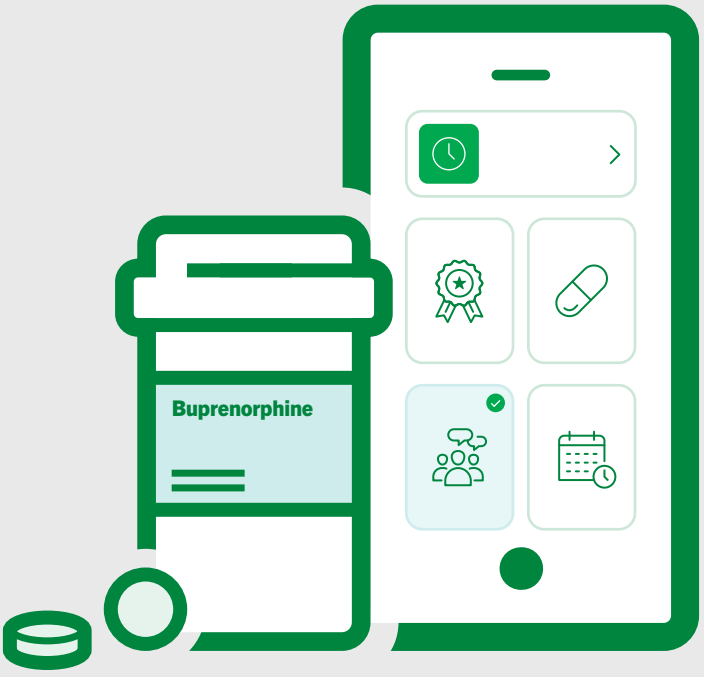
PETERSON HEALTH TECHNOLOGY INSTITUTE

Virtual Opioid Use Disorder Solutions

HEALTH TECHNOLOGY ASSESSMENT | SEPTEMBER 2025



PHTI.org

About This Report

The Peterson Health Technology Institute (PHTI) provides independent evaluations of innovative healthcare technologies to improve health and lower costs.

Through its rigorous, evidence-based research, PHTI analyzes the clinical benefits and economic impact of digital health solutions. These evaluations inform decisions for providers, patients, health plans, and investors, accelerating the adoption of high-value technology in healthcare.

PHTI focuses on health technologies designed to replace or augment traditional care delivery, including digital therapeutics, chronic care management apps, and remote patient monitoring technologies.

PHTI selects assessment topics based on the:

- Burden of disease to the healthcare system;
- Investment and innovation in the digital health technology;
- Body of evidence about the effectiveness of the technology; and
- Stakeholder interest (purchasers, providers, and patients).

PHTI assessments evaluate evidence of the clinical and economic impact of these technologies using the ICER-PHTI Assessment Framework for Digital Health Technologies, which was designed by a team of experts specifically for digital health products and solutions. This is a secondary research review that relies on published literature and information, as well as proprietary data submitted directly from companies. PHTI did not conduct original testing of the products. All companies included in this report were notified and given an opportunity to submit clinical, commercial, and economic data, which were included in the evaluation if eligible.

The economic models used in this report are intended to compare clinical outcomes and expected costs at the population level. Model results represent average findings and should not be presumed to represent cost or outcomes for any specific patient or payer.

The findings and recommendations contained within this report represent the opinions of PHTI based on the information considered in this assessment. The findings are current as of the date of publication. Readers should be aware that new evidence may emerge following the publication of this report that could influence the results. Opioid use disorder (OUD) solutions are likely to evolve over time, which may impact their performance. PHTI may revisit its analyses in updates to this report in the future.

The Peterson Health Technology Institute

PHTI was founded in 2023 by the Peterson Center on Healthcare, a nonprofit organization dedicated to making higher-quality, more affordable healthcare a reality for all Americans. PHTI and the Center are wholly owned subsidiaries of, and are funded entirely by, the Peter G. Peterson Foundation. PHTI does not accept financial contributions.

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Letter From the Executive Director

Opioid use disorder (OUD) is a public health crisis that continues to afflict this country. Access to buprenorphine-based treatment has improved outcomes, and broad dissemination of Naloxone has begun to reduce deaths from overdose; however, opioid addiction continues to claim too many lives and disrupt families, communities, and workplaces.

Today, only one in four Americans who need it receive best-in-class OUD treatment that includes lifesaving medications. Moreover, these treatment programs have dishearteningly poor retention rates, with patients suffering from frequent relapses and lengthy recovery journeys.

The solutions assessed in this report represent a first generation of virtual OUD treatment programs—which fully leverage telehealth and digital support services—with an aim to improve access to care and keep patients in treatment longer. Medication-based solutions that allow patients to get their prescriptions virtually and reduce or eliminate the need for in-person visits can improve convenience, reduce stigma, and extend care to communities that lack treatment providers. Digital wraparound solutions enhance other treatments with digital therapy options and programs that reward patients for adhering to treatment.

The results show that these programs are a step in the right direction, but the magnitude of their benefit is unsatisfying. We find that virtual OUD solutions are as effective as in-person treatment options, but they only slightly extend treatment retention—by 13 days over six months. Despite added availability and convenience of care, most solutions are not achieving measurable improvements in expanding the number of previously untreated patients receiving medication-based care.

To realize the potential of virtual OUD care, digital health companies must continue innovating to deliver better clinical outcomes and more evidence about which approaches work best for which patients. State and local officials can improve access by using opioid settlement funds to pay for evidence-based treatment, including virtual solutions. Policymakers should modernize teleprescribing and licensure rules to enable these programs to expand into underserved areas. Finally, providers and payers must prioritize efforts to bring more untreated patients into treatment, and keep them in treatment longer.

As a country, we cannot be satisfied with small improvements in outcomes that fall far short of the gains needed to reverse the devastating effects of the opioid epidemic. Digital solutions show promise, and some are ready to be scaled. To address the challenge of opioid abuse, however, it will take a comprehensive strategy that goes far beyond technology—one that dramatically expands access to evidence-based medication treatment, addresses the barriers that prevent so many people from receiving lifesaving care, and treats this medical condition with the same systematic approach and resource commitment brought to other chronic diseases affecting millions of Americans.

Sincerely,

Caroline Pearson, Executive Director
Peterson Health Technology Institute

Report Contributors and Reviewers

PHTI partners with a diverse set of contributors, advisors, and stakeholders. Those who directly contributed to this report are listed below. See our website for a full list of partners and advisors, including our Advisory Board and Purchaser Advisory Council, who offer general guidance but do not participate in the assessment process.

Clinical Advisors

The following clinical advisors provided expertise about usual clinical care for opioid use disorder solutions, and primary and secondary health outcomes. The clinical advisors have no conflicts of interest with respect to this assessment.

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Evaluation Partners

The following independent evaluation partners contributed to this report. The evaluation partners have no conflicts of interest with respect to this assessment.

- Curta assessed the clinical and economic impact of these technologies, including a systematic literature review and budget impact assessment, using the ICER-PHTI Assessment Framework.
- Charm Economics developed insight into how different technologies work, what they cost to deliver, and their impact on patients and purchasers.
- The Institute for Clinical and Economic Review (ICER) codeveloped the ICER-PHTI Assessment Framework for Digital Health Technologies and reviewed the framework's implementation in this report.

Other Partners

Manatt Health provided consulting, research, and operational support throughout the development of the report.

Patient Perspectives

PHTI collaborated with Savvy Cooperative to conduct patient interviews. PHTI conducted interviews with 10 patients with opioid use disorder who had experience with virtual opioid use disorder solutions. Patients were recruited for diversity across age, gender, race and ethnicity, income level, geography, and insurance type.

Company Submissions

PHTI directly engaged companies included in the report and accepted submissions of public and proprietary information to inform the assessment. PHTI did not conduct any primary analysis of company data. PHTI applied the same standards for minimum evidence requirements and risk of bias reviews to company-submitted information as to all other studies included in the report. Companies did not influence the assessment methods or findings.

Report contributors and reviewers provided important expertise and insight throughout our process. PHTI is solely responsible for the report and its findings.

Executive Summary

Opioid use disorder (OUD) is a significant public health crisis in the United States that results in approximately 80,000 deaths from overdose and $111 billion in direct healthcare costs annually. Despite the proven efficacy of medications for opioid use disorder (MOUD)—including buprenorphine, methadone, and naltrexone—only 25% of adults in need of OUD treatment receive a medication-based intervention. Individuals with OUD face significant barriers to receiving MOUD treatment, including limited provider availability, onerous and fragmented care requirements, medication availability, and societal stigma.

Virtual solutions provide treatment for OUD through a combination of teleprescribing and digital support services. Most platforms offer a suite of services—such as MOUD initiation and titration, drug testing, individual therapy, peer and group support, digital self-guided content, contingency management (CM), and care navigation—designed to improve retention, support recovery, and reduce fragmentation in care.

This evaluation reviews the clinical effectiveness and economic impact of 16 virtual solutions that combine MOUD treatment with digital support services that aim to improve treatment retention and outcomes. There are two broad categories for how these solutions are sold and integrated into MOUD treatment:

1 **Medication-Focused Solutions** provide virtual MOUD prescribing—primarily buprenorphine—with optional support services, such as therapy, peer support, and CM. Medication-focused solutions are generally reimbursed via fee-for-service or bundled models by health plans or Medicaid programs, with some companies also selling to employers.

2 **Digital Wraparound Solutions** are used to enhance MOUD treatment programs by adding support services, such as CM, peer support, care navigation, and educational content. These solutions are primarily purchased by healthcare providers, health plans, and public health agencies.

CATEGORIES OF VIRTUAL OUD SOLUTIONS

Medication-Focused Solutions

- Affect Therapeutics
- Aware Recovery Care
- Better Life Partners
- Bicycle Health
- Boulder Care
- Eleanor Health
- Groups Recover Together
- Ophelia
- Pelago
- PursueCare
- Wayspring
- Workit Health

Digital Wraparound Solutions

- CHESS Health
- DynamiCare Health
- Q2i
- WEconnect Health

PHTI Assessment Approach

This evaluation has two primary components: clinical effectiveness and economic impact. Details on the assessment methodology can be found here.

Clinical Effectiveness: This evaluation reviewed evidence across eight outcome measures, with treatment retention—particularly to buprenorphine-based care—identified as the primary clinical outcome because it is a key proxy for sustained adherence and overdose risk reduction. The systematic literature review identified 43 studies that met inclusion criteria, with study durations ranging from 3–12 months and a mix of patients with Medicaid and commercial coverage. While definitions and measurement approaches for retention varied across studies, improved retention in treatment is associated with better long-term outcomes, and even small gains in this area can be meaningful to patients and purchasers.

The report also examines secondary outcomes, such as abstinence from opioid use, rate of relapse, and attenuation of withdrawal symptoms. The evidence base includes several well-designed studies but is limited by small sample sizes, relatively short follow-up duration given the chronic nature of OUD, potential selection bias, single-site designs, and gaps in generalizability to the broader OUD population.

Economic Impact: The budget impact model estimates annual healthcare savings from improved treatment retention with virtual OUD solutions—based on published literature—and assumes sustained clinical benefits over one year. The model estimates the number of adults with OUD who could be eligible for the virtual solutions, the gross reduction in expected healthcare spending resulting from improved MOUD treatment retention, and the net impact on health system spending once such savings are offset by the cost of the virtual solutions. The budget model does not include the impact on productivity, criminal justice costs, or other spending that falls outside of direct healthcare costs.

Stakeholder Engagement: During the assessment process, PHTI partnered with clinical advisors, experts in health technology assessment, and health economists. PHTI also conducted interviews with patients with OUD who had experience using virtual solutions. All companies included in the report had an opportunity to submit clinical, economic, and other commercial information to inform the assessment; 13 of the 16 companies engaged with PHTI during the assessment process, and 10 submitted evidence.

Clinical Effectiveness

Treatment using MOUD has been shown to be effective whether delivered in person or via telehealth or other virtual care models, and MOUD teleprescribing has become integrated into usual care since the COVID-19 pandemic. As such, PHTI's review of the clinical evidence focuses on comparative evidence examining the impact of adding digital support services to MOUD treatment, regardless of whether that treatment is delivered virtually or in person.

Treatment Retention: Overall, evidence reviewed on treatment retention compared with usual MOUD treatment was mixed. Fourteen comparative studies evaluated treatment retention—measured as number of days retained or the share of patients retained—among patients using virtual OUD solutions with digital engagement features and found retention rates comparable to or slightly higher than those achieved with usual MOUD services. The weighted average increase in retention at six months for patients using virtual OUD solutions was estimated to be 13 days.

There was insufficient evidence to determine whether fully integrated MOUD-focused solutions deliver improved outcomes relative to digital wraparound solutions paired with a separate MOUD provider. There also was not enough evidence to determine the relative benefits of various support services (e.g., CM vs. peer support).

Secondary Outcomes: Evidence reviewed on abstinence and relapse was mixed: While several studies found improved abstinence rates among users of virtual OUD solutions, others found no significant difference compared with usual care, and relapse rates were generally comparable across groups. Across multiple studies, virtual solutions demonstrated strong safety profiles, high patient satisfaction, and positive usability ratings, though engagement typically declined over time, reflecting the difficult chronic and relapsing nature of OUD.

Access to Care: One goal of expanding virtual OUD care is to improve the convenience of care, thereby increasing the number of patients who seek or enroll in treatment. PHTI reviewed the clinical literature and company-submitted information about their patient populations and found no evidence to suggest that these solutions are disproportionately enrolling people newly receiving OUD treatment.

PHTI RATINGS FOR VIRTUAL OPIOID USE DISORDER SOLUTIONS BY CATEGORY

● Positive ● Moderate ● Negative
● Higher Evidence Certainty ○ Lower Evidence Certainty

Category of Solution	Clinical Effectiveness[a]	Economic Impact	Summary Rating[b]
Medication-Focused Affect Therapeutics, Aware Recovery Care, Better Life Partners, Bicycle Health, Boulder Care, Eleanor Health, Groups Recover Together, Ophelia, Pelago, PursueCare, Wayspring, Workit Health	○ **Results:** Comparable or slightly better treatment retention than usual care **Evidence Certainty:** Lower	● Comparable or slight decrease in net spending due to avoided healthcare costs from improved treatment retention	● **May be substituted for usual care** **Given only slight improvement in treatment retention, broader adoption should be focused on previously untreated patients**
Digital Wraparound CHESS Health, DynamiCare Health, Q2i, WEconnect Health	● **Results:** Slightly better treatment retention when added to usual care **Evidence Certainty:** Higher	● Increases net spending because the price of the solution exceeds the avoided healthcare costs from improved treatment retention	● **Greater improvements in treatment retention are needed to justify broader adoption at current solution prices**

Source: PHTI, Virtual Solutions for Opioid Use Disorder, September 2025. See PHTI.org for complete report, methods, and recommendations.

Notes: [a] Not all solutions have clinical data that meet the inclusion standards for this report. [b] Summary rating reflects the combination of clinical and economic results.

Summary Ratings

Medication-Focused Solutions: Based on PHTI's review of the evidence, medication-focused solutions deliver comparable outcomes as usual MOUD treatment, with some evidence suggesting small improvements in retention. This review found no evidence that these solutions improve access to care by increasing the number of patients who are newly entering treatment.

Medication-focused solutions are used as alternatives to usual MOUD treatment and their prices are similar to typical usual care costs. Given the variation in pricing models and outcomes, for most payers, medication-focused solutions result in comparable or slightly lower overall treatment costs for patients with OUD who use them.

Although medication-focused solutions can be more broadly adopted as an alternative to usual MOUD treatment, this review found no evidence that these solutions improve access or materially lower spending relative to usual care.

Digital Wraparound Solutions: Based on PHTI's review of the evidence, digital wraparound solutions slightly improve treatment retention when used to augment MOUD care. Digital wraparound solutions that are provided as adjunct to MOUD treatment are expected to slightly increase annual healthcare spending because solution costs—assumed to be $205 per user per month—outweigh the cost offsets of health benefits from improved retention.

Next Steps

Based on PHTI's review of the evidence, virtual solutions for OUD show promise that they may be able to retain patients in care longer and reduce unnecessary healthcare spending compared with in-person care. However, current evidence about the clinical performance of these solutions suggest they deliver only modest benefits.

Currently, rather than expanding the number of people receiving OUD treatment, virtual solutions are primarily reaching individuals who are already in some form of treatment or would otherwise access in-person care. To help virtual solutions for OUD gain wider adoption by the populations that stand to benefit most, further attention is needed from innovators, purchasers, and policymakers in several key areas.

PHTI's recommendations include:

- **Advance evidence generation** to demonstrate which aspects of virtual OUD solutions are improving treatment retention and for which populations.
- **Expand access** by focusing on patient acquisition and engagement to bring a broader range of patients into MOUD treatment and keep them in treatment longer.
- **Improve care coordination** by integrating virtual OUD solutions more effectively into the healthcare delivery system.
- **Leverage opioid settlement funds** for OUD support services and evidence-based approaches to OUD treatment.
- **Expand the availability and uptake of MOUDs** by promoting comprehensive coverage and addressing access barriers to long-acting formulations such as injectable buprenorphine and naltrexone.
- **Modernize federal and state policy** by finalizing Drug Enforcement Administration (DEA) teleprescribing rules, expanding licensure flexibilities, and investing in rigorous evaluations of digital OUD models and support services tools.

These findings are based on the criteria set forth in the ICER-PHTI Assessment Framework and the currently available evidence. Please see the full PHTI report, appendices, and online data supplement for complete assessment, methods, and recommendations.

The Case for Innovation

More than nine million adults across the United States are diagnosed with opioid use disorder (OUD)[1] and 29% of Americans have someone in their family who has struggled with OUD.[2]

For individual patients, OUD is a chronic, often relapsing disease associated with alterations in brain function and behavior, and characterized by compulsive drug use despite severe physical, psychological, and potentially fatal consequences.[3]

Opioid use plays a role in approximately 80,000 deaths from overdose per year, with the number of opioid-related deaths rising by 67% between 2017 and 2023, before declining in 2024.[4–6] And as the potent, illicitly manufactured synthetic opioid fentanyl has increased its share of the drug supply, OUD has become an even more fatal condition.[7] In addition, the economic burden of OUD is large—estimated at $175 billion annually, including treatment costs and criminal justice spending.[8]

The most effective treatment for OUD involves prescription medications, sometimes in combination with therapy and other psychosocial interventions. Medications for opioid use disorder (MOUD)—methadone, buprenorphine, and naltrexone—represent the gold standard of care, as patients who receive them experience lower overdose rates and better long-term outcomes than those who receive no treatment or non-MOUD approaches.[9] However, despite the demonstrated effectiveness of MOUD treatment, only one-fourth of adults with documented OUD in 2022 received recommended medications.[10] Several barriers contribute to this treatment gap, including patients' reluctance to seek treatment, access challenges, limited insurance coverage, social stigma, fragmented care, and an uncertain and changing policy environment regarding controlled substances and teleprescribing for medications such as buprenorphine.[11] The result is low treatment uptake and unstable retention, with inequities along racial, socioeconomic, and geographic lines.[12]

Virtual solutions for OUD aim to improve retention on MOUD treatment while addressing traditional barriers to care. Some platforms offer direct MOUD prescribing capabilities for buprenorphine and naltrexone, along with digital wraparound services, such as psychotherapy, care coordination, peer support, and educational content. The wraparound components are often optional, in accordance with low-barrier care principles that prioritize keeping patients in MOUD treatment. Other solutions offer only the wraparound services and are designed to enable primary care physicians or other providers to offer a more robust or convenient MOUD treatment program. By integrating multiple components of a MOUD treatment program into a single integrated platform, these virtual solutions aim to reduce the burden on patients of navigating complex care programs.

This report incorporates scientific evidence, company data, and budget impact modeling to answer three fundamental questions: **How well do these virtual OUD solutions work? For whom? And are they worth it?**

> **"The hope for virtual innovations in OUD care is that the increased accessibility** will help patients stay engaged longer, or better yet, bring new patients into treatment. Virtual care is a promising and needed tool in our toolbox."
>
> —Dr. Lewei (Allison) Lin

COMPANIES WITH VIRTUAL OUD SOLUTIONS REVIEWED IN THIS REPORT

Affect Therapeutics | Aware Recovery Care | Better Life Partners | Bicycle Health | Boulder Care | CHESS Health | DynamiCare Health | Eleanor Health | Groups Recover Together | Ophelia | Pelago | PursueCare | Q2i | Wayspring | WEconnect Health | Workit Health

Condition Overview

Opioid use disorder (OUD) is a chronic, relapsing disease of addiction marked by the compulsive use of opioids, despite negative consequences. In the United States, more than nine million adults (3.7% of all adults) have OUD, and 29% of all adults report having a family member who has been impacted by OUD.[13] Opioid use brings a significant risk of overdose, as evidenced by approximately 80,000 opioid-involved deaths from overdose in 2022. And with growing levels of the powerful synthetic opioid fentanyl in the country, deaths from overdose have increased, by 70% since 2017.[14] The expanded availability of naloxone has played a central role in reversing overdoses and decreasing fatality rates in recent years, yet the underlying prevalence of OUD remains significant.[15, 16]

OUD is a biological disease that alters the brain functions involved in reward, stress, and self-regulation.[17] Opioids attach to receptors in the brain that modulate pain, mood, and respiration.[18] The condition is clinically diagnosed when ongoing opioid use leads to compulsive use and causes impairment or distress in different areas of the person's life.[19] Repeated use of opioids can lead to the development of tolerance, requiring escalating doses to achieve the same effect—a cycle that can quickly lead to physical dependence and withdrawal.[20] Opioid-related overdoses occur when the potency or amount of opioid an individual has taken causes respiratory function to slow to life-threatening levels, potentially resulting in hypoxia, brain damage, or death.[21]

OUD carries a significant economic cost. Annual direct healthcare costs for OUD are estimated at $175 billion, with public and private health insurers spending an estimated $111 billion on healthcare services, and broader costs related to criminal justice accounting for $52 billion.[22] The impact of OUD on employers is considerable as well. More than 75% of employers indicate that their businesses have been affected by OUD and more than 30% of employers—particularly in industrial sectors, such as construction, transportation, and material-moving occupations—report feeling unprepared to help employees with OUD.[23]

Patient Demographics and Disparities

While OUD affects all racial and age groups, the prevalence of those meeting OUD criteria is highest among the Black population (4.5%) and among adults aged 35–49 (4.3%; Exhibit 1).[24]

The national average opioid-related mortality rate is approximately 24.0 deaths per 100,000. Geographic variation by state is significant, with opioid-related death rates in 2023 ranging from 4.3 per 100,000 in Nebraska to 71.4 per 100,000 in West Virginia.[25] States with the highest rates are concentrated in the southeastern and northeastern regions, compared with significantly lower rates in many central states.[26]

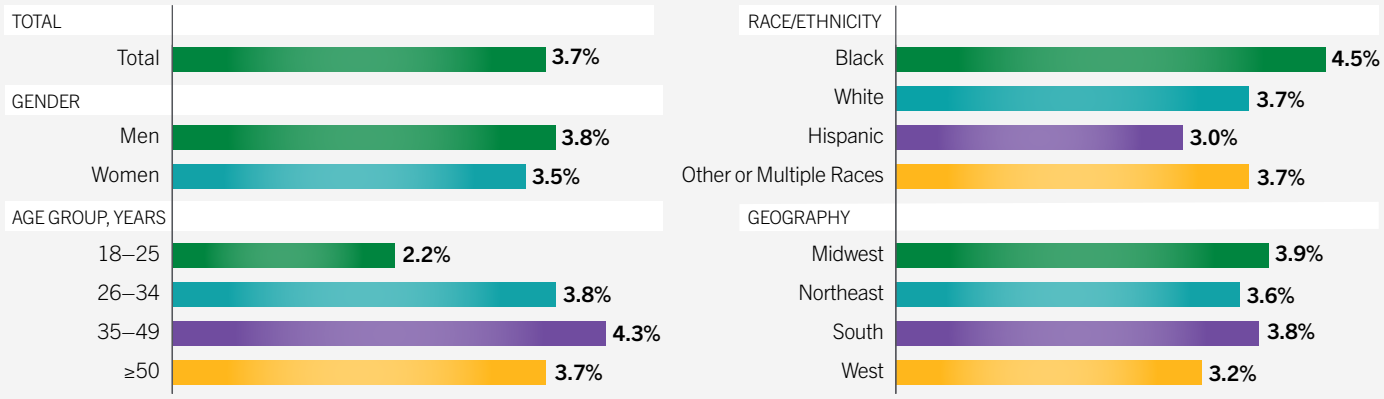
Socioeconomic disparities among those affected by OUD are also prominent. In 2022, only 41% of individuals with OUD were employed and more than half earned less than 200% of the poverty level.[27, 28] These economic challenges are compounded by OUD's broader effects: disrupted employment, strained relationships, legal issues, and social isolation.

The Opioid Crisis

The opioid crisis was declared a public health emergency in 2017 and deaths rapidly grew until 2023.[29] While both evolving patterns of use and new medications such as naloxone have helped to slow deaths from overdose in 2024, the opioid crisis remains a significant public health crisis.[30] Since the epidemic's onset, more than 645,000 people have died from drug overdoses, with the crisis claiming more than 220 lives daily in 2022.[31]

Exhibit 1

U.S. ADULTS WITH OUD IN 2022, BY DEMOGRAPHIC GROUP



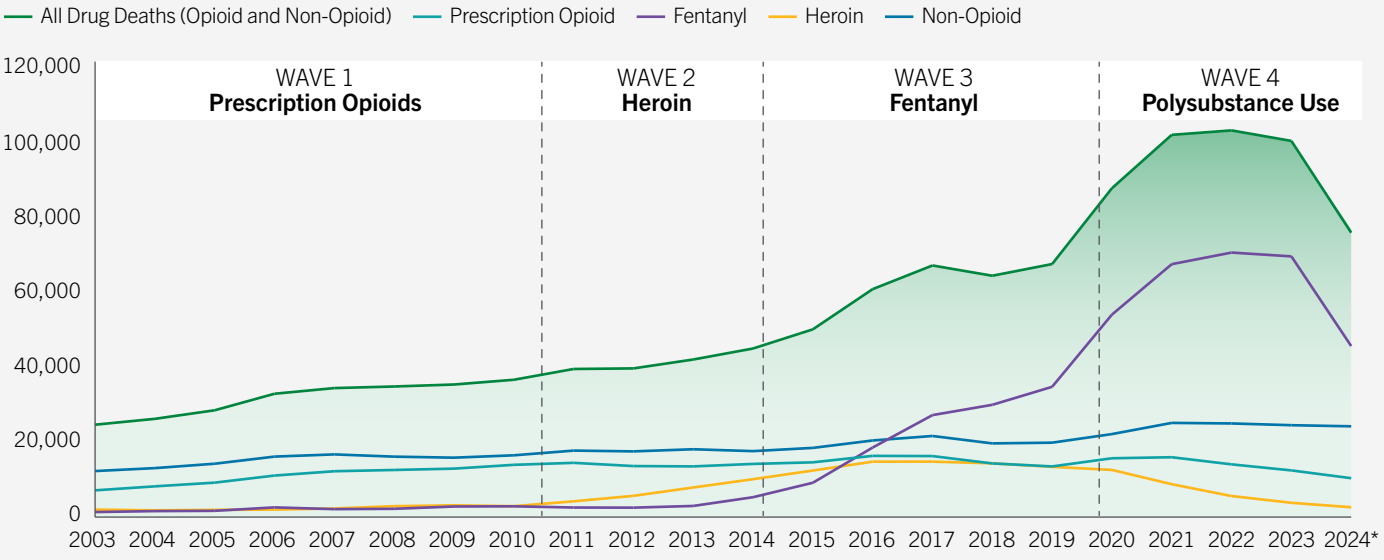
Notes: Adults who needed OUD treatment were defined as those who met DSM-5 criteria for OUD or received OUD treatment in the past year. Adults were classified as having received OUD treatment in the past year if they met any of the following criteria: 1) received inpatient treatment for opioid use, outpatient treatment for opioid use, or medications for OUD in the past year, 2) received inpatient or outpatient treatment in the past year for a substance that they did not specify in the survey, and had past-year opioid use, or 3) did not receive inpatient or outpatient substance use treatment, but received substance use treatment virtually or in a prison or jail for an unspecified substance, and had past-year opioid use.

Source: Dowell, Deborah, Samantha Brown, Shiromani Gyawali, et al., "Treatment for Opioid Use Disorder: Population Estimates—United States, 2022," *Morbidity and Mortality Weekly Report* 73 (2024): 567–574. https://dx.doi.org/10.15585/mmwr.mm7325a1

Exhibit 2

THE OPIOID CRISIS, BY WAVE

Number of Deaths by Overdose Overall and by Opioid Type



Notes: A single overdose death may involve multiple drugs or may not have an individual drug specified. Therefore, the total number of deaths by overdose is not equal to the sum of the deaths attributed to specific drugs or categories. * 2024 data is preliminary.

Drug deaths from overdose were identified using the International Classification of Disease, Tenth Revision (ICD-10), based on the ICD-10 underlying cause-of-death codes X40-44, X60-64, X85, and Y10-14, and multiple cause-of-death codes T40.0-T40.4, T40.6 (any opioid), T40.2, T40.3 (natural and semisynthetic and methadone (prescription or methadone), T40.4 (synthetic opioids, other than methadone), and T40.1 (heroin). In the data source, deaths from illegally made fentanyl cannot be distinguished from those from pharmaceutical fentanyl. Non-opioid deaths are the difference between overall drug deaths and those with any opioid involvement and can include such specific non-opioid drugs as stimulants, barbiturates, and other unspecified drugs.

Sources: Data from 2003–2023: Saunders, Heather, Nirmita Panchal, and Sasha Zitter, "Opioid Deaths Fell in Mid-2023, But Progress Is Uneven and Future Trends Are Uncertain," *KFF*, September 23, 2024. https://www.kff.org/mental-health/issue-brief/opioid-deaths-fell-in-mid-2023-but-progress-is-uneven-and-future-trends-are-uncertain/

Data from 2024: PHTI analysis of CDC WONDER provisional cause of death data. Compiled from data provided by the 57 vital statistics jurisdictions through the vital statistics cooperative program. Accessed on Aug 28, 2025. https://wonder.cdc.gov/mcd-icd10-provisional.html

Types of Opioids

Natural opioids—also known as opiates—include substances like morphine, codeine, and opium, which are derived directly from the seed pods of the opium poppy plant.[32] Semisynthetic opioids, such as heroin and prescription pain relievers like oxycodone, are created in laboratories by chemically modifying natural opioid compounds.[33] Synthetic opioids, such as fentanyl, are man-made in laboratories and contain no natural opioid ingredients.[34] When used outside of a medical context, fentanyl is highly fatal.

While many people with OUD initially become addicted through use of prescription medications, many eventually transition to illegally acquired drugs that may be laced with other chemicals, including fentanyl.[35] Nearly 70% of overdoses in 2023 involved synthetic opioids, with the vast majority attributed to fentanyl (Exhibit 2).[36]

Economic Impact

OUD imposes substantial economic costs across healthcare systems, with patients often receiving care over years or decades. In 2018, patients with OUD incurred $13,000–$15,000 more in annual healthcare costs than similar patients without OUD.[37]

The total economic impact of OUD extends beyond direct healthcare costs to include criminal justice costs, lost productivity, and reduced quality of life for patients and their families. In 2024, state and local government costs related to OUD ranged from $137 to $524 annually per state resident.[38]

Standard of Care for Opioid Use Disorder

Routine screening for substance use disorders (SUDs)—including OUD, alcohol use disorder, and stimulant use disorder, among others—is recommended across primary care, emergency departments, and behavioral health settings.[39] The American Society of Addiction Medicine's (ASAM) National Practice Guideline for the Treatment of Opioid Use Disorder outlines a comprehensive evaluation process that includes past and current substance use history, co-occurring mental health conditions, and social determinants that may impact treatment engagement and recovery stability.

Once diagnosed, patients should be offered evidence-based treatment using MOUD, which was historically referred to as medication-assisted treatment (MAT). MOUD treatment consists of the use of medications, such as buprenorphine, naltrexone, and methadone, often combined with substance-use counseling, individual and group therapy, drug testing, case management, and peer recovery support.[40] The goal of MOUD treatment is to manage withdrawal symptoms, reduce overdose mortality, and prevent relapses, while addressing the psychological and behavioral dimensions of addiction.[41] Studies have shown that MOUD treatment significantly reduces overdose mortality and all-cause mortality compared with no treatment, with protective effects that persist even after treatment discontinuation.[42]

MOUD treatment typically encompasses three phases: initiation, stabilization, and maintenance (Exhibit 3).[43] During initiation, patients begin medication at a clinically appropriate dosage to alleviate withdrawal symptoms. Stabilization involves dose titration and the addition of wraparound services. Maintenance focuses on long-term management and relapse prevention. MOUD treatment is long-term with no recommended time limit, and research shows that longer treatment duration results in better outcomes.[44]

Opioid Settlement Funds

A substantial share of individuals with OUD developed the disorder through introduction to prescription opioids for pain management. The widespread availability of prescription opioids in the early 2000s has been a central focus of national, state, and local litigation, which has alleged that opioid manufacturers and distributors played a major role in fueling the public health crisis.[45]

As of 2025, some legal actions remain ongoing, while others have resulted in settlements requiring manufacturers and distributors to make financial payments to federal, state, and local governments. To date, more than $50 billion has been committed in settlements.[46, 47] These funds are earmarked for opioid abatement strategies, including expanded access to treatment, support services for individuals with OUD, and increased availability of naloxone and other overdose-reversal drugs.

MAT and MOUD

- MAT is a comprehensive, evidence-based approach that combines U.S. Food and Drug Administration-approved medications with counseling, behavioral therapies, and support services to treat SUDs.
- MOUD refers specifically to the use of medications, such as buprenorphine, naltrexone, and methadone, as the pharmacological component of treatment for OUD. In practice, the term is used interchangeably with MAT and often also includes support services. For clarity, this report uses MOUD to refer specifically to medications.

The shift in terminology from MAT to MOUD by agencies such as the Substance Abuse and Mental Health Services Administration and the National Institute on Drug Abuse reflects an effort to reduce stigma and clarify that medication does not play a temporary role but instead represents a central and effective treatment for OUD.[48] It also reflects the concept that receipt of medication should not be contingent on engagement in therapy or other services, emphasizing the effectiveness of medications alone.

Medications for Opioid Use Disorder

Evidenced-based OUD treatment is centered around the use of medications approved by the U.S. Food and Drug Administration (FDA), including buprenorphine, methadone, and naltrexone.[49, 50] These medications function through different mechanisms (Exhibit 4).

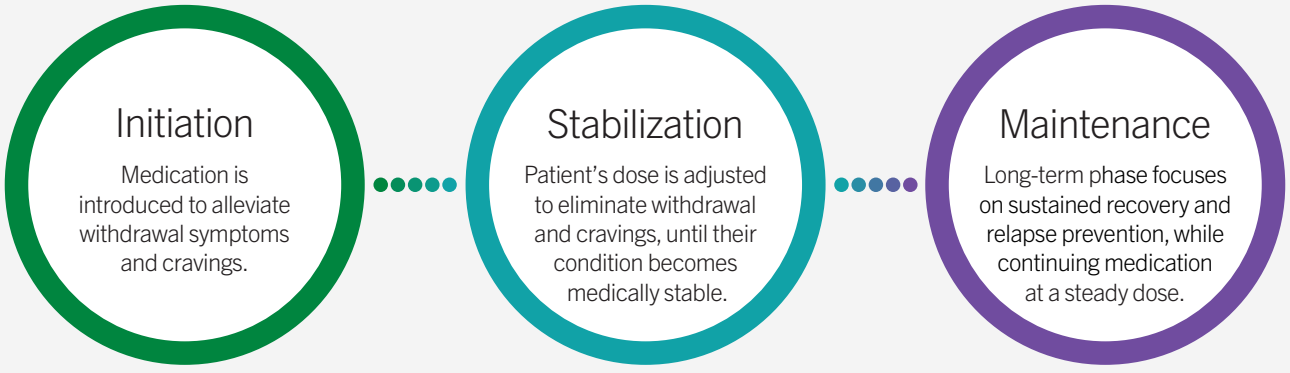
Buprenorphine is the most commonly prescribed medication for treating OUD in outpatient primary care settings.[51] It is frequently administered with naloxone in a combination product such as Suboxone, which acts as an opioid antagonist. This is important as buprenorphine can be misused by patients when crushed or snorted. The addition of naloxone is intended to deter this misuse; naloxone remains inactive when taken as prescribed but blocks misused buprenorphine's effects and causes withdrawal if injected or snorted.[52]

Extended-release naltrexone, an opioid antagonist, may be prescribed in the maintenance phase for individuals who have completed opioid withdrawal.[53] Methadone—a full opioid agonist—is generally prescribed to individuals with more severe OUD or those that have not succeeded with buprenorphine. Because of its pharmacologic profile and federal regulations, it can only be dispensed through certified opioid treatment programs (OTPs), with rare exceptions.[54, 55]

Many MOUD are available in generic formularies. Additionally, buprenorphine and naltrexone are available in long-acting injectable formularies that require less-frequent dosing than oral formulations, potentially reducing the challenges of daily adherence.[56]

Exhibit 3

STAGES OF MOUD TREATMENT



Source: Donaher, Paul A., and Christopher Welsh, "Managing Opioid Addiction with Buprenorphine," *American Family Physician* 73, no. 9 (2006): 1573–1578. https://www.aafp.org/pubs/afp/issues/2006/0501/p1573.html

Exhibit 4

EXAMPLES OF MEDICATIONS FOR OUD

Methadone	Buprenorphine Buprenorphine and Naloxone (Suboxone)	Naltrexone
PHASE: • Initiation, after mild to moderate withdrawal	PHASE: • Initiation, after moderate withdrawal begins	PHASE: • Maintenance, postwithdrawal
WITHDRAWAL RISK AT START: • Low	WITHDRAWAL RISK AT START: • Risk of precipitated withdrawal	WITHDRAWAL RISK AT START: • High risk if not fully detoxed
PREFERRED USE CASES: • Severe OUD, high relapse risk, more commonly used for fentanyl/heroin • Schedule II	PREFERRED USE CASES: • Moderate to severe OUD • Schedule III	PREFERRED USE CASES: • Highly motivated, postdetox • Not a controlled substance

Naloxone (Narcan)	
PREFERRED USE CASES:	
• Used during suspected overdose	• Not a treatment, but a safety medication

Source: American Society of Addiction Medicine, *The ASAM National Practice Guideline for the Use of Medications in the Treatment of Addiction Involving Opioid Use: 2020 Focused Update,* 2020. https://www.asam.org/docs/default-source/practice-support/guidelines-and-consensus-docs/asam-national-practice-guideline-pocketguide.pdf

OUD care is delivered through two primary outpatient models in the United States, each with distinct regulatory frameworks and service configurations.

1. OTPs—also known as methadone clinics—are highly regulated outpatient programs subject to Substance Abuse and Mental Health Services Administration (SAMHSA) regulations and Drug Enforcement Administration (DEA) registration that provide comprehensive services, including on-site administration of methadone.[57] OTPs often provide comprehensive nonmedication services, such as counseling, case management, drug testing, and peer support.[58]
2. Office-Based Opioid Treatment (OBOT) is a model of care that allows licensed practitioners (typically primary care providers, addiction specialists, psychiatrists, or advanced practice providers) to prescribe buprenorphine. Patients fill prescriptions at retail pharmacies and may receive behavioral health services through in-house staff or external referrals.[59]

Most virtual OUD solutions function under the OBOT model, while others integrate with existing OTPs. As a result, in this report, MOUD is defined as only inclusive of buprenorphine and naltrexone—which is not a controlled substance—and does not include methadone.

While OUD can be treated in a range of settings, this assessment focuses on outpatient treatment, as it is the most commonly utilized setting to treat SUD.[60]

Traditional in-person MOUD care requires regular clinical contact, particularly during the initiation and early stabilization phases. Visit frequency varies depending on the medication type and treatment stage, with patients visiting daily to weekly during initiation and often monthly during maintenance for patients stabilized on buprenorphine or naltrexone.[61]

During these visits, patients may receive medications, participate in counseling, and undergo drug testing to monitor medication adherence and detect other substance use.[62] Patients that are more adherent to medications are more likely to use office- and pharmacy-based services,[63] particularly during the initiation and stabilization phases of treatment. One study found patients adherent to buprenorphine attended an average of 15.0 office visits per year compared with 12.6 visits among nonadherent patients.[64] As patients stabilize, the frequency of visits may decline; however, ongoing monitoring, medication management, and structured support remain core to MOUD treatment plans.

Research also shows that improved MOUD treatment adherence reduces emergency department visits and inpatient admissions.[65] As a result, MOUD treatment shifts healthcare resource utilization toward lower-cost services, such as physician visits and pharmacy use, while reducing dependence on more expensive emergency and hospital-based care.

Prescribing Controlled Substances for the Treatment of OUD

Two of the medications used for OUD treatment—buprenorphine and methadone—are controlled substances governed by the DEA. These medications are subject to many federal and state regulations that determine where and how they can be dispensed.[66]

Until recently, outpatient providers needed to obtain special authorization (an "X-waiver") from the DEA to prescribe buprenorphine for OUD. Authorized providers were also limited in the number of patients that they could treat for OUD at a given time. The Consolidated Appropriations Act of 2023 eliminated the federal X-waiver requirement for prescribing buprenorphine, allowing providers to prescribe buprenorphine for OUD if permitted by applicable state laws.[67]

State laws regulating buprenorphine often extend beyond federal requirements. For example, while most states have eliminated prior authorization requirements for buprenorphine treatment, as of September 2023, four state Medicaid programs still require it for standard oral formulations of buprenorphine.[68] States also differ substantially in their scope of practice laws, which define what types of providers can prescribe buprenorphine and under what conditions. For example, some states allow nurse practitioners and physician assistants to prescribe buprenorphine independently, while other states require collaboration with or supervision by a physician. Similarly, prescribing authority for pharmacists to independently dispense buprenorphine varies across states.

Psychosocial Interventions

MOUD treatment integrates pharmacotherapy with psychosocial interventions, recognizing that addressing addiction may require both medication management and behavioral support to achieve sustained recovery. Common psychosocial interventions include individual counseling or talk therapy, educational content, cognitive behavioral therapy (CBT) modules, peer support, group counseling, and connection to community resources that address social determinants of health.[69] These interventions seek to address the underlying factors that reinforce opioid use, manage co-occurring psychiatric conditions that may contribute to relapse, and support adherence to treatment.[70]

Some research indicates that adding psychosocial interventions to MOUD is associated with a lower risk of medication discontinuation within the first 180 days of treatment.[71] For example, peer recovery-support services have been linked to increased attendance at buprenorphine treatment appointments, and participation in group therapy in conjunction with MOUD treatment has been associated with higher treatment completion rates[72, 73] However, studies adding CBT modules to standard buprenorphine treatment have demonstrated mixed results: Some found no difference in treatment retention for patients adding CBT modules compared with those in usual care, while others reported higher opioid abstinence for those adding CBT modules—though this benefit was not found across all subgroups.[74–76]

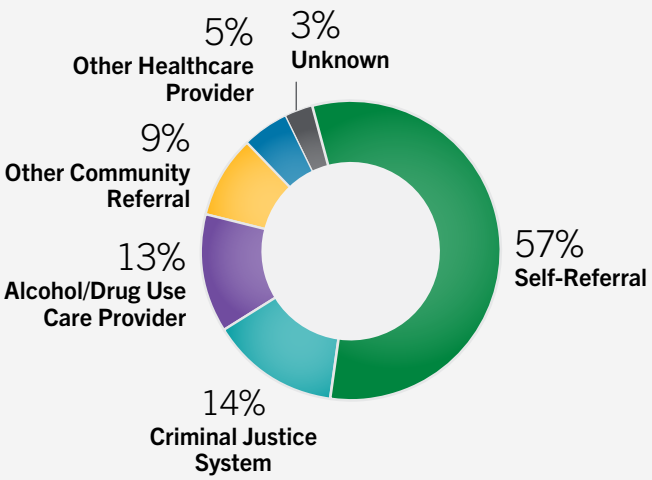
Contingency management (CM) is an evidence-based psychosocial intervention that reinforces positive behaviors through incentives. Drugs activate the brain's reward pathways[77] and CM approaches tap into these same pathways by providing immediate rewards—such as an added balance on a debit card or a gift certificate to a store—for adherence to a care plan.

CM has been studied with positive results across several substances, including stimulants,[78] alcohol,[79] and nicotine.[80] It is considered the "gold standard" of care for stimulant use,[81] and the core idea of reinforcing healthy behavior has been shown to be effective for care-plan adherence in areas such as HIV, tuberculosis, Hepatitis C,[82] and diabetes.[83] The evidence for CM as an intervention for OUD is more limited.

Although psychosocial interventions show promise in supporting treatment for OUD, it is important that they be delivered in conjunction with medication. Research shows that these interventions are less effective as standalone treatments. One study found high relapse rates following a standard treatment episode for patients who received psychosocial interventions without medications across care settings, with 61% and 77% relapsing within six months of outpatient and short-term inpatient care, respectively.[84]

Exhibit 5

HOW PATIENTS ENTER THE OPIOID USE DISORDER TREATMENT SYSTEM



Source: Mallow, Peter. J., Michael Mercado, and Michael Topmiller, "Disparities in Opioid Use Disorder Treatment Admissions in the United States," *Journal of Health Economics and Outcomes Research* 7, no. 1 (2020): 85–93. https://doi.org/10.36469/jheor.2020.13266

Barriers to Access and Care

Despite the strong evidence base supporting MOUD treatment, access remains limited. In 2022, only 25% of adults in need of OUD treatment received a medication-based intervention; 30% received treatment without MOUD, while 45% received no treatment at all.[85] Individuals most likely to access MOUD treatment were those who were white, male, employed, and had a household income above 200% of the federal poverty level—highlighting persistent disparities in care access.[86]

Of those who did not receive any treatment, SAMHSA estimates that 95% do not believe they need treatment.[87] This perception may reflect multiple overlapping beliefs: insufficient recognition of the problem, shame about needing help, reluctance to engage in pharmacologic treatment, and prior negative treatment experiences.[88] Public stigma also plays a role, as 78% of Americans believe individuals with prescription OUD are to blame for their condition.[89] These attitudes may discourage treatment-seeking behavior and contribute to underutilization of evidence-based therapies.

Patients who seek treatment still face significant provider availability gaps. Only 5% of ZIP codes have an opioid treatment program, with lower availability in rural areas. One in five counties have no buprenorphine providers and nearly one-third of counties have no MOUD providers who serve Medicare or Medicaid patients.[90, 91] MOUD providers in the United States are concentrated in the West and Northeast, leaving large areas of Midwest and South with fewer than 25 providers per 100,000 people, despite rising overdose rates.[92] Access barriers also exist at the pharmacy level, as an estimated 50% of pharmacies do not stock buprenorphine or naloxone, with even lower availability in rural communities.[93]

Provider-related factors further constrain MOUD treatment availability. Some clinicians hesitate to provide MOUD because of fears of medication misuse and knowledge gaps around prescribing MOUD.[94] While teleprescribing has expanded since the COVID-19 pandemic, a patchwork of state licensing rules limit national scaling of virtual clinics and force physicians to navigate a patchwork of state-specific rules. Average wait times to first appointments often exceed six days in high-mortality areas, which can significantly increase overdose risk.[95]

Other barriers to treatment include the cost of treatment and the fragmentation of care delivery. Most patients seeking OUD treatment do so themselves rather than being guided by external sources, such as employee assistance programs or healthcare providers. This leaves them to navigate the system on their own (Exhibit 5). Out-of-pocket costs can be substantial: For example, in 2018, patients paid an average of $728 for MOUD services, despite widespread insurance coverage.[96] Additionally, many health plans require prior authorizations and step therapy that can limit timely access to treatment.

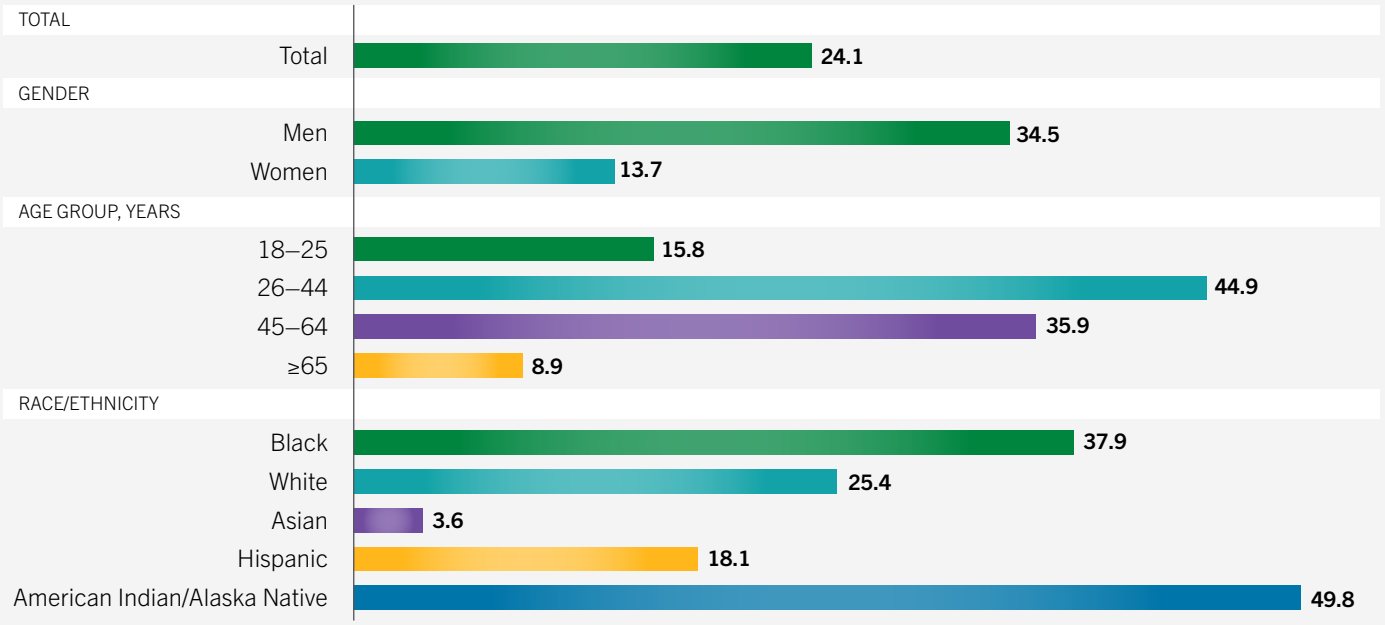
Fragmentation of services poses additional challenges. Unlike inpatient or structured outpatient programs housed within single institutions, outpatient MOUD care often spans multiple providers and settings—including emergency departments, primary care offices, OTPs, and retail pharmacies. Patients are frequently responsible for coordinating transportation, appointments, insurance approvals, medication acquisition, and follow-up care.

These barriers to care substantially increase overdose risk, particularly following gaps in treatment or treatment discontinuation. The 90-day period following treatment termination is associated with high overdose risk—approximately 40% of all deaths from overdose occur within the first two weeks of leaving treatment.[97]

With these barriers to care, along with fragmentation and gaps in treatment, the risk of opioid overdose has the potential to increase. Overall, deaths by OUD overdose are disproportionately higher among Black and American Indian/Alaska Native communities (Exhibit 6).

Exhibit 6

U.S. OPIOID OVERDOSE DEATH RATES PER 100,000 PEOPLE, BY DEMOGRAPHIC GROUP, 2023



Source: Saunders, Heather, Nirmita Panchal, and Sasha Zitter, "Opioid Deaths Fell in Mid-2023, but Progress Is Uneven and Future Trends Are Uncertain," KFF, September 23, 2024. https://www.kff.org/mental-health/issue-brief/opioid-deaths-fell-in-mid-2023-but-progress-is-uneven-and-future-trends-are-uncertain/

Low-Barrier Care

In SUD treatment, there have historically been two philosophies to care: 12-step programs like Narcotics and Alcoholics Anonymous have focused on "complete abstinence from all drugs,"[98] while low-barrier approaches focus on removing obstacles to treatment. The low-barrier approach generally encourages patients to continue MOUD treatment even if they do not want to be in counseling or participate in peer support or other components of a care plan. Practitioners typically prescribe MOUD to patients who no longer use drugs, as well as to those who continue to use illicit drugs.[99] Given the effectiveness of medications such as buprenorphine and methadone at preventing overdoses, there is now general consensus in support of low-barrier approaches. Research shows low-barrier approaches reduce deaths from overdose and the spread of infectious diseases.[100]

The Rise of Virtual Care for Treatment of OUD

In 2019, the SUPPORT for Patients and Communities Act exempted SUD and co-occurring mental health disorders from specific telehealth requirements under Medicare.[101] At the time, telehealth services were mostly authorized for beneficiaries living in rural areas and patients were required to travel to designated sites, such as a provider's office or local hospital, to receive services via telehealth. Outside of rural areas, Medicare covered only a limited set of services via telehealth, such as stroke care. The SUPPORT Act allowed eligible Medicare beneficiaries anywhere in the United States to begin receiving in-home SUD treatment services via telehealth for the first time.

During the COVID-19 pandemic, additional flexibilities were granted to ensure people retained broad access to treatment. The Department of Health and Human Services (HHS) waived multiple requirements, including an in-person medical evaluation of a patient before issuing a prescription for a controlled substance (as required by the Ryan Haight Online Pharmacy Consumer Protection Act of 2008).[102] As a result, buprenorphine became available to individuals without first having to be seen in person by a healthcare provider. Use of telehealth services went from less than 1% of all payers' claims before the pandemic to 29% of claims for SUD treatment by March–August 2021.[103]

Similar telehealth flexibilities remain in place today. Beginning January 1, 2026, a final DEA rule is set to take effect that allows DEA-registered practitioners to teleprescribe a six-month supply of buprenorphine, after checking the state's prescription drug monitoring program database. After the six-month supply runs out, providers either have to see their patients in person or continue care through other forms of authorized teleprescribing.[104] This past January, the DEA released a proposed rule to create a special registration for telehealth providers who prescribe controlled substances without an in-person medical evaluation.[105] Organizations such as ASAM support continued prescribing flexibilities to preserve critical care for OUD.[106] Together, these policy changes should reduce barriers that prevent providers from prescribing OUD medications and make it easier for patients to receive their treatment virtually.

> **"The elephant in the room is that one barrier—one contributor to nonadoption of MOUD treatment—is opposition from family, friends, and even sponsors**
>
> in 12-step fellowships to a recovering person being on such medications. And worse, low support from traditional addiction treatment professionals for patients using pharmacological therapies to manage addiction."
>
> —Dr. Mike M. Miller

Virtual Solutions

This assessment includes 16 companies that provide virtual OUD solutions that are designed to offer or augment MOUD-based treatment with additional support services, like therapy and CM. These platforms are designed to address traditional barriers to in-person MOUD care and to improve treatment retention and duration.

The solutions in this assessment were identified through an initial market scan, a search of published literature, and a detailed company-by-company review. The final list was informed by company meetings; detailed company research; and input from stakeholders, including health plans, employers, providers, and virtual health experts. While most platforms are built to provide treatment for a spectrum of SUDs, they each have a specialized focus and specific care pathways for OUD.

All of the solutions included in this report:

- Are sold by companies that have clinical evidence of treating OUD or indicate they target people with OUD;
- Offer OUD treatment primarily as an outpatient program (less than nine hours of treatment per week) rather than as an intensive outpatient program (9–20 hours per week);[107]
- Offer combinations of psychotherapy, CM, educational content, peer support, or group support, in addition to or supporting the initiation or maintenance of medications for OUD including buprenorphine and/or naltrexone;
- Are sold in the United States;
- Are sold to employers, payers, or health systems/providers; and
- Are sold by companies that have raised at least $10M in funding via private investors or have at least one publicly funded, state-wide deployment (Exhibit 7).

Exhibit 7

COMPANY HISTORY AND FUNDING

Company	Year Founded	Ownership[a]	Total Private Investment
Affect Therapeutics	2020	Private	$26.1M
Aware Recovery Care	2011	Private	$66.0M
Better Life Partners	2018	Private	$34.6M
Bicycle Health	2017	Private	$103.8M
Boulder Care	2017	Private	$85.7M
CHESS Health	2014	Private	$7.4M
DynamiCare Health	2016	Private	$20.8M
Eleanor Health	2019	Private	$165.9M
Groups Recover Together	2014	Private	$245.4M
Ophelia	2018	Private	$68.5M
Pelago	2017	Private	$150.1M
PursueCare[b]	2019	Private	$31.3M
Q2i	2017	Private	—
Wayspring	2012	Private	$164.6M
WEconnect Health	2014	Private	$21.3M
Workit Health	2014	Private	$141.9M

Notes: [a] None of these companies were public, as of August 1, 2025. [b] PursueCare acquired RESET, RESET-O, and RESET-A from Pear Therapeutics in December 2023. Pear Therapeutics, which filed chapter 11 bankruptcy in April 2023, previously raised $396M.

Source: PitchBook Data, Inc.

Components of Care

Digital solutions for OUD aim to initiate and retain patients in a care plan. These care plans often—but not always—include medications, as well as other support services (Exhibit 8).

MOUD Prescribing: MOUD prescribing consists of virtual one-on-one appointments with a MOUD prescriber to initiate and titrate medications. Visit frequency varies on the basis of patient need and is typically more frequent during initiation, decreasing over time as patients stabilize.

Exhibit 8

CORE COMPONENTS OF VIRTUAL CARE FOR OUD SOLUTIONS

MOUD PRESCRIBING

Evaluation and prescriptions for MOUDs from physicians or advanced practice providers.

SUPPORT SERVICES

Therapy

Human-guided therapy from coaches, psychologists, social workers, or psychiatrists.

Peer and Group Support

One-on-one peer recovery coaching or moderated group support meetings and forums.

Care Navigation

Help to connect patients with other healthcare providers and external resources for nonmedical needs (e.g., housing).

Drug Testing

At-home urine or saliva tests to monitor MOUD or opioid use.

Educational Content

Digital, on-demand lessons, videos, and educational content based on CBT and harm reduction methods.

Contingency Management

Monetary rewards for meeting participation and adherence goals, often delivered via reloadable debit or gift cards.

Drug Testing: Drug testing involves testing for both the presence of buprenorphine and the absence of illicit substances. Most solutions offer either at-home drug testing with digital validation (e.g., video verification of saliva test) or use clinic-based drug testing that is manually entered into the platform.

Therapy: Therapy includes one-on-one psychotherapy that is delivered by a licensed provider, often a specialist in addiction treatment. Therapists may employ a range of evidence-based techniques, including CBT, dialectical behavior therapy, community reinforcement approach, and motivational enhancement therapy. Therapy sessions focus on addressing addiction and other co-occurring mental health conditions.

Educational Content: Digital self-guided content provides on-demand interactive lessons, videos, quizzes, and digital worksheets focused on overdose prevention or managing co-occurring conditions, such as hepatitis C. Many solutions also offer therapeutic content based in techniques like CBT.

Contingency Management: CM is an intervention that provides motivational incentives for demonstrated changes in patient behaviors, such as negative drug tests and appointment attendance. This intervention uses positive reinforcement—often monetary rewards—to encourage sustained engagement with treatment activities and care goals.

Peer Support/Group Support: Peer support includes one-on-one nonclinical connections that link patients in recovery with certified or noncertified peer recovery coaches. These relationships are often long-term and allow patients to learn from someone with similar lived experiences. Group support programs involve meetings moderated by either a therapist or a peer. These discussions aim to better facilitate social connections and help people learn from others' recovery experiences.

Care Navigation: Care navigation includes services that help connect patients to therapists, peer support networks, OUD treatment providers, and pharmacies with the required medications. Care navigation aims to guide patients through OUD care and related systems—such as primary care, social services, and the criminal justice system—to eliminate treatment fragmentation. Navigation may include automated reminders and messages and engagement with live care coordinators.

Solution Categories

The solutions reviewed in this report aim to improve patient engagement and retention in MOUD treatment. These solutions can be grouped into two broad categories based on the components of the solution offerings (Exhibit 9): medication-focused solutions and digital wraparound solutions.

1 **Medication-Focused Solutions:** Provide virtual MOUD prescribing capabilities, supplemented with support services—such as therapy, peer support, or CM—that aim to enhance care coordination and treatment outcomes (Exhibit 10). These solutions all prescribe buprenorphine/naloxone and some also prescribe naltrexone; none prescribe methadone. They vary in the comprehensiveness of their support service offerings and do not require users to participate in support services as a condition of receiving MOUD. Medication-focused solutions are most often reimbursed by health plans and Medicaid programs as network providers, either on a fee-for-service or case-rate basis. Some solutions also sell directly to employers.

2 **Digital Wraparound Solutions:** Offer support services to enhance other OUD treatment programs, but they do not offer direct MOUD prescribing (Exhibit 11). The digital wraparound solutions in this report all offer CM to patients directly or enable treatment providers to implement CM programs. Some offer other wraparound services, such as peer support, care navigation, and educational content. Digital wraparound solutions are primarily sold to health systems and public health agencies.

Company Overview

Thirteen of the 16 companies included in this assessment engaged with PHTI during the evaluation process and 10 submitted evidence for review. PHTI met with companies to understand their solutions, and companies had an opportunity to submit commercial information and clinical evidence for review. See **Appendix B** for more company-specific information. Results for all included studies are captured in the detailed **online data supplement**.

There is a broad set of purchasers for virtual OUD solutions. Provider organizations—including individual outpatient clinics, emergency departments, and large integrated health systems—adopt these solutions to expand or enable new capabilities of OTPs and OBOTs. Commercial insurers and employers are also key purchasers and may offer OUD solutions as in-network providers through standard medical benefits, as part of employee assistance programs, or through other mental health offerings.

The public sector—including state Medicaid programs and Medicaid managed care plans, as well as state and local health departments—is an important purchaser of OUD solutions as well. These agencies frequently allocate resources from opioid settlement funds and such federal grants as State Opioid Response funding to support virtual solutions that have the potential to address geographic and provider access gaps and expand existing provider capabilities.

Exhibit 9

CATEGORIES OF VIRTUAL OUD SOLUTIONS

Medication-Focused Solutions

Affect Therapeutics
Aware Recovery Care
Better Life Partners
Bicycle Health
Boulder Care
Eleanor Health
Groups Recover Together
Ophelia
Pelago
PursueCare
Wayspring
Workit Health

Digital Wraparound Solutions

CHESS Health
DynamiCare Health
Q2i
WEconnect Health

Exhibit 10

CORE COMPONENTS OF VIRTUAL SOLUTIONS FOR OUD—MEDICATION-FOCUSED SOLUTIONS

● Standard Feature ○ Optional Feature

CATEGORY Services	Affect Therapeutics	Aware Recovery Care	Better Life Partners	Bicycle Health	Boulder Care[a]	Eleanor Health	Groups Recover Together	Ophelia	Pelago	PursueCare	Wayspring	Workit Health
TELEMEDICINE Prescribers	●	●	●	●	●	●	●	●	●	●	●	●
Therapists	●	●	●	●	●	●	●		●	●	●	●
DRUG TESTING At-home drug testing	●	●	●	●	●	●	●	●	●	●		●
In-clinic drug testing					○		●	●				●
PLATFORM Digital educational (e.g., CBT) Tools	●	●			●			●	●	●		●
Contingency management	●		●		●	●	●		●	●		●
Peer support	●	●	●	●	●	●	●		●			●
Group support	●		●	●	●	●	●					●
Care navigation	●	●		●	●	●	●	●	●	●	●	●

Notes: CBT = Cognitive behavioral therapy. [a] Boulder Care offers navigation and support services for patients who wish to satisfy their program testing in person at a facility near them.

Source: Public information (websites, marketing materials, company-provided public information).

Medication-Focused Solutions

Affect Therapeutics

Affect Therapeutics provides a digital recovery program for a range of SUDs, including OUD. Affect combines medication prescribing and support services that include video-based group and individual therapy, virtual drug testing, CM, app-based CBT content, peer support, and care coordination. Patients can also participate in online moderated discussion forums with other members in their therapist's patient panel. Affect Therapeutics sells directly to health systems and health plans—including Medicaid agencies—and partners with employers as an in-network provider. Affect Therapeutics offers performance guarantees based on various healthcare effectiveness data and information set (HEDIS) measures.

Aware Recovery Care

Aware Recovery Care offers an in-home addiction treatment program for SUDs. The solution includes medication-based treatment, CBT content, drug testing, therapy, client recovery advisors, psychological evaluation, medication bridges, and coordinated medical and behavioral healthcare. Aware Recovery Care emphasizes family involvement by providing access to a dedicated family education facilitator who meets with and supports the patient's family throughout treatment. The program includes stand-alone, medication-based treatment options and a 5–7-day virtual withdrawal management program for those beginning recovery. Aware Recovery Care sells to health plans.

Better Life Partners

Better Life Partners offers opioid addiction treatment, alcohol addiction treatment, mental health care, and responsive healthcare to members in five states. Better Life Partners offers medication-based therapy through in-person community partners, as well as virtual treatment options. The solution offers CM, individual and group therapy, peer support, drug testing, and care coordination in their program. Better Life Partners sells to health plans, including Medicaid agencies.

Bicycle Health

Bicycle Health provides virtual care for patients with OUD through a combination of medication-based treatment and support services. Services provided include therapy, health coaching and care navigation, drug testing, education, and virtual peer support groups. Patients receive ongoing care and guidance from providers and clinical support specialists through both asynchronous chat and live video sessions. Bicycle Health sells to health systems and health plans, including Medicaid and Medicare agencies, and is available to employers through in-network provider agreements. Bicycle Health offers performance guarantees when requested, usually based on guaranteed initial appointments and program retention.

Boulder Care

Boulder Care delivers outpatient treatment for SUD with a team-based approach to long-term care for OUD and other SUDs. A multidisciplinary team of addiction medicine experts —including physicians, certified peer specialists, and care navigators—work together to provide ongoing management of SUDs. Services include prescribing medications, care for common behavioral health conditions, CBT tools, CM, at-home drug testing, and other psychosocial support programs, including group support. Patients can engage with their care teams through both video and messaging platforms. Boulder Care sells directly to health plans, including Medicaid agencies, and partners with state public health agencies, health systems, and employers through referral relationships and in-network provider agreements. Boulder Care offers performance guarantees based on retention in care, HEDIS measures, time to access care, and primary care provider engagement.

Eleanor Health

Eleanor Health offers virtual and in-person outpatient rehabilitation services for opioid and alcohol use disorders. The solution incorporates MOUD with therapy, CM, at-home drug testing, group support, one-on-one peer support, and coaching. Patients establish personal goals and navigate the healthcare system to access resources through their community recovery partners. Eleanor Health sells to health plans, including Medicaid agencies, and is available to employers through in-network provider agreements. Eleanor Health offers performance guarantees based on access, satisfaction, and HEDIS metrics.

Groups Recover Together

Groups Recover Together is an in-person and virtual addiction medicine practice that combines medication, therapy, and wraparound care services. Groups Recover Together is a provider that seeks to address social isolation as a driver of addiction by building connections between group members through shared treatment experiences. The program includes recovery-support specialists who provide peer support and case management in conjunction with CM and regular drug testing. Groups Recover Together partners with health plans, including Medicaid agencies, through in-network provider agreements. Groups Recover Together offers performance guarantees based on retention, emergency department utilization, engagement, total cost of care, and HEDIS metrics.

Ophelia

Ophelia is a virtual medical practice specializing in treatment of SUDs. The solution provides team-based care, matching each patient with a primary and secondary prescriber to ensure continuity of medication-based care. Ophelia's prescribers are trained in medical counseling therapeutic approaches, use digital educational tools, and employ care coordinators to help patients navigate a range of services, including pharmacy challenges, insurance issues, and outside referrals. The platform incorporates regular at-home drug testing as part of their care delivery. Ophelia providers use a custom-built electronic health record (EHR) for clinical documentation and scheduling, and deliver services through a combination of video sessions, text messages, and phone calls. Ophelia also offers a drop-in clinic with a bridge prescribing program. Ophelia sells to health systems and health plans, including Medicaid agencies; partners with state public health agencies; and is available to employers through in-network provider agreements.

Pelago

Pelago is a virtual clinic offering comprehensive treatment for SUDs. The solution offers therapeutic provider visits, medication-based treatment, CM, CBT modules, peer support, and care coordination. Pelago incorporates prescription home delivery alongside regular and random drug screens and pill counts to monitor patient adherence remotely. Pelago uses a clinical assessment to stratify patients into treatment pathways based on risk and acuity levels, and can refer patients to vetted, outside rehabilitation partners when higher levels of care are needed. Pelago sells to health plans and employers, and is

available to employers through in-network provider agreements. Pelago offers performance guarantees based on clinical outcomes, return on investment, and operational metrics.

PursueCare

PursueCare offers treatment for SUDs and co-occurring mental health conditions by connecting patients to a multidisciplinary care team. The company owns RESET and RESET-O, FDA-cleared prescription digital therapeutics (PDTs) originally developed by Pear Therapeutics that are approved for SUD and OUD, respectively. These PDTs deliver CBT modules and CM protocols. PursueCare's solution combines medical care, MOUD, therapy, nonclinical case management, and psychiatric and physical health services—all delivered virtually. PursueCare operates a specialty mail order pharmacy and provides at-home drug tests for medication access and adherence. PursueCare sells to health systems, employers, and health plans, including Medicaid agencies. PursueCare also partners with state public health agencies and is available to employers through in-network provider agreements.

Wayspring

Wayspring is a virtual and in-person care navigation and treatment platform for SUDs. The solution includes medication prescribing, therapy, and support for adjacent health areas. Wayspring's solution is used by provider organizations to enhance wraparound services for their patients and to assess opioid-related member risk. Wayspring sells to health plans and health systems.

Workit Health

Workit Health provides a virtual-first treatment program for SUDs that includes MOUD-prescribing and virtual medical appointments. Patients receive an initial evaluation, custom care plan, and group follow-up visits. Virtual care is supplemented by CM, CBT content, and remotely monitored mailed drug screens. Workit Health sells directly to health plans, including Medicaid agencies; it also partners with state public health agencies, employers, and health systems through referral relationships and in-network provider agreements. Workit Health offers performance guarantees supporting key metrics including time to care, adherence, and retention.

Digital Wraparound Solutions

CHESS Health

CHESS Health offers a suite of services to address SUDs, from prevention to treatment. CHESS's core solution, eRecovery, focuses on supporting patients between treatment sessions using their Connections app, which includes peer support

Exhibit 11

CORE COMPONENTS OF VIRTUAL SOLUTIONS FOR OUD—DIGITAL WRAPAROUND SOLUTIONS

● Standard Feature ○ Optional Feature

CATEGORY Services	CHESS Health	DynamiCare[a]	Q2i	WEconnect Health
TELEMEDICINE Prescribers				
Therapists				
DRUG TESTING At-home drug testing		●	●	
In-clinic drug testing	●	○		
PLATFORM Digital educational (e.g., CBT) tools	●	●		●
Contingency management	●	●	●	●
Peer support	●	●	●	●
Group support	●	●	●	●
Care navigation	●	●		●

Notes: CBT = Cognitive behavioral therapy. [a] DynamiCare offers in-clinic drug testing as an option and facilitates via their web-based Provider Portal.

Source: Public information (e.g., websites, marketing materials, company-provided public information).

forums moderated by 24/7 peer support specialists. In addition to app-based chat and video peer support, CHESS offers digital CBT content and CM to support clinic-based events, including drug testing. There is a separate app to support family members and caregivers, and to facilitate referrals to providers. The Connections App and peer support are accessible to patients regardless of whether they are receiving medications. CHESS Health sells its solutions to health systems, employers, and health plans, including Medicaid agencies; it is also funded by state public health agencies. CHESS Health offers performance guarantees based on retention and satisfaction.

DynamiCare Health

DynamiCare Health provides CM and coaching programs for SUDs, including OUD. DynamiCare also offers digital CBT modules, group recovery support, and family engagement services. The solution uses at-home or in-clinic drug testing and pairs each patient with a peer recovery coach who provides program guidance and outreach based on real-time risk alerts. Patients can enroll in the program regardless of whether they are receiving medications and may be eligible to earn incentives for engaging in harm-reduction activities. DynamiCare Health sells to health systems, employers, and health plans, including Medicaid agencies; it is also funded by state public health agencies. DynamiCare Health is also available to employers through in-network provider agreements. DynamiCare Health offers performance guarantees based on feasibility, engagement, retention, and satisfaction.

Q2i

Q2i develops software to enable providers of medication-based therapy programs to deliver CM services and oversee patients' recovery progress. The solution includes provider-facing dashboards and can integrate into existing EHR systems. Q2i offers a patient-facing app that facilitates CM incentive payments, direct communication with providers, and peer and group support. Q2i sells to health systems and is also funded by state public health agencies.

WEconnect Health

WEconnect Health provides personalized recovery support for patients with OUD, all other SUDs, and behavioral health conditions through a digital platform that matches patients with certified WEconnect peer support specialists. WEconnect Health also incorporates CM, digital therapy tools, and provides care plan–monitoring through GPS tracking and other verification techniques. The solution offers one-on-one peer support from certified recovery specialists and regular group support meetings designed to address social isolation in recovery. Specialists are available anytime through messaging, phone, and video platforms. WEconnect Health sells to health systems, employers, and health plans, including Medicaid agencies; it is also funded by state public health agencies. WEconnect Health offers performance guarantees based on engagement metrics.

Patient Perspectives

PHTI conducted interviews with 10 patients with OUD who had experience with virtual solutions for OUD. Patients were recruited for diversity across age, gender, race, ethnicity, income level, geography, and insurance type.

Convenience, Access, and Flexibility

Patients emphasized that virtual solutions for OUD helped them overcome gaps in treatment by providing immediate access to medications, quick intake processes, flexible appointment scheduling, and home-based drug testing. Many discovered virtual options through online searches, highlighting the role that these solutions may be able to play in increasing the ease and speed into care.

> **"It feels more normal now—like a regular doctor's appointment.** You show up, it's straightforward, and it doesn't feel like a burden. You're not jumping through hoops because something's 'wrong' with you. There's no label, no waiting in line with people dealing with all kinds of issues."
>
> —Patient Interview Participant

> **"It was really easy. You just download the app and follow the instructions.** It was user-friendly and I had an appointment with the doctor the very next day. It was fast, which was a huge benefit, because when someone's ready to seek help, they're probably in a bad place. You want to get help as quickly as possible."
>
> —Patient Interview Participant

Shifting Coverage and Usage

Patients noted challenges with changing app features or insurance policies that disrupted their care. These disruptions resulted in patients discontinuing services, switching providers, or taking on increased out-of-pocket expenses.

> **"When I lost my job and insurance, I had to start paying out of pocket** and it was much more expensive, so I began looking for more affordable treatment options."
>
> —Patient Interview Participant

> **"I could not find a platform that had the abuse treatment, the MAT—medication-assisted treatment—and therapy.** Either they didn't take my insurance, or they didn't treat in Pennsylvania."
>
> —Patient Interview Participant

Meeting Patients Where They Are

Patients valued that virtual solutions could support them throughout their care journey, from treatment initiation to maintenance. Patients appreciated access to peer support and 24/7 chat when they needed extra help.

> **"[The app] was really helpful because I had a list in the back of my mind** I could turn to if I was having cravings or a bad day. The longer the list, the more ways I had to distract myself or use tools that lowered my risk of relapse. Having it right on my phone gave me peace of mind, knowing I could open the app and get help right away."
>
> —Patient Interview Participant

> **"I felt like I had a team, and they were all communicating amongst each other."**
>
> —Patient Interview Participant

Stigma

Patients found that digital tools helped them overcome the discomfort of attending outpatient clinics and reduced feelings of shame associated with receiving care. Virtual solutions offered a sense of normalcy and helped patients move beyond concerns about medication substitution.

> **"My doctor said, if a diabetic needs insulin, they don't just stop taking it.** It's the same idea—we have an opioid system in our brain and this treatment supports it. It's something that works for you."
>
> —Patient Interview Participant

> **"The general belief among people that [MOUD] is just replacing one habit with another.** And in a way, it is. I'm still opioid dependent 11 years later, but being under medical supervision makes a world of difference. I understand their point of view, but it's a completely different experience compared to going to illegal sources. The risk and anxiety I used to deal with are just not part of my life anymore. Now, it's much easier and more accessible."
>
> —Patient Interview Participant

Clinical Effectiveness

This report evaluates the effectiveness of virtual solutions for OUD by examining the primary clinical outcome of retention on treatment, as well as additional outcomes including abstinence and relapse, health equity, and user experience.

Based on a robust literature base outlined below, this report assumes comparable effectiveness of MOUD prescribed via in-person or virtual providers. To augment the existing body of evidence supporting the clinical effectiveness of teleprescribing for MOUD, this systematic literature review focuses specifically on virtual OUD solutions that integrate additional digital support services (e.g., CM, educational modules) to determine how they may enhance adherence to treatment and overall treatment outcomes.

Prior to the COVID-19 pandemic, MOUD treatment was predominantly delivered in person, typically through outpatient settings that included on-site medication dispensing and routine drug testing. During the COVID-19 pandemic, rules around buprenorphine prescribing were relaxed to allow providers to remotely prescribe and deliver virtual MOUD care via telehealth.

Numerous retrospective studies have analyzed patient outcomes during this period to compare telehealth-based care and in-person care. Multiple studies of Medicare and Medicaid populations found that virtual MOUD treatment was as effective as or better than in-person care.[108, 109] For example, when adjusted for demographics, patients receiving MOUD via teleprescribing showed slight improvements in treatment retention[110] and a 36% lower overdose rate than those receiving in-person initiation.[111] In addition, a study of patients treated in the Veterans Health Administration found that teleprescribing increased the proportion of patients retained in treatment.[112] These studies generally find telehealth-based treatment programs to be equally as effective as in-person care.[113]

The consistency of these findings suggests that MOUD prescribing adapts well to virtual delivery models.

Systematic Literature Review

Using the ICER-PHTI Assessment Framework, independent reviewers conducted a systematic literature review of peer-reviewed and gray literature on virtual solutions for OUD on the basis of the predefined criteria in Exhibit 12 (Prospero Registry Link). The review included published and unpublished evidence on clinical effectiveness from online databases (EMBASE, PUBMED, and ClinicalTrials.gov), conference proceedings, company-provided data, and company websites. See **Appendix A** for a detailed methodology.

The analysis included a systematic literature review of more than 4,000 pieces of evidence and identified 43 studies that met inclusion criteria, including 11 randomized controlled trials (RCTs). Most studies include 3–12 months of follow up.

> **"The crux of what telehealth can accomplish, aligning patients' treatment readiness with immediate help, is very difficult to do in other treatment settings."**
>
> —Dr. Jeanmarie Perrone

Exhibit 12

PICOS INCLUSION AND EXCLUSION CRITERIA

Criteria	Exclusion Criteria
POPULATION: • Adults managing OUD	• Patients <18 years of age • Patients managing another SUD (i.e., alcohol or tobacco use disorder, or other SUD) without co-occurring OUD
INTERVENTIONS: • Medication-based treatment, plus therapy with one or more components being digital	• Teleprescribing-only solutions • Therapy-, peer support-, or care navigation-only solutions • Digital tools used for screening/diagnosis of OUD without any condition management • Digital tools measuring only the knowledge about, perspective toward, or attitude toward opioid use
COMPARATORS: Usual Care • In-person MOUD, with or without therapy/peer support • No care (i.e., not on any treatment, waitlisted, or delayed)	N/A
OUTCOMES: See Exhibit 15	N/A
SETTING: • Virtual or outpatient setting • United States	• Inpatient setting/ED setting only • In person only (no virtual component)
STUDY DESIGN: • Randomized controlled trials and nonrandomized controlled trials • Observational studies • SLRs[a]	• Editorials, commentaries, study protocols, case reports, qualitative reports, and narrative reviews • ≤20 study participants
DATE OF PUBLICATION: 2015–2025, and Conferences: 2022–2025	N/A

Notes: N/A = not applicable. SLR = systematic literature review. ED = emergency department. See Appendix table A-1 and A-2 for detailed list of search terms.

[a] SLRs were included for manual reference checks for studies published between 2015–2025 and were not included in the qualitative evidence synthesis.

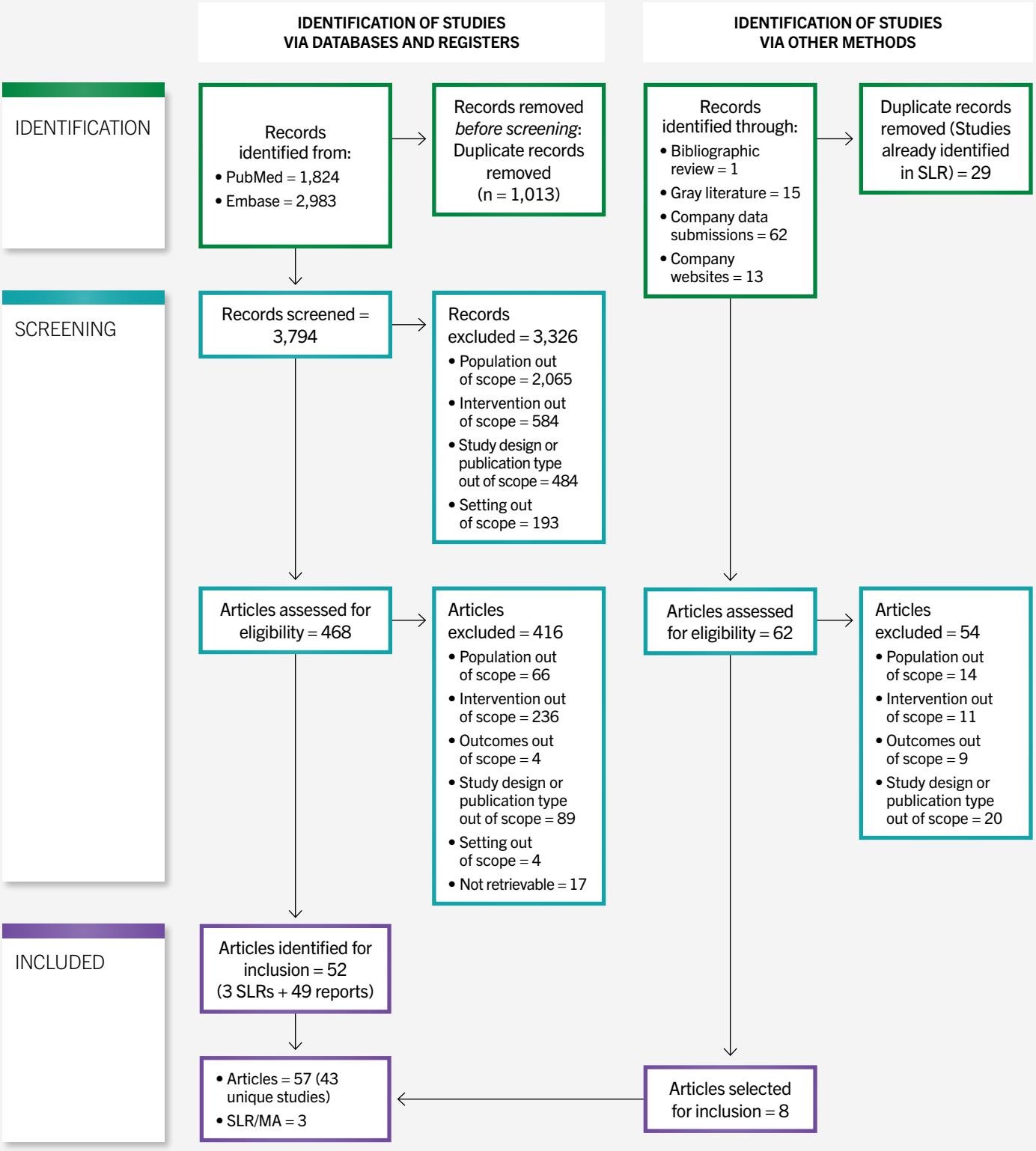
The search of online databases and conference posters identified 4,807 pieces of evidence. Reviewers screened these for inclusion in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (see Exhibit 13) and identified 468 eligible articles (including peer-reviewed journal publications and conference posters/abstracts) and three systematic literature reviews/meta-analyses. References from the systematic literature reviews/meta-analyses resulted in one additional eligible article. Ten companies (Affect Therapeutics, Boulder Care, CHESS Health, DynamiCare Health, Groups Recover Together, Ophelia, Pelago, Q2i, WEconnect Health, and Workit Health) submitted 62 pieces of clinical evidence for review. After screening using the PICOS criteria, eight more articles were added, for a total of 57 articles based on 43 unique studies and three systematic literature reviews/meta-analyses.*

The 43 studies identified in the systematic literature review included 26 interventional studies and 17 observational studies. Of the interventional studies, 11 were RCTs—two of which have not yet been published in a peer-reviewed journal. Twenty-three studies examined virtual solutions for OUD compared with a control arm, but without randomization. These trials are referred to as "comparative studies" in this report.

* Of the 57 articles, two were not included in data extraction because of limited data, resulting in 55 articles from 43 unique studies in the analysis.

Exhibit 13

PRISMA DIAGRAM



Notes: SLR = systematic literature review. MA = meta-analysis. The SLR was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Articles include peer-reviewed publications, conference abstracts and posters, and studies listed on clinicaltrials.gov.

Evidence Requirements and Risk of Bias

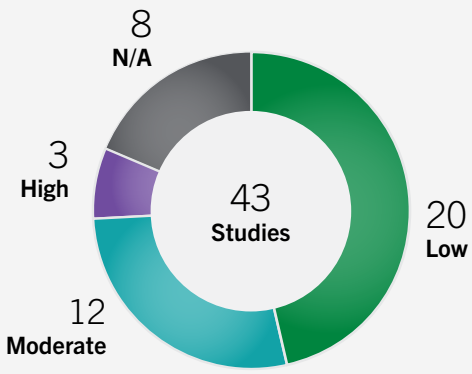
According to the ICER-PHTI Assessment Framework for Digital Health Technologies, the digital health interventions in this report qualify as Tier 3b because they are professionally directed therapeutic services that represent "moderate to severe risk" to patients if they are not effective. The minimum evidence requirements for Tier 3b are RCTs demonstrating clinical efficacy. Other real-world comparative evidence and single-arm studies may be considered as additional supporting data.

Independent reviewers conducted study quality assessments —or risk of bias ratings—on 43 studies with sufficient detail to be rated (see Exhibit 14). The 11 RCTs were rated with the Cochrane Collaboration Risk of Bias in Randomized Trials Version 2 (RoB2), of which six were rated with a low risk of bias and three with moderate risk; two studies could not be rated. The 32 nonrandomized studies were rated with the Newcastle-Ottawa Scale (NOS), of which 14 were rated with low risk of bias, nine with moderate risk, and three with high risk; six studies could not be rated.

There was more robust evidence about the digital wraparound category than the medication-focused category, which primarily consisted of single-arm studies. Further evidence details are described in the category-specific clinical sections.

Exhibit 14

RISK OF BIAS RATINGS FOR CLINICAL STUDIES



Notes: N/A = not applicable. N/A means that studies could not be rated. Risk of bias is assessed for studies, not articles. For ease of interpretation across risk of bias ratings, "Low" refers to original ratings of "Low Risk of Bias" (RoB2) or "Good Study Quality" (NOS), "Moderate" refers to original ratings of "Some Risk of Bias" (RoB2) or "Fair Study Quality" (NOS), and "High" refers to original ratings of "High Risk of Bias" (RoB2) or "Poor Study Quality" (NOS). See Appendix C-1 and C-2 for more detail on risk of bias ratings.

Outcomes Assessed

This evaluation reviewed evidence across eight outcome measures (see Exhibit 15), including primary clinical outcomes that focus on retention on treatment and adherence to MOUD-based care. Other secondary clinical outcomes include opioid abstinence, relapse rates, and user engagement. Outcomes considered in this assessment were informed by the International Consortium for Health Outcomes Measurement (ICHOM) substance-related and addictive disorders outcome measures sets.[114] User experience and health equity measures focused on engagement, satisfaction, access, and distribution.

The primary clinical outcome for virtual OUD solutions was retention on buprenorphine-based treatment, which may be measured as the average number of days or weeks that patients are continuously retained or the proportion of patients retained in treatment at specific timepoints. Given the effectiveness of these medications, clinical experts consistently recommended treatment retention as a primary outcome because it serves as a proxy for (and sometimes directly measures) sustained medication adherence, which is associated with substantial reductions (66–80%) in the risk of overdose and all-cause mortality.[115] The systematic literature review identified 14 comparative studies and nine single-arm studies examining treatment retention as an outcome.

Retention measures varied considerably across studies, including self-reported patient data, clinical attendance records, MOUD prescription fills, and biologic markers such as buprenorphine-positive urine samples. When multiple measures were available, this analysis prioritized medication adherence measures over attendance-based measures. While some trials exclusively enrolled buprenorphine patients, others included mixed populations receiving buprenorphine, methadone, or other medications. For studies with mixed-medication populations, buprenorphine-specific outcomes were prioritized, when available.

There is no consensus in the literature or among clinical experts about what constitutes a minimal clinically important difference (MCID) for OUD retention or related outcomes such as abstinence. Given the elevated risk of overdose after treatment cessation, this report assumes that even modest improvements in retention may reduce mortality and improve long-term outcomes.

Exhibit 15

DETAILED SUMMARY OF CLINICAL, USER EXPERIENCE, AND HEALTH EQUITY OUTCOMES

Primary Clinical Outcomes	Secondary Clinical Outcomes	User Experience and Health Equity Outcomes
RETENTION ON TREATMENT • Days in treatment • Number of visits attended • Proportion of patients retained in treatment ADHERENCE TO MEDICATION • Self-reported buprenorphine use • Buprenorphine-positive urine samples • Days with a buprenorphine prescription	OPIOID ABSTINENCE • Duration of abstinence (e.g., absolute number or percentage of abstinence days) • Frequency of opioid use (e.g., opioid-positive urine samples, self-reported opioid use) PROPORTION/NUMBER OF RELAPSES, OR RATE OF RELAPSE SYMPTOMS OF WITHDRAWAL SAFETY • Adverse events • Crisis events (e.g., suicide attempts)	ENGAGEMENT • Treatment completion rates (e.g., share of all modules completed) • Sessions (e.g., number completed, average duration) • Communications (e.g., responses, total contacts, texts/messages sent, average duration) • App usage (e.g., features used, modules/activities/lessons/exercises completed, completed weekly measures) • Other (e.g., number of videos submitted) SATISFACTION/USABILITY HEALTH EQUITY • Access and accessibility • Distribution

Primary Clinical Outcomes

Fourteen comparative studies examined retention on treatment for patients using virtual OUD solutions that include digital engagement services. These studies show comparable or slightly better treatment retention compared with usual MOUD care.

In the studies reviewed, usual care for OUD generally encompasses outpatient medication treatment with varying degrees of supplemental services. Study participants—whether newly initiated on medication or in the maintenance phase—were predominantly recruited from outpatient MOUD treatment centers that provided medications for OUD as their core service. These centers typically offered additional support services, including case management and counseling, as components of standard care, but typically did not offer services like CM. Most of these centers delivered all care in person, but some integrated telehealth into treatment. While some studies included patients on buprenorphine, methadone, and naltrexone, the majority of participants in the reviewed studies received buprenorphine treatment.

Retention: Time-Based

Five comparative studies measured time-based retention, such as days in treatment and days' supply of medication (Exhibit 16).

Each of these studies showed longer average retention on treatment for enrollees using virtual OUD solutions (staying in treatment from 1–17 percentage points longer as a share of the total study duration) compared with control groups, but only two of the five studies had statistically significant results.

One large, 12-month study with low risk of bias found a statistically significant improvement in retention of 32 additional days for patients using Pear Therapeutics' RESET-O, a PDT delivering CM and CBT, compared with controls.[116]

Another year-long study found patients using WEconnect Health's app-based CM solution alongside standard care were retained 54 additional days compared with matched controls.[117] However, this study's findings may be limited by self-selection bias, as patients could choose their treatment arm and less than 20% of patients opted to use the digital solution. The intervention group also had a significantly higher share of buprenorphine patients at baseline (60% vs. 45%), which may contribute to the observed differences in retention. Two shorter-term studies did not find statistically significant improvements in retention and one study did not test for significance.[118–120]

Exhibit 16

TIME-BASED RETENTION ON TREATMENT OUTCOMES FOR VIRTUAL OUD SOLUTIONS COMPARED WITH USUAL CARE

Study (Risk of Bias)	Company (Solution)	Sample Using Digital Solution[a]	NUMBER OF DAYS RETAINED[b]		Between-Group Difference (Days)[c]	Between-Group Difference (Percentage Points)[c]	Last Reported Timepoint[d]
			Digital Solution Arm	Control Arm			
Tofighi 2023(L)	N/A	64	37	35	2NS	3NS	2 months
Shi 2019(L)	CHESS Health (CBT4CBT)	10	83	69	14NS	17NS	3 months
Velez 2021c(M)	Pear Therapeutics (RESET-O)	444	219	216	3	1	9 months
Velez 2022(L)	Pear Therapeutics (RESET-O)	619	310	278	32*	9*	12 months
Marino 2024(M)	WEconnect Health (N/A)	300	290	236	54*	15*	12 months

Notes: * Statistically significant at p < .05. NS = not statistically significant. (L) = low risk of bias. (M) = moderate risk of bias. [a] Number of patients in the intervention arm of the study. [b] Number of days retained at the last reported timepoint of the intervention period, if available. All outcomes were converted to days for comparability. [c] Between group difference, expressed as a difference in days and as a difference as a percentage of the time period at the last reported timepoint of the intervention period, if available. [d] Last reported timepoint of the intervention period, if available. Timepoints reported in months for comparability. All values are rounded to a whole number; differences may not sum due to rounding.

Two single-arm studies reported time-based retention outcomes, which are difficult to evaluate absent control arms. Another study of RESET-O reported 82% retention (approximately 148 days) at six months based on days' supply of buprenorphine.[121] A study of 27 patients initiating buprenorphine through a medication-focused solution found that patients who successfully achieved buprenorphine stabilization and were retained for the full three-month study period had high rates of buprenorphine-positive urine samples each month (95%, 95%, and 98%).[122] Given differences in study design and duration, it is difficult to compare these single-arm findings to the comparative study results.

Retention: Patient-Based

Six comparator studies measured patient-based retention, such as the share of patients with buprenorphine-positive urine samples and self-reported buprenorphine use. These studies show generally similar results with no change or modest improvements in retention (Exhibit 17).

An observational study of predominantly Medicaid beneficiaries, which occurred during COVID, compared retention rates for patients receiving care from Boulder Care—a virtual MOUD provider—with those receiving a mix of in-person and telehealth treatment.[123] At six months, self-reported retention (having a buprenorphine prescription) was higher for those using the virtual solution than the control group (96% vs. 88%). Although the difference in six-month outcomes was not tested for significance in the study, those using the solution had a significantly lower adjusted risk of discontinuation across all timepoints than the control group.

A study of Pear Therapeutic's RESET-O found that 71% of patients using RESET-O were retained in treatment compared with 52% of patients receiving usual care at six months—a 19 percentage point difference that was not tested for significance in preliminary data.[124] Another study of RESET-O found that retention was significantly higher for those using the solution than those who were not (88% vs. 55%) at three months.[125] A separate trial of Therapeutic Education System (TES), an earlier version of RESET-O, also found higher retention for those using the solution than those who were not (82% vs. 68%) at three months.[126]

By contrast, two studies showed no statistically significant difference in outcomes. One study recruited patients who were not in medication treatment at baseline. While CM incentives increased initial treatment enrollment (71% vs. 30%), there was no significant difference in retention (based on buprenorphine-positive urine samples) at six months.[127]

Exhibit 17

PATIENT-BASED RETENTION ON TREATMENT OUTCOMES FOR VIRTUAL OUD SOLUTIONS COMPARED WITH USUAL CARE

Study (Risk of Bias)	Company (Solution)	Sample Using Digital Solution[a]	SHARE OF PATIENTS RETAINED[b]		Between-Group Difference (Percentage Points)[c]	Last Reported Timepoint[d]
			Digital Solution Arm	Control Arm		
Rozycki 2022[(N/A)]	Pear Therapeutics (RESET-O)	40	88%	55%	32*	3 months
Maricich 2021b[(L)]	Pear Therapeutics (TES)	91	82%	68%	14	3 months
Chan 2024a[(M)]	Boulder Care (N/A)	103	96%	88%	8	6 months
Kawasaki 2024[(N/A)]	Pear Therapeutics (RESET-O)	48	71%	52%	19	6 months
Holtyn 2021[(M)]	N/A	21	16%	20%	–4[NS]	6 months
Gustafson 2024[(L)]	CHESS Health (A-CHESS)	46[e]	65%	64%	2	16 months

Notes: * Statistically significant at p < .05. N/A = not applicable. NS = not statistically significant. TES = Therapeutic Education System. (L) = low risk of bias. (M) = moderate risk of bias. (N/A) = risk of bias could not be rated. [a] Number of patients in the intervention arm of the study. [b] Share of patients retained at the last reported timepoint of the intervention period, if available. [c] Between-group difference at last reported timepoint of the intervention period. [d] Last reported timepoint of the intervention period, if available. Timepoints reported as months for comparability. [e] Outcomes for subpopulation of patients taking buprenorphine; full sample using digital solution is 208. All values are rounded to a whole number; differences may not sum due to rounding.

A long-term, unblinded RCT compared patients that reported taking buprenorphine in an MOUD treatment program who did or did not receive CHESS Health's A-CHESS app (including motivational content, social support, and coping tools) and found 65% (30/46) of patients receiving A-CHESS were retained, compared with 64% (28/44) receiving usual care.[128]

Two studies reported outcomes for patients in periods before and after receiving Q2i's OARS app. One long-term study found no significant difference in retention (meeting attendance) when patients received the app (20% in pre-period vs. 27% in post-period).[129] Another long-term study with preliminary data also found no difference in retention rates (buprenorphine-positive urine samples) when patients received the app (92.0% in pre-period vs. 92.3% post-period).[130]

One study of patients with concurrent stimulant use disorder reported a visit-level retention metric. At four months, those using DynamiCare's CM digital solution had a significantly higher rate of attending scheduled appointments than patients receiving usual care (52% vs. 34%).[131]

Retention results from seven single-arm studies are hard to interpret absent control arms. One small single-arm pilot study of 25 patients using a digital OUD solution found that 56% were retained at six months.[132] Another small study found that 66% of patients using a CBT-based solution were retained at two months.[133] A retrospective cohort study of rural patients using a medication-focused solution found that 69% were taking buprenorphine at one month, 56% at three months, and 49% at six months.[134] Another retrospective study found that 73% of patients initiating MOUD treatment were retained for at least three months.[135] A study reporting at six and 12 months found that 56% of patients who initiated buprenorphine treatment at baseline were retained at six months.[136] A small study with high risk of bias found 57% of pregnant women using a medication-focused solution were retained six weeks postpartum.[137] Another small study (n = 20) of patients using a CM solution with a history of stimulant use disorder found that 55% were adherent to buprenorphine on more than 90% of opportunities over three months.[138]

Summary of Primary Outcomes

Based on PHTI's review of the clinical evidence, virtual OUD solutions deliver comparable or slightly better treatment retention than usual MOUD care. While statistical significance of study results is mixed, directionally all but one study shows higher treatment retention in virtual solutions. Improvements—either as a share of patients retained or a share of the study duration retained—range from 14 to 32 percentage points at three months and appear to taper down over time, ranging from nine to 15 percentage points at 12 months (Exhibit 18). Across studies, the weighted average improvement in retention for patients using virtual solutions is estimated to be 13 days at six months of follow up, compared with control arms (see **Appendix A** for details on methodology).

Expanding Access and Treatment

With only one in four people with OUD receiving evidence-based treatment, another important outcome measure is the ability of virtual solutions to improve convenience and access to care, ultimately resulting in more patients getting treated. To evaluate how these solutions impact access to care, the assessment looked for evidence that virtual solutions are disproportionately treating patients who would not otherwise enroll in medication-based treatment programs.

Studies in the clinical evidence review largely recruited participants who were already receiving or seeking MOUD treatment, rather than recruiting previously untreated patients. PHTI also collected data from the companies included in the assessment about their mix of patients between those previously receiving MOUD treatment, other treatments, and no treatment. This data showed that most digital solutions are serving a similar mix of patients to those treated in traditional, in-person care settings. Based on the available literature and company-reported data, there is currently no indication that virtual solutions are reaching a disproportionate share of new-to-treatment patients or materially expanding overall access to MOUD. Additional research explicitly designed to assess the impact of virtual care on expanding access to care is needed and solutions should focus on strategies to increase the number of people treated.

Exhibit 18

COMPARATIVE STUDY RESULTS OF BETWEEN-GROUP DIFFERENCE IN RETENTION OUTCOMES FOR VIRTUAL OUD SOLUTIONS VERSUS CONTROL ARMS

Notes: The between-group difference in retention to treatment outcomes are shown at the last timepoint of the intervention periods.

Secondary Clinical Outcomes

In addition to improving retention on treatment, patients and providers prioritize outcomes such as abstinence from opioid use, relapse prevention, and attenuation of withdrawal symptoms. The evidence for these secondary outcomes varies in both quality and quantity. All studies reporting on secondary outcomes are listed in the **online data supplement**.

Abstinence and Relapse

Clinical advisors and professional societies deemphasize abstinence as a primary goal for treatment, favoring retention and continuity of care as core outcomes. However, long-term abstinence remains a goal for many patients and family members and improves both clinical and functional outcomes. Fourteen studies in this review report abstinence rates, measured by urine screening or self-report. Among the nine comparator studies of interest, evidence was mixed: Five studies demonstrated statistically significant improvements in abstinence rates for digital-solution users compared with control arms, while two found no significant improvement between groups (see **Appendix E**). Two studies had mixed results and did not test the difference in abstinence rates for significance. Overall, while opioid abstinence rates range widely across studies, there is some evidence suggesting that using digital solutions may improve abstinence relative to controls.

Two comparative studies that examined relapse rates (i.e., the occurrence of an OUD hospitalization, emergency department visit, detoxification, or a change in OUD diagnosis code away from OUD remission) found no significant differences between participants using digital solutions and those receiving usual care.[139, 140]

Safety

The evidence suggests that virtual solutions for OUD present minimal safety risks, with low rates of unexpected or serious adverse events among virtual solution users, similar to those observed in control arms. Based on six studies, five of which were comparative studies, digital solutions were generally well-tolerated and were not associated with material safety concerns. No studies reported crisis events.

User Experience

To help patients stay in treatment and adhere to medications, virtual solutions must engage patients and deliver a strong user experience. Across the studies in this report, those using virtual solutions reported high satisfaction and usability scores. Evidence on engagement with digital solutions was more variable, generally peaking in the beginning of use and declining over time. Varied engagement rates reflect the chronic, relapsing nature of OUD and underscore the challenge of sustained engagement over time.

Engagement

Engagement with virtual solutions for OUD varied substantially across studies, with metrics ranging from average module and activity completion to time spent messaging providers. This heterogeneity in reported metrics limits direct comparisons, but the evidence suggests patterns of early engagement followed by a gradual decline.[141–145] Two studies assessed engagement across demographic groups and found comparable engagement rates by age, sex, race, and ethnicity.[146, 147]

Satisfaction and Usability

User satisfaction and usability metrics help determine whether digital solutions meet user expectations and can easily be integrated into their lives, which is essential for promoting sustained engagement and adherence to MOUD treatment protocols.

Across 12 studies, patients generally reported high satisfaction with digital solutions. Satisfaction scores often exceeded 4.0 on a five-point scale.[148–152] Patients indicated they were very likely to recommend the solution to others[153, 154] and reported that these solutions helped them remain in treatment.[155–157] Studies using other scales, such as a four-point Likert scale and a visual analog scale ranging from 0 to 100, showed similarly positive results.[158–160] One comparative study found that patients using a virtual OUD solution and those receiving hybrid in-person and telehealth care reported similar scores for satisfaction and usefulness on the five-point Telehealth Usability Questionnaire scale.[161]

Ease of use across different digital solution platforms received high ratings, with patients emphasizing easy navigation and account setup.[162–165]

Health Equity

Few studies stratify their results by demographic group; results from those that do suggest that virtual OUD solutions can be effective across diverse populations (see **online data supplement** for more detail on demographics). Study samples were primarily composed of white participants aged 30–50, with slightly higher female representation than male. Notably, older adults and individuals in rural areas experienced higher retention than those who are younger or in urban areas, suggesting that virtual care could improve outcomes for underserved populations. Conversely, individuals facing housing instability or relying on Medicaid may be less likely to remain in care, highlighting the need for targeted strategies to support these high-needs groups. The limited amount of evidence about diverse patient populations highlights the need for more inclusive research to ensure that virtual solutions reduce existing disparities in OUD treatment.

Geography: Geographic representation in study demographics is limited, with only seven articles reporting baseline geographic location characteristics. Among these, one study that examined a primarily rural population that received a virtual solution found participants living in rural areas had significantly higher rates of retention than those in less rural areas. Specifically, retention rates at six months were 49.6% for those living in large rural areas, 55.5% in small rural areas, and 57.3% in isolated rural areas.[166] Two additional studies that examined both rural and nonrural participants found no significant associations between geographic location and treatment retention or user experience satisfaction with a virtual solution.[167, 168] These findings suggest that while geographic representation remains limited, virtual solutions may be effective in improving retention to care for rural residents, where in-person OUD treatment options may be limited.

Race/Ethnicity: Only two studies evaluated treatment outcomes by race/ethnicity, with mixed results. One study did not find significant differences in retention rates for Hispanic participants enrolled in a virtual OUD solution compared with white participants.[169] In another study, Hispanic and white participants demonstrated a significantly higher percentage of total weeks abstinent in the digital intervention arm compared with the control arm, though race and ethnicity were not associated with differences in retention to care.[170]

Gender: Solutions for OUD are generally investigated in study populations with balanced gender representation, though female participation slightly exceeds male, and analysis of gender-based differences in retention outcomes is limited. Three studies examined treatment retention by gender and found slightly higher rates among female participants when using a digital intervention, though none reached statistical significance.[171–173] One study also found that men in treatment tended to have fewer weeks of opioid abstinence.[174]

Age: Only two articles examined the clinical effectiveness of virtual OUD solutions across age groups. One study found virtual solutions were more effective in improving retention among people older than 30 compared with younger populations.[175] Another study reported that older age was significantly associated with higher retention rates in the digital intervention arm.[176] Two studies found no significant differences in engagement levels across age groups using virtual solutions.[177, 178]

Housing Status: Across seven articles that reported housing status, the majority of participants lived in stable or housed conditions, though a notable minority ranging from 1% to 29% experienced housing instability. One study found statistically significant differences in retention by housing status for patients using a virtual solution, with 57% of participants in stable housing retained at six months compared with 40% of those in unstable housing.[179]

Insurance Status: Among the 10 articles that reported insurance status, the majority of study participants had Medicaid coverage, followed by commercial coverage, Medicare coverage, and no insurance. One study found significant differences in retention by insurance status for patients using a virtual solution. Patients with commercial insurance and Medicare had higher rates of retention at six months (71% and 66%), with only 50% of patients with Medicaid retained on care.[180]

Solution-Specific Clinical Outcomes

Only 10 of the 16 companies included in this report produced evidence about the clinical effectiveness of their solutions that met inclusion criteria (Exhibit 19). Those company studies make up approximately a third of the literature review and three-fourths of comparative studies. The solution RESET-O, a PDT developed by Pear Therapeutics that was acquired by PursueCare, made up the majority of the company-sponsored evidence in the literature review. However, the features evaluated in these studies vary and RESET-O's solution was examined as a digital wraparound solution, whereas PursueCare delivers a medication-focused solution. After RESET-O, the digital wraparound solutions—including CHESS Health, Q2i, and DynamiCare—made up a substantial portion of the comparative studies with low and moderate risk of bias. CHESS Health had the most comparative evidence.

Given that most digital solutions in this report are 7–10 years old, many have a surprising lack of clinical evidence. Six companies had no evidence that met inclusion criteria for this report: Affect Therapeutics, Aware Recovery Care, Better Life Partners, Eleanor Health, Groups Recover Together, and Wayspring. Evidence was particularly limited for the medication-focused solutions. As a result, it is unclear whether fully integrated virtual programs that combine MOUD treatment with support services improve care coordination and overall clinical outcomes. This review found no evidence about whether these solutions—as a result of convenience or by increasing the volume of MOUD providers—improve access to care and result in more people receiving needed OUD treatment.

> **"A continuum of care suggests coordination across that continuum.**
>
> That kind of coordination rarely exists, and it's especially rare for the people who need it the most."
>
> —Dr. Joe Wright

Medication-Focused Solutions

Bicycle Health

One single-arm study from Bicycle Health with a high risk of bias met inclusion criteria.[181] The study assessed the teleMOUD program, which offered live one-on-one therapy, group support, and peer support using a survey tool that measured drug use, cravings, and other factors. After one month, the survey found statistically significant increases in protective factors and decreases in risk factors, with the share of participants reporting zero days of opioid use increasing by 23 percentage points.

Boulder Care

One comparative study from Boulder Care resulted in three articles that all assessed the teleMOUD program with the feature of peer support.[182–184] The study had a moderate risk of bias and evaluated buprenorphine discontinuation in patients with OUD initiating buprenorphine virtually compared with those who received in-office treatment, though the COVID-19 pandemic interrupted the study procedure and led some patients in the control group to receive telehealth services. Buprenorphine discontinuation rates among the participants —who were predominantly white, unemployed, and Medicaid recipients—were lower in the telehealth-only intervention group than the treatment as usual group with selective telehealth participation (4% vs. 13%) at approximately six months.

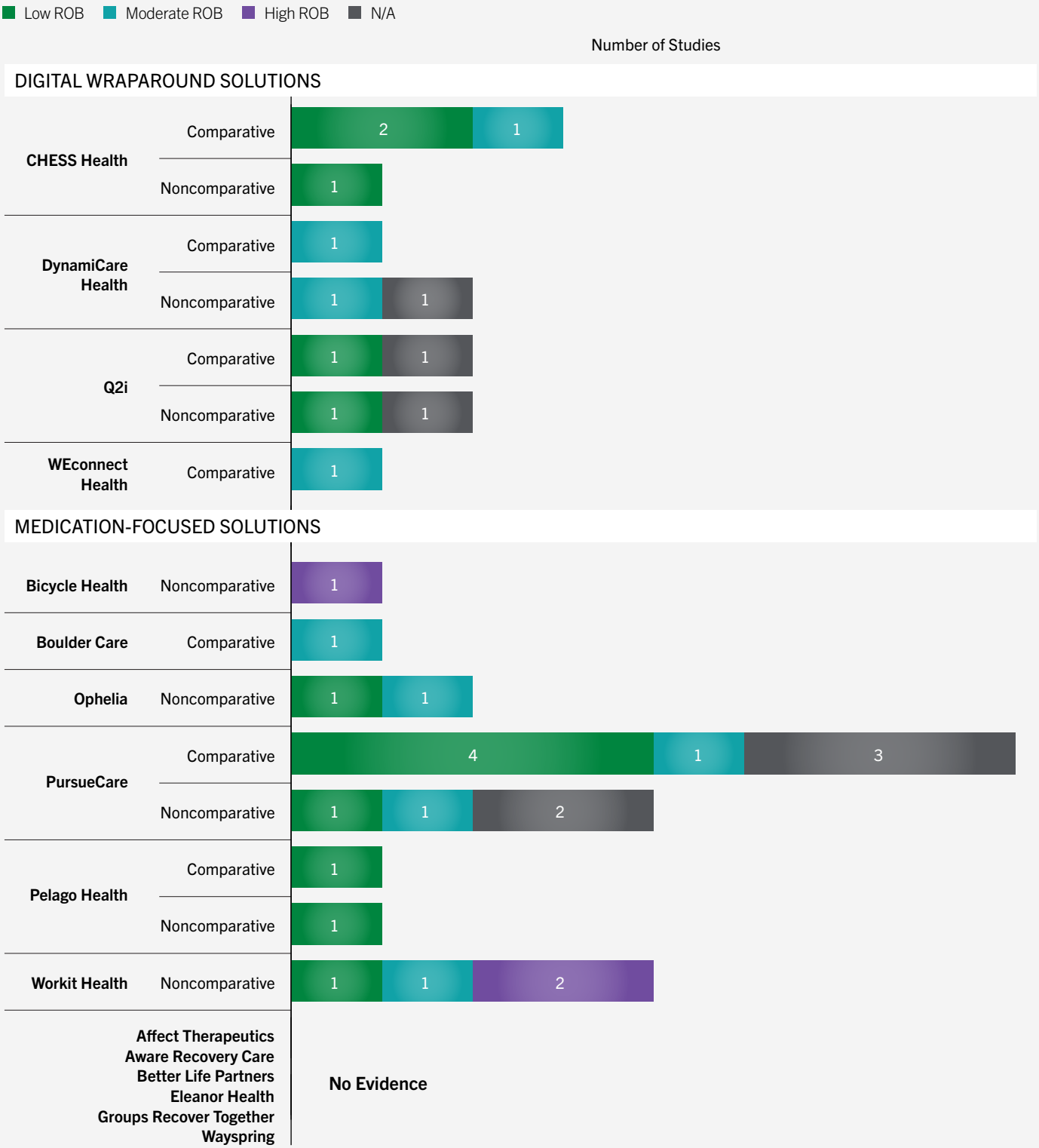
Ophelia

Two single-arm studies from Ophelia met inclusion criteria; both evaluated the teleMOUD platform with additional live therapy, drug testing, and care coordination. One of the studies had a moderate risk of bias and found that 56% of patients were retained in treatment at six months and 48% at one year, with no significant differences by geography, sex, race, or ethnicity.[185] The other study had a low risk of bias and found that among patients retained for more than three months, those with high baseline recovery capital† (measured by BARC-10) maintained it at four months, while 87% of patients with low baseline recovery capital experienced increases in recovery capital while in care.[186]

† Recovery capital refers to the psychological, physical, social, and environmental resources an individual can draw on during their recovery.

Exhibit 19

RISK OF BIAS OF CLINICAL STUDIES, BY COMPANY



Notes: ROB = risk of bias. N/A = not applicable. The 12 PursueCare studies assess Pear Therapeutics solutions. For ease of interpretation across risk of bias ratings, "Low" refers to original ratings of "Low Risk of Bias" (RoB2) or "Good Study Quality" (NOS), "Moderate" refers to original ratings of "Some Risk of Bias" (RoB2) or "Fair Study Quality" (NOS), and "High" refers to original ratings of "High Risk of Bias" (RoB2) or "Poor Study Quality" (NOS). No evidence indicates that no evidence met the inclusion criteria of the systematic literature review.

Pelago

Two studies on Pelago—from the literature review and company submissions—met inclusion criteria. One comparative study with low risk of bias reported healthcare resource utilization findings, detailed in the company economic section below.[187] One small single-arm study (n = 27) with low risk of bias evaluated a teleMOUD platform including counseling, group support, and digital CBT modules over three months.[188] Of the 78% of patients who were retained for the full study period, 71% reported being abstinent for the last 30-day period and 67% reported full 90-day abstinence.

PursueCare

A total of 19 articles met inclusion criteria across 12 studies. Of these, eight were comparative studies and four were single-arm studies. These studies generally looked at RESET-O, a PDT with digital CBT modules and CM; many but not all of the studies included CM in their intervention. Twelve of the articles reported healthcare resource utilization findings, detailed in the company economic section below.

Three comparative studies with low risk of bias assessed the Therapeutic Education System (TES), a CBT program that preceded RESET-O. One study found that adding TES to treatment as usual had a statistically significant improvement in abstinence in months 2–3, compared with treatment as usual.[189] The additional comparative studies reported high satisfaction with TES and identified age, gender, ethnicity (Hispanic), and race (white) as statistically significant predictors of better opioid abstinence outcomes over 12 months.[190, 191] A related single-arm study with a low risk of bias showed that 55% of patients remained active on the app at three months.[192]

Additional studies on RESET-O showed mixed results. An NIH-funded clinical trial found higher six-month retention rates for the PDT group (70.8% vs. 51.9%), though urine drug screen results showed similar rates of opioid abstinence among both groups.[193] Another comparative study on RESET-O found that participants opting into the PDT showed a significantly higher abstinence rate in the last month of the program (77.5% vs. 51.9%).[194] Other studies found some secondary benefits.[195–197]

Workit Health

Four single-arm studies from Workit Health met inclusion criteria, evaluating different aspects of a teleMOUD platform that offers individual and group counseling and coordinates care for patients. One study with low risk of bias showed that rural patients receiving buprenorphine on this platform—the majority of whom were on Medicaid—had 52.3% retention and 49.2% buprenorphine adherence at six months.[198] A study with moderate risk of bias examining home delivery of buprenorphine showed that at six months, 78.6% of patients who opted into home delivery were retained in treatment, compared with 45.5% among those who did not opt in.[199] A study with high risk of bias demonstrated that 79.8% of pregnant patients on the platform maintained continuous OUD treatment throughout pregnancy, with patients who became pregnant after initiating treatment more likely to do so.[200] Another study with high risk of bias showed that patients in telehealth OUD treatment were highly satisfied with care and experienced strong provider-patient relationships, with no statistically significant differences between patients in rural versus nonrural groups.[201]

Digital Wraparound Solutions

CHESS Health

Three studies from CHESS with low risk of bias and one study with a moderate risk of bias were found in the literature review. Two articles from the same RCT found no statistically significant differences in abstinence over 24 months between patients receiving MOUD alone versus those receiving MOUD plus the CHESS Health platform, which included therapy modules, peer support, and group support. However, in one of the articles, abstinence among patients without withdrawal symptoms had a statistically significant increase for the intervention group (odds ratio, 1.3).[202] In the other article from the same study, no differences in hepatitis C virus (HCV) testing uptake were found between those who received HCV information through the CHESS Health platform and the control group.[203] Another comparative study with low risk of bias assessed patients receiving MOUD alone versus patients receiving MOUD plus CBT modules over three months. The study found that patients receiving MOUD alone completed fewer days of treatment compared with the intervention group (69 vs. 83 days), although the difference was not significant. The intervention group had a significantly greater percentage of urine samples that were negative for opioids compared with the MOUD-only group (91% vs. 64%).[204] The comparative study with moderate risk of bias found that among women in a residential SUD treatment center, patients using CBT modules in addition to MOUD showed improvement in coping skills compared with those receiving MOUD alone, though this was not statistically significant.[205]

One single-arm study found that adding CBT modules to standard treatment with methadone did not moderate the effects of perceived stress on opioid use outcomes.[206]

DynamiCare Health

A total of three studies—two comparative and one single-arm study—from DynamiCare that evaluated the CM platform with a variety of additional features met inclusion criteria. Two moderate risk of bias articles from the same study assessed outcomes for patients with concurrent stimulant use disorder, the vast majority of whom (95%) had OUD as their primary diagnosis. The intervention group, which used CM and CBT modules, had significantly higher rates of drug abstinence and clinic attendance between two and four months.[207] A second article from the same study found similar trends in an inner-city outpatient setting.[208]

A second study—an RCT—compared three configurations of CM (incentives tied to abstinence outcomes, behavioral inputs, and abstinence outcomes plus the use of CBT content).[209] At week 12, 85.7% of participants in the abstinence-based incentives group had opioid-negative saliva tests, compared with approximately 60% in the other two intervention arms.

A single-arm study with a moderate risk of bias evaluated a CM platform integrated with peer recovery coaching support for patients with OUD. The platform demonstrated effectiveness in promoting adherence to buprenorphine treatment, with an overall rate of confirmed buprenorphine adherence of 76% over three months.[210]

Q2i

Four studies from both the literature review and company submission were included for Q2i. Early evidence from a clinical trial assessed Q2i's OARS program enabled by their software, which includes messaging with provider teams, educational content, and peer support, in addition to MOUD treatment. The comparator study without a risk of bias rating found that patients had nearly identical rates of appointment attendance and urine drug testing, with similar percentages of participants with buprenorphine-positive urine tests before and during the pilot.[211] A comparative study with low risk of bias assessed the OARS program in patients receiving MOUD treatment compared with the period four months before using OARS. The study found that compared with treatment as usual, patients during the OARS period had significantly more urine drug tests than during the treatment as usual period (33% vs. 13%) but no significant difference in appointment attendance.[212]

Two single-arm studies assessed the implementation of the OARS program in primary care settings. One study without a risk of bias found that 89% of patients using OARS had no opioid-positive urine drug testing and 64% had no missed appointments over the nine-month study period; in addition, providers reported in interviews that the program improved communication and eased viewing patient progress.[213] The other study—which had low risk of bias—found that patients receiving MOUD treatment did not frequently view test results or educational content, and staff reported greater perceived value in the program than reported patient usage suggested.[214]

WEconnect Health

WEconnect produced one comparative study with moderate risk of bias. The study assessed patients who received MOUD alone compared with those who received MOUD plus additional app-based CM and peer-support interventions across OTPs and OBOTs. The study found that compared with patients who chose to receive MOUD only, those who chose to receive MOUD plus CM reported significantly fewer days of opioid use at 12 months or at their last appointment before dropping out of treatment (8.4 days vs. 12.0 days.) Additionally, patients in the MOUD plus CM group showed significantly more days in treatment (290 days vs. 236 days) over the course of one year.[215]

Evidence Limitations

While the literature review identified a body of evidence that includes numerous well-designed comparative studies, there were several notable limitations.

One of the primary challenges in this assessment is not having an established threshold for MCID in outcomes. When available, PHTI uses MCID to establish a threshold for clinical impact, beyond study-specific statistical significance. Absent MCID, this assessment is forced to rely more heavily on statistical significance, which was mixed in the primary clinical outcomes. Furthermore, many of the studies in this review were small—enrolling 150 or fewer patients—and, thus, may have had limited statistical power. For primary outcomes, there was a relatively even distribution between studies that found significant improvements in retention, those that found no statistically significant difference, and those that did not test for significance when examining between-group differences in retention.

In addition, the absolute results for average treatment retention varied widely across studies, depending on study design, follow-up duration, patient demographics, and the retention metric used. Given the chronic nature of OUD, studies with shorter durations may not have been long enough to demonstrate a meaningful impact on retention or adherence. These limitations make the findings of the systematic review less conclusive relative to other PHTI assessments in which study results have been more consistent across the evidence base. It also limits the ability to draw conclusions from single-arm studies by aligning their results to those from comparative studies as a proxy for understanding the magnitude of clinical improvements.

Some studies in this assessment allowed patients to self-select into the treatment arm, potentially inflating the observed benefit of digital solutions. Most studies were conducted at single sites with specific patient populations and treatment protocols, limiting the generalizability of findings. Retrospective claims analyses with larger and potentially more diverse populations present other limitations, such as selection bias from enrollment requirements and lack of clinical detail.

Additionally, while mortality represents a key outcome of OUD care for society, most studies evaluated were not sufficiently powered to assess mortality.

Finally, the body of evidence may not reflect the full breadth of patients with OUD. While study samples did include people with housing instability (range, 1–29%), criminal justice involvement (25–82%), and varying levels of insurance coverage, they may not fully represent the broader spectrum of individuals with OUD, particularly across different levels of disease severity. Additionally, virtual solutions require baseline digital literacy and reliable technology access, potentially excluding patients who lack these resources. Individuals with active addiction, unstable housing, or acute medical and psychiatric needs may face barriers to both treatment entry and research participation, and thus findings from the analysis may not apply to patients with the most severe OUD.

While PHTI was able to draw meaningful conclusions from the available evidence, the limitations of the data and the marginal differences in clinical effectiveness for the assessed solutions highlights the need for further innovation in the OUD space. Continued development of more impactful solutions is essential to better serve this large and critically underserved population.

Economic Impact

Health plans, employers, and state health agencies cover virtual OUD solutions to improve health outcomes for patients. Providers may also purchase digital engagement solutions to enhance their MOUD treatment by improving patient recruitment and retention.

If these solutions deliver better treatment retention, they also have the potential to reduce overall healthcare spending. People with untreated or poorly managed OUD experience substantially higher healthcare spending as a result of a variety of healthcare needs, including more frequent emergency department visits and overdose-related hospitalizations.[216] Treatment with evidence-based MOUD—such as buprenorphine, naltrexone, or methadone—is highly correlated with lower rates of relapse, overdose, and medical complications. Studies have found that patients with OUD who are not receiving MOUD have approximately 30% higher monthly healthcare costs than patients treated with MOUD.[217]

Longer retention on MOUD treatment is associated with reduced overall healthcare utilization and net costs for individuals with OUD. Improved treatment adherence increases pharmaceutical spending and physician visits—tied to MOUD treatment—and reduces spending on high-cost services like inpatient admissions and emergency department visits, leading to overall net savings.[218, 219] Accordingly, purchasers may realize lower overall healthcare spending if digital interventions can effectively extend MOUD treatment and improve adherence.

Budget Impact Model Methodology

The budget impact model seeks to estimate the expected one-year change in total healthcare spending that results from offering virtual solutions for OUD to a hypothetical one-million member plan. The model estimates the number of people who receive MOUD who would use the virtual solution, the gross reduction in expected healthcare spending resulting from increased retention in treatment for patients enrolled in these programs, and the net impact on health system spending once such savings are offset by spending on the virtual solutions.

Based on the clinical effectiveness results above, the budget impact model estimates the impact of virtual solutions for OUD on healthcare spending.

There are three primary components of the budget impact:

1. **Eligible population:** The total number of patients currently treated with MOUD who may engage with a virtual solution, if broadly implemented;
2. **Reduced costs from health improvements:** The net changes in healthcare spending that result from increased retention in treatment under usual care and virtual solutions; and
3. **Technology price:** The price paid to a virtual solution company under a contractual agreement.

These components come together to estimate the net impact on healthcare spending per user of a virtual OUD solution and the overall per member per month impact of that spending across all enrollees in a hypothetical one-million-member plan.

Eligible Population

The model estimates the number of adults who are treated with MOUD across commercial insurance, Medicare, and Medicaid. In the United States, the proportion of adults with OUD is 3.7% in commercial insurance, 1.6% in Medicare, and 7.5% in Medicaid.[220–222]

Nationally, approximately 25% of commercially insured patients receive MOUD treatment (15% of Medicare and 25% of Medicaid) and roughly 75% of patients remain untreated.[223] Vendor-supplied estimates indicate that, on average, 27% of patients using virtual solutions were previously in MOUD treatment and 73% were new to MOUD treatment. Since this closely mirrors the national treatment gap, these figures suggest virtual OUD solutions are reaching the same proportion of untreated patients as usual care providers. As such, the model does not assume any change in the percentage of previous treatment history (new to treatment, previously in MOUD treatment) of patients for virtual solutions versus in-person treatment providers. Therefore, up to 0.7% of commercial enrollees, 0.2% of Medicare beneficiaries, and 0.9% of Medicaid

beneficiaries treated with MOUD are eligible to receive either a medication-focused or digital wraparound solution (Exhibit 20). When estimating the budget impact of these solutions, the model assumes a 25% participation rate in virtual OUD solutions among all eligible individuals.

Reduced Costs from Health Improvements

The budget impact model uses published literature to estimate healthcare spending impact due to improvements in treatment retention between individuals receiving usual care and those enrolled in a virtual solution. The model assumes that the clinical improvements achieved by virtual OUD solutions will be sustained for a full year, despite most studies having shorter follow-up periods. As a result, healthcare costs avoided from improved clinical outcomes may be over- or underestimated.

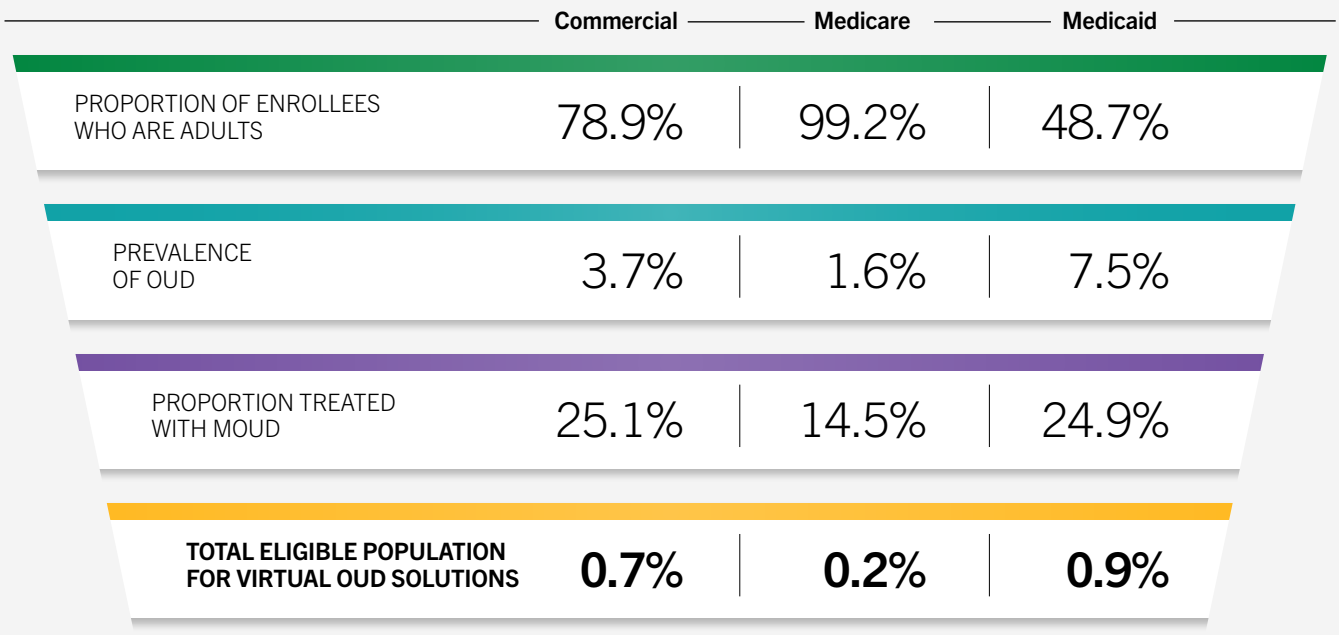
A real-world analysis using 2014 commercial claims examined annual healthcare spending for people with OUD initiating buprenorphine treatment and stratified by adherence groups based on the proportion of days covered by buprenorphine over a 12-month treatment period.[224] These estimates include inpatient, outpatient (emergency department, physician office visits, other outpatient), medical, and pharmacy costs (including buprenorphine costs). Patients were grouped on the basis of their adherence level and total healthcare costs were adjusted for differences across groups, including age, sex, insurance plan type, other SUDs, behavioral health disorders, and chronic pain conditions. Over a year, patients retained for fewer than 20% of days covered were estimated to have approximately $6,912 higher annual healthcare costs, on average, than patients retained for at least 80% of days. The model assumes an overall linear relationship between annual spending and days adherent, for an estimated savings of $29 per additional day adherent in 2024 dollars.[‡, 225]

The budget impact model uses the comparative clinical studies identified in the systematic literature review of primary outcomes to estimate the weighted average days of retention in treatment for the virtual solutions and usual care. The average duration of days retained in treatment at six months for patients receiving virtual solutions was 150 days compared with 137 days for patients receiving usual care—a difference of 13 days.

By applying the average increase in days retained from the clinical evidence, the model estimates the expected per person decrease in healthcare spending that results from improved retention outcomes for those using virtual solutions. For instance, in the commercial market, people with OUD who

Exhibit 20

ESTIMATING THE ELIGIBLE POPULATION FOR VIRTUAL OUD SOLUTIONS



‡ Costs were inflated to 2024 U.S. dollars using the annual consumer price index for medical care.

Exhibit 21

ESTIMATED DIFFERENCE IN DAYS RETAINED ON MOUD TREATMENT AND ASSOCIATED ANNUAL HEALTHCARE SPENDING PER PATIENT

		Average Annual Spending Per Patient, by Payer		
Treatment Arm	**Weighted Average Days Retained in Treatment**	**Commercial**	**Medicare**	**Medicaid**
Usual Care	137	$29,233	$32,160	$25,920
Virtual Solution	150	$28,862	$31,752	$25,590
Change in spending resulting from health improvements	**13**	**–$372**	**–$409**	**–$329**

receive usual care are retained in treatment for 137 days and have an estimated annual spend of $29,233. If those people engage with a virtual solution and it is assumed that their days retained in treatment increases by 13, they would have a projected average duration of treatment of 150 days and an estimated annual spend of $28,862. Thus, this improvement in retention predicts that per virtual solution user, healthcare spending would decrease by $372 per year before accounting for solution costs. Estimated annual spending per patient on MOUD treatment for the virtual solution was less than usual care by $409 for Medicare and by $329 for Medicaid (Exhibit 21).

Research indicates that standard, health plan–specific, payment-rate conversions for outpatient services may underestimate the disproportionately high healthcare costs associated with OUD in Medicare and Medicaid populations.[226, 227] To account for this, spending for Medicare and Medicaid are adjusted using published literature that analyzed total OUD-related healthcare costs by specific payer perspectives (see conversion ratios in **Appendix A**).

Studies reported retention measures as a proportion of patients retained in treatment or as days retained in treatment. For studies that reported the proportion of patients, retention measures were converted to average duration of days using a restricted mean survival time approach. Calculations assumed that the retention proportion reported at each timepoint represents the average retention over the preceding interval (see methodology details in **Appendix A**).

Technology Price

To estimate the overall spending impact of virtual OUD solutions, the model offsets the price of the virtual solution provided to the entire member plan from the healthcare savings.

Medication-focused solutions are primarily contracted to health plans as in-network providers that play the same role as in-person, office-based providers for buprenorphine. These solutions offer the same type of services, such as MOUD prescribing, behavioral health services, CM, peer and group support, at-home drug testing, and online provider-patient messaging. The pricing of medication-focused solutions generally reflects that of in-person MOUD programs, with variations driven by differences in payment models and monthly reimbursement rates across payers for care coordination and therapy-related services. Costs for MOUD are billed separately through the patient's local pharmacies—at an approximate cost of $150 per month—and are not included in pricing estimates for the virtual solutions. The model accounts for the cost of MOUD in the annual healthcare spending estimates as described above for both the virtual solution and usual care arms.

Commercial payers typically contract with medication-focused solutions under fee-for-service models or alternative payment arrangements. Because of the diversity in plan design and negotiated agreements, vendor-supplied pricing for commercial contracts ranges widely from $300 to $800 per month; estimated average monthly pricing is $409.

Under Medicare, medication-focused solutions are reimbursed either through monthly bundled payments or fee-for-service rates that may include patient management, care coordination, individual and group therapy, and substance use counseling.

Monthly bundled payments in the initial month include intake, assessment, and 70 minutes of services (HCPCS code G2086) at a rate of $463, and for subsequent months (HCPCS code G2087) a monthly rate of $427.[228] Additional vendor-supplied pricing information for Medicare ranged from $350 to $400 per month, for an average of $379, reflecting lower reimbursement rates for patients who do not require therapy—and, therefore, are not billed for full bundled services.

Medicaid reimbursement varies by state and program design. Some states reimburse medication-focused solutions on a fee-for-service basis, while others use bundled payment models similar to Medicare.[229] In some cases, medication-focused solutions are reimbursed under a negotiated case rate agreement with Medicaid managed-care plans that includes additional services, such as CM, digital app access, and at-home drug testing. Vendor-supplied Medicaid rates ranged from $150 to $500, for an average of $333 per month. Published literature on 2021 Medicaid rates reflected similar price variation across states, ranging from $103 to $648 per month for opioid treatment programs, and averaging $313 per month in 2024 dollars.[230]

Overall, the pricing of medication-focused solutions is generally reflective of established reimbursement rates across Medicare, Medicaid, and commercial payers for in-person MOUD treatment. Therefore, the model assumes equal payment for virtual medication-focused solutions and usual MOUD care for buprenorphine.

Digital wraparound solutions are typically sold to health plans and employers as digital tools that augment in-person MOUD treatment. These solutions may include educational content, CM, at-home drug testing, and group and peer support. Vendor-supplied pricing for digital wraparound services without CM varied widely, ranging from $18 to $250 per user per month, depending on the support services offered. Standard CM protocols for stimulant use disorder in Medicaid include a maximum of $599 over a six-month period, for an average of $100 per month.[231, 232] Therefore, pricing estimates for digital wraparound solutions inclusive of standard CM rewards range from $118 to $350 per user per month. To reflect the duration patients typically remain on MOUD, based on retention estimates from clinical literature, the model assumes an average cost of $205 per user per month for five months—or an annual program cost of $1,025 per user across all payers.

Actual prices charged by specific solution vendors or negotiated by particular purchasers may vary and would impact these results.

Change in Overall Spending

The budget impact model estimates that **medication-focused solutions** will slightly decrease total healthcare spending across all payer types because of health savings from longer average retention in treatment (Exhibit 22). Assuming 25% participation in a million-member plan, the one-year healthcare spending decrease would be $0.7 million in the commercial market, $0.2 million in Medicare, and $0.8 million in Medicaid.

Exhibit 22

ESTIMATED NET CHANGE IN ANNUAL HEALTHCARE SPENDING ON SOLUTIONS

	Commercial	Medicare	Medicaid
MEDICATION-FOCUSED SOLUTIONS			
Total Per 1M Members	–$0.7M	–$0.2M	–$0.8M
Per User Per Year	–$372	–$409	–$329
Per Member Per Month	–$0.06	–$0.02	–$0.06
DIGITAL WRAPAROUND SOLUTIONS			
Total Per 1M Members	+$1.2M	+$0.4M	+$1.6M
Per User Per Year	+$654	+$616	+$696
Per Member Per Month	+$0.10	+$0.03	+$0.13

Note: Negative numbers represent healthcare savings and positive numbers represent healthcare spending.

By comparison, since **digital wraparound solutions** are provided as adjunct to MOUD treatment, within a one-year time horizon, these solutions slightly increase total healthcare spending across all plans because the cost of the solution exceeds the savings from improved retention outcomes. Assuming 25% participation in a million-member plan, the one-year healthcare spending increase would be $1.2 million in the commercial market, $0.4 million in Medicare, and $1.6 million in Medicaid.

To offset the cost of the solution, the model estimates that in the commercial market, digital wraparound solutions would need to retain users in treatment for 180 days, or an average of 43 days longer than usual care. To reflect the extended retention, the solution would be billed for six months at an average cost of $205 per user per month, or an annual program cost of $1,230 per user.

While virtual OUD solutions demonstrate slight improvement in clinical effectiveness, their impact on spending is minimal across all payers. However, these solutions could achieve greater savings if they expand access to MOUD treatment for individuals who are currently untreated. Although this analysis did not include evidence that virtual solutions increase the proportion of patients receiving MOUD, with only 25% of individuals with OUD receiving any form of MOUD, there is a significant opportunity for virtual solutions to help close this gap. Research shows that untreated patients incur $9,300 more in annual healthcare costs than those receiving MOUD treatment.[233] By reaching untreated populations and supporting longer retention in care, virtual solutions can offer a scalable pathway to drive substantial reductions in healthcare spending for purchasers.

Patient Out-of-Pocket Costs

Patient out-of-pocket costs for virtual OUD solutions can vary by an individual's insurance status, plan benefit design, medication type, and treatment setting. Research shows that higher out-of-pocket costs are associated with lower treatment retention and even modest increases can lead to higher risks of relapse and overdose.[234] In most cases, virtual solutions that are directly purchased by a health plan are typically offered to users without any cost-sharing requirement. However, many patients with OUD remain uninsured—with approximately 18% of OUD patients vulnerable to high out-of-pocket costs and reduced access to treatment.[235]

Productivity and Criminal Justice Costs

This budget impact analysis does not account for lost workplace productivity or criminal justice costs related to OUD. However, in 2017, lost productivity and criminal justice costs represented approximately 9% and 1.5%, respectively, of the total economic burden associated with OUD and fatal opioid overdoses.[236] Research shows that OUD is associated with substantial indirect costs, including work loss, absenteeism, disability, and criminal justice involvement.

Individuals with OUD incur average annual work loss costs of $3,773 per person, which is $1,244 more per person than those without OUD.[237] Additionally, one study estimated OUD-related criminal justice costs—including policing, court, corrections, and victimization expenses—during MOUD treatment and post-MOUD treatment.[238] Results found costs of crime were $140 per day lower during MOUD treatment than after treatment. If virtual OUD solutions can improve treatment retention outcomes, they offer the potential for greater cost savings to employers and society.

Solution-Specific Economic Findings

The evaluation of the economic evidence examined 30 articles that included information about the impacts of virtual solutions for OUD on costs of care and healthcare resource utilization. The articles were identified through the structured literature search described above and direct submissions from companies. A total of 15 articles contained sufficient methodological detail to evaluate economic results and OUD-specific findings are described below. See **Appendix B-3** for a list of articles.

Importantly, although company-sponsored, retrospective economic studies and return-on-investment analyses are common, they tend to overestimate expected savings because of selection bias, lack of randomization, and other methodological limitations inherent to retrospective observational study designs.

CHESS Health provided a RCT comparing treatment with MOUD-only to MOUD combined with the CHESS program. The trial found over a 16-month period that patients receiving MOUD with CHESS had 12% decreased odds of emergency department and urgent care use compared with those receiving MOUD-only. The study did not report any cost or savings outcomes.[239]

PursueCare has 12 articles about RESET-O; evidence was generated by Pear Therapeutics and RESET-O was subsequently acquired by PursueCare. These included six abstracts, five peer-reviewed publications, and one conference poster with economic evidence.

Seven of the articles reported estimated savings derived from claims and published service unit costs. Of these, three articles specifically examined gross savings from reduced inpatient or hospital-related service utilization and reported savings ranging from $186 to $1,178 per participant per month.[240–242]

The high savings figure reflects a small cohort and includes a broad scope of hospital-related costs beyond inpatient and emergency care, and does not reflect total healthcare spending. However, the other four studies assessed gross savings from reductions in overall healthcare utilization—including inpatient, outpatient, and medical service costs—with reported savings ranging from $233 to $398 per participant per month.[243–246] A study comparing patients before and after engagement with RESET-O found gross savings of $398 and program costs of $278 per participant per month, resulting in a net savings of $120 per participant per month.[247] All 12 studies reported healthcare resource utilization outcomes, with most studies observing meaningful reductions in inpatient and emergency room visits. Outpatient utilization findings were mixed, with increased use of services such as case management and behavioral health, but reduced use of drug testing.[248–252]

Pelago provided a difference-in-difference study over 12-months using commercial claims data that compared medical spending between patients with SUD—including OUD—who enrolled in the Pelago program and propensity-matched controls not enrolled in Pelago. For participants with OUD, the study reported gross savings of $512 per participant per month and a program cost of $256 per participant per month—resulting in net savings of $256 per participant per month for those enrolled in the Pelago program.[253]

Workit Health provided a cohort study comparing Medicaid claims data from participants with OUD using Workit Health and individuals with OUD who did not across three states and found that participants using Workit Health had 18–50% gross savings in total medical and behavioral costs, mainly driven by reductions in emergency room and inpatient costs. A second analysis from the same study showed that Workit Health participants had 22–50% gross cost savings compared with those receiving other outpatient OUD care and 49–73% gross total cost savings compared with those in inpatient OUD care. The study did not report any program costs for Workit Health.[254]

Summary Ratings

Virtual OUD solutions show modest positive clinical benefits from integrating digital support services into medication-based treatment, though evidence was mixed.

Medication-Focused Solutions: Based on PHTI's review of the evidence, medication-focused solutions deliver comparable clinical outcomes to usual MOUD care. These solutions may slightly improve treatment retention because (1) they offer added convenience from virtual MOUD prescribing and drug testing, and (2) they include digital support services that are shown to modestly increase the average duration of treatment and proportion of patients retained.

However, more company evidence is needed to support these conclusions; there was only one comparative study on primary outcomes from these companies. This review found no evidence that these solutions improve access to care by increasing the number of patients who are newly entering treatment. Based on the ICER Evidence Rating Matrix, medication-focused solutions receive a C+, with a high certainty of comparable net health benefit and moderate certainty of a small net health benefit.

Medication-focused solutions are used as alternatives to usual MOUD care and their prices are similar to typical usual care costs. Often, these solutions are reimbursed using the same codes or case rates as in-person care. Any improvements in treatment duration have the potential to deliver reductions in net spending as a result of avoided healthcare costs. Given the variation in pricing models and outcomes, for most payers, medication-focused solutions result in comparable or slightly lower overall treatment costs for patients with OUD who use them. Taken together, these solutions can be more-broadly adopted as an alternative to usual MOUD care; however, this review found no evidence that current solutions improve access or materially lower spending compared with usual care.

Digital Wraparound Solutions: Based on PHTI's review of the evidence, digital wraparound solutions slightly improve treatment retention when used to augment MOUD care. Not all results were statistically significant, but studies consistently show a directional improvement in average treatment retention. There was not enough evidence to determine the relative benefits of various support services (e.g., CM vs. peer support). Based on the ICER Evidence Rating Matrix, digital wraparound solutions receive a C+, with moderate certainty of a small net health benefit.

Digital wraparound solutions are used to augment other MOUD treatment. Providers may purchase these solutions to enhance their care without increasing overall healthcare spending.

However, when sold to health plans, employers, and public health agencies, digital wraparound solutions increase net spending because the avoided healthcare costs from improved retention do not offset the prices charged for the solutions. Given the small positive clinical benefits of these solutions, broader adoption would be warranted if average increases in retention were higher. In the commercial market, PHTI estimates that solutions would need to increase treatment retention by an average of 43 days at six months to offset an annual solution price of $1,230 per user. Opioid abatement funds could also be used to defray the added costs of these solutions to make them more broadly available to MOUD providers.

Exhibit 23

PHTI RATINGS FOR VIRTUAL OPIOID USE DISORDER SOLUTIONS BY CATEGORY

● Positive ● Moderate ● Negative
● Higher Evidence Certainty ○ Lower Evidence Certainty

Category of Solution	Clinical Effectiveness[a]	Economic Impact	Summary Rating[b]
Medication-Focused Affect Therapeutics, Aware Recovery Care, Better Life Partners, Bicycle Health, Boulder Care, Eleanor Health, Groups Recover Together, Ophelia, Pelago, PursueCare, Wayspring, Workit Health	○ **Results:** Comparable or slightly better treatment retention than usual care **Evidence Certainty:** Lower	● Comparable or slight decrease in net spending due to avoided healthcare costs from improved treatment retention	● **May be substituted for usual care** **Given only slight improvement in treatment retention, broader adoption should be focused on previously untreated patients**
Digital Wraparound CHESS Health, DynamiCare Health, Q2i, WEconnect Health	● **Results:** Slightly better treatment retention when added to usual care **Evidence Certainty:** Higher	● Increases net spending because the price of the solution exceeds the avoided healthcare costs from improved treatment retention	● **Greater improvements in treatment retention are needed to justify broader adoption at current solution prices**

Source: PHTI, Virtual Solutions for Opioid Use Disorder, September 2025. See PHTI.org for complete report, methods, and recommendations.

Notes: [a] Not all solutions have clinical data that meet the inclusion standards for this report. [b] Summary rating reflects the combination of clinical and economic results.

Next Steps

Based on PHTI's review of the evidence, virtual solutions for OUD show promise that they may be able to retain patients in care longer and reduce unnecessary healthcare spending and adverse events compared with in-person care. However, current evidence about the clinical performance of these solutions suggests they deliver only modest benefits and face ongoing headwinds.

Currently, virtual solutions are primarily reaching individuals who are already in some form of treatment or would otherwise access in-person care. Virtual solutions have not demonstrated that they can expand the number of patients who pursue MOUD treatment.

Broader adoption of these solutions has also been constrained by multiple policy barriers, including strict teleprescribing regulations for controlled substances. To help virtual solutions for OUD gain wider adoption by the populations that stand to benefit most, further attention is needed from innovators, purchasers, and policymakers in several key areas.

Recommendations to Improve Innovation

- **Advance the evidence:** Further evidence generation is needed to demonstrate the value of virtual OUD solutions and understand which aspects of these solutions are improving treatment retention.

  Key questions include:

  - Are digital support services more effective when integrated into the same platform as MOUD prescribing or are they equally effective if offered separately as a wraparound service?
  - Which support services within the digital wraparound solutions are most impactful—care coordination and pharmacy navigation, CM, peer support, group support, educational modules, or digital CBT?
  - Which support services are most effective for patients with different demographics and co-occurring conditions?
  - Which CM program features are most effective for OUD patients?
  - Which engagement approaches are best for the initiation, maintenance, and stabilization phases of MOUD treatment?

- **Expand access:** More than half of treatment-seeking people with OUD receive non-MOUD treatment. Of those who need but do not seek treatment, 95% do not perceive a need for treatment. Developers should focus on strategies to improve patient acquisition and engagement to bring more of these people into MOUD treatment for longer periods of time. Patients who receive buprenorphine-based treatment experience superior clinical outcomes and much lower healthcare spending. Digital health companies, purchasers, and MOUD providers should continue to pursue creative methods to bring new patients into care. For example, purchasers could structure contracts for virtual OUD solutions that distribute bonuses to companies that meet or exceed targets for initiating care among patients previously not receiving MOUD treatment, delivering services in underserved areas (e.g., rural care), or sustaining patient retention beyond short-term milestones.
- **Improve care coordination:** Nearly all virtual OUD solutions offer care coordination services that aim to help patients navigate the in-person OUD care continuum and care transitions. Referring patients to appropriate and high-quality resources is critical for digital health companies. Companies should educate traditional providers on available virtual OUD solutions and establish mutual referral relationships with bidirectional sharing of information and outcomes over time and across episodes of care. This coordination would help smooth patients' care transitions between virtual solutions and higher levels of care, and vice versa. It could also help create care continuity for patients transitioning coverage (e.g., from commercial insurance coverage to Medicare). Companies should also consider partnerships with pharmacies, emergency departments, hospitals, federally qualified health centers, rural health centers, and local health departments to improve care coordination services.

- **Leverage opioid abatement funds:** Treatment initiation and maintenance is costly, and more than $50 billion has been committed in opioid settlement dollars and earmarked for opioid abatement strategies, including expanded access to MOUD treatment. States and localities can use opioid abatement funds for new investments in virtual OUD solutions and investments in evidence generation.
- **Thoughtful use of drug testing:** Payers should cover drug testing—which is more reliable than self-report—to validate adherence to MOUD treatment plans. Drug testing should be generally no more than once per week during the initiation phase of treatment, to align with appointment frequency, and then should be ramped down over time as patients move from initiation to maintenance.

Recommendations for Policymakers

- **Establish a teleprescribing special registration:** To create a permanent pathway for prescribing controlled substances via telehealth following the expiration of the COVID-19 era flexibilities, the DEA should finalize its proposed rule to establish a special teleprescribing registration. This would allow eligible clinicians and online platforms to teleprescribe Schedule II–V controlled substances and fulfill a long-standing requirement of the Ryan Haight Online Pharmacy Consumer Protection Act of 2008.[255] Under the proposed rule, any board-certified, mid-level practitioner could prescribe buprenorphine without in-person visits by attesting those visits would impose a significant burden on their patients. It would also allow audio-only teleprescribing refills of buprenorphine. As the gold standard treatment for OUD, buprenorphine is unique among other Schedule III medications and should continue to be treated separately from other Schedule III drugs.
- **Promote comprehensive coverage and availability of MOUDs, including long-acting injectables.** Medicare, Medicaid, and commercial insurers should maintain comprehensive coverage for the full range of MOUD options, including long-acting injectable formulations such as extended-release buprenorphine and naltrexone. Beyond insurer coverage, patient access to MOUDs can be further challenged by prior authorization requirements, pharmacy stocking and storage hurdles, and high upfront out-of-pocket costs. Insurers, regulators, and policymakers should work to reduce the administrative and operational obstacles that limit timely access to MOUD across all care settings.
- **Increase provider licensure flexibility:** Congress and states should consider increased healthcare provider licensure flexibility for the treatment of OUD, including allowing providers delivering virtual addiction services to initiate care for patients in medically underserved areas across state lines or to continue to treat patients with whom they have an established therapeutic relationship even as they move across state lines.

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To access all appendices, please visit https://phti.org/assessment/virtual-opioid-use-disorder-solutions/#appendices.

Online Data Supplement

Access the online data supplement at: https://phti.org/assessment/virtual-opioid-use-disorder-solutions/#data-supplement.

References

1 Dowell, Deborah, Samantha Brown, Shiromani Gyawali, et al., "Treatment for Opioid Use Disorder: Population Estimates—United States, 2022," *Morbidity and Mortality Weekly Report* 73 (2024): 567–574. https://dx.doi.org/10.15585/mmwr.mm7325a1

2 KFF, "KFF Poll: Three-in-Ten People Say They or Someone in Their Family Has Been Addicted to Opioids, with Rural Families Hit Hardest," August 15, 2023. https://www.kff.org/other/press-release/kff-poll-three-in-ten-people-say-they-or-someone-in-their-family-has-been-addicted-to-opioids-with-rural-families-hit-hardest

3 Substance Abuse and Mental Health Services Administration (SAMHSA), "Key Substance Use and Mental Health Indicators in the United States: Results from the 2023 National Survey on Drug Use and Health," July 2024. https://www.samhsa.gov/data/report/2023-nsduh-annual-national-report

4 National Institute on Drug Abuse (NIDA), "Drug Overdose Deaths: Facts and Figures," August 4, 2025, Figure 3. https://nida.nih.gov/research-topics/trends-statistics/overdose-death-rates#Fig3

5 Saunders, Heather, Nirmita Panchal, and Sasha Zitter, "Opioid Deaths Fell in Mid-2023, but Progress Is Uneven and Future Trends Are Uncertain," KFF, September 23, 2024. https://www.kff.org/mental-health/issue-brief/opioid-deaths-fell-in-mid-2023-but-progress-is-uneven-and-future-trends-are-uncertain/

6 National Center for Health Statistics (NCHS), "U.S. Overdose Deaths Decrease Almost 27% in 2024," May 14, 2025. https://www.cdc.gov/nchs/pressroom/nchs_press_releases/2025/20250514.htm

7 Saunders, "Opioid Deaths Fell."

8 Avalere Health, "The Cost of Addiction: Opioid Use Disorder in the United States," May 2025. https://advisory.avalerehealth.com/wp-content/uploads/2025/05/Avalere-Health-White-Paper_The-cost-of-opioid-addiction_OUD-in-the-United-States.pdf

9 SAMHSA, "Substance Use Disorder Treatment Options," July 25, 2025. https://www.samhsa.gov/substance-use/treatment/options

10 Dowell, "Treatment for Opioid Use," 567–574.

11 Coupet, Edouard, Marek C. Chawarski, Kavari Hercules, et al., "Racial and Ethnic Factors and Opioid Use Disorder Treatment After an Emergency Department Visit," *JAMA Network Open* 8, no. 7 (2025): e2520661. https://doi.org/10.1001/jamanetworkopen.2025.20661

12 Mackey, Katherine, Stephanie Veazie, Johanna Anderson, et al., "Barriers and Facilitators to the Use of Medications for Opioid Use Disorder: A Rapid Review," *Journal of General Internal Medicine* 35, Suppl. 3 (2020): 954–963. https://doi.org/10.1007/s11606-020-06257-4

13 KFF, "KFF Poll: Three-in-Ten."

14 NIDA, "Drug Overdose Deaths," Figure 3.

15 NIDA, "Drug Overdose Deaths."

16 Post, Lori Ann, Daniel Ciccarone, George Jay Unick, et al., "Decline in US Drug Overdose Deaths by Region, Substance, and Demographics," *JAMA Network Open* 8, no. 6 (2025): e2514997. https://doi.org/10.1001/jamanetworkopen.2025.14997

17 NIDA, "Opioids," November 2024. https://nida.nih.gov/research-topics/opioids#opioids

18 NIDA, "Opioids."

19 Dydyk, Alexander M., Nitesh K. Jain, and Mohit Gupta, *Opioid Use Disorder: Evaluation and Management,* StatPearls Publishing, 2025. https://www.ncbi.nlm.nih.gov/books/NBK553166/

20 NIDA, "Opioids."

21 NIDA, "Opioids."

22 Avalere Health, "The Cost of Addiction."

23 B2B International, "National Employer Survey 2019: Opioid Usage in the Workplace," National Safety Council (NSC), February 2019. https://www.nsc.org/getmedia/d7221a2a-a6a5-4348-a092-02ed41e9d251/ppw-survey-methodology.pdf

24 Dowell, "Treatment for Opioid Use," 567–574.

25 Saunders, "Opioid Deaths Fell."

26 Saunders, "Opioid Deaths Fell."

27 Dowell, "Treatment for Opioid Use," 567–574.

28 KFF, "Distribution of Total Population by Federal Poverty Level," Table, 2022. https://www.kff.org/other/state-indicator/distribution-by-fpl/?currentTimeframe=1&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D

29 Becerra, Xavier, "Renewal of Determination that a Public Health Emergency Exists," Administration for Strategic Preparedness and Response (ASPR), June 25, 2024. https://aspr.hhs.gov/legal/PHE/Pages/Opioid-25June2024.aspx

30 Centers for Disease Control and Prevention (CDC), "CDC Reports Nearly 24% Decline in U.S. Drug Overdose Deaths," February 25, 2025. https://www.cdc.gov/media/releases/2025/2025-cdc-reports-decline-in-us-drug-overdose-deaths.html

31 CDC, "Understanding the Opioid Overdose Epidemic," June 9, 2025. https://www.cdc.gov/overdose-prevention/about/understanding-the-opioid-overdose-epidemic.html

32 NIDA, "Opioids."

33 NIDA, "Opioids."

34 NIDA, "Opioids."

35 Dickson-Gomez, Julia, Sarah Krechel, Antoinette Spector, et al., "The Effects of Opioid Policy Changes on Transitions from Prescription Opioids to Heroin, Fentanyl and Injection Drug Use: A Qualitative Analysis," *Substance Abuse Treatment, Prevention, and Policy* 17, no. 1 (2022): 55. https://doi.org/10.1186/s13011-022-00480-4

36 NIDA, "Drug Overdose Deaths."

37 Davenport, Stoddard, Alexandra Weaver, and Matt Caverly, "Economic Impact of Non-Medical Opioid Use in the United States Annual Estimates and Projections for 2015 through 2019," Society of Actuaries, October 2019. https://www.soa.org/globalassets/assets/files/resources/research-report/2019/econ-impact-non-medical-opioid-use.pdf

38 Avalere Health, "The Cost of Addiction."

39 National Academies of Sciences, Engineering, and Medicine, "Pain Management."

40 American Society for Addiction Medicine (ASAM), "National Practice Guideline for the Treatment of Opioid Use Disorder: 2020 Focused Update," 2020. https://downloads.asam.org/sitefinity-production-blobs/docs/default-source/guidelines/npg-jam-supplement.pdf?sfvrsn=a00a52c2_4

41 ASAM, "National Practice Guideline."

42 Sordo, Luis, Gregorio Barrio, Maria J. Bravo, et al., "Mortality Risk During and After Opioid Substitution Treatment: Systematic Review and Meta-Analysis of Cohort Studies," *BMJ* 357, (2017): j1550. https://doi.org/10.1136/bmj.j1550

43 IT MATTRS Colorado, "Medication Assisted Treatment Program," no date. https://www.asam.org/docs/default-source/education-docs/mat-program-overview_2-12-2019239e2b9472bc604ca5b7ff000030b21a.pdf

44 ASAM, "National Practice Guideline."

45 Opioid Settlement Tracker, accessed May 23, 2025. https://www.opioidsettlementtracker.com/

46 National Academies of Sciences, Engineering, and Medicine, *Pain Management and the Opioid Epidemic: Balancing Societal and Individual Benefits and Risks of Prescription Opioid Use,* The National Academies Press, 2017. https://doi.org/10.17226/24781

47 Opioid Settlement Tracker, accessed May 23, 2025. https://www.opioidsettlementtracker.com/

48 Behavioral Health Group, "MAT vs. MOUD: What's the Difference?" March 31, 2025. https://www.bhgrecovery.com/blog/mat-vs-moud

49 U.S. Food and Drug Administration (FDA), "Information About Medications for Opioid Use Disorder (MOUD)," December 26, 2024. https://www.fda.gov/drugs/information-drug-class/information-about-medications-opioid-use-disorder-moud

50 ASAM, "National Practice Guideline."

51 FDA, "Primary Care Providers Can Prescribe with Confidence," December 18, 2024. https://www.fda.gov/drugs/prescribe-confidence/primary-care-providers-can-prescribe-confidence

52 Bapat, Mona, "Suboxone for Opioid Addiction Treatment," American Addiction Centers, June 20, 2025. https://americanaddictioncenters.org/suboxone

53 FDA, "Primary Care Providers."

54 Whelan, Paul J., and Kimberly Remski, "Buprenorphine vs. Methadone Treatment: A Review of Evidence in Both Developed and Developing Worlds," *Journal of Neurosciences in Rural Practice* 3, no.1 (2012): 45–50. https://doi.org/10.4103/0976-3147.91934

55 FDA, "Primary Care Providers."

56 McMaster, John, and Hesitha Abeysundera, "Effectiveness of Long-Acting Buprenorphine—A Systematic Review," *Australasian Psychiatry* 33, no. 2 (2024): 235–248. https://doi.org/10.1177/10398562241295872

57 SAMHSA, "42 CFR Part 8 Final Rule," January 31, 2024. https://www.samhsa.gov/substance-use/treatment/opioid-treatment-program/42-cfr-part-8

58 American Association for the Treatment of Opioid Dependence (AATOD), "Opioid Treatment Programs & Office Based Opioid Treatment: Understanding the Difference," no date. https://www.aatod.org/wp-content/uploads/2023/06/Comparison-Document_OTP-and-OBOT_FINAL3.2023.pdf

59 AATOD, "Opioid Treatment Programs."

60 SAMHSA, "Key Substance Use."

61 ASAM, "National Practice Guideline."

62 ASAM, "National Practice Guideline."

63 Ronquest, Naoko A., Tina M. Willson, Leslie B. Montejano, et al., "Relationship Between Buprenorphine Adherence and Relapse, Health Care Utilization and Costs in Privately and Publicly Insured Patients with Opioid Use Disorder," *Substance Abuse and Rehabilitation* 9, (2018): 59–78. https://doi.org/10.2147/SAR.S150253

64 Ruetsch, Charles, Joseph Tkacz, Vijay R. Nadipelli, et al., "Heterogeneity of Nonadherent Buprenorphine Patients: Subgroup Characteristics and Outcomes," *American Journal of Managed Care* 3, no.6 (2017): e172–e179. https://pubmed.ncbi.nlm.nih.gov/28817294/

65 Ronquest, "Relationship Between Buprenorphine," 59–78.

66 U.S. Drug Enforcement Agency (DEA), "Drug Scheduling," no date. https://www.dea.gov/drug-information/drug-scheduling

67 FDA, "Primary Care Providers."

68 Saunders, Heather, and Kathy Gifford, "State Approaches to Addressing the Opioid Epidemic: Findings from a Survey of State Medicaid Programs," February 6, 2024. https://www.kff.org/medicaid/issue-brief/state-approaches-to-addressing-the-opioid-epidemic-findings-from-a-survey-of-state-medicaid-programs/

69 ASAM, "National Practice Guideline."

70 ASAM, "National Practice Guideline."

71 Samples, Hillary, Arthur R. Williams, Stephen Crystal, and Mark Olfson, "Psychosocial and Behavioral Therapy in Conjunction with Medication for Opioid Use Disorder: Patterns, Predictors, and Association with Buprenorphine Treatment Outcomes," *Journal of Substance Use & Addiction Treatment* 139, (2022): 108774. https://doi.org/10.1016/j.jsat.2022.108774

72 Huffnagle, Sara M., Grace Brennan, Keegan Wicks, et al., "A Comparison of Patients with Opioid Use Disorder Receiving Buprenorphine Treatment with and Without Peer Recovery Support Services," *Journal of Substance Use* 27, no. 3 (2021): 266–271. https://doi.org/10.1080/14659891.2021.1938265

73 Shikalgar, Sahil, Scott G. Weiner, Gary J. Young, and Md. Noor-E-Alam, "Self-Help Groups and Opioid Use Disorder Treatment: An Investigation Using a Machine Learning-Assisted Robust Causal Inference Framework," *International Journal of Medical Informatics* 190, (2024): 105530. https://doi.org/10.1016/j.ijmedinf.2024.105530

74 Moore, Brent A., David A. Fiellin, Christopher J. Cutter, et al., "Cognitive Behavioral Therapy Improves Treatment Outcomes for Prescription Opioid Users in Primary Care Buprenorphine Treatment," *Journal of Substance Use & Addiction Treatment* 71, (2016): 54–57. https://doi.org/10.1016/j.jsat.2016.08.016

75 McHugh, R. Kathryn, Garrett M. Fitzmaurice, Victoria R. Votaw, et al., "Cognitive Behavioral Therapy for Anxiety and Opioid Use Disorder: Development and Pilot Testing," *Journal of Substance Use & Addiction Treatment* 169, (2024): 209296. https://doi.org/10.1016/j.josat.2024.209296

76 Kathleen M. Carroll, and Roger D. Weiss, "The Role of Behavioral Interventions in Buprenorphine Maintenance Treatment: A Review," *American Journal of Psychiatry* 174, no. 8 (2017): 738–747. https://doi.org/10.1176/appi.ajp.2016.16070792

77 NIDA, "Drugs and the Brain," July 6, 2020. https://nida.nih.gov/publications/drugs-brains-behavior-science-addiction/drugs-brain

78 Ronsley, Claire, Seonaid Nolan, Rod Knight, et al., "Treatment of Stimulant Use Disorder: A Systematic Review of Reviews," *PLoS One* 15, no. 6 (2020): e0234809. https://doi.org/10.1371/journal.pone.0234809

[79] Coughlin, Lara N., Sarah Salino, Claudia Jennings, et al., "A Systematic Review of Remotely Delivered Contingency Management Treatment for Substance Use," *Journal of Substance Use & Addiction Treatment* 147, (2023): 208977. https://doi.org/10.1016/j.josat.2023.208977

[80] Coughlin, "A Systematic Review."

[81] American Psychological Association (APA), "APA Applauds SAMHSA Action to Expand Access to Effective Addiction Treatment," January 10, 2025. https://www.apa.org/news/press/releases/2025/01/samhsa-addiction-treatment

[82] Herrmann, Evan S., Alexis K. Matusiewicz, Maxine L. Stitzer, et al., "Contingency Management Interventions for HIV, Tuberculosis, and Hepatitis Control Among Individuals with Substance Use Disorders: A Systematized Review," *Journal of Substance Use & Addiction Treatment* 72, (2017): 117–125. https://doi.org/10.1016/j.jsat.2016.06.009

[83] Wagner, Julie A., Nancy M. Petry, Kate Weyman, et al., "Glucose Management for Rewards: A Randomized Trial to Improve Glucose Monitoring and Associated Self-Management Behaviors in Adolescents with Type 1 Diabetes," *Pediatric Diabetes* 20, no. 7 (2019): 997–1006. https://doi.org/10.1111/pedi.12889

[84] Nunes, Edward V., Michael Gordon, Peter D. Friedmann, et al., "Relapse to Opioid Use Disorder After Inpatient Treatment: Protective Effect of Injection Naltrexone," *Journal of Substance Abuse Treatment* 85, (2018): 49–55. https://doi.org/10.1016/j.jsat.2017.04.016

[85] Dowell, "Treatment for Opioid Use," 567–574.

[86] Dowell, "Treatment for Opioid Use," 567–574.

[87] Dowell, "Treatment for Opioid Use," 567–574.

[88] Mackey, "Barriers and Facilitators," 954–963.

[89] Kennedy-Hendricks, Alene, Colleen L. Barry, Sarah E. Gollust, et al., "Social Stigma Toward Persons with Prescription Opioid Use Disorder: Associations with Public Support for Punitive and Public Health-Oriented Policies," *Psychiatric Services* 68, no. 5 (2017): 462–469. https://doi.org/10.1176/appi.ps.201600056

[90] Department of Health and Human Services Office of Inspector General (DHHS OIG), "Medicare and Medicaid Enrollees in Many High-Need Areas May Lack Access to Medications for Opioid Use Disorder," September 2024. https://oig.hhs.gov/documents/evaluation/9999/OEI-BL-23-00160.pdf

[91] Jehan, Sadia, Whitney E. Zahnd, Nikki R. Wooten, and Kristen D. Seay, "Geographic Variation in Availability of Opioid Treatment Programs Across U.S. Communities," *Journal of Addictive Diseases* 42, no. 2 (2023): 136–146. https://doi.org/10.1080/10550887.2023.2165869

[92] DHHS OIG, "Medicare and Medicaid."

[93] Hill, Lucas G., Lindsey J. Loera, Sorina B. Torrez, et al., "Availability of Buprenorphine/Naloxone Films and Naloxone Nasal Spray in Community Pharmacies in 11 U.S. States," *Drug and Alcohol Dependence* 237, (2022): 109518. https://doi.org/10.1016/j.drugalcdep.2022.109518

[94] Mackey, "Barriers and Facilitators," 954–963.

[95] Beetham, Tamara, Brendan Saloner, Sarah E. Wakeman, et al., "Access to Office-Based Buprenorphine Treatment in Areas with High Rates of Opioid-Related Mortality: An Audit Study," *Annals of Internal Medicine* 171, no. 1 (2019): 1–9. https://doi.org/10.7326/M18-3457

[96] Martin, Kristi, "Is Treatment for Opioid Use Disorder Affordable for Those with Public or Private Health Coverage?" Foundation for Opioid Response Efforts, November 2021. https://forefdn.org/wp-content/uploads/2021/11/fore-moud-insured.pdf

[97] Jordan, Ashly E., Gail Jette, Sarah Gorry, et al., "Reducing Overdose Deaths: Strategies to Enhance Overdose Prevention During and After Substance Use Disorder Treatment," *Addiction Data Bulletin* (No. 2024-03), New York State Office of Addiction Services and Support, June 2024. https://oasas.ny.gov/system/files/documents/2024/06/addiction-data-bulletin-2024-03_1.pdf

[98] Narcotics Anonymous, *Who, What, How, and Why,* Narcotics Anonymous World Services, 1976. https://na.org/wp-content/uploads/2024/05/EN3101-IP-1-English.pdf

[99] SAMHSA, "SAMHSA Overdose Prevention and Response Toolkit," Substance Abuse and Mental Health Services Administration, 2025. https://www.samhsa.gov/substance-use/harm-reduction

[100] Puzhko, Svetlana, Mark J. Eisenberg, Kristian B. Filion, et al., "Effectiveness of Interventions for Prevention of Common Infections Among Opioid Users: A Systematic Review of Systematic Reviews," *Frontiers in Public Health* 10, (2022): 749033. https://doi.org/10.3389/fpubh.2022.749033

[101] H.R.6 - SUPPORT for Patients and Communities Act, Pub. L. No. 115-271, 115 Stat (2018).
https://www.congress.gov/bill/115th-congress/house-bill/6

[102] H.R.6353 - Ryan Haight Online Pharmacy Consumer Protection Act of 2008, Pub. L. No. 110-425, 110 Stat (2008).
https://www.congress.gov/bill/110th-congress/house-bill/6353

[103] Lo, Justin, Matthew Rae, Krutika Amin, et al., "Telehealth Has Played an Outsized Role Meeting Mental Health Needs During the COVID-19 Pandemic," KFF, March 15, 2022.
https://www.kff.org/mental-health/issue-brief/telehealth-has-played-an-outsized-role-meeting-mental-health-needs-during-the-covid-19-pandemic/

[104] Department of Justice (DOJ) and DEA, "Expansion of Buprenorphine Treatment via Telemedicine Encounter," *Federal Register* 90, no. 11 (January 17, 2025): 6504–6523.
https://www.govinfo.gov/content/pkg/FR-2025-01-17/pdf/2025-01049.pdf

[105] DOJ and DEA, "Special Registrations for Telemedicine and Limited State Telemedicine Registrations," *Federal Register* 90, no. 11 (January 17, 2025): 6541–6598.
https://www.govinfo.gov/content/pkg/FR-2025-01-17/pdf/2025-01099.pdf

[106] ASAM, "ASAM Supports DEA and HHS Final Rule on Telemedicine Initiation of Buprenorphine Treatment for OUD," January 16, 2025.
https://downloads.asam.org/sitefinity-production-blobs/docs/default-source/advocacy/asam-final-bupe-telemed-rule-statement_1.16.25.pdf?sfvrsn=9095d796_1

[107] Walker, Leah K., "ASAM Criteria and Levels of Care in Addiction Treatment," American Addiction Centers, August 22, 2023.
https://americanaddictioncenters.org/rehab-guide/asam-criteria-levels-of-care

[108] Hammerslag, Lindsey R., Aimee Mack, Redonna K. Chandler, et al., "Telemedicine Buprenorphine Initiation and Retention in Opioid Use Disorder Treatment for Medicaid Enrollees," *JAMA Network Open* 6, no. 10 (2023): e2336914.
https://doi.org/10.1001/jamanetworkopen.2023.36914

[109] Jones, Cristopher M., Carla Shoff, Carlos Blanco, et al., "Association of Receipt of Opioid Use Disorder-Related Telehealth Services and Medications for Opioid Use Disorder with Fatal Drug Overdoses Among Medicare Beneficiaries Before and During the COVID-19 Pandemic," *JAMA Psychiatry* 80, no. 5 (2023): 508–514.
https://doi.org/10.1001/jamapsychiatry.2023.0310

[110] Nguyen, Binh, Chenyue Zhao, Eric Bailly, and Winnie Chi, "Telehealth Initiation of Buprenorphine for Opioid Use Disorder: Patient Characteristics and Outcomes," *Journal of General Internal Medicine* 39, no. 1 (2024): 95–102.
https://doi.org/10.1007/s11606-023-08383-1

[111] Nguyen, "Telehealth Initiation," 95–102.

[112] Frost, Madeline C., Lan Zhang, H. Myra Kim, and Lewei Lin, "Use of and Retention on Video, Telephone, and In-Person Buprenorphine Treatment for Opioid Use Disorder During the COVID-19 Pandemic," *JAMA Network Open* 5, no.10 (2022): e2236298.
https://doi.org/10.1001/jamanetworkopen.2022.36298

[113] Mahmoud, Hossam, Hady Naal, Emile Whaibeh, and Alyson Smith, "Telehealth-Based Delivery of Medication-Assisted Treatment for Opioid Use Disorder: A Critical Review of Recent Developments," *Current Psychiatry Reports* 24, no. 9 (2024): 375–386.
https://doi.org/10.1007/s11920-022-01346-z

[114] Black, Nicola, Sophie Chung, Calvert Tisdale, et al., "An International, Multidisciplinary Consensus Set of Patient-Centered Outcome Measures for Substance-Related and Addictive Disorders," *Journal of Clinical Medicine* 13, no. 7 (2024): 2154.
https://doi.org/10.3390/jcm13072154

[115] Sordo, "Mortality Risk During," j1550

[116] Velez, Fulton F., Kathryn P. Anastassopoulos, Samuel Colman, et al., "Reduced Healthcare Resource Utilization in Patients with Opioid Use Disorder in the 12 Months After Initiation of a Prescription Digital Therapeutic," *Advances in Therapy* 39, no. 9 (2022): 4131–4145.
https://doi.org/10.1007/s12325-022-02217-y

[117] Marino, Elise N., Tara Karns-Wright, Matthew C. Perez, et al., "Smartphone App-Based Contingency Management and Opioid Use Disorder Treatment Outcomes," *JAMA Network Open* 7, no. 12 (2024): e2448405.
https://doi.org/10.1001/jamanetworkopen.2024.48405

[118] Tofighi, Babak, Beita Badiei, Ryan Badolato, et al., "Integrating Text Messaging in a Low Threshold Telebuprenorphine Program for New York City Residents with Opioid Use Disorder During COVID-19: A Pilot Randomized Controlled Trial," *Journal of Addiction Medicine* 17, no. 5 (2023): e281–e286.
https://doi.org/10.1097/ADM.0000000000001161

[119] Shi, Julia M., Susan P. Henry, Stephanie L. Dwy, et al., "Randomized Pilot Trial of Web-Based Cognitive-Behavioral Therapy Adapted for Use in Office-Based Buprenorphine Maintenance," *Substance Abuse* 40, no. 2 (2019): 132–135. https://doi.org/10.1080/08897077.2019.1569192

[120] Velez, Fulton F., Sam Colman, Laura Kauffman, et al., "Comparison of Healthcare Resource Utilization Between Patients Who Engaged or Did Not Engage with a Prescription Digital Therapeutic for Opioid Use Disorder," *ClinicoEconomics and Outcomes Research* 13, (2021): 909–916. https://doi.org/10.2147/CEOR.S334274

[121] Velez, Fulton F., Sam Colman, Laura Kauffman, et al., "Real-World Reduction in Healthcare Resource Utilization Following Treatment of Opioid Use Disorder with reSET-O, a Novel Prescription Digital Therapeutic," *Expert Review of Pharmacoeconomics & Outcomes Research* 21, no. 1 (2021): 69–76. https://doi.org/10.1080/14737167.2021.1840357

[122] Monico, Laura B., Megan Eastlick, Darcy Michero, et al., "Feasibility and Acceptability of a Novel Digital Therapeutic Combining Behavioral and Pharmacological Treatment for Opioid Use Disorder," *Digital Health* 10 (2024): 20552076241258400. https://doi.org/10.1177/20552076241258400

[123] Chan, Brian, Ryan Cook, Ximena Levander, et al., "Buprenorphine Discontinuation in Telehealth-Only Treatment for Opioid Use Disorder: A Longitudinal Cohort Analysis," *Journal of Substance Use & Addiction Treatment* 167 (2024): 209511. https://doi.org/10.1016/j.josat.2024.209511

[124] Kawasaki, Sarah, "A Randomized Clinical Trial of Comprehensive Cognitive Behavioral Therapy (CBT) via reSET-O for a Hub and Spoke Medication Assisted Treatment (MAT) System of Care," ClinicalTrials.gov, November 20, 2024. https://clinicaltrials.gov/study/NCT04129580

[125] Rozycki, Stephen C., Xiaorui Xiong, Paul Walter, et al., "Outcomes from Engagement and Use of a Prescription Digital Therapeutic to Treat Opioid Use Disorder: A Real-World Pilot Study," *CNS Spectrums* 27, no. 2 (2022): 237–238. https://doi.org/10.1017/S1092852922000396

[126] Maricich, Yuri A., Warren K. Bickel, Lisa A. Marsch, et al., "Safety and Efficacy of a Prescription Digital Therapeutic as an Adjunct to Buprenorphine for Treatment of Opioid Use Disorder," *Current Medical Research and Opinion* 37, no. 2 (2021): 167–173. https://doi.org/10.1080/03007995.2020.1846022

[127] Holtyn, August, Forrest F. Toegel, Matthew D. Novak, et al., "Remotely Delivered Incentives to Promote Buprenorphine Treatment Engagement in Out-of-Treatment Adults with Opioid Use Disorder," *Drug and Alcohol Dependence* 225, (2021): 108786. https://doi.org/10.1016/j.drugalcdep.2021.108786

[128] Gustafson, David H., Gina Landucci, Olivia J. Vjorn, et al., "Effects of Bundling Medication for Opioid Use Disorder with an mHealth Intervention Targeting Addiction: A Randomized Clinical Trial," *American Journal of Psychiatry* 181, no. 2 (2024): 115–124. https://doi.org/10.1176/appi.ajp.20230055

[129] Rosen, Allison, Steven J. Shoptaw, Li Li, et al., " Clinical Management of Medication-Assisted Treatment for Opioid Use Disorder Using a Mobile Health App Within a Primary Care Clinic: Quasi-Experimental Study," *JMIR Form Research* 9, (2020): e63526. https://doi.org/10.2196/63526

[130] Jenkins, Steven, "Technology Improving Success of Medication-Assisted Treatment in Primary Care – Phase 2," ClinicalTrials.gov, May 6, 2025. https://clinicaltrials.gov/study/NCT05017272

[131] DeFulio, Anthony, Mark J. Rzeszutek, Josh Furgeson, et al., "A Smartphone-Smartcard Platform for Contingency Management in an Inner-City Substance Use Disorder Outpatient Program," *Journal of Substance Abuse Treatment* 120, (2021): 108188. https://doi.org/10.1016/j.jsat.2020.108188

[132] Hodges, Jacqueline, Marika Waselewski, William Harrington, et al., "Six-Month Outcomes of the HOPE Smartphone Application Designed to Support Treatment with Medications for Opioid Use Disorder and Piloted During an Early Statewide COVID-19 Lockdown," *Addiction Science & Clinical Practice* 17, no. 16 (2022). https://doi.org/10.1186/s13722-022-00296-4

[133] Tofighi, Babak, Meghan Durr, Christina Marini, et al., "A Mixed-Methods Evaluation of the Feasibility of a Medical Management-Based Text Messaging Intervention Combined with Buprenorphine in Primary Care," *Substance Abuse* 16, (2022): 11782218221078253. https://doi.org/10.1177/11782218221078253

[134] Lira, Marlene C., Cynthia Jimes, and M. Justin Coffey, "Retention in Telehealth Treatment for Opioid Use Disorder Among Rural Populations: A Retrospective Cohort Study," *Telemedicine Journal and e-Health* 29, no. 12 (2023): 1890–1896. https://doi.org/10.1089/tmj.2023.0044

[135] Rowe, Christopher, Arthur R. Williams, and Adam Bisaga, "Changes in Recovery Capital Among Patients Receiving Buprenorphine Treatment for Opioid Use Disorder in a Telehealth Setting," *Substance Use & Addiction Journal* 46, no. 1 (2025): 112–119. https://doi.org/10.1177/29767342241283174

[136] Williams, Arthur R., Shoshana V. Aronowitz, Christopher Rowe, et al., "Telehealth for Opioid Use Disorder: Retention as a Function of Demographics and Rurality," *American Journal of Drug and Alcohol Abuse* 49, no. 2 (2023): 260–265. https://doi.org/10.1080/00952990.2023.2180382

[137] Coffey, M. Justin, et al., "Telehealth Treatment for Opioid Use Disorder During Pregnancy," *JAMA Network Open* 7, no. 3 (2024): e242463. https://doi.org/10.1001/jamanetworkopen.2024.2463

[138] DeFulio, Anthony, Hayley D. Brown, Rosemarie M. Davidson, et al., "Feasibility, Acceptability, and Preliminary Efficacy of a Smartphone-Based Contingency Management Intervention for Buprenorphine Adherence," *Behavior Analysis in Practice* 16, (2023): 450–458. https://doi.org/10.1007/s40617-022-00730-8

[139] Shah, Neel, Rowan Mahon, Kathryn Anastassopoulos, et al., "Real-World Impact of a Prescription Digital Therapeutic on Retention in Treatment and Relapse Indicators in Patients with Opioid Use Disorder," *Value in Health* 25, no. 12 (2022): S38. https://doi.org/10.1016/j.jval.2022.09.183

[140] Parlier-Ahmad, Anna Beth, Sydney Kelpin, Caitlin E. Martin, and Dace S. Svikis, "Baseline Characteristics and Post Discharge Outcomes by Medication for Opioid Use Disorder Status Among Women with Polysubstance Use in Residential Treatment," *Women's Health Reports* 4, no. 1 (2023): 617–626. https://doi.org/10.1089/whr.2023.0082

[141] Hochstatter, Karli R., David H. Gustafson, Sr., Gina Landucci, et al., "Effect of an mHealth Intervention on Hepatitis C Testing Uptake Among People with Opioid Use Disorder: Randomized Controlled Trial," *JMIR mHealth and uHealth* 9, no. 2 (2021): e23080. https://doi.org/10.2196/23080

[142] Maricich, Yuri A., Xiaorui Xiong, Robert Gerwien, et al., "Real-World Evidence for a Prescription Digital Therapeutic to Treat Opioid Use Disorder," *Current Medical Research and Opinion* 37, no. 2 (2021): 175–183. https://doi.org/10.1080/03007995.2020.1846023

[143] Maricich, Yuri A., Robert Gerwien, Alice Kuo, et al., "Real-World Use and Clinical Outcomes After 24 Weeks of Treatment with a Prescription Digital Therapeutic for Opioid Use Disorder," *Hospital Practice* 49, no. 5 (2021): 348–355. https://doi.org/10.1080/21548331.2021.1974243

[144] Gustafson, "Effects of Bundling Medication," 115–124.

[145] Hodges, "Six-Month Outcomes."

[146] Campbell, Cynthia I., Ching-Hua Chen, Sara R. Adams, et al., "Patient Engagement in a Multimodal Digital Phenotyping Study of Opioid Use Disorder," *Journal of Medical Internet Research* 25, (2023): e45556. https://doi.org/10.2196/45556

[147] Maricich, "Real-World Use," 348–355.

[148] Moore, Brent A., Daniel F. Buono, Daniel P. Lloyd, et al., "A Randomized Clinical Trial of the Recovery Line Among Methadone Treatment Patients with Ongoing Illicit Drug Use," *Journal of Substance Abuse Treatment* 97, (2019): 68–74. https://doi.org/10.1016/j.jsat.2018.11.011

[149] DeFulio, "Feasibility, Acceptability," 450–458.

[150] Shi, "Randomized Pilot Trial," 132–135.

[151] Hendy, Lauren, Amanda Olguin, Cynthia Jimes, et al., "Satisfaction with Telehealth Treatment for Opioid Use Disorder Among Individuals Living in Rural and Nonrural Areas," *Telemedicine and e–Health* 31, no. 8 (2025): 1039–1046. https://doi.org/10.1089/tmj.2024.0598

[152] Moore, Brent A., Frank D. Buono, Destiny M. B. Printz, et al., "Customized Recommendations and Reminder Text Messages for Automated, Computer-Based Treatment During Methadone," *Experimental and Clinical Psychopharmacology* 25, no. 6 (2017): 485–495. https://doi.org/10.1037/pha0000149

[153] Shi et al., "Randomized Pilot Trial," 132–135.

[154] DeFulio, "Feasibility, Acceptability," 450–458.

[155] Moore, "A Randomized Clinical," 68–74.

[156] DeFulio, "Feasibility, Acceptability," 450–458.

[157] Shi, "Randomized Pilot Trial," 132–135.

[158] DeFulio et al., "A Smartphone-Smartcard Platform," 108188.

[159] Guarino, Honoria, Michelle Acosta, Lisa A. Marsch, et al., "A Mixed-Methods Evaluation of the Feasibility, Acceptability, and Preliminary Efficacy of a Mobile Intervention for Methadone Maintenance Clients," *Psychology of Addictive Behaviors* 30, no. 1 (2016): 1–11. https://doi.org/10.1037/adb0000128

[160] Monico, "Feasibility and Acceptability," 20552076241258400.

[161] Chan, "Buprenorphine Discontinuation," 209511.

[162] Defulio et al., "Feasibility, Acceptability," 450–458.

[163] Guarino, "A Mixed-Methods Evaluation," 1–11.

[164] Monico, "Feasibility and Acceptability," 20552076241258400.

[165] Moore, "A Randomized Clinical," 68–74.

[166] Lira, "Early Findings on Home Delivery," 14.

[167] Williams, "Telehealth for Opioid Use Disorder," 260–265.

[168] Hendy, "Satisfaction with Telehealth," 1039–1046.

[169] Williams, "Telehealth for Opioid Use Disorder," 260–265.

[170] Kim, Sunny Jung, Lisa A. Marsch, Honaria Guarino, et al., "Predictors of Outcome from Computer-Based Treatment for Substance Use Disorders: Results from a Randomized Clinical Trial," *Drug and Alcohol Dependence* 157, (2015): 174–178. https://doi.org/10.1016/j.drugalcdep.2015.09.019

[171] Williams, "Telehealth for Opioid Use Disorder," 260–265.

[172] Lira, "Early Findings on Home Delivery," 14.

[173] Kim, "Predictors of Outcome," 174–178.

[174] Kim, "Predictors of Outcome," 174–178.

[175] Williams, "Telehealth for Opioid Use Disorder," 260–265.

[176] Kim, "Predictors of Outcome," 174–178.

[177] Maricich, "Real-World Use," 348–355.

[178] Maricich et al., "Real-World Evidence," 175–83.

[179] Lira, "Retention in Telehealth," 12.

[180] Lira, "Retention in Telehealth," 12.

[181] Burke, Barbara., Brian Clear, Rebekah L. Rollston, et al., "An Assessment of the One-Month Effectiveness of Telehealth Treatment for Opioid Use Disorder Using the Brief Addiction Monitor," *Substance Use & Addiction Journal* 45, no. 1 (2024): 16–23. https://doi.org/10.1177/29767342231212790

[182] Chan, "Buprenorphine Discontinuation in Telehealth," 209511.

[183] Chan, Brian, Ryan Cook, Ximena Levander, et al., "Participant Retention in Digitally-Provided Buprenorphine Treatment for Opioid Use Disorder Compared with Treatment as Usual Office-Based Treatment: An Observational Longitudinal Cohort Study," *Drug and Alcohol Dependence* 260, Suppl. 1 (2024): 110089. https://doi.org/10.1016/j.drugalcdep.2023.110089

[184] Chan, Brian, R. Cook, X. Levander, et al., "Participant Retention in Telehealth-Only Buprenorphine Treatment for Opioid Use Disorder Compared with Treatment as Usual Office-Based Treatment: Results of an Observational Longitudinal Cohort Study," 2023. Poster.

[185] Williams, "Telehealth for Opioid Use Disorder," 260–265.

[186] Rowe, "Changes in Recovery," 112–119.

[187] Glasner, Suzette, Alfonso Ang, and Darcy Michero, "Economic Impact of an Employer-Sponsored Integrated Digital Intervention Targeting Substance Use Disorders: Return on Investment Analysis," *Telemedicine and e-Health,* (2025). https://doi.org/10.1089/tmj.2025.0102

[188] Monico, "Feasibility and Acceptability," 20552076241258400.

[189] Maricich, "Safety and Efficacy," 167–173.

[190] Guarino, "A Mixed-Methods Evaluation," 1–11.

[191] Kim, "Predictors of Outcome," 174–178.

[192] Maricich, "Real-World Evidence," 175–183.

[193] Kawasaki, "A Randomized Clinical Trial."

[194] Rozycki, "Outcomes from Engagement," 237–238.

[195] Maricich, Yuri A., Robert Gerwien, Alice Kuo, et al., "A Prescription Digital Therapeutic for Opioid Use Disorder: 36-Week Real-World Clinical Data," poster presented at the ASAM 53rd Annual Conference, Hollywood, FL, March 31-April 3, 2022. https://www.eventscribe.net/2022/ASAM/fsPopup.asp?PosterID=449171&mode=posterinfo

[196] Velez, Fulton F., Kathryn Anastassopoulo, Sam Colman, et al., "Bacteremia, Sepsis, and Endocarditis Outcomes in Patients with Opioid Use Disorder Treated with a Prescription Digital Therapeutic," *Value in Health* 26, no. 6 (2023): S16. https://doi.org/10.1016/j.jval.2023.03.089

[197] Stidham, Jennifer, Chinedu Jon-Emefieh, Jennifer Carrano, et al., "Characteristics of mHealth Therapy App Engagement by Young Adults with OUD," *Journal of Addiction Diseases* 43, no. 3 (2024): 201–206. https://doi.org/10.1080/10550887.2024.2363027

[198] Lira, "Retention in Telehealth," 12.

[199] Lira, Marlene C., Lauren E Hendy, Alisha Liakas et al., "Early Findings on Home Delivery of Buprenorphine and Retention in Treatment for Opioid Use Disorder," *Addiction Science & Clinical Practice* 20, no. 1 (2025): 14. https://doi.org/10.1186/s13722-025-00545-2

[200] Coffey, "Telehealth Treatment for Opioid," e242463.

[201] Hendy, "Satisfaction with Telehealth," 1039–1046.

[202] Gustafson, "Effects of Bundling Medication," 115–124.

[203] Hochstatter, "Effect of an mHealth," e23080.

[204] Shi et al., "Randomized Pilot Trial," 132–135.

[205] Parlier-Ahmad, "Baseline Characteristics," 617–626.

[206] Roos, Corey R., Brian D. Kiluk, R. Kathryn McHugh, and Kathleen M. Carroll, "Evaluating a Longitudinal Mediation Model of Perceived Stress, Depressive Symptoms, and Substance Use Treatment Outcomes," *Psychology of Addictive Behaviors* 34, no. 6 (2020): 660–668. https://doi.org/10.1037/adb0000581

[207] DeFulio, Anthony, Joshua Furgeson, Hayley D. Brown, and Shawn Ryan, "A Smartphone-Smartcard Platform for Implementing Contingency Management in Buprenorphine Maintenance Patients with Concurrent Stimulant Use Disorder," *Frontiers in Psychiatry* 12, (2021): 778992. https://doi.org/10.3389/fpsyt.2021.778992

[208] DeFulio et al., "A Smartphone-Smartcard Platform," 108188.

[209] Waite, Mindy, "Encouraging Opioid Abstinence Behavior: Incentivizing Inputs and Outcomes – Pilot," Clinicaltrials.gov, October 3, 2024. https://clinicaltrials.gov/study/NCT04235582

[210] DeFulio, "Feasibility, Acceptability," 450–458.

[211] Jenkins, "Technology Improving Success."

[212] Rosen, "Clinical Management."

[213] Kalmin, Mariah, Bengisu Tulu, Omar Nieto, et al., "Small Business Program: Implementation of a Technological Solution to Support Treatment for Opioid Use Disorder in the Primary Care Setting," *Drug and Alcohol Dependence* 260, Suppl. 1 (2024): 110284. https://doi.org/10.1016/j.drugalcdep.2023.110284

[214] Nieto, Omar, Allison D. Rosen, Mariah M. Kalmin, et al., "Facilitators and Challenges to Adoption of a Digital Health Tool for Opioid Use Disorder Treatment in Primary Care: Mixed Methods Study," *Journal of Medical Internet Research* 27, (2025): e69953. https://doi.org/10.2196/69953

[215] Marino, "Smartphone App-Based," e2448405.

[216] Avalere Health, "The Cost of Addiction."

[217] Larochelle, Marc R., Sarah E. Wakeman, Omid Ameli, et al., "Relative Cost Differences of Initial Treatment Strategies for Newly Diagnosed Opioid Use Disorder: A Cohort Study," *Medical Care* 58, no. 10 (2020): 919–926. https://doi.org/10.1097/MLR.0000000000001394

[218] Ronquest, "Relationship Between Buprenorphine," 59–78.

[219] Ruetsch, "Heterogeneity of Nonadherent," e172–e179.

[220] U.S. Census Bureau, "Age and Sex Composition in the United States: 2022," October 2022. https://www.census.gov/data/tables/2022/demo/age-and-sex/2022-age-sex-composition.html

[221] Shoff, Carla, Tse-Chuan Yang, and Benjamin A. Shaw, "Trends in Opioid Use Disorder Among Older Adults: Analyzing Medicare Data, 2013–2018," *American Journal of Preventative Medicine* 60, no. 6 (2021): 850–855. https://doi.org/10.1016/j.amepre.2021.01.010

[222] Dowell, "Treatment for Opioid Use," 567–574.

[223] Dowell, "Treatment for Opioid Use," 567–574.

[224] Ronquest, "Relationship Between Buprenorphine," 59–78.

[225] Federal Reserve Bank of St. Louis, "Consumer Price Index for All Urban Consumers: Medical Care in U.S. City Average," accessed November 1, 2023. https://fred.stlouisfed.org/series/CUUS0000SAM

[226] Florence, Curtis, Chao Zhou, Feijun Luo, et al., "The Economic Burden of Prescription Opioid Overdose, Abuse, and Dependence in the United States, 2013." *Medical Care* 54, no. 10 (2016): 901–906. https://doi.org/10.1097/MLR.0000000000000625

[227] Ronquest, "Relationship Between Buprenorphine," 59–78.

[228] Data.CMS.gov, "Medicare Physician & Other Practitioners - by Geography and Service, 2024," accessed July 16, 2024. https://data.cms.gov/provider-summary-by-type-of-service/medicare-physician-other-practitioners/medicare-physician-other-practitioners-by-geography-and-service/data

[229] Virginia Department of Medical Assistance Services, "Addiction and Recovery Treatment Services (ARTS) Reimbursement Structure," Virginia Association of Community Services Boards, October 6, 2017. https://vacsb.org/wp-content/uploads/2017/10/ARTS-Reimbursement-Structure-10-6-2017.pdf

[230] Clemans-Cope, Lisa, Victoria Lynch, Maya Payton, and Joshua Aarons, "Medicaid Professional Fees for Treatment of Opioid Use Disorder Varied Widely Across States and Were Substantially Below Fees Paid by Medicare in 2021," *Substance Abuse Treatment, Prevention, and Policy* 17, no. 49 (2022). https://doi.org/10.1186/s13011-022-00478-y

[231] DynamiCare Health. https://www.dynamicarehealth.com/

[232] Freese, Thomas E., Beth A. Rutkowski, James A. Peck, et al., "Recovery Incentives Program: California's Contingency Management Benefit," *Preventive Medicine* 176, (2023): 107703. https://doi.org/10.1016/j.ypmed.2023.107703

[233] Larochelle, "Relative Cost Differences," 919–926.

[234] Leech Ashley A., Elizabeth McNeer, Andrew W. Roberts, et al., "Buprenorphine Out-of-Pocket Costs and Discontinuation in Privately Insured Adults with Opioid Use Disorder," *JAMA Internal Medicine* 183, no. 9 (2023):1023–1026. https://doi.org/10.1001/jamainternmed.2023.2826

[235] Orgera, Kendal, and Jennifer Tolbert, "Key Facts about Uninsured Adults with Opioid Use Disorder," KFF, July 15, 2019. https://www.kff.org/uninsured/issue-brief/key-facts-about-uninsured-adults-with-opioid-use-disorder/

[236] Florence, Curtis, Feijun Luo, and Ketra Rice, "The Economic Burden of Opioid Use Disorder and Fatal Opioid Overdose in the United States, 2017," *Drug and Alcohol Dependence* 218 (2021): 108350. https://doi.org/10.1016/j.drugalcdep.2020.108350

[237] Reinhart, Marcia, Lauren M. Scarpati, Noam Y. Kirson, et al., "The Economic Burden of Abuse of Prescription Opioids: A Systematic Literature Review from 2012 to 2017," *Applied Health Economics and Health Policy* 16, (2018): 609–632. https://doi.org/10.1007/s40258-018-0402-x

[238] Krebs, Emanuel, Darren Urada, Elizabeth Evans, et al., "The Costs of Crime During and After Publicly Funded Treatment for Opioid Use Disorders: A Population-Level Study for the State of California," *Addiction* 112, no. 5 (2017): 838–851. https://doi.org/10.1111/add.13729

[239] Gustafson, "Effects of Bundling Medication," 115–124.

[240] Mahon, Rowan, H. M. Shapiro, Fulton Velez, et al., "Machine Learning Analysis of Patient Engagement and One-Year Health Care Resource Utilization and Costs in Patients with Opioid Use Disorder Treated with a Prescription Digital Therapeutic," *Value in Health* 26, no. 6 (2023): S16–S17. https://doi.org/10.1016/j.jval.2023.03.091

[241] Maricich, "A Prescription Digital Therapeutic."

[242] Shapiro, H.M., Robert W. Gerwien, and Fulton Velez, "A Machine Learning Approach to Understanding How Patient Engagement with a Prescription Digital Therapeutic Relates to Healthcare Resource Utilization in Opioid Use Disorder," *Value in Health* 24, (2021): S137. https://doi.org/10.1016/j.jval.2021.04.675

[243] Velez, "Real-World Reduction," 69–76.

[244] Velez, "Reduced Healthcare Resource," 4131–4145.

[245] Velez, Fulton F., Sam Colman, Laura Kauffman, et al., "Real-World Changes in US Health System Hospital-Based Services Following Treatment with a Prescription Digital Therapeutic for Opioid Use Disorder," *Hospital Practice* 49, no. 5 (2021): 341–347. https://doi.org/10.1080/21548331.2021.1956256

[246] Velez, "Comparison of Healthcare," 909–916.

[247] Velez, "Real-World Changes," 341–347.

[248] Shah, "Real-World Impact," S38.

[249] Shah, Neel, Fulton Velez, Kathryn Anastassopoulos, et al., "Changes in Healthcare Resource Utilization in Patients Using an FDA-Authorized Prescription Digital Therapeutic for Opioid Use Disorder over a 12-Month Period," *Value in Health* 25, no. 7 (2022): S534. https://doi.org/10.1016/j.jval.2022.04.1291

[250] Shah, Neel, Rowan Mahon, Sean M. Murphy, et al., "Rates of Inpatient Hospitalizations Across a 2-Year Time Horizon Between reSET-O and Control Patients: A Difference in Differences Approach," *CNS Spectrums* 28, no. 2 (2023): 228. https://doi.org/10.1017/S1092852923001517

[251] Maricich, "Real-World Use," 348–355.

[252] Rozycki, "Outcomes from Engagement," 237–238.

[253] Glasner, "Economic Impact."

[254] Cost Savings Workit Health, 2021.

[255] DOJ and DEA, "Special Registrations for Telemedicine," 6541–6598.