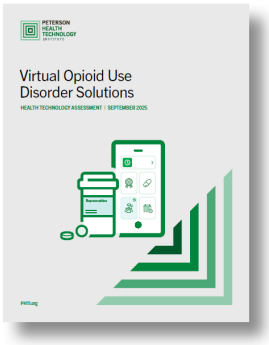
Virtual Opioid Use Disorder Solutions Evaluation — Appendices

September 2025 | Version 1.0

Accessing PHTI's Full Report

You can access the full report here.



Appendix A – Methodology Overview

This evaluation of virtual solutions for opioid use disorder (OUD) followed the Peterson Health Technology Institute's (PHTI) published assessment methodology, using the ICER-PHTI Assessment Framework for Digital Health Technologies, and stakeholder engagement process. Additional information about PHTI's process and advisors can be found at phti.org.

Assessment Framework

PHTI partnered with the Institute for Clinical and Economic Review (ICER), a leader in health technology assessment, to develop the ICER-PHTI Assessment Framework for Digital Health Technologies that guides this and all other PHTI evaluations. The assessment framework prioritizes products' clinical benefits and economic impact, while also considering effects on health equity and user experience. The selection process for which technologies are evaluated are based on several factors, including market relevance, disease burden, level of spend and claimed savings, and evidence quality and availability.

PHTI's goal is to provide decision makers with relevant information to inform digital health purchasing and innovation that improves overall health system performance and delivers better health outcomes at lower costs. By helping purchasers identify bright spots in digital health innovation, PHTI aims to raise the bar for technology-driven advances in healthcare delivery, including superior outcomes, convenience, access, and affordability. The assessment framework can also guide technology developers and investors about performance standards and the evidence needs required to demonstrate stated clinical and economic benefits.

Clinical Assessment

A systematic literature review (SLR), including online database searches, data screening and extraction, and evidence quality ratings, was conducted by a third-party health technology assessment partner to identify all relevant published literature evaluating clinical impact of virtual solutions for OUD. The SLR was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. This SLR followed the methods and standard set forth in the ICER-PHTI Assessment Framework to provide a rigorous evaluation of digital health technologies. The SLR was registered a priori with PROSPERO (CRD420250653694).

Data from two literature databases, MEDLINE and EMBASE, were systematically searched for inclusion into the SLR. Conference proceedings were hand-searched to retrieve relevant publications. Potentially eligible studies were identified via the search strategy outlined in Tables 1 and 2 below. Studies were considered for inclusion in the SLR based on the population, intervention, comparators, outcomes, and setting/study design (PICOS) criteria presented in Table 3 below.

The SLR included a review of the "grey" literature, which captured data from sources not indexed and that are available from scientific conferences, the US Food and Drug Administration (FDA) website and 510k clearances, company websites, and information provided by companies under review.

Table 1. Medline Search Strategy

Search	Terms	Citations
#1	Opioid-Related Disorders[Mesh] OR exp opioid-related disorders OR opioid*related disord* OR opioid addict* OR opioid dependen* OR opioid abus* OR "opioid use disorder" OR opiate addict* OR opiate dependen* OR opiate abus* OR dependence, opiate OR "prescription opioid" OR opioid	182,408
#2	"digital health"[MeSH Terms] OR “digital health”[Text Word] OR "digital mental health"[tiab:~0] OR "Mobile Applications"[MAJR] OR "digital health intervention"[tiab:~0] OR "mental health app"[tiab:~0] OR "digital intervention"[tiab:~0] OR "digital mental treatment"[tiab:~0] OR “digital therapeutic”[tiab:~0] OR "digital treatment"[tiab:~0] OR DTx OR iCBT OR telemedicine[MeSH Terms] OR “mobile health program”[tiab] OR "mobile health app*"[tiab] OR “smartphone app*”[tiab] OR internet*based[tiab] OR telephone[tiab] OR online[tiab] OR e-health[tiab] OR computer-based treatment[tiab] OR computer-based training[tiab] OR web-based psychotherapy[tiab] OR web-based cognitive behavior therapy[tiab] OR cognitive behavioral therapy[MeSH Terms] OR telephone counselling[tiab] OR m-health[tiab] OR mhealth[tiab] OR ehealth[tiab] OR e-therapy[tiab] OR web-based treatment[tiab] OR web-based interventio*[tiab] OR messaging[tiab] OR text*based [tiab] OR "text messaging"[MeSH Terms] OR behavioral intervention[tiab] OR behavior therapy[tiab]	506,012
#3	buprenorphine[tiab] OR methadone[tiab] OR naltrexone[tiab] OR suboxone[tiab] OR opioid substitution treatmen*[tiab] OR opioid dependence treatmen*[tiab] OR opioid substitution therapy[tiab] OR opioid replacement therapy[tiab] OR medication*assisted treatment[tiab] OR medication*assisted therapy[tiab] OR "intensive outpatient program"[tiab] OR treatment[tiab] OR intervention[tiab] OR therapy[tiab] OR opioid use disorder treatmen*[tiab] OR opioid treatmen*[tiab]	7,607,675
#4	#1 AND #2 AND #3	2,444
#5	#4 NOT (“address”[pt] OR "case reports"[pt] OR "case report*"[tiab] OR "clinical trial protocol"[pt] OR “Clinical Trial, Veterinary”[pt] OR “comment”[pt] OR “editorial”[pt] OR “lecture”[pt] OR “letter”[pt] OR “Observational Study, Veterinary”[pt] OR “Personal Narrative”[pt] OR “Published Erratum”[pt] OR “Randomized Controlled Trial, Veterinary”[pt] OR “Retracted Publication”[pt] OR “Retraction of Publication”[pt])	2,310
#6	#5 NOT (“Animals”[MeSH] NOT “Humans”[MeSH])	2,300
#7	Filter 2015-2025	1,794
#8	Filter Language: English	**1,779**

Table 2. Embase Search Strategy

Search	Terms	Citations
#1	'opioid-related disorder' OR 'opioid addiction' OR 'opioid dependence' OR 'opioid abuse' OR 'opioid use disorder' OR 'opiate addiction' OR 'opiate dependence' OR 'opiate abuse' OR 'prescription opioid' OR 'opioid use':ti,ab OR 'opioid use disorder':ti,ab	58,389
#2	'digital health' OR 'digital health technology' OR 'digital mental health' OR 'mobile application' OR 'digital health intervention' OR 'mental health app' OR 'digital intervention' OR 'digital mental treatment' OR 'digital therapeutic' OR 'digital treatment' OR 'DTx' OR 'iCBT' OR 'telemedicine' OR 'mobile health program' OR 'mobile health app' OR 'smartphone app' OR 'internet based' OR 'telephone' OR 'online' OR 'e-health' OR 'computer-based treatment' OR 'computer-based training' OR 'web-based psychotherapy' OR 'web-based cognitive behavior therapy' OR 'cognitive behavioral therapy' OR 'telephone counselling' OR 'm-health' OR 'mhealth' OR 'ehealth' OR 'e-therapy' OR 'web-based treatment' OR 'web-based intervention' OR 'messaging' OR 'text based' OR 'text messaging' OR 'behavioral intervention' OR 'behavior therapy' OR 'digital':ti,ab	1,280,155
#3	'buprenorphine' OR 'methadone' OR 'naltrexone' OR 'suboxone' OR 'opioid substitution treatment' OR 'opioid dependence treatment' OR 'opioid substitution therapy' OR 'opioid replacement therapy' OR 'medication assisted treatment' OR 'medication assisted therapy' OR 'intensive outpatient program' OR 'treatment' OR 'intervention' OR 'therapy' OR 'opioid use disorder treatment' OR 'opioid treatment'	15,748,395
#4	1 AND #2 AND #3	3,897
#5	#4 NOT ('case report'/it OR 'case report':ti,ab OR 'comment'/it OR 'editorial'/it OR 'letter'/it OR 'clinical trial protocol'/it)	3,660
#6	#5 NOT (('animal'/exp OR 'nonhuman'/exp OR 'animal experiment'/exp OR 'animal model'/exp OR 'in vitro study'/de) NOT 'human'/exp)	3,649
#7	#6 NOT 'conference abstract'/it	2,616
#8	Filter Language: English	1,998
#9	Filter 2015-2025	1,988
Conference abstracts		
#10	#6 AND 'conference abstract'/it	1,033
#11	Filter 2015-2025	976
#12	Filter Language: English	976
Total		
#13	#9 OR #11	**2,964**

Table 3. PICOS Inclusion and Exclusion Criteria

Criteria	Inclusion 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
Subgroup	• Age, sex, race/ethnicity, urban/rural location	
Intervention(s)	• Medication-based treatment, plus therapy with ≥1 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
Comparator(s)	• Comparators: Usual Care • In-person MOUD treatment, with or without therapy/peer support • No care (i.e., not on any treatment, waitlisted, or delayed)	N/A

Outcomes	**Primary Clinical 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
	
	Secondary Clinical Outcomes
	• 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)
	
	User Experience
	• 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
		N/A

	• Distribution	
Setting	• Virtual or outpatient setting • United States	• Inpatient/ED setting only • In-person only (no virtual component)
Study Design	• Randomized controlled trials and non-randomized controlled trials • Observational studies • SLRs[a]	• Editorials, commentaries, study protocols, case reports, qualitative reports, and narrative reviews • ≤20 study participants
Data Sources	• MEDLINE (via PubMed) • EMBASE	N/A
Conferences	• American Society of Addiction Medicine (ASAM) Annual Conference • American Academy of Addiction Psychiatry (AAAP) Annual Conference	N/A
Date of Publication	2015 to 2025, and Conferences: 2022-2025	N/A
Language	English	N/A

Notes: N/A = not applicable. SLR = systematic literature review. ED = emergency department. [a] SLRs were included for manual reference checks for studies published between 2015 to 2025 and were not included in the qualitative evidence synthesis.

Screening

All publications identified by the systematic literature searches were reviewed against the predefined selection criteria (Table 3). Study selection followed a two-stage screening process based on the review of titles and abstracts (stage I) and full-text articles (stage II). Following completion of title/abstract review, all full texts of publications identified for inclusion during this stage were retrieved for further review. For conference abstracts without available associated posters and for database abstracts without a full text available, the report was screened based on the available information within the abstract. Title/abstract and full-text screening for each report were conducted by two independent investigators with any disagreements resolved by discussion with a third investigator, if needed.

All screening was conducted using Nested Knowledge software, which provides a platform where reports retrieved from the database searches can be organized and screened using customizable entry forms. During both screening stages, abstracts and articles were excluded if they had populations, interventions, outcomes, settings, study designs, or publication types that were out of scope based on the PICOS criteria. Studies published in languages other than English were also excluded.

Data Extraction

Data were extracted by one investigator with quality assurance against the original source publication completed by another independent investigator. Table 4 lists the reported data captured for each included study.

Table 4. Data Collected

Study Information
Publication citation
Study identifier or trial name
Study design
Source of data
Timeframe of data collection
Follow-up duration

Patient Information
Sample size
Age, in years
Sex and/or Gender
Race/Ethnicity
Employment status
Insurance type (commercial, Medicaid, Medicare, uninsured)
Housing type
Past criminal justice involvement
Location (urban/rural)
Comorbidities
Other notable characteristics
Interventions
Digital intervention, including definition
Usual care, including definition
Unit of service (Mobile or web app or platform)
Outcomes[a]
Primary Clinical Outcomes • Retention on treatment • Adherence to medication
Secondary Clinical Outcomes • Opioid abstinence (i.e., number of abstinence days, frequency of opioid use) • Proportion/number of relapses, or relapse rate • Proportion/number of withdrawals/withdrawal symptoms • Safety (e.g., adverse events)
User Experience • Treatment satisfaction or usability (% or Likert scale) • Engagement with intervention (i.e., duration/frequency of app usage)
Health Equity • Access and accessibility • Distribution • Outcomes by subgroups of interest in context of health equity: Race/Ethnicity, Gender, Age, Urban/rural

Notes: [a] If outcomes are reported across multiple timepoints, results will be captured separately.

Evidence Quality Assessment

All included randomized controlled trials (RCTs) were assessed for potential bias using the Cochrane Collaboration Risk of Bias in Randomized Trials Version 2 (RoB2).[1] The RoB2 includes a maximum of 22 questions that considers the following domains:

Domain 1: Risk of bias arising from the randomization process
Domain 2: Risk of bias due to deviations from the intended interventions (effect of assignment or adherence to intervention)
Domain 3: Missing outcome data
Domain 4: Risk of bias in measurement of the outcome
Domain 5: Risk of bias in selection of the reported result

Possible ROB2 ratings are shown in Table 5.

Table 5. Risk of Bias Categories for RoB2

Rating	Criteria
Low risk of bias	The trial is judged to be at low risk of bias for all domains for this result.
Some concerns	The trial is judged to raise some concerns in at least one domain for this result, but not to be at high risk of bias for any domain.
High risk of bias	The trial is judged to be at high risk of bias in at least one domain for this result. OR The trial is judged to have some concerns for multiple domains in a way that substantially lowers confidence in the result.

Notes. RoB2 = risk of bias in randomized trials version 2.

Non-randomized and observational studies were assessed using the Newcastle-Ottawa Scale (NOS).[2] Studies were evaluated for multiple criteria within 3 categories: selection of groups, comparability of groups, and either exposure or outcome, depending on the type of study. Possible NOS ratings are shown in Table 6.

Table 6. Risk of Bias Rating Using NOS

Rating	Description
++	All or most of the checklist criteria have been fulfilled, where they have not been fulfilled the conclusions are very unlikely to alter.
+	Some of the checklist criteria have been fulfilled, where they have not been fulfilled or not adequately described, the conclusions are unlikely to alter.
-	Few or no checklist criteria have been fulfilled and the conclusions are likely or very likely to alter.

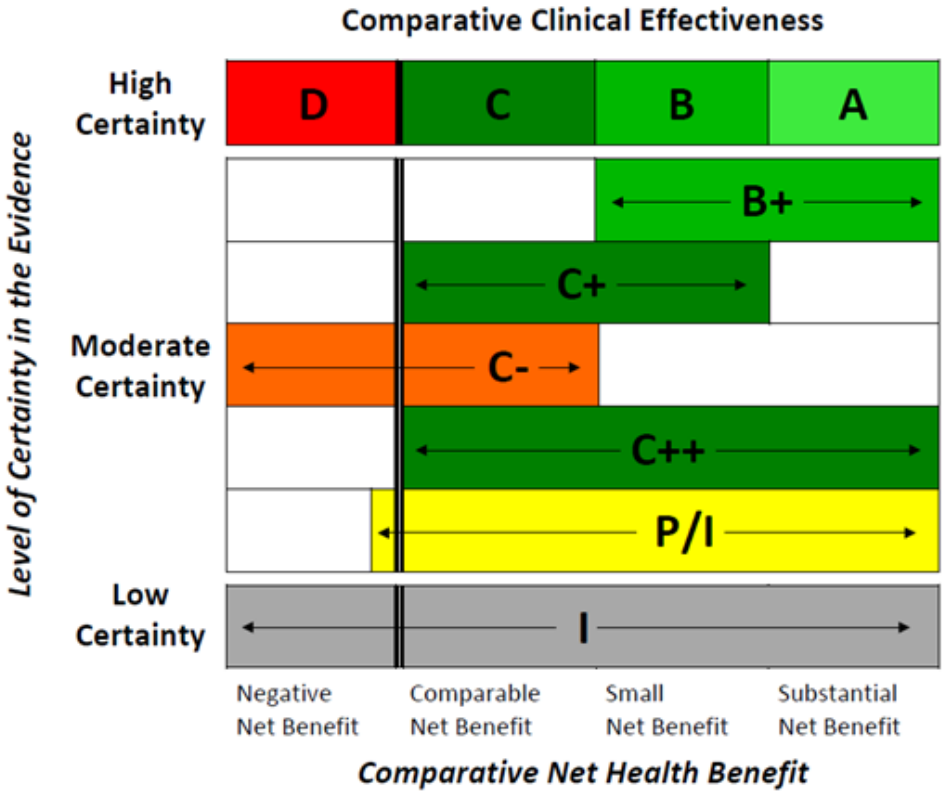
Notes. NOS = Newcastle Ottawa Scale.

For ease of interpretation, scales from the two Risk of Bias tools were converted to a single scale: Low, Moderate, High. “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); “High” refers to original ratings of “High Risk of Bias” (ROB2) or “Poor Study Quality” (NOS).

ICER-PHTI Assessment Framework Evidence Standards: The body of research that comprised the clinical effectiveness section was assessed against the minimum evidence requirements set forth in the ICER-PHTI framework based on the level of risk that the digital intervention presents to a user. The interventions in this assessment qualify as Tier 3b according to the ICER-PHTI Assessment Framework because they are professionally directed therapeutic services with “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.

ICER Evidence Rating Matrix: The body of evidence for each digital solution approach was evaluated based on effectiveness and safety that followed the ICER Evidence Rating Matrix™ (see Figure 1).

Figure 1. The ICER Evidence Rating Matrix™



- **A = "Superior" –** High certainty of a substantial (moderate-large) net health benefit
- **B = "Incremental" –** High certainty of a small net health benefit
  C = "Comparable" – High certainty of a comparable net health benefit
- **D= "Negative" –** High certainty of an inferior net health benefit
- **B+= "Incremental or Better" –** Moderate certainty of a small or substantial net health benefit, with high certainty of at least a small net health benefit
- **C+ = "Comparable or Incremental" –** Moderate certainty of a comparable or small net health benefit, with high certainty of at least a comparable net health benefit
- **C- = "Comparable or Inferior"** – Moderate certainty that the net health benefit is either comparable or inferior, with high certainty of at best a comparable net health benefit
- **C++ = "Comparable or Better" –** Moderate certainty of a comparable, small, or substantial net health benefit, with high certainty of at least a comparable net health benefit
- **P/I = "Promising but Inconclusive"** – Moderate certainty of a small or substantial net health benefit, small likelihood of a negative net health benefit
- **I = "Insufficient" –** Any situation in which the level of certainty n the evidence is low

Evidence Evaluation Approach

The evaluation approach is informed by expert advisors in the healthcare space, clinical advisors, and patients with a goal of producing meaningful evaluations that inform purchasing decisions.

Virtual Solutions for Opioid Use Disorder: The solutions evaluated aim to improve patient activation and retention for MOUD treatment. The solutions vary in the composition of the solution offerings: (1) medication-focused solutions provide virtual MOUD prescribing capabilities, supplemented with support services, and (2) digital wraparound solutions offer support services to enhance other OUD treatment programs, but they do not offer direct MOUD prescribing.

Comparator Interventions: This assessment prioritizes studies that include comparators over single-arm studies to understand the incremental impact of digital interventions relative to usual care for improving symptoms. The comparator studies in this review defined usual care or "treatment as usual" for OUD as primarily outpatient medication-based treatment accompanied by various supplemental services. Buprenorphine was the predominant treatment received by participants across the reviewed studies.

Clinical Outcomes: The primary clinical outcome of clinical effectiveness is 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.

Retention measures varied considerably across studies, reflecting differences in study design and data availability. Studies employed patient self-report, clinical attendance records, prescription fill data from administrative claims, and biologic markers, such as positive urine samples, as measures of retention and adherence to treatment. In this analysis, retention refers to continued attendance and adherence to treatment. When available, medication adherence measures were prioritized over attendance-based measures as more direct indicators of medication treatment continuation. Biologic testing, such as buprenorphine positive urine samples, were prioritized over claims-based measures (i.e., days with a prescription) and self-reported medication use. When both a time-based (i.e., days in treatment) and patient-based (i.e., proportion of patients in treatment) retention metric were reported in a study, the time-based metric was prioritized. As studies most commonly reported the average number of days of retention and the proportion of patients retained at the end of the study, other measures were converted into these metrics for comparability across studies (see Appendix D).

Secondary clinical outcomes described in the evidence include opioid abstinence, relapse rates, withdrawal symptoms, and safety.

Comparator Studies Data: Among comparator studies that had more than one article with retention metrics, the most complete and relevant data across all study articles was selected for interpretation of the findings. For studies missing between-group differences data points, values were calculated based on data provided in the study articles or, when figures or graphs were provided, digitized data values were obtained. Between-group comparison values were based on differences at follow-up periods when reported or calculation was possible.

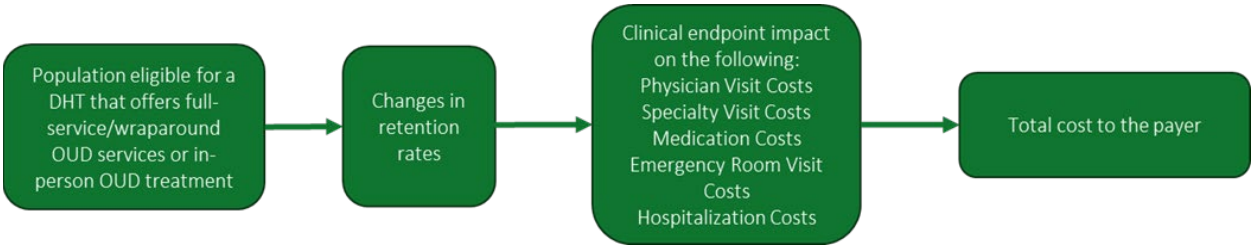
Minimally Important Clinical Differences (MCID): There is not consensus in the literature or among clinical experts about what constitutes a minimal clinically important difference (MCID) for OUD retention or related outcomes such as abstinence. Given the elevated risk of overdose after treatment cessation, any improvement in retention can reduce mortality and improve long-term outcomes.

User Experience and Health Equity: To be clinically effective, virtual solutions for opioid use disorder must engage patients and deliver strong user experience. The assessment includes data on patients' user experience, satisfaction, and engagement with the solutions. In addition, patient sociodemographic characteristics were used to better understand how the solutions performed in different patient subgroups.

Economic Assessment

PHTI developed a de novo budget impact analysis for virtual solutions for US adults with OUD. The model assumed a hypothetical US health plan with 1,000,000 members where eligible patients initiated a virtual solution compared to usual care and were followed until the end of a one-year time horizon. The budget impact model schematic is presented in Figure 2. Based on available data, the base case model focuses on the impact on annual healthcare costs via a change in retention rate, defined by duration on MOUD treatment. Further details on cost inputs are presented below.

Figure 2: Budget Impact Model Schematic



Notes: DHT = digital health technology; OUD= opioid use disorder.

Intervention: The interventions in the budget impact analysis were hypothetical virtual solutions for treating OUD based on the two solution categories: medication-focused solutions and digital wraparound solutions.

Comparator: The comparator for this analysis was usual care defined as in-person MOUD treatment.

Results: The budget impact analysis reports the following results across commercial, Medicare, and Medicaid populations:

- Total costs for virtual solutions and usual care scenarios
- Incremental cost per user per year (PUPY)
- Incremental cost per member per month (PMPM).

Model Assumptions and Limitations:

- The model assumes that 25% of patients in the usual care arm would shift to virtual OUD solutions.
- The model does not assume any changes in the percentage of patients with previous MOUD treatment history between the virtual solutions and usual care treatment providers.
- The model uses annual healthcare costs from a real-world analysis that used 2014 commercial claims for people with OUD initiating buprenorphine treatment and stratified by adherence groups based on the proportion of days covered over a 12-month treatment period.[3] The study was conducted during the heroin era and prior to illicitly manufactured fentanyl. The model may be limited by the use of older economic data from this time period and annual healthcare costs may be overestimated.
- To estimate the average annual healthcare spending, the model assumes an overall linear relationship between annual commercial healthcare spending and treatment adherence days. This approach assumes that multiplying the proportion of days covered by buprenorphine by one year is equal to treatment duration as measured by retention days – an assumption that may oversimplify the difference between adherence and continuous engagement in care.
- The average number of days of MOUD treatment for the virtual solution and usual care arms was identified from comparator studies identified in the systematic literature review.

- The model assumes that the clinical impact of the virtual solutions vs usual care on retention are sustained throughout a one-year time horizon despite shorter periods of follow-up from the clinical evidence sources. Therefore, the costs averted from improved clinical outcomes may be over- or underestimated. Additionally, the model assumes the clinical impact for the virtual solutions was equal across plan perspectives, when the effectiveness of virtual solutions are likely to have varying impacts across health plans of different patient populations.
- Medicare and Medicaid spending estimates are adjusted using published literature analyzing total OUD-related healthcare costs by specific payer perspectives.[4]

Analysis Inputs

Patient Population: The eligible patient population for the analysis was US adults with OUD receiving MOUD treatment. Prevalence of OUD was taken from the Center for Disease Control and Prevention (CDC) Survey data[5] and published research on the Medicare population[6]. The proportion treated with MOUDs was also informed by the CDC Survey. Patient population funnel inputs are presented in Table 7. The patient funnel diagram is presented in Figure 2.

Table 7: Eligible Population Inputs

Criteria	Commercial	Medicare	Medicaid	Source
Plan population	1,000,000	1,000,000	1,000,000	Assumption
Proportion of plan that is adults	78.9%	99.2%	48.7%	ACS[7]
Prevalence of OUD	3.7%	1.6%	7.5%	Adapted from CDC data[8] and published research for the Medicare population[9]
Proportion of OUD treated with MOUD	25.1%	14.5%	24.9%	Adapted from CDC data[10]

Note: ACS = American Community Survey; CDC = Centers for Disease Control; OUD = opioid use disorder, MOUD = medications for opioid use disorder.

Figure 2: Population Funnels for a 1 Million-Member Health Plan

Costs: Cost inputs for the budget impact analysis were informed by a pragmatic literature review. Cost inputs were inflated to 2024 US dollars using the annual Consumer Price Index for medical care.[11] Costs were converted from the commercial perspective to Medicare and Medicaid using published literature that analyzed total OUD-related healthcare costs by specific payer perspectives.[12] 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.[1314] These ratios are presented in Table 8.

Table 8: Health plan Cost Conversions

Health Plan	Outpatient Services
Medicare to Commercial	91%[15]
Commercial to Medicaid	89%[16]

Healthcare Resource Use Costs: Costs were informed by a real-world analysis of commercially insured enrollees with OUD. This study characterized annual costs by adherence group, using the proportion of days covered (PDC) by buprenorphine in the 12 months following treatment initiation.[17] Patients were grouped by adherence levels using the following categories: PDC < 20%, 20% ≤ PDC< 40%, 40% ≤ PDC < 60%, 60% ≤ PDC < 80% and PDC ≥ 80%. Total healthcare costs were adjusted for differences between adherence groups such as age, sex, insurance plan type, other substance use disorders, behavioral health disorders, and chronic pain conditions. Annual healthcare costs used in the budget impact analysis are presented in Table 9.

Table 9: Annual Healthcare Costs by Adherence Group

PDC Interval	Annual Reported Costs (2014)	Annual Costs (2024)
<0.20	$24,431	$31,645
0.20 <0.40	$22,697	$29,399
0.40 <0.60	$22,878	$29,633
0.60 <0.80	$20,294	$26,286
≥0.8	$17,519	$22,692

Notes: MOUD = medications for opioid use disorder; PDC = proportion of day covered.

The model converts the PDC to days over one year and assumes a linear equation between the number of days adherent and the annual costs. The slope of this linear equation was -28.77, meaning that for each additional day a patient is on MOUD treatment, they are expected to avoid $29 in total healthcare spending.

Clinical Inputs: For both virtual solutions and usual care, days of MOUD treatment were used in the linear equation to inform annual healthcare costs for each treatment arm. For both categories, the average MOUD treatment duration for usual care and virtual solutions was 137 days and 150 days, respectively, for a difference of 13 days. These were derived from comparator studies identified in the clinical systematic literature review.

This analysis estimated the weighted average days of retention at six months for patients receiving digital solutions and patients in usual care. For studies that reported retention as the proportion of patients at discrete timepoints, the average duration of treatment in days up to 6 months was estimated using restricted mean survival time calculated via an area-under-the-curve approach. At each interval, the area was calculated by multiplying the average retention proportion during that interval by the interval's length. Where data at both ends of the interval were available, the mean of the two proportions (i.e., trapezoidal integration) was used. If retention values for specific timepoints were missing, linear interpolation was used from the nearest known values. The cumulative restricted mean survival time at 6 months was computed by summing the interval areas. For studies that reported mean days of treatment retention at discrete timepoints, cumulative retention was calculated by monthly intervals up to the last reported timepoint using linear interpolation.

Virtual Solution Program Costs: Program costs for each solution category are described below:

- Medication-focused solutions: The model assumes equal payment for virtual medication-focused solutions and usual MOUD care for buprenorphine. 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. Vendor-supplied pricing for commercial contracts ranges widely from $300 to $800 per month, with average monthly pricing estimated to be $409. For Medicare, vendor-supplied pricing information 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 rates were more variable with vendor-supplied rates ranging from $150 to $500, for an average of $333 per month.

- Digital wraparound solutions: 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.[18][19] Pricing estimates for digital wraparound solutions inclusive of standard CM rewards ranged from $118 to $350 per user per month, for an average cost of $205 per user per month.

Appendix B – SLR Studies, Company-specific Clinical Citations, HCRU Data, and Contracting Details

Appendix B-1: 57 Articles Included in the SLR

Study Articles	Article Type	Study Category	Data Source	Full Reference
Bicycle Health				
Burke 2024	Full Text	I	Online Databases & Conference Proceedings	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
Boulder Care				
Chan 2023	Abstract/Poster	O	Company Data Submission	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.
Chan 2024a	Full Text	O	Online Databases & Conference Proceedings	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
Chan 2024b	Abstract/Poster	O	Online Databases & Conference Proceedings	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.
CHESS Health				
Gustafson 2024	Full Text	I	Online Databases & Conference Proceedings	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
Hochstatter 2021	Full Text	I	Online Databases & Conference Proceedings	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
Parlier–Ahmad 2023	Full Text	I	Online Databases & Conference Proceedings	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

Study Articles	Article Type	Study Category	Data Source	Full Reference
Roos 2020	Full Text	I	Online Databases & Conference Proceedings	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
Shi 2019	Full Text	I	Online Databases & Conference Proceedings	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
DynamiCare Health				
DeFulio 2021a	Full Text	I	Online Databases & Conference Proceedings	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
DeFulio 2021b	Full Text	I	Online Databases & Conference Proceedings	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
DeFulio 2022	Full Text	I	Online Databases & Conference Proceedings	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
Waite 2021	Registered Clinical Trial Data	I	Clinicaltrials.gov	Waite, Mindy, "Encouraging Opioid Abstinence Behavior: Incentivizing Inputs and Outcomes – Pilot," Clinicaltrials.gov, October 3, 2024. https://clinicaltrials.gov/study/NCT04235582
Ophelia				
Rowe 2025	Full Text	I	Online Databases & Conference Proceedings	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
Williams 2023	Full Text	O	Online Databases & Conference Proceedings	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

PursueCare				
Guarino 2016	Full Text	I	Online Databases & Conference Proceedings	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
Kawasaki 2024	Registered Clinical Trial Data	I	Clinicaltrials.gov	Kawasaki, S. "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
Kim 2015a	Full Text	I	Online Databases & Conference Proceedings	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
Kim 2015b*	Abstract/Poster	N/A	Online Databases & Conference Proceedings	Kim, S. J., and L. A. Marsch., "Can Persons with a History of Multiple Addiction Treatment Episodes and Chronic Relapse Benefit from Technology–Delivered Behavior Therapy?" Drug and Alcohol Dependence 156 (2015): e111.
Kim 2016*	Full Text	N/A	Online Databases & Conference Proceedings	Kim, S. J., L. A. Marsch, M. C. Acosta, H. Guarino, et al., "Can Persons with a History of Multiple Addiction Treatment Episodes Benefit from Technology–Delivered Behavior Therapy? A Moderating Role of Treatment History at Baseline," Addictive Behaviors 54 (March 2016): 18–23. https://doi.org/10.1016/j.addbeh.2015.11.009
Mahon 2023	Abstract/Poster	O	Online Databases & Conference Proceedings	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
Maricich 2021a	Full Text	O	Online Databases & Conference Proceedings	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
Maricich 2021b	Full Text	I	Online Databases & Conference Proceedings	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
Maricich 2021c	Full Text	O	Online Databases & Conference Proceedings	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
Maricich 2022	Abstract/Poster	O	Online Databases & Conference Proceedings	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

Rozycki 2022	Abstract/Poster	I	Online Databases & Conference Proceedings	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
Shah 2022a	Abstract/Poster	O	Online Databases & Conference Proceedings	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
Shah 2022b	Abstract/Poster	O	Online Databases & Conference Proceedings	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
Shah 2023	Abstract/Poster	O	Online Databases & Conference Proceedings	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
Shapiro 2021	Abstract/Poster	O	Online Databases & Conference Proceedings	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
Stidham Ba 2024	Abstract/Poster	O	Online Databases & Conference Proceedings	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
Velez 2021a	Full Text	O	Online Databases & Conference Proceedings	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
Velez 2021b	Full Text	O	Online Databases & Conference Proceedings	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
Velez 2021c	Full Text	O	Online Databases & Conference Proceedings	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
Velez 2022	Full Text	O	Online Databases & Conference Proceedings	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

Velez 2023	Abstract/Poster	O	Online Databases & Conference Proceedings	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
Pelago				
Glasner 2025	Full Text	O	Company Data Submission	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
Monico 2024	Full Text	O	Online Databases & Conference Proceedings	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
Q2i				
Jenkins 2025	Registered Clinical Trial Data	I	Clinicaltrials.gov	Jenkins, Steven, “Technology Improving Success of Medication-Assisted Treatment in Primary Care – Phase 2,” ClinicalTrials.gov, May 6, 2025. https://clinicaltrials.gov/study/NCT05017272
Kalmin 2024	Abstract/Poster	I	Online Databases & Conference Proceedings	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
Nieto 2025	Full Text	O	Company Data Submission	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
Rosen 2025	Full Text	I	Company Data Submission	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
WEconnect Health				
Marino 2024	Full Text	I	Online Databases & Conference Proceedings	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
Workit Health				
Coffey 2024	Full Text	O	Online Databases & Conference Proceedings	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

Hendy 2025	Full Text	O	Company Data Submission	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
Lira 2023	Full Text	I	Online Databases & Conference Proceedings	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
Lira 2025	Full Text	O	Online Databases & Conference Proceedings	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
Other				
Bertz 2022	Full Text	I	Online Databases & Conference Proceedings	Bertz, J. W., Panlilio, L. V., Stull, S. W., et al., "Being at Work Improves Stress, Craving, and Mood for People with Opioid Use Disorder: Ecological Momentary Assessment during a Randomized Trial of Experimental Employment in a Contingency–Management–Based Therapeutic Workplace." Behaviour Research and Therapy 152 (May 2022): 104071. https://doi.org/10.1016/j.brat.2022.104071
Campbell 2023	Full Text	O	Online Databases & Conference Proceedings	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
Flickinger 2022	Full Text	I	Online Databases & Conference Proceedings	Flickinger, T. E., M. Waselewski, A. Tabackman, et al., "Communication between Patients, Peers, and Care Providers through a Mobile Health Intervention Supporting Medication-Assisted Treatment for Opioid Use Disorder." Patient Education and Counseling 105, no. 7 (2022): 2110–2115. https://doi.org/10.1016/j.pec.2022.02.014
Heinz 2024	Full Text	I	Online Databases & Conference Proceedings	Heinz, M. V., Lekkas, D., Abreu, V., et al., "Evaluating a Mobile App's Effects on Depression and Anxiety in Medication–Treated Opioid Use Disorder." NPJ Mental Health Research 3 (2024): 43. https://doi.org/10.1038/s44184–024–00086–7
Hodges 2022	Full Text	I	Online Databases & Conference Proceedings	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
Holtyn 2021	Full Text	I	Online Databases & Conference Proceedings	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
Moore 2017	Full Text	I	Online Databases & Conference Proceedings	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

Moore 2019	Full Text	I	Online Databases & Conference Proceedings	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
Tofighi 2022	Full Text	O	Online Databases & Conference Proceedings	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
Tofighi 2023	Full Text	I	Online Databases & Conference Proceedings	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

Notes: I = interventional. O = observational. N/A = not applicable. SLR = systematic literature review. Systematic literature reviews and meta-analyses are not included in the table.
*Denotes articles with data that could not be extracted.

Appendix B-2: 62 Company-specific Clinical Citations Excluded from SLR

Source	Full Reference	Reason for Exclusion	Details on Reason for Exclusion
Affect Therapeutics			
Clinicaltrials.gov	Affect Therapeutics, Inc. Demonstration of a Digital Care Program for Methamphetamine Use Disorder. ClinicalTrials.gov. Last updated January 11, 2023. https://clinicaltrials.gov/study/NCT05206175	Population out of scope	Not specific to OUD; focus on stimulant use disorder
Company Website	Muhlner, Kristin. Demonstration of a Digital Care Program for Methamphetamine Use Disorder. NIH SBIR Phase I Grant No. 1R43DA055394-01, PA-20-262. Awarded to Affect Therapeutics, Inc., DUNS No. 117929466, UEI DBZDN1DH5K35. Funded by the National Institute on Drug Abuse (NIDA), administered under the Special Emphasis Panel [ZRG1 RPHB-D (16)], Fiscal Year 2021. Award notice dated September 21, 2021. https://reporter.nih.gov/project-details/10382485	Publication type out of scope	Study design was not peer-reviewed research; grant
Company Website	"Affect Therapeutics: Delivering Next Generation Addiction Recovery - An Overview." YouTube video, length: 9:37. Posted by Affect Therapeutics , December 21, 2023 https://youtu.be/QnHy93nHk1g?feature=shared	Publication type out of scope	Study design was not peer-reviewed research; Youtube video
Aware Recovery Care			
Clinicaltrials.gov	Yale University. Preliminary Effectiveness of Remotely Monitored Blood Alcohol Concentration Device as Treatment Modality (Soberlink). ClinicalTrials.gov. Last updated May 26, 2023. https://clinicaltrials.gov/study/NCT04380116	Population out of scope	Not specific to OUD; focus on alcohol use disorder
Bicycle Health			
Clinicaltrials.gov	Cambridge Health Alliance. Effects of Remote Motivational Enhancement in Buprenorphine Treatment. ClinicalTrials.gov. Last updated April 5, 2024. https://clinicaltrials.gov/study/NCT05184907	Outcomes out of scope	No results posted
Company Website	Rollston, Rebekah, Winifred Gallogly, Liza Hoffman, et al., “Collaborative, Patient-Centered Care Model That Provides Tech-Enabled Treatment of Opioid Use Disorder via Telehealth,” BMJ Innovations 8 (2022): 117–22. https://doi.org/10.1136/bmjinnov-2021-000816	Outcomes out of scope	No results posted
Company Website	Weiner, Scott G., Emily N. Miller, and Brian Clear, “Use of Diverted Buprenorphine by Individuals Initiating Telehealth Opioid Use Disorder Treatment,” Substance Use & Misuse 60, no. 3 (2024): 442–445. https://doi.org/10.1080/10826084.2024.2434006	Outcomes out of scope	Outcome is use of diverted buprenorphine

Source	Full Reference	Reason for Exclusion	Details on Reason for Exclusion
Company Website	Rollston, Rebekah, Barbara Burke, Scott G. Weiner, et al., "Evaluation of Urine Drug Screen Falsification of Results among Patients with Opioid Use Disorder Receiving Treatment in a Telehealth Model of Care," Journal of Substance Use and Addiction Treatment 154 (November 2023): 209151. https://doi.org/10.1016/j.josat.2023.209151	Outcomes out of scope	Outcome is rate of falsifying urine drug tests
Company Website	Sousa, Jessica L., Pushpa Raja, Haiden A. Huskamp, et al, "Perspectives of Patients Receiving Telemedicine Services for Opioid Use Disorder Treatment: A Qualitative Analysis of User Experiences," Journal of Addiction Medicine 16, no. 6 (November/December 2022): 702–708. https://doi.org/10.1097/ADM.0000000000001006	Publication type out of scope	Qualitative study design
Company Website	Bicycle Health. Effective Treatment of Opioid Use Disorder Through Telehealth. White paper. September 14, 2023. https://partner.bicyclehealth.com/bicycle-health-news/effective-treatment-of-oud-treatment-through-telehealth	Publication type out of scope	Study design was not peer-reviewed research; white paper
Boulder Care			
Company Data Submission	Randall, Adam, Ilana Hull, and Stephen A. Martin, "Enhancing Patient Choice: Using Self-Administered Intranasal Naloxone for Novel Rapid Buprenorphine Initiation," Journal of Addiction Medicine 17, no. 2 (March–April 2023): 237–40. https://doi.org/10.1097/ADM.0000000000001073	Publication type out of scope	Sample size less than 20
Company Data Submission	Martin, Stephen A., Lisa M. Chiodo, Jordon D. Bosse et al, "The Next Stage of Buprenorphine Care for Opioid Use Disorder," Annals of Internal Medicine 169, no. 9 (2018): 628–635. https://doi.org/10.7326/M18-1652	Intervention out of scope	No digital component to the intervention
Clinicaltrials.gov	Boulder Care. Evaluating the Efficacy of a Digital Platform to Deliver Comprehensive Treatment for Opioid Use Disorder (BEaTS). ClinicalTrials.gov. Last updated February 8, 2023. https://clinicaltrials.gov/study/NCT05529225	Outcomes out of scope	No results posted
Company Data Submission	Jack, Helen E., Devin Oller, John Kelly, et al, "Addressing Substance Use Disorder in Primary Care: The Role, Integration, and Impact of Recovery Coaches," Substance Abuse 39, no. 3 (2018): 307–314. https://doi.org/10.1080/08897077.2017.1389802	Population out of scope	Not specific to OUD; focus on substance use disorder
Company Data Submission	Bosse, Jordon D., Kim Hoffman, Katharina Wiest, et al., "Patient Evaluation of a Smartphone Application for Telehealth Care of	Publication type out of scope	Qualitative study design

Source	Full Reference	Reason for Exclusion	Details on Reason for Exclusion
	Opioid Use Disorder," Addiction Science & Clinical Practice 17, no. 1 (September 9, 2022): 50. https://doi.org/10.1186/s13722-022-00331-4		
Company Data Submission	Bellosi, Danielle, Wesley Brewington, Stephen Martin, et al., "Planning for Success: Shared Decision-Making and the Outpatient Transition from Fentanyl to Buprenorphine," Presentation at the MOUD ECHO Learning Community Webinar, New England Addiction Technology Transfer Center, 2024. https://mesudlearningcommunity.org/events/planning-for-success-shared-decision-making-and-outpatient-transition-from-fentanyl-to-buprenorphine/	Population out of scope	Not specific to OUD; focus on shared decision-making process
Company Data Submission	Martin, Stephen and Stephanie Strong, "Better, Faster, Cheaper, and Scaled: Opioid Use Disorder Treatment in the Fentanyl Era," Presentation at the Center for Prevention Implementation Methodology (Ce-PIM) Seminar Series, Northwestern University, September 24, 2024. https://cepim.northwestern.edu/calendar-events/2024-09-24-martin-strong	Publication type out of scope	Study design was not peer-reviewed research; webinar presentation
Company Data Submission	Hubbard, "Meeting People Where They Are: Corrections, Telehealth and OUD," Presentation at the American Society of Addiction Medicine (ASAM) eLearning event. https://elearning.asam.org/products/meeting-people-where-they-are-corrections-telehealth-and-oud	Publication type out of scope	Study design was not peer-reviewed research; webinar presentation
Company Data Submission	Justice Community Opioid Innovation Network. Treating Opioid Use Disorder in Justice-Involved Populations. JCOIN Issue Brief No. 3. Bethesda, MD: National Institute on Drug Abuse, 2021. https://www.jcoinctc.org/issue-brief-treating-oud-in-justice-involved-populations/	Publication type out of scope	Study design was not peer-reviewed research; issue brief
CHESS Health			
Company Website	Kiluk, Brian D., Charla Nich, Matthew B. Buck, et al., "Randomized Clinical Trial of Computerized and Clinician-Delivered CBT in Comparison with Standard Outpatient Treatment for Substance Use Disorders: Primary Within-Treatment and Follow-Up Outcomes," American Journal of Psychiatry 175, no. 9 (September 1, 2018): 853–63. https://doi.org/10.1176/appi.ajp.2018.17090978	Population out of scope	Not specific to OUD; focus on substance use disorder
Company Data Submission	Wright, David, "Evaluating the Impact of CHESS Health's Digital Health Solution on Clinical Outcomes in Oklahoma's Substance Use Disorder Population," 2022.	Publication type out of scope	Study design was not peer-reviewed research; white paper

Source	Full Reference	Reason for Exclusion	Details on Reason for Exclusion
DynamiCare Health			
Company Data Submission	Sweeney, Mary M., August F. Holtyn, Maxine L. Stitzer, and David R. Gastfriend, "Practical Technology for Expanding and Improving Substance Use Disorder Treatment: Telehealth, Remote Monitoring, and Digital Health Interventions," Psychiatric Clinics of North America 45, no. 3 (2022): 515-528. https://doi.org/10.1016/j.psc.2022.05.006	Publication type out of scope	Systematic literature review
Clinicaltrials.gov	BrightView LLC. Contingency Management Using Smartphone App in Patients With SUD. ClinicalTrials.gov. Last updated November 20, 2019. https://clinicaltrials.gov/study/NCT04162132	Outcomes out of scope	No results posted
Clinicaltrials.gov	Center for Progressive Recovery, LLC. A Brief Negotiation Interview Chatbot to Improve Buprenorphine Engagement Among Justice-Involved Individuals (BNICHAT). ClinicalTrials.gov. Last updated July 3, 2024. https://clinicaltrials.gov/study/NCT04982627	Outcomes out of scope	No results posted
Clinicaltrials.gov	Virginia Commonwealth University. Mobile Based Contingency Management to Promote Daily Self-Monitoring in Primary Care Patients (ProMPT). ClinicalTrials.gov. Last updated December 7, 2022. https://clinicaltrials.gov/study/NCT03962491	Population out of scope	Not specific to OUD; focus on chronic pain
Company Data Submission	Hallgren, Kevin A., Mark H. Duncan, Matthew D. Iles-Shih, et al. “Feasibility, Engagement, and Usability of a Remote, Smartphone-Based Contingency Management Program as a Treatment Add-On for Patients Who Use Methamphetamine: Single-Arm Pilot Study,” JMIR Formative Research 7, no. 1 (2023): e47516. https://doi.org/10.2196/47516	Population out of scope	Not specific to OUD; focus on stimulant use disorder
Company Data Submission	Palmer, Amanda M., Rachel L. Tomko, Lindsay M. Squeglia, et al., "A Pilot Feasibility Study of a Behavioral Intervention for Nicotine Vaping Cessation Among Young Adults Delivered via Telehealth," Drug and Alcohol Dependence 232 (2022): 109311. https://doi.org/10.1016/j.drugalcdep.2022.109311	Population out of scope	Not specific to OUD; focus on nicotine vaping
Company Data Submission	Brown, Hayley D., and Anthony DeFulio, "Contingency Management for the Treatment of Methamphetamine Use Disorder: A Systematic Review," Drug and Alcohol Dependence 216 (2020): 108307. https://doi.org/10.1016/j.drugalcdep.2020.108307	Population out of scope	Not specific to OUD; focus on stimulant use disorder
Company Data Submission	De Crescenzo, Franco, Marco Ciabattini, Gian Loreto D’Alò, et al., "Comparative Efficacy and Acceptability of Psychosocial Interventions for Individuals with Cocaine and Amphetamine	Population out of scope	Not specific to OUD; focus on stimulant use disorder

Source	Full Reference	Reason for Exclusion	Details on Reason for Exclusion
	Addiction: A Systematic Review and Network Meta-analysis," PLOS Medicine 15, no. 12 (2018): e1002715. https://doi.org/10.1371/journal.pmed.1002715		
Company Data Submission	Kurti, Allison N., Katherine Tang, Hypatia A. Bolivar, et al., "Smartphone-based Financial Incentives to Promote Smoking Cessation During Pregnancy: A Pilot Study," Preventive Medicine 140 (2020): 106201. https://doi.org/10.1016/j.ypmed.2020.106201	Population out of scope	Not specific to OUD; focus on pregnant smokers
Company Data Submission	Kurti, Allison N., Tyler D. Nighbor, Katherine Tang, et al., "Effect of Smartphone-based Financial Incentives on Peripartum Smoking Among Pregnant Individuals: A Randomized Clinical Trial," JAMA Network Open 5, no. 5 (2022): e2211889–e2211889. https://doi.org/10.1001/jamanetworkopen.2022.11889	Population out of scope	Not specific to OUD; focus on pregnant smokers
Company Data Submission	Hammond, Alexis S., Mary M. Sweeney, Tanyaradzwa U. Chikosi, et al, “Digital Delivery of a Contingency Management Intervention for Substance Use Disorder: A Feasibility Study with DynamiCare Health,” Journal of Substance Abuse Treatment 126 (2021): 108425. https://doi.org/10.1016/j.jsat.2021.108425	Population out of scope	Not specific to OUD; focus on alcohol use disorder
Company Data Submission	Polak, Kathryn, Mobile-Based Contingency Management to Promote Daily Self-Monitoring of Pain Severity and Related Measures in an Online Sample of Individuals with Chronic Pain. PhD diss., Virginia Commonwealth University, 2021. https://doi.org/10.25772/01EX-VM82	Population and publication type out of scope	Not specific to OUD; study design was not peer-reviewed research; thesis/dissertation
Company Data Submission	Ryan-Pettes, Stacy R., Amanda Devoto, and Anthony DeFulio, "Acceptability and Willingness to Pay for Contingency Management Interventions Among Parents of Young Adults with Problematic Opioid Use," Drug and Alcohol Dependence 206 (2020): 107687. https://doi.org/10.1016/j.drugalcdep.2019.107687	Population out of scope	Participants were those with or without history of opiate use
Company Data Submission	Davidson, Rosemarie M., Hayley D. Brown, Sean D. Regnier, et al, “Incentivized Collaborative Care to Disseminate and Enhance Contingency-Management Services,” Journal of Applied Behavior Analysis 58, no. 1 (2025): 56–66. https://doi.org/10.1002/jaba.1099	Population out of scope	Participants were prescribers
Company Data Submission	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	Population out of scope	Not specific to OUD; focus on stimulant use disorder

Source	Full Reference	Reason for Exclusion	Details on Reason for Exclusion
Company Data Submission	DynamiCare Health Inc. 2022.“DynamiCare Health Digital Therapeutic Receives FDA Breakthrough Device Designation for Treatment of Smoking During Pregnancy,” DynamiCare Health, February 22, 2022, DynamiCare Health, accessed July 28, 2025, https://www.dynamicarehealth.com/news/2022/3/4/dynamicare-health-digital-therapeutic-receives-fda-breakthrough-device-designation-for-treatment-of-smoking-during-pregnancy	Publication type out of scope	Study design was not peer-reviewed research; press release
Company Data Submission	DynamiCare Health Inc. 2023. “DynamiCare Health Digital Therapeutic Receives FDA Breakthrough Device Designation for Treatment of Alcohol Use Disorder.” Boston, March 28, 2023. DynamiCare Health. Accessed July 28, 2025. https://www.dynamicarehealth.com/news/2023/3/28/dynamicare-health-digital-therapeutic-receives-fda-breakthrough-device-designation-for-treatment-of-alcohol-use-disorder	Publication type out of scope	Study design was not peer-reviewed research; press release
Company Data Submission	U.S. Department of Health & Human Services, Office of Inspector General. 2022. Advisory Opinion No. 22-04, Regarding a program through which Requestor provides certain individuals access to digital contingency management and related tools to treat substance use disorders. Issued March 2, 2022. https://oig.hhs.gov/compliance/advisory-opinions/22-04/	Publication type out of scope	Study design was not peer-reviewed research; perspective
Company Data Submission	Regnier, Sean D., and Anthony DeFulio, "Implications of Epidemic-Pandemic Convergence for Routine Care Adoption of Contingency Management: A Case Study," Experimental and Clinical Psychopharmacology 31, no. 2 (2023): 295-99. https://doi.org/10.1037/pha0000569	Publication type out of scope	Study design was not peer-reviewed research; case study
Company Data Submission	Washington State Institute for Public Policy. Benefit-Cost Results: Substance Use Disorders. Website report. 2019. http://www.wsipp.wa.gov/BenefitCost?topicId=7	Publication type out of scope	Study design was not peer-reviewed research; white paper
Groups Recover Together			
Company Website	Groups. 2025 Annual Outcomes Report. White Paper. 2025. https://cdn.prod.website-files.com/66543ba223f69ee06864121d/67aa43920d7dede8a3b366bd_Groups%20%E2%80%94%C2%A0Annual%20Outcomes%202025%20Digital.pdf	Publication type out of scope	Study design was not peer-reviewed research; white paper

Source	Full Reference	Reason for Exclusion	Details on Reason for Exclusion
Company Website	Groups. 2023 Annual Outcomes Report. White Paper. 2023. https://joingroups.com/wp-content/uploads/2024/02/2023-Groups-Annual-Report-Final-1.pdf	Publication type out of scope	Study design was not peer-reviewed research; white paper
Ophelia			
Company Data Submission	Williams, Arthur Robin, Christopher Rowe, Lexie Minarik, et al., "Use of In-Network Insurance Benefits Is Critical for Improving Retention in Telehealth-Based Buprenorphine Treatment," Health Affairs Scholar 2, no. 3 (2024): qxae009. https://doi.org/10.1093/haschl/qxae009	Intervention and outcome out of scope	Intervention is teleprescribing-only and association to payment source
Company Data Submission	Williams, Arthur Robin, Christopher Rowe, Ryan Gallagher, et al., "Urine Drug Screening in a Telehealth Setting for the Treatment of Opioid Use Disorder," JAMA Health Forum 4, no. 7 (2023): e232247-e232247. https://doi.org/10.1001/jamahealthforum.2023.2247	Intervention and outcome out of scope	Intervention is teleprescribing-only and feasibility of urine drug screening
Company Data Submission	Williams, Arthur Robin, Shoshana Aronowitz, Ryan Gallagher, et al., "A Virtual-First Telehealth Treatment Model for Opioid Use Disorder," Journal of General Internal Medicine 38, no. 3 (2023): 814-816. https://doi.org/10.1007/s11606-022-07955-x	Intervention out of scope	Intervention is teleprescribing-only
Company Data Submission	French, Rachel, Erica Lyons, Allison Schachter, et al., "Because of This Rotation, This Is What I Want to Do": Implementation and Evaluation of a Telehealth Opioid Use Disorder Clinical Placement for Nurse Practitioner Students," Journal of the American Association of Nurse Practitioners 35, no. 12 (2023): 826-834. https://doi.org/10.1097/JXX.0000000000000949	Population out of scope	Subpopulation (nurse practitioner students)
Company Website	Ophelia. Characteristics, Care Measures, and Clinical Outcomes of Insured Ophelia Patients. White paper. 2023. https://cdn.prod.website-files.com/6345fd5afa932e34e6d158b1/654ad97281a6818e4e7cb315_Insured_patient_summary_1023.pdf	Publication type out of scope	Study design was not peer-reviewed research; white paper
Company Website	Ophelia. Virtual Care for Opioid Use Disorder: An Evidence- and Value-Based Approach. White paper. 2022. https://cdn.prod.website-files.com/6345fd5afa932e34e6d158b1/6377bd88879e136eadf1f5ec_Virtual%20Care%20for%20Opioid%20Use%20Disorder-%20An%20evidence-%20and%20value-based%20approach.pdf	Publication type out of scope	Study design was not peer-reviewed research; white paper

Source	Full Reference	Reason for Exclusion	Details on Reason for Exclusion
Company Data Submission	Williams, Arthur Robin, Shoshana Aronowitz, Ryan Gallagher, et al., “A Digitally-Native Telehealth Treatment Model for Opioid Use Disorder,” Poster presented at the CPDD Annual Scientific Meeting, Minneapolis, MN, June 11–15, 2022.	Intervention out of scope	Intervention is teleprescribing-only
Company Data Submission	Williams, Arthur Robin, Christopher Rowe, Ryan Gallagher, et al., "Urine Drug Screening in a Telehealth Setting for the Treatment of Opioid Use Disorder." JAMA Health Forum 4, no. 7 (2023): e232247. https://doi.org/10.1001/jamahealthforum.2023.2247	Intervention and outcome out of scope	Intervention is teleprescribing-only and feasibility of urine drug screening
Company Data Submission	Rowe Christopher, Arthur Robin Williams and Adam Bisaga, “Recovery Capital Among Patients Receiving Telehealth-Based Opioid Use Disorder Treatment,” Poster presented at the ASAM Annual Conference: Innovations in Addiction Medicine and Science, Denver, CO, April 24–27, 2025.	Intervention and outcome out of scope	Intervention is teleprescribing-only and association to recovery capital
Company Data Submission	Paczynski, Richard P., Edin Memisevich, and Adam Bisaga, “Buprenorphine/Naloxone Induction of OUD Patients Using Telehealth in the Fentanyl Era,” Poster presented at the ASAM Annual Conference: Innovations in Addiction Medicine and Science, Washington, DC, April 13–16, 2023.	Intervention and outcome out of scope	Intervention is teleprescribing-only and association to induction experience
Pelago			
Company Data Submission	Michero, Darcy, Laura Monico, Peyton Pielstickeret al., "Concurrent Treatment of Opioid and Tobacco Use Disorder in a Telemedicine Clinic: Case Report of Breaking Through Barriers," JMIR Formative Research 9 (2025): e72872. https://doi.org/10.2196/72872	Publication type out of scope	Sample size less than 20
Company Data Submission	Glasner, Suzette, August X. Wei, Patrick C. Ryan, et al., “Implementing Suicide Risk Screening in a Virtual Addiction Clinic,” Community Mental Health Journal 60, no. 1 (September 9, 2023): 98–107. https://doi.org/10.1007/s10597-023-01181-3	Intervention out of scope	Intervention is suicide risk screening
Company Data Submission	Monico, Laura B., Megan Eastlick, Darcy Michero, et al., “Overcoming Barriers to Traditional Care Delivery and Pharmacy Challenges: A Qualitative Study of Buprenorphine, Telehealth, and a Digital Therapeutic for Opioid Use Disorder,” Substance Abuse Treatment, Prevention, and Policy 20 (2025): 8. https://doi.org/10.1186/s13011-024-00631-9	Publication type out of scope	Qualitative study design; sample size less than 20

PursueCare			
Clinicaltrials.gov	Milton S. Hershey Medical Center. Comprehensive CBT (Cognitive Behavioral Therapy) Via reSET App. ClinicalTrials.gov. Last updated July 8, 2020. https://clinicaltrials.gov/study/NCT03826966	Outcomes out of scope	No results posted
Clinicaltrials.gov	Pear Therapeutics, Inc. Feasibility Study of Novel Prescription Digital Therapeutic Supporting Unobserved Buprenorphine Initiation & Adherence. ClinicalTrials.gov. Last updated January 9, 2023. https://clinicaltrials.gov/study/NCT05412966	Outcomes out of scope	No results posted
Clinicaltrials.gov	Pear Therapeutics, Inc. A Remote, Decentralized Opioid Use Disorder Study to Evaluate Patient Engagement With a Game-Based Digital Therapeutic. ClinicalTrials.gov. Last updated December 14, 2022. https://clinicaltrials.gov/study/NCT04542642	Outcomes out of scope	No results posted
Q2i			
Company Data Submission	Q2i, LLC. Usability Testing for the Reward-based Technology to Improve OUD Treatment (OARSCM). ClinicalTrials.gov. Last updated May 30, 2023. https://clinicaltrials.gov/study/NCT05159362	Publication type out of scope	Sample size less than 20
Clinicaltrials.gov	Q2i, LLC. Technology for MAT in Primary Care, Phase 1. ClinicalTrials.gov. Last updated August 16, 2021. https://clinicaltrials.gov/study/NCT05006846	Outcomes out of scope	No results posted
Workit Health			
Company Data Submission	Lira, Marlene C., Lauren E. Hendy, Judith I. Tsui, et al., "Treating Hepatitis C Within Real-World Telemedicine Addiction Care," Journal of Addiction Medicine (2024): 10-1097. https://doi.org/10.1097/ADM.0000000000001492	Outcomes out of scope	No results posted

Notes: CBT = cognitive behavioral therapy; MOUD = medications for opioid use disorder; OUD = opioid use disorder.

Appendix B-3: 15 Company-specific Economic Citations Included with Healthcare Resource Utilization Claims

Source	Full Reference
CHESS Health	
Company data submission	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
PursueCare	
Online Databases & Conference Proceedings	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
Online Databases & Conference Proceedings	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
Online Databases & Conference Proceedings	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
Online Databases & Conference Proceedings	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
Online Databases & Conference Proceedings	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
Online Databases & Conference Proceedings	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
Online Databases & Conference Proceedings	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
Online Databases & Conference Proceedings	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
Online Databases & Conference Proceedings	Shah, "Real-World Impact," S38.[1] 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

Source	Full Reference
Online Databases & Conference Proceedings	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
Online Databases & Conference Proceedings	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
Online Databases & Conference Proceedings	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
Pelago	
Company data submission	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
Workit Health	
Company data submission	Workit Health. 2021. “Cost Savings Workit Health.” Claims analysis.

Appendix B-4: Core Contracting Table Per Company

Company Name	Applies for Opioid Abatement Fund money	Sells to states directly (not including Opioid Abatement Funds)	Sells to health plans directly	Available to employers as an in-network provider through the health plan	Available to employers as a buy-up though the health plan	Available to employers through a mental health EAP offering	Sells to employers directly	Sells to health systems/ providers directly
Medication-Focused Solutions								
Affect Therapeutics			X	X		X		X
Aware Recovery Care[a]			X					
Better Life Partners[a]			X					
Bicycle Health	X		X	X				X
Boulder Care			X	X	X	X		
Eleanor Health			X	X				
Groups Recover Together	X		X	X				
Ophelia		X	X	X		X		X
Pelago			X	X	X		X	
PursueCare	X		X	X	X	X	X	X
Wayspring[a]			X					X
Workit Health	X	X	X	X	X	X		
Digital Wraparound Solutions								
CHESS Health		X	X			X	X	X
DynamiCare Health	X	X	X	X	X	X	X	X
Q2i	X	X						X
WEconnect Health	X	X	X				X	X

Note: [a] Companies did not confirm contracting details and may reach patients through channels other than those specified in the table.

Appendix C – Risk of Bias Ratings for SLR Studies

Appendix C-1: Risk of Bias Ratings using the Cochrane Collaboration Risk of Bias in Randomized Trials Version 2 (ROB2)

Study Articles	Overall Rating	Random Sequence Generation	Deviation from Intended Intervention Bias	Missing Outcome Data	Outcomes Measurement Bias	Selective Reporting
CHESS Health						
Gustafson 2024; Hochstatter 2021	Low	Low	Low	Low	Low	Low
Shi 2019	Low	Moderate	Low	Low	Low	Low
DynamiCare Health						
Waite 2021*	N/A	N/A	N/A	N/A	N/A	N/A
PursueCare						
Kawasaki 2024*	N/A	N/A	N/A	N/A	N/A	N/A
Kim 2015a; Kim 2015b[a]; Kim 2016[a]	Low	Low	Low	Low	Low	Low
Other						
Bertz 2022	Low	Low	Low	Low	Low	Low
Heinz 2024	Low	Low	Low	Low	Low	Low
Holtyn 2021	Moderate	Low	Low	Low	Moderate	Low
Moore 2017	Moderate	Moderate	Moderate	Low	Low	Low
Moore 2019	Moderate	Moderate	Low	Low	Low	Low
Tofighi 2023	Low	Low	Low	Low	Low	Low

Notes: N/A = not applicable. See Appendix A for detailed rating information. * Indicates clinicaltrials.gov entry. [a] Was not included in data extraction.

Appendix C-2: Risk of Bias Ratings using the Newcastle-Ottawa Scale (NOS)

Study Articles	Overall Rating	Group Selection	Group Comparability	Outcome/Exposure Assessment
Bicycle Health				
Burke 2024	High	++	N/A	+
Boulder Care				
Chan 2024a[a]; Chan 2024b; Chan 2023*	Moderate	++	+	+++
CHESS Health				
Parlier-Ahmad 2023	Moderate	++	+	+++
Roos 2020	Low	+++	N/A	++
DynamiCare Health				
DeFulio 2021a; DeFulio 2021b	Moderate	++	+	+++
DeFulio 2022	Moderate	++	N/A	++
Ophelia				
Rowe 2025	Low	+++	N/A	++
Williams 2023	Moderate	++	N/A	++
Pelago				
Glasner 2025	Low	+++	N/A	+++
Monico 2024	Low	+++	N/A	++
PursueCare				
Guarino 2016	Low	+++	+	+++
Mahon 2023*	N/A	N/A	N/A	N/A
Maricich 2021a[a]; Maricich 2022*	Moderate	++	N/A	++
Maricich 2021b; Maricich 2021c	Low	+++	+	+++
Rozycki 2022*	N/A	N/A	N/A	N/A
Shapiro 2021*	N/A	N/A	N/A	N/A
Stidham Ba 2024*	N/A	N/A	N/A	N/A
Shah 2022a*; Shah 2022b*; Shah 2023*; Velez 2022[a]; Velez 2023*	Low	+++	+	+++
Velez 2021a; Velez 2021b	Low	+++	N/A	++
Velez 2021c	Moderate	++	+	+++
Q2i				
Jenkins 2025*	N/A	N/A	N/A	N/A
Kalmin 2024*	N/A	N/A	N/A	N/A
Nieto 2025	Low	+++	N/A	++
Rosen 2025	Low	++++	N/A	++
WEconnect Health				
Marino 2024	Moderate	++	+	+++
Workit Health				
Coffey 2024	High	+++	N/A	+
Hendy 2025	High	+++	N/A	+
Lira 2023	Low	+++	N/A	++
Lira 2025	Moderate	++	N/A	++

Study Articles	Overall Rating	Group Selection	Group Comparability	Outcome/Exposure Assessment
Other				
Campbell 2023	Low	+++	N/A	++
Flickinger 2022; Hodges 2022	Low	+++	N/A	++
Tofighi 2022	Low	+++	N/A	++

Notes: N/A = not applicable. More + indicates better evidence quality (lower risk of bias). See Appendix A for detailed rating information. * Indicates conference abstract/poster/clinicaltrials.gov entry. [a] Study article used to assess risk of bias.

Appendix D – Key Comparator Studies with Retention on Treatment Outcomes

Publication	Company (Device)	Risk of Bias	Total N, Study	Reported Metric	Treatment Arm	Total N, Arm	Timepoint	Follow-Up Score, Mean	Between Group Difference at Follow-Up	
									Mean	p-value
Time-Based Outcomes, Days										
Marino 2024	WEconnect Health (N/A)	Moderate	600	Mean number of days the patient received MOUD care up to the 1-year end point	DHT	300	12 months	290.2	54.1	<0.001
					Control	300	12 months	236.1	N/R	N/R
Shi 2019	CHESS Health (CBT4CBT)	Low	20	Mean number of days in the 84-day protocol that patients completed treatment	DHT	10	3 months	82.6	14.0	0.19
					Control	10	3 months	68.6	N/R	N/R
Tofighi 2023	N/A	Low	128	Mean number of days of retention, defined as having an active buprenorphine prescription within the prior 7 days at 8 weeks[a]	DHT	64	2 months	36.6	1.8	0.676
					Control	64	2 months	34.9	N/R	N/R
Velez 2021c	Pear Therapeutics (RESET-O)	Moderate	508	Days' supply buprenorphine[b]	DHT	444	9 months	219.0	2.7	N/R
					Control	64	9 months	216.3	N/R	N/R
Velez 2022	Pear Therapeutics (RESET-O)	Low	1879	Days' supply buprenorphine[b]	DHT	619	12 months	309.5	31.8	<0.001
					Control	650	12 months	277.8	reference	N/A
Patient-Based Outcomes, Percent										
Chan 2024a	Boulder Care (N/A)	Moderate	159	Self-reported rate of buprenorphine continuation[c]	DHT	103	1 month	97.0%	2.6	N/A
					Control	56	1 month	94.4%	N/R	N/A
					DHT	103	3 months	97.0%	4.8	N/A
					Control	56	3 months	92.2%	N/R	N/A
					DHT	103	6 months	95.9%	8.4	N/A
					Control	56	6 months	87.5%	N/R	N/A
Gustafson 2024	CHESS Health (A-CHESS)	Low	414	Participants who reported using buprenorphine	DHT	46	4 months	87.0%	-1.6	N/A
					Control	44	4 months	88.6%	N/R	N/R
					DHT	46	8 months	76.1%	-3.5	N/R
					Control	44	8 months	79.5%	N/R	N/R

Publication	Company (Device)	Risk of Bias	Total N, Study	Reported Metric	Treatment Arm	Total N, Arm	Timepoint	Follow-Up Score, Mean	Between Group Difference at Follow-Up	
									Mean	p-value
					DHT	46	12 months	69.6%	-0.9	N/R
					Control	44	12 months	70.5%	N/R	N/R
					DHT	46	16 months	65.2%	1.6	N/R
					Control	44	16 months	63.6%	N/R	N/R
Holtyn 2021	N/A	Moderate	41	Participants with buprenorphine positive urine samples	DHT	21	6 months	16.1%	-3.6	0.914
					Control	20	6 months	19.7%	N/R	N/R
Kawasaki 2024	Pear Therapeutics (RESET-O)	N/A	100	Participants retained in treatment on MAT	DHT	48	6 months	70.8%	18.9	N/R
					Control	52	6 months	51.9%	N/R	N/R
Maricich 2021b	Pear Therapeutics (Therapeutic Education System)	Low	170	Participants retained in treatment[d]	DHT	91	3 months	82.4%	14.0	N/R
					Control	79	3 months	68.4%	N/R	N/R
Rozycki 2022	Pear Therapeutics (RESET-O)	N/A	198	Clinician-reported participant treatment retention rates	DHT	40	1 month	100%	29.1	<0.01
					Control	158	1 month	70.9%	N/R	N/R
					DHT	40	3 months	87.5%	32.4	<0.01
					Control	158	3 months	55.1%	N/R	N/R

Notes: DHT = digital health technology. N/A = not applicable. N/R = not reported. Italic values are calculated values from other data provided in article. [a] Originally reported as number of weeks; converted into number of days for comparability. [b] The Medication Possession Ratio was converted to days' supply of buprenorphine by multiplying the MPR by the number of days in the study period to estimate the number of days' supply of buprenorphine over the period. [c] Study originally reported self-reported buprenorphine discontinuation rates; calculated the inverse to show continuation rates. [d] Study originally reported the dropout rates; calculated the inverse to show retention rates. See online data supplement for original values.

Appendix E – Key Comparator Studies with Opioid Abstinence Outcomes

Publication	Company (Device)	Risk of Bias	Total N, Study	Reported Metric	Treatment Arm	Total N, Arm	Timepoint	Follow-Up Score Mean	Between Group Difference at Follow-Up	
									Mean	p-value
30-Day Abstinence, Percent										
Maricich 2021b	Pear Therapeutics (Therapeutic Education System)	Low	170	Percentage of participants who were abstinent from opioids during weeks 9-12	DHT	91	3 months	77.3	15.2	0.02
					Control	79	3 months	62.1	N/R	N/R
Rozycki 2022	Pear Therapeutics (RESET-O)	N/A	198	Abstinence rate from opioids in the 30 days prior to discharge from the program	DHT	40	3 months	77.5	25.6	<0.01
					Control	158	3 months	51.9	N/R	N/R
Holtyn 2021	N/A	Moderate	41	Percent of individuals with opiate negative urine samples[a]	DHT	21	6 months	37.9	-1.6	0.816
					Control	20	6 months	39.5	N/R	N/R
Gustafson 2024	CHESS Health (A-CHESS)	Low	414	Participants who reported opioid abstinence[a]	DHT	208	4 months	68.3	-7.4	N/R
					Control	206	4 months	75.7	N/R	N/R
					DHT	208	8 months	73.6	-2.1	N/R
					Control	206	8 months	75.7	N/R	N/R
					DHT	208	12 months	82.2	0.6	N/R
					Control	206	12 months	81.6	N/R	N/R
					DHT	208	16 months	83.2	3.6	N/R
					Control	206	16 months	79.6	N/R	N/R
Cumulative Abstinence, Percent										
Defulio 2021b	DynamiCare (DynamiCare Health)	Moderate	170	Urine samples consistent with illicit drug abstinence and medication adherence	DHT	85	1 month	33.0	14.12	N/R
					Control	85	1 month	18.9	N/R	N/R
					DHT	85	2 months	37.7	17.65	<0.05
					Control	85	2 months	20.0	N/R	N/R
					DHT	85	3 months	28.2	16.47	<0.05
					Control	85	3 months	11.9	N/R	N/R
					DHT	85	4 months	28.3	20.0	<0.05
					Control	85	4 months	8.4	N/R	N/R

Publication	Company (Device)	Risk of Bias	Total N, Study	Reported Metric	Treatment Arm	Total N, Arm	Timepoint	Follow-Up Score Mean	Between Group Difference at Follow-Up	
									Mean	p-value
Shi 2019	CHESS Health (CBT4CBT)	Low	20	Percent opioid-free urine specimens	DHT	10	3 months	91.3	27.4	0.05
					Control	10	3 months	63.9	N/R	N/R
Kawasaki 2024	Pear Therapeutics (RESET-O)	N/A	100	Percentage of patients with a negative urine drug screen	DHT	48	6 months	33.3	-3.2	N/R
					Control	52	6 months	36.5	N/R	N/R
30-Day Abstinence, Days										
Marino 2024	WEconnect Health (N/A)	Moderate	600	Mean number of days abstinent from opioids in the past 30 days (before dropping out of treatment or at the 1-year time point)[a]	DHT	300	12 months	21.6	3.6	<0.001
					Control	300	12 months	18.0	N/R	N/R

Notes: DHT = digital health technology. N/A = not applicable. N/R = not reported. Italic values are calculated values from other data provided in article. Data extracted from a figure is in blue. [a] Metrics were originally reported as opioid positive rates; calculated inverse for abstinence rate.

References

[1] Higgins, Julian P.T., Jelena Savović, Matthew J. Page et al., “Chapter 8: Assessing Risk of Bias in a Randomized Trial,” in *Cochrane Handbook for Systematic Reviews of Interventions,* version 6.4, updated August 2023, https://training.cochrane.org/handbook/current/chapter-08

[2] Wells, G.A., B. Shea, D. O'Connell et al., “The Newcastle-Ottawa Scale (NOS) for Assessing the Quality of Nonrandomised Studies in Meta-Analyses,” *Ottawa Hospital Research Institute*, n.d., https://www.ohri.ca/programs/clinical_epidemiology/oxford.asp

[3] 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

[4] Florence, Curtis S., 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

[5] 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. http://dx.doi.org/10.15585/mmwr.mm7325a1

[6] 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

[7] 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

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

[9] Shoff, “Trends in Opioid Use,” 850–855.

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

[11] 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

[12] Florence, “The Economic Burden,” 901-906.

[13] Florence, “The Economic Burden,” 901-906.

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

[15] Florence, “The Economic Burden,” 901-906.

[16] Florence, “The Economic Burden,” 901-906.

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

[18] DynamiCare Health, https://www.dynamicarehealth.com/

[19] 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