Med. 2019 Dec 2;2:118.
Staiger PK, O'Donnell R, Liknaitzky P, Bush R, Milward J. Mobile Apps to Reduce Tobacco, Alcohol, and Illicit Drug Use: Systematic Review of the First Decade. J Med Internet Res. 2020 Nov 24;22(11):e17156.

Existing Reviews
(Cont.)

	Random sequence generation	Allocation concealment	Blinding of participants and personnel	Blinding of outcome assessment	Incomplete outcome data
Aharonovich et al, 2017	+	+	+	+	+
Baskerville et al, 2018	+	+	+	+	+
Boendermaker et al, 2015	-	-	?	?	?
Bricker et al, 2014	?	?	+	+	+
Crane et al, 2018	+	+	?	+	+
Crane et al, 2018	+	+	?	+	+
Davies et al, 2017	+	+	+	+	+
Earle et al, 2018	+	+	?	+	+
Gajecki et al, 2014	+	+	-	+	+
Gajecki et al, 2017	+	?	-	+	?
Gonzalez & Dulin, 2015	-	-	?	?	?
Gustafson et al, 2014	+	+	-	-	+
Hasin et al, 2014	-	-	-	?	?
Hertzberg et al, 2013	?	?	?	?	+
Hides et al, 2018	+	?	?	+	+
Kerst & Waters, 2014	?	?	+	+	+
Krishnan et al, 2018	?	?	?	-	-
Liang et al, 2018	?	?	?	?	+
Ruscio et al, 2016	+	?	-	+	+
Witkiewitz et al, 2014	?	?	?	+	?

2019 Meta-Analysis of CBT-Tech

- Gold standard approach to treat alcohol use disorder, often combined with motivational approaches, community reinforcement approach and mindfulness
- 2019 meta-analysis of CBT in computer or mobile form called "CBT tech" (15 studies)
- Controls were assessment, treatment as usual, psychoeducational reading and waitlist
- CBT tech compared to:
  - Minimal or no treatment found small positive effect at early follow up, but were non-significant at late follow up
  - Treatment as usual showed no significant differences

Kiluk BD, Ray LA, Walthers J, Bernstein M, Tonigan JS, Magill M. Technology-Delivered Cognitive-Behavioral Interventions for Alcohol Use: A Meta-Analysis. Alcohol Clin Exp Res. 2019 Nov;43(11):2285–95.

2019 Meta-Analysis of CBT-Tech *(Cont.)*

- CBT tech added to treatment as usual was helpful at both follow up times compared to just treatment as usual
- No difference was found between CBT tech versus therapist delivered, but notably the statistic (not significant) was negative for CBT Tech
- All effect sizes mentioned were small, with the largest (g=0.3) being for added CBT tech to treatment as usual

Kiluk BD, Ray LA, Walthers J, Bernstein M, Tonigan JS, Magill M. Technology-Delivered Cognitive-Behavioral Interventions for Alcohol Use: A Meta-Analysis. Alcohol Clin Exp Res. 2019 Nov;43(11):2285–95.

2019 Meta-Analysis of CBT-Tech *(Cont.)*

- Heterogeneous in design, content (4 vs 62 modules at 3 min each)
- Also incorporated MI/ME, not just CBT
- Adherence, engagement and exposure was also low for the majority of programs, as users could access at their will
- Reach on the other hand was huge for the interventions with the average RCT enrolling 656, with the largest being nearly 8,000 people and with diverse populations
- Take home:
  - While the effect sizes were small, the potential reach and potential effect of these interventions warrants more research.
  - These models should NOT replace in-person or established services, as there have been few well-controlled comparisons thus far

Kiluk BD, Ray LA, Walthers J, Bernstein M, Tonigan JS, Magill M. Technology-Delivered Cognitive-Behavioral Interventions for Alcohol Use: A Meta-Analysis. Alcohol Clin Exp Res. 2019 Nov;43(11):2285–95.

2017 Cochrane Review of Digital Interventions for Alcohol Versus No Treatment or Face to Face

- Community settings like workplaces, colleges, clinics and internet users
- Aimed to assess the effectiveness and cost-effectiveness AND what behavior change components and theoretical bases were used
- 41 studies (42 comparisons, 19,241 participants)
- Findings:
  - Most people reported drinking less (23 grams of alcohol or 1.6 standard drinks) if they received advice about alcohol from a computer or mobile device compared to people who did not get this advice (studies were moderate quality) (Effect diminished over time)
  - Not enough data to differentiate the efficacy of computers, telephone or internet advice, but trusted virtual sources such as clinicians were more helpful as were specific recommendations
  - Only 5 studies compared digital advice (computers or mobile) to face to face conversations with doctors and nurses and there were little to no differences detected

Kaner EF, Beyer FR, Garnett C, Crane D, Brown J, Muirhead C, et al. Personalised digital interventions for reducing hazardous and harmful alcohol consumption in community-dwelling populations. Cochrane Database Syst Rev. 2017 Sep 25;2017(9):CD011479.

2017 Cochrane Review of Digital Interventions for Alcohol Versus No Treatment or Face to Face (*Cont.*)

- Behavior change techniques:
  - Most common behavior change techniques were feedback on behavior (85.7%, n = 36), social comparison (81.0%, n = 34), information about social and environmental consequences (71.4%, n = 30) feedback on outcomes of behavior (69.0%, n = 29) and social support (64.3%, n = 27)
  - Interventions had an average 9 behavior change techniques with the most effective being (in an adjusted model): behavior substitution, problem solving and credible source
  - Behavior change techniques we use in traditionally use not in these studies (Self-monitoring, goal setting and review of behavioral/outcome goals have great efficacy)

Kaner EF, Beyer FR, Garnett C, Crane D, Brown J, Muirhead C, et al. Personalised digital interventions for reducing hazardous and harmful alcohol consumption in community-dwelling populations. Cochrane Database Syst Rev. 2017 Sep 25;2017(9):CD011479.

2017 Cochrane Review of Digital Interventions for Alcohol Versus No Treatment or Face to Face (*Cont.*)

- Most common theories cited were Motivational Interviewing Theory (7/20), Transtheoretical Model (6/20) and Social Norms Theory (6/20)
  - Over half of the interventions (21) had no theory mentioned
- No intentionally used theory to guide recruitment
- Take home:
  - From a public health perspective, despite the small effect, with the low cost and wide reach of digital inventions, more research warranted
  - Digital interventions can be considered alongside face-to-face interventions as part of a strategy for addressing hazardous alcohol consumption and there is moderate quality evidence that digital interactions may reduce alcohol use compared to no treatment

Newer (2020) Review of Mobile Apps for Alcohol

- 19 unique apps in 21 studies (11 that were no longer available in app stores)
- 7 were for youth and 12 for adults.
- For young people, efficacy inconclusive with only 2/5 RCTs finding any significant reduction in alcohol consumption
- For adults, 7/12 had reductions in alcohol and 1 had a significant increase
- Take home from authors:
  - Hundreds of alcohol apps available and a few with peer review BUT evidence is underwhelming and in infancy
  - Still, potential in offering some intervention versus no intervention

Colbert S, Thornton L, Richmond R. Smartphone apps for managing alcohol consumption: a literature review. Addict Sci Clin Pract. 2020;15:17.

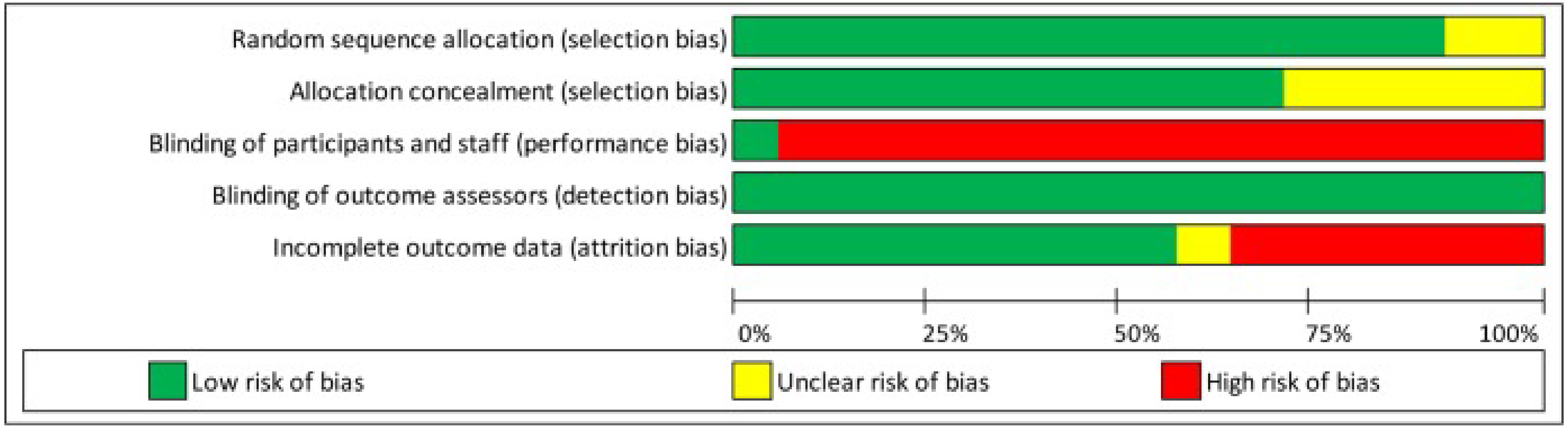
Guided Care with Apps

2018 Review Investigated Internet-Based Alcohol Interventions (iAIs), Guided and Unguided

- Aims:
  - Comment on whether usually underrepresented groups benefit (women and older people)
  - Do varying levels of alcohol use benefit?
  - Are guided or unguided are more effective?
- Individual patient data meta-analysis (IPDMA) with author collaboration
  - Identified 183 papers, 24 of which were eligible, 19 of which chose to participate.
  - 26 comparisons made, 19 of which were for unguided interventions
  - Outcome: standard units (SU) of alcohol use post intervention
    - Secondary outcome of treatment response (drinking 14 SUs [females] or 21 SUs [males]) at varying times of follow up
- Of the 14,198 enrolled participants, 8,095 provided post-intervention data (mean weekly SU baseline=38.1)
- Studies were considered relatively high quality based on Cochrane Collaboration risk-of-bias assessment tool

Riper H, Hoogendoorn A, Cuijpers P, Karyotaki E, Boumparis N, Mira A, et al. Effectiveness and treatment moderators of internet interventions for adult problem drinking: An individual patient data meta-analysis of 19 randomised controlled trials. PLoS Med. 2018 Dec 18;15(12):e1002714.

2018 Review Investigated Internet-Based Alcohol Interventions (iAIs), Guided and Unguided (*Cont.*)



Riper H, Hoogendoorn A, Cuijpers P, Karyotaki E, Boumparis N, Mira A, et al. Effectiveness and treatment moderators of internet interventions for adult problem drinking: An individual patient data meta-analysis of 19 randomised controlled trials. PLoS Med. 2018 Dec 18;15(12):e1002714.

2018 Review Investigated Internet-Based Alcohol Interventions (iAIs), Guided and Unguided (*Cont.*)

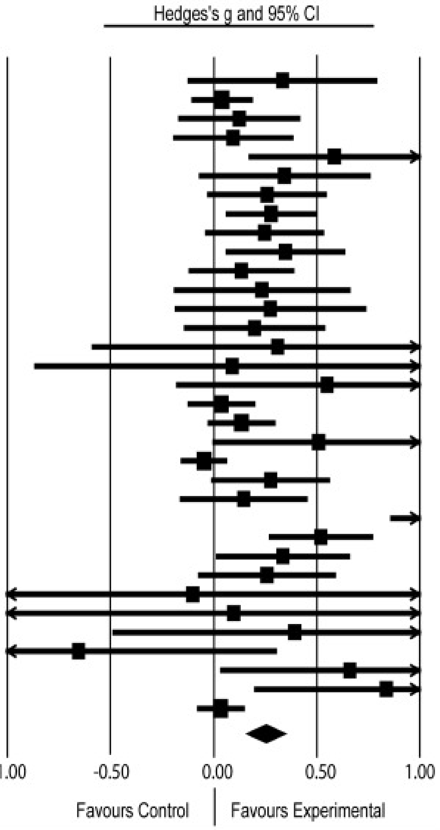
- Controls were largely psychoeducational material, assessment only and waitlist controls (WLC)
- Outcomes
  - Compared to controls, iAI participants had a significant difference in mean weekly alcohol reduction (5 SUs) and treatment response
  - Women had a less robust reduction in drinks than men
  - >55-year-old participants had a better treatment response than those who are younger
  - Guided interventions and therapeutic principal interventions (versus just personalized normative feedback) were also more helpful
  - WLC studies had a greater effect size (may be participants delaying changes in alcohol use)

Riper H, Hoogendoorn A, Cuijpers P, Karyotaki E, Boumparis N, Mira A, et al. Effectiveness and treatment moderators of internet interventions for adult problem drinking: An individual patient data meta-analysis of 19 randomised controlled trials. PLoS Med. 2018 Dec 18;15(12):e1002714.

2018 Review Investigated Internet-Based Alcohol Interventions (iAIs), Guided and Unguided (*Cont.*)

Forest plot of conventional meta-analysis iAi's versus controls

Study name	Outcome	Hedges's g	Standard error	Variance	Lower limit	Upper limit	Z-Value	*p*-Value
Araki 2006	drinks/day	0.336	0.232	0.054	-0.119	0.791	1.448	0.148
Bertholet 2015	drinks/week	0.044	0.074	0.005	-0.101	0.188	0.592	0.554
Bischof 2007a	combined	0.126	0.148	0.022	-0.163	0.415	0.853	0.394
Bischof 2007b	combined	0.097	0.146	0.021	-0.190	0.383	0.660	0.509
Blankers 2011a	drinks/lastweek	0.588	0.211	0.044	0.176	1.001	2.795	0.005
Blankers 2011b	drinks/lastweek	0.346	0.210	0.044	-0.066	0.757	1.647	0.100
Boon 2006	drinks/week	0.261	0.145	0.021	-0.023	0.545	1.800	0.072
Boon 2011	drinks/week	0.281	0.109	0.012	0.067	0.495	2.578	0.010
Boss 2017a	drinks/week	0.249	0.144	0.021	-0.033	0.531	1.728	0.084
Boss 2017b	drinks/week	0.350	0.145	0.021	0.066	0.634	2.419	0.016
Brendryen 2013	drinks/week	0.136	0.128	0.016	-0.114	0.387	1.066	0.286
Brendryen 2017	drinks/week	0.236	0.216	0.047	-0.187	0.659	1.094	0.274
Cunningham 2009	drinks/week	0.277	0.234	0.055	-0.182	0.737	1.182	0.237
Delrahim 2011a	combined	0.200	0.172	0.029	-0.136	0.537	1.167	0.243
Doumas 2008a	drinks/weekend	0.312	0.457	0.209	-0.584	1.208	0.683	0.495
Doumas 2008b	drinks/week	0.092	0.487	0.238	-0.863	1.048	0.189	0.850
Fingfeld 2008	drinks/day	0.552	0.370	0.137	-0.174	1.277	1.491	0.136
Hansen 2012a	drinks/week	0.040	0.081	0.007	-0.119	0.200	0.496	0.620
Hansen 2012b	drinks/week	0.137	0.081	0.007	-0.021	0.295	1.696	0.090
Hester 2005	drinks/day	0.511	0.260	0.067	0.002	1.020	1.966	0.049
Khadjesari 2014	drinks/week	-0.044	0.055	0.003	-0.152	0.063	-0.804	0.421
Pemberton 2011a	combined	0.279	0.144	0.021	-0.005	0.562	1.929	0.054
Pemberton 2011b	combined	0.148	0.155	0.024	-0.156	0.452	0.956	0.339
Postel 2010	drinks/week	1.204	0.173	0.030	0.864	1.543	6.945	0.000
Riper 2008	drinks/week	0.522	0.126	0.016	0.275	0.769	4.143	0.000
Schultz 2013b	drinks/week	0.337	0.163	0.027	0.018	0.657	2.070	0.038
Schulz 2013a	drinks/week	0.260	0.168	0.028	-0.069	0.589	1.548	0.122
Sinadovic 2014a	drinks/week	-0.100	2.005	4.021	-4.030	3.831	-0.050	0.960
Sinadovic 2014b	drinks/week	0.100	2.005	4.021	-3.831	4.030	0.050	0.960
Suffoletto 2012a	drinks/drinkday	0.395	0.449	0.201	-0.484	1.274	0.881	0.378
Suffoletto 2012b	drinks/drinkday	-0.654	0.488	0.239	-1.611	0.304	-1.338	0.181
Sundstrom 2016a	drinks/week	0.663	0.319	0.102	0.038	1.288	2.080	0.038
Sundstrom 2016b	drinks/week	0.840	0.324	0.105	0.205	1.474	2.593	0.010
Wallace 2011	drinks/week	0.036	0.056	0.003	-0.074	0.146	0.641	0.521
		0.257	0.045	0.002	0.169	0.345	5.711	0.000



- Meta-analysis: Small significant difference in mean weekly SUs at the first follow-up in favor of iAI participants (Hedges' g = 0.26, 95% CI 0.17–0.34, p < 0.001).
- Take home:
  - IPDMA method provided greater power and some insights into how iAI can be a helpful first step for many people.
  - Not all treatment participants benefited from iAIs, so more research is needed to understand which people such interventions work for and in what contexts

Riper H, Hoogendoorn A, Cuijpers P, Karyotaki E, Boumparis N, Mira A, et al. Effectiveness and treatment moderators of internet interventions for adult problem drinking: An individual patient data meta-analysis of 19 randomised controlled trials. PLoS Med. 2018 Dec 18;15(12):e1002714.

2018 Review and Meta-analysis of 30 Studies for Cannabis

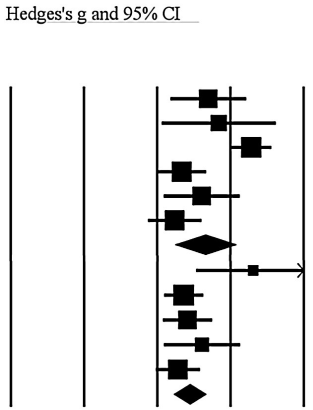
- Studies:
  - 10 prevention- 4 guided/6 unguided (comparison either prevention as usual or assessment only)
  - 20 treatment- 8 guided/12 unguided (comparison largely education and assessment only)
  - 21 for the meta-analysis (6 prevention and 15 treatment)
- Quality of studies was low based on the Cochrane risk-of-bias tool
- Outcomes:
  - Prevention programs: Associated with reduction in cannabis use at post treatment and follow up (Image 1)
  - Treatment programs were mildly significant at post treatment but not at follow up (Image 2)

Boumparis N, Loheide-Niesmann L, Blankers M, Ebert DD, Korf D, Schaub MP, et al. Short- and long-term effects of digital prevention and treatment interventions for cannabis use reduction: A systematic review and meta-analysis. Drug Alcohol Depend. 2019 Jul 1;200:82–94.

2018 Review and Meta-Analysis of 30 Studies for Cannabis *(Cont.)*

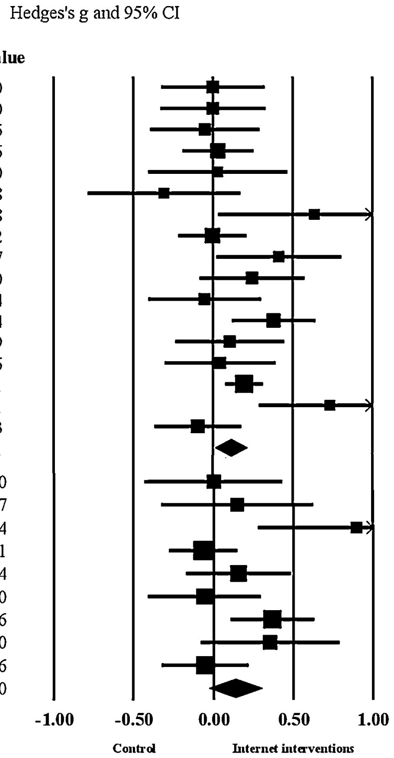
Study name	Assessment	Hedges's g	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Elliot, 2012	Post-treatment	0.349	0.130	0.017	0.094	0.604	2.682	0.007
Fang, 2010	Post-treatment	0.421	0.197	0.039	0.035	0.807	2.135	0.033
Schinke, 2009a	Post-treatment	0.643	0.068	0.005	0.510	0.776	9.495	0.000
Schinke, 2009b	Post-treatment	0.168	0.083	0.007	0.005	0.331	2.016	0.044
Schwinn, 2010	Post-treatment	0.304	0.131	0.017	0.048	0.560	2.329	0.020
Walton, 2014	Post-treatment	0.120	0.091	0.008	-0.060	0.299	1.310	0.190
	POOLED	0.332	0.105	0.011	0.127	0.537	3.175	0.001
Fang, 2010	Follow-up	0.655	0.198	0.039	0.268	1.042	3.314	0.001
Schinke, 2009a	Follow-up	0.180	0.066	0.004	0.050	0.310	2.718	0.007
Schinke, 2009b	Follow-up	0.206	0.084	0.007	0.041	0.371	2.453	0.014
Schwinn, 2010	Follow-up	0.305	0.131	0.017	0.048	0.562	2.329	0.020
Walton, 2014	Follow-up	0.140	0.075	0.006	-0.007	0.287	1.861	0.063
	POOLED	0.224	0.055	0.003	0.116	0.332	4.071	0.000

Statistics for each study



Study name	Assessment	Hedges's g	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Becker, 2014a	Post-treatment	0.000	0.164	0.027	-0.321	0.321	0.000	1.000
Becker, 2014b	Post-treatment	0.000	0.167	0.028	-0.327	0.327	0.000	1.000
Christoff, 2015	Post-treatment	-0.050	0.174	0.030	-0.390	0.291	-0.286	0.775
Elliot, 2014	Post-treatment	0.032	0.112	0.013	-0.188	0.252	0.284	0.776
Gryczynski, 2016	Post-treatment	0.031	0.221	0.049	-0.403	0.465	0.139	0.890
Jonas, 2012	Post-treatment	-0.306	0.243	0.059	-0.782	0.170	-1.260	0.208
Kay-Lambkin, 2009	Post-treatment	0.637	0.307	0.094	0.035	1.240	2.074	0.038
Lee, 2010	Post-treatment	-0.002	0.108	0.012	-0.214	0.209	-0.023	0.982
Ondersma, 2007	Post-treatment	0.414	0.199	0.040	0.024	0.804	2.081	0.037
Ondersma, 2014	Post-treatment	0.246	0.167	0.028	-0.081	0.574	1.475	0.140
Palfai, 2014	Post-treatment	-0.052	0.179	0.032	-0.403	0.300	-0.288	0.774
Rooke, 2013	Post-treatment	0.382	0.133	0.018	0.121	0.642	2.875	0.004
Schaub, 2015a	Post-treatment	0.106	0.173	0.030	-0.233	0.446	0.614	0.539
Schaub, 2015b	Post-treatment	0.046	0.176	0.031	-0.300	0.391	0.258	0.796
Tossman, 2011	Post-treatment	0.196	0.059	0.004	0.080	0.312	3.315	0.001
Towe, 2014	Post-treatment	0.735	0.226	0.051	0.292	1.178	3.249	0.001
Walton, 2013	Post-treatment	-0.094	0.138	0.019	-0.364	0.176	-0.685	0.493
	POOLED	0.116	0.050	0.003	0.017	0.215	2.301	0.021
Gryczynski, 2016	Follow-up	0.000	0.221	0.049	-0.434	0.434	0.000	1.000
Jonas, 2012	Follow-up	0.146	0.242	0.058	-0.328	0.620	0.603	0.547
Kay-Lambkin, 2009	Follow-up	0.895	0.315	0.099	0.278	1.511	2.844	0.004
Lee, 2010	Follow-up	-0.068	0.108	0.012	-0.280	0.144	-0.627	0.531
Ondersma, 2014	Follow-up	0.154	0.167	0.028	-0.172	0.481	0.927	0.354
Palfai, 2014	Follow-up	-0.060	0.179	0.032	-0.411	0.292	-0.332	0.740
Rooke, 2013	Follow-up	0.367	0.133	0.018	0.107	0.627	2.766	0.006
Towe, 2014	Follow-up	0.353	0.221	0.049	-0.079	0.785	1.600	0.110
Walton, 2013	Follow-up	-0.056	0.138	0.019	-0.326	0.214	-0.404	0.686
	POOLED	0.138	0.084	0.007	-0.027	0.303	1.644	0.100

Statistics for each study



Boumparis N, Loheide-Niesmann L, Blankers M, Ebert DD, Korf D, Schaub MP, et al. Short- and long-term effects of digital prevention and treatment interventions for cannabis use reduction: A systematic review and meta-analysis. Drug Alcohol Depend. 2019 Jul 1;200:82–94.

2018 Review and Meta-analysis of 30 Studies for Cannabis *(Cont.)*

- Outcomes (continued):
  - Subgroup analyses did not show significant differences between groups like number of sessions, recruitment strategy/location, guided/unguided, intervention type
  - Trends support multi-session interventions, such as those combining CBT with MI
- Take home
  - While quality effect sizes are low, because of the impact on prevention and potentially reaching a large number of people, there is promise.
  - Need more research with randomization/blinding

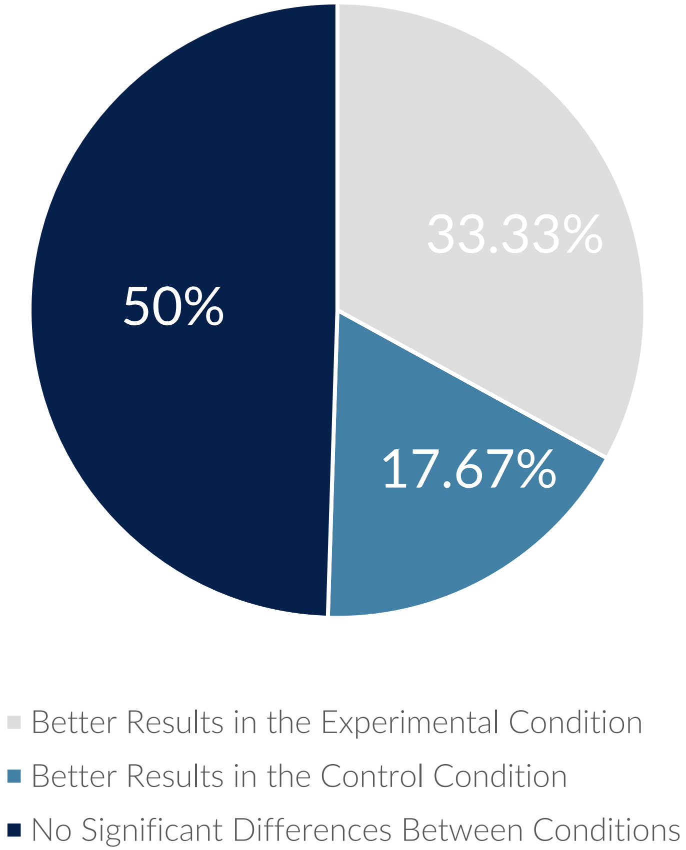
Boumparis N, Loheide-Niesmann L, Blankers M, Ebert DD, Korf D, Schaub MP, et al. Short- and long-term effects of digital prevention and treatment interventions for cannabis use reduction: A systematic review and meta-analysis. Drug Alcohol Depend. 2019 Jul 1;200:82–94.

2017 Systematic Review of 17 Studies Internet Interventions for Illicit Drug Use

- Compare to TAU, MI, brief intervention or psychoeducation
- 9 added to guided care
- Approaches included CRA largely for opioids, and CBT for stimulants
- Effect of intervention was mildly significant (Hedge's g =0.301, $p<0.001$). (No benefit for stimulant)
- More effective:
  - Guided interventions
  - Validated outcomes (toxicology) versus self-report
  - Clinic-based technology was also more effective than school or home.
- Take home: Effectiveness was small but promising and more research is needed

Boumparis N, Karyotaki E, Schaub MP, Cuijpers P, Riper H. Internet interventions for adult illicit substance users: a meta-analysis. Addict Abingdon Engl. 2017 Sep;112(9):1521–32.

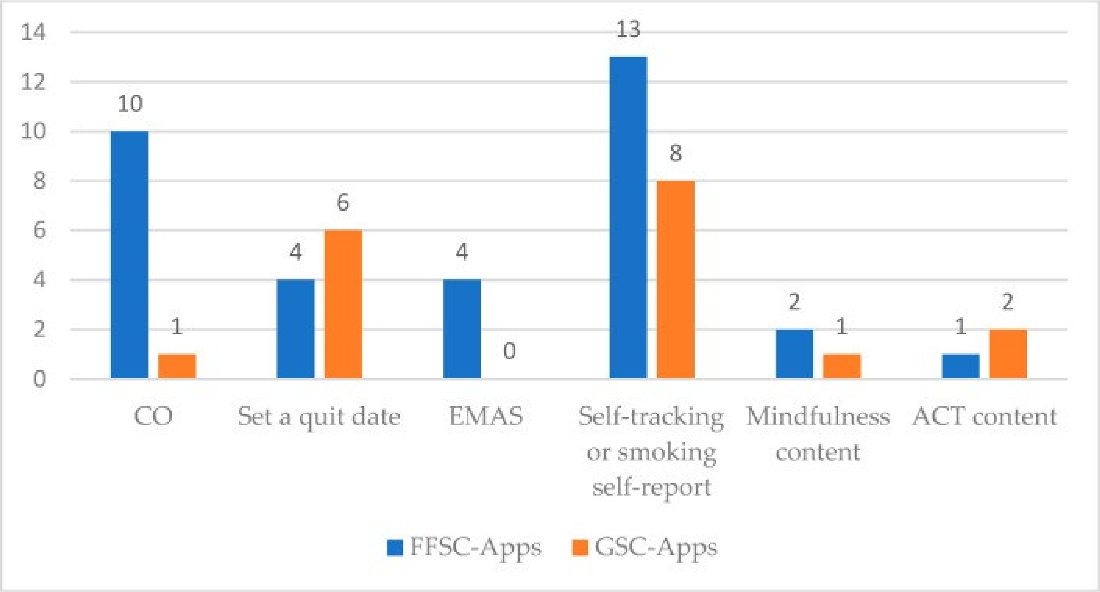
2021 Review of Smoking Cessation Apps (Some Guided)



- Initial scope: 6016 studies → narrowing to 24 apps
- Only 8 studies reported significant differences between treatment and other intervention
- Only 6 were considered high quality studies (image shows their outcomes)
- Some apps were just as effective as the control groups (self-help material, text messaging service, before/after)

Barroso-Hurtado M, Suárez-Castro D, Martínez-Vispo C, Becoña E, López-Durán A. Smoking Cessation Apps: A Systematic Review of Format, Outcomes, and Features. Int J Environ Res Public Health. 2021 Nov 6;18(21):11664.

2021 Review of Smoking Cessation Apps (Some Guided, *Cont.*)



- Most studies did not describe their apps well, mentioned in several other reviews; authors extracted data in image
- 7 of the studies targeted more complex groups (dual diagnosis, unhoused)
- Several studies were pilots (small n)
- Take home:
    - Especially for stand-alone apps, opportunity to at least function as good as no intervention since smoking undertreated

Barroso-Hurtado M, Suárez-Castro D, Martínez-Vispo C, Becoña E, López-Durán A. Smoking Cessation Apps: A Systematic Review of Format, Outcomes, and Features. Int J Environ Res Public Health. 2021 Nov 6;18(21):11664.

Not Included in this Presentation

- Not discussed are parallel areas of substance use disorders
- Examples:
  - Pain management
  - Overdose surveillance through technology

Technology to Deliver Standard Care Like Telemedicine

Telemedicine

- Prior to the pandemic from the VHA showed that tele-buprenorphine increased and later that treatment discontinuation from buprenorphine was lower for the telemedicine group
- COVID-19:
  - Prior to the pandemic, less than 1% of mental health and SUD outpatient care was via telehealth based on national data
  - Increased to 40% of mental health and substance use outpatient visits and 11% of other visits (during the March- August 2020 period)

Lin LA, Fortney JC, Bohnert ASB, Coughlin LN, Zhang L, Piette JD. Comparing telemedicine to in-person buprenorphine treatment in U.S. veterans with opioid use disorder. J Subst Abuse Treat. 2022 Feb;133:108492.

Vakkalanka JP, Lund BC, Ward MM, Arndt S, Field RW, Charlton M, et al. Telehealth Utilization Is Associated with Lower Risk of Discontinuation of Buprenorphine: a Retrospective Cohort Study of US Veterans. J Gen Intern Med. 2022 May;37(7):1610–8.

Lo J, Panchal N, Mar 15 BFMP, 2022. Telehealth Has Played an Outsized Role Meeting Mental Health Needs During the COVID-19 Pandemic [Internet]. KFF. 2022 [cited 2022 Aug 11]. Available from: https://www.kff.org/coronavirus-covid-19/issue-brief/telehealth-has-played-an-outsized-role-meeting-mental-health-needs-during-the-covid-19-pandemic/

Telemedicine

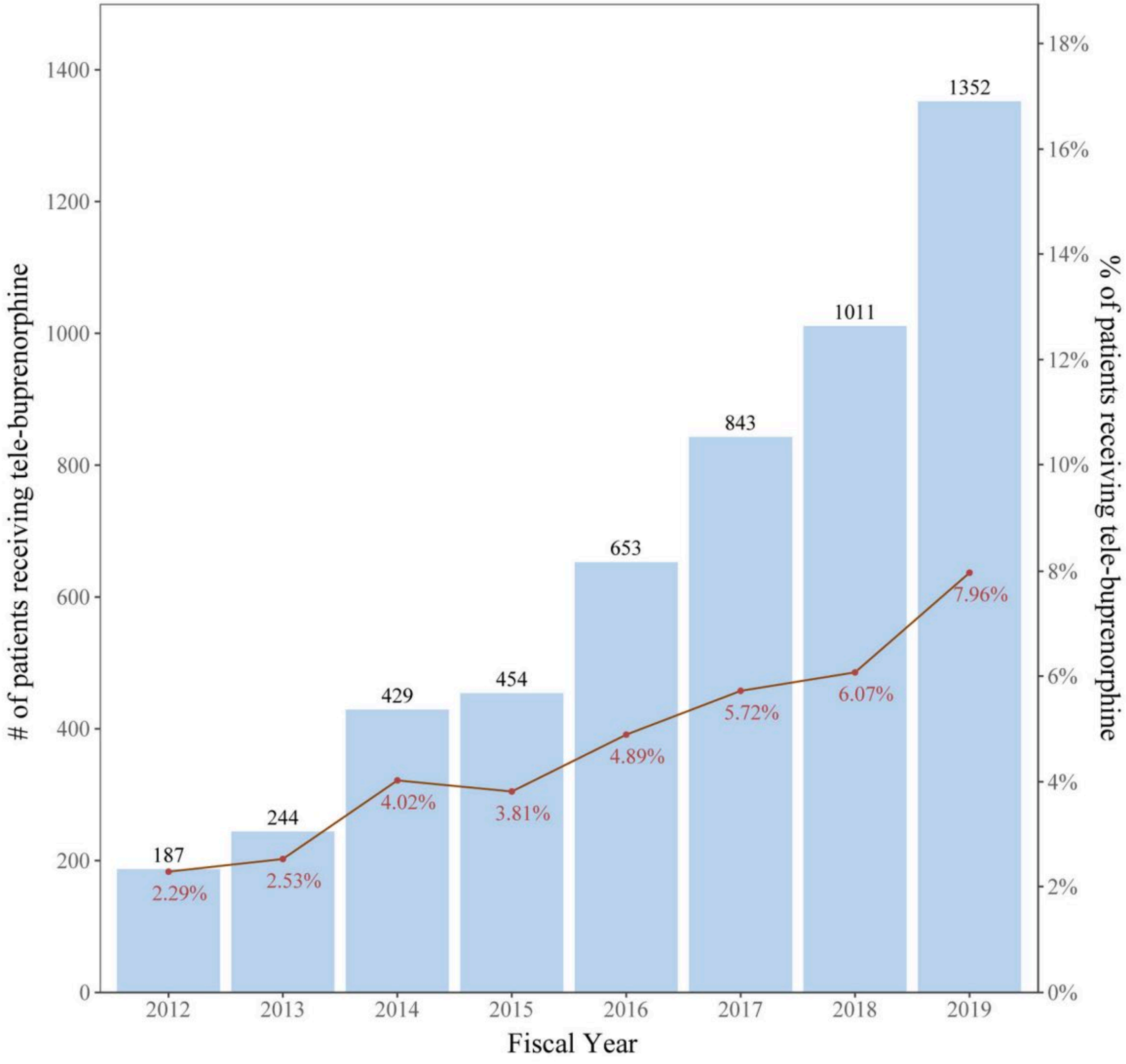
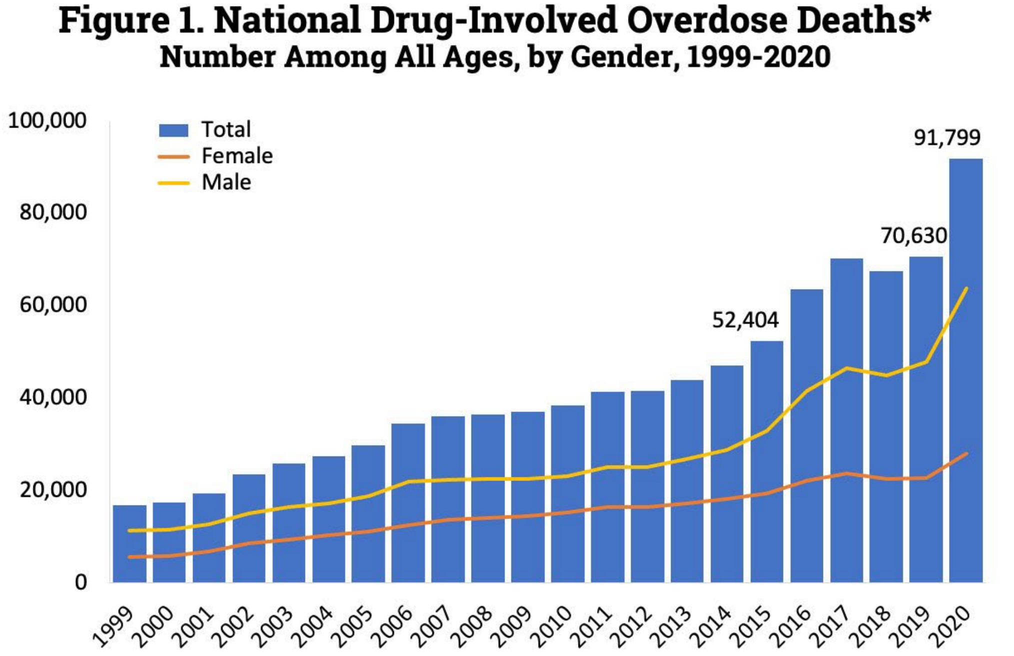


Figure 1.
Trends in patients receiving tele-buprenorphine for opioid use disorder in the VHA.

Federal Restrictions on MOUD Were Present During the Pandemic



*Includes deaths with underlying causes of unintentional drug poisoning (X40–X44), suicide drug poisoning (X60–X64), homicide drug poisoning (X85), or drug poisoning of undetermined intent (Y10–Y14), as coded in the International Classification of Diseases, 10th Revision. Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2020 on CDC WONDER Online Database, released 12/2021.

- SAMHSA granting flexibility for OTPs with 28-day supply of take-homes (14 days for less stable patients)
- DEA waived the in-person requirement for buprenorphine via telemedicine
- Unfortunately, despite all of this, from 2019 to 2020, overdose rates increased by 30% and again by 15% in 2021

Review of 25 Innovation Studies on Treating OUD During COVID-19

- 16 studies included telemedicine as an innovation
  - Basic video or phone sessions for care
  - Distributing phones to help patient with limited access
  - Building sanitized phone booths
- Naloxone education online
  - Text messaging to connect to young people
  - Virtual groups
- On take-home dosing increasing
  - Variation in use of those relaxed regulations
- Other challenges have to do with technology access, toxicology testing

Krawczyk N, Fawole A, Yang J, Tofighi B. Early innovations in opioid use disorder treatment and harm reduction during the COVID-19 pandemic: a scoping review. Addict Sci Clin Pract. 2021;16:68.

ATA and APA Best Practices for Video Telehealth

- Recommendations from administrative issues, legal and regulatory, emergencies, technical considerations, clinical considerations and special populations (e.g., child/adolescent)
- For SUD specifically they review assessment, testing and subsequent visits
  - Buprenorphine prescribing
- Acknowledge that telehealth reimbursement is a topic to consider when there are parity discussions
- Regardless of regulatory changes (for example SAMHSA proposed rule) telehealth is expanding and all health care providers must be versed in the delivery

Shore JH, Yellowlees P, Caudill R, Johnston B, Turvey C, Mishkind M, et al. Best Practices in Videoconferencing-Based Telemental Health April 2018. Telemed J E-Health Off J Am Telemed Assoc. 2018 Nov;24(11):827–32.

2019 Review of Telemedicine for SUD (Medications and Therapy)

- 13 publications about 12 studies, including 7 RCTs
- Tobacco (n=3 therapy+meds), alcohol (n=5 and therapy only) and opioid (n=5 therapy+methadone or buprenorphine)
- Studies with comparison groups didn't find differences in outcomes compared to in person or phone or usual care
  - But noticeable effects on retention
  - AND high satisfaction with telemedicine
- Based on results, reviewers cannot recommend telemedicine over conventional treatments, but in resource strained places where evidence-based treatments are not readily available, telemedicine is promising

Lin LA, Casteel D, Shigekawa E, Weyrich MS, Roby DH, McMenamin SB. Telemedicine-delivered treatment interventions for substance use disorders: A systematic review. J Subst Abuse Treat. 2019 Jun;101:38–49.

Emerging Areas

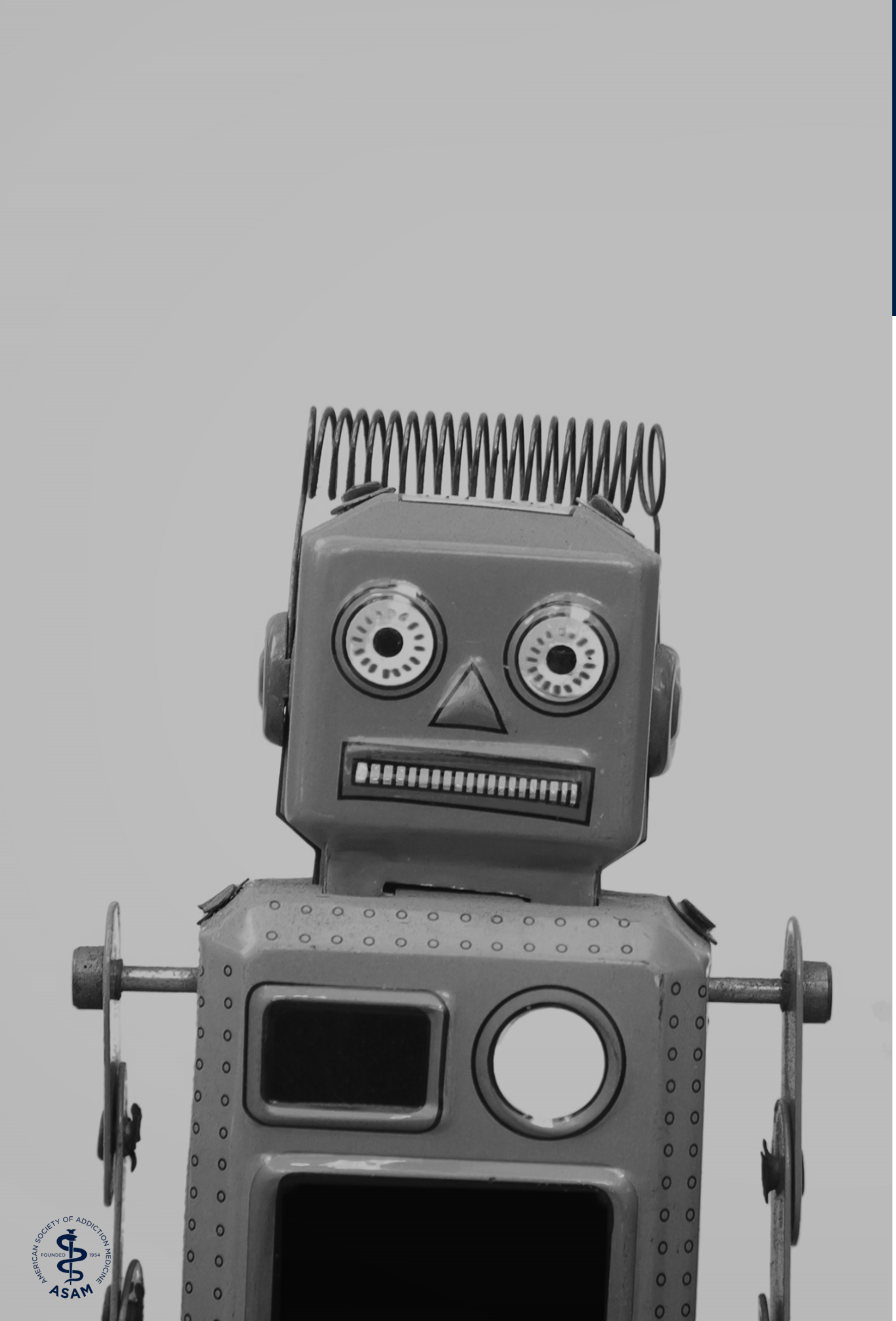
Social Media
Chatbots
Peer Support/Groups
Wearables
Virtual Reality

Social Media

- Often cited as a negative influence on mental health, it can do good from a survey of hazardous drinking adults who use social media
  - Exposure to peer pro-drinking posts was negatively associated with intentions to seek treatment
  - Exposure to peer alcohol-related negative consequences posts AND peer posts about positive experiences with treatment/recovery were positively associated with treatment-seeking intention
- TikTok is a platform of brief videos by user and has potential for wide reach
  - Study examined 82 of the most liked TikTok videos related to attempts to cut down on or abstain from substances and/or strengthen SUD recovery
  - Videos had 2 million views and 325,000 “likes” on average;
  - Shared themes of a journey from active SUD to recovery, recovery milestones and relapses

Social Media *(Cont.)*

- 2018 review on social media interventions for smoking cessation identified seven studies between 2014 and 2018 (n=9755) using Facebook (n=4) and Twitter (n=2)
  - Tailored content, targeted reminders and moderated discussions
  - Often treatment groups smoked less at follow up
  - Active participation (comments, likes) associated with improved outcomes
  - Retention in the studies range from 35% to 84% in one month to one-year studies
- Still need future rigorous trials are necessary to establish effectiveness, evaluate the costs/ sustainability of these programs, and determine whether these programs can reach vulnerable populations who smoke more



Chatbots

- Chatbot: software or hardware that can converse with users without a human facilitator using machine learning and artificial intelligence
- Bots tend to provide warm and friendly messages based on user, similar to reflections in motivational interviewing
- 2019 QUALITATIVE review describes 14 early chatbots in mental health
  - None for SUD
  - One focused on healthy lifestyle in women (n=61) which did help users significantly decrease alcohol consumption
- Research has not been sufficient for review data

Vaidyam AN, Wisniewski H, Halamka JD, Kashavan MS, Torous JB. Chatbots and Conversational Agents in Mental Health: A Review of the Psychiatric Landscape. Can J Psychiatry Rev Can Psychiatr. 2019 Jul;64(7):456–64.

Digital Peer Support

- Cochrane Review demonstrated TSF was more effective than other established treatments, such as CBT, for increasing abstinence (2020)
- Digital options in pandemic grew
- May be more challenging to complete elements of TSF (finding a sponsor, disclosure, picking up on cues) via video
- Challenges around access to technology and privacy, especially for groups that have "anonymity”

Bergman BG, Kelly JF. Online digital recovery support services: An overview of the science and their potential to help individuals with substance use disorder during COVID-19 and beyond. J Subst Abuse Treat. 2021 Jan;120:108152.

Digital Peer Support *(Cont.)*

- A summary of early guidance on virtual peer support notes organizations with compiled lists of free, social-online links with include, but are not limited to (reference below):
  - The Grayken Center for Addiction at the Boston Medical Center (https://www.bmc.org/addiction/covid-19-recovery-resources)
  - The American Society of Addiction Medicine (https://www.asam.org/Quality-Science/covid-19-coronavirus/support-group)
  - The National Institute on Drug Abuse (https://www-drugabuse-gov /related-topics/covid-19-resources)
  - Google's Recover Together (https://recovertogether.withgoogle.com/)
  - The Recovery Research Institute (https://www.recoveryanswers.org/media/digital-recovery-support-online-and-mobile-resources/)
- (Area with little research is aftercare and IOP via telemedicine)

Bergman BG, Kelly JF. Online digital recovery support services: An overview of the science and their potential to help individuals with substance use disorder during COVID-19 and beyond. J Subst Abuse Treat. 2021 Jan;120:108152.

Wearables and Tracking

- Systematic review of 32 studies on transdermal alcohol sensors (like SCRAM)
  - Found lack of consistency with respect to accuracy
  - Comparisons were not possible due to flaws in the studies
- Mobile phone for digital phenotyping (AKA behavioral sensing)
  - Use passively collected, real-time data from a mobile phone (e.g., GPS tracking, social patterns, typing patterns)
  - Inform assessment, predict changes in clinical status, and deliver on-demand interventions
  - Can help with relapse prevention and intervention (for example when a person is close to a triggering location like bar), or detect relapse, for example with a smartwatch detecting heart rate, detect overdose risk and more

Brobbin E, Deluca P, Hemrage S, Drummond C. Accuracy of Wearable Transdermal Alcohol Sensors: Systematic Review. J Med Internet Res. 2022 Apr 14;24(4):e35178.
Mohr DC, Shilton K, Hotopf M. Digital phenotyping, behavioral sensing, or personal sensing: names and transparency in the digital age. NPJ Digit Med. 2020;3:45.

Virtual Reality

- Computer-generated simulation of a three-dimensional environment using social equipment such as head mounted displaces (HMD)
- Exposure therapy is foundation and in SUD, show trigger and work to not using
- 2021 systematic review of 19 studies
  - Treatment studies: Participants were exposed to cues like a lighter or a cigarette in a typical virtual environment like a café with visual, auditory, olfactory, haptic stimuli
  - Craving outcome: 4 found null results, 2 reported negative results, 5 found reduction in craving
  - Use outcome: 6 reported reductions, 2 found no change, 2 found increased use and 1 was mixed.
  - Low quality
  - Conclusion: Future research should correct methodological shortcomings of existing studies through scientific rigor, including better pre-registered outcomes, investigating severity of SUD, accounting for multiple interventions and testing in representative clinical populations.
- VR is too early for widespread clinical implementation.
- Adjacent area is gamification which needs more research

Summary

- As noted, presentation attempted to capture the current transitory state of the field.
- Next 5-10 years will yield future reviews and evidence.
- We must still use evidence based and proven methods while approaching technology with cautious optimism.

Q&A

Integrating Digital Approaches for SUD Treatment into Practice

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Use Case Example

32-year-old female with a 5-year history of opioid use disorder recently started on sublingual buprenorphine-naloxone. She attends your clinic to access Medication for Opioid Use Disorder and occasionally attends a Narcotics Anonymous meeting in her community.

- Medication +
- Cognitive Behavioral Therapy +
- Community Reinforcement Approach

Pairing skills training to encourage behavioral change with non-drug incentives that reinforce positive behaviors.

Ethics, Safety, and Data Privacy

- Standards
- FDA
- Personal Health Information

Industry Core Principles of Digital Therapeutics

- Prevent, manage, or treat a medical disorder or disease.
- Produce a medical intervention that is driven by software.
- Incorporate design, manufacture, and quality best practices
- Engage end users in product development and usability processes
- Incorporate patient privacy and security protections
- Apply product deployment, management, and maintenance best practices.
- Publish trial results inclusive of clinically-meaningful outcomes in peer-reviewed journals.
- Be reviewed and cleared or certified by regulatory bodies as required to support product claims of risk, efficacy, and intended use.
- Make claims appropriate to clinical evaluation and regulatory status.
- Collect, analyze, and apply real world evidence and/or product performance data.

Source: Digital Therapeutics Alliance
https://dtxalliance.org/understanding-dtx/what-is-a-dtx/#understand

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In a few words, please share the barriers you have encountered or expect to encounter while integrating digital approaches in SUD treatment.

Barriers & Considerations

- Insurance coverage
- Regulation
- FDA Approval for Prescription Digital Therapeutics
- Payers
- Coding
- Organizational adoption and workflows

Q&A

ASAM is committed to providing ongoing education and resources on digital approaches for substance use disorders, including advanced and specialized topics. We encourage you to stay informed and to visit our website regularly for information on upcoming webinars, courses, and other educational resources.