Benefits of Medically Assisted Treatment in Opioid Use Disorder

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Abstract

Introduction: For 2019 in the U.S. opioid overdose deaths neared 50,000 people. Increasing the number of Medication Assisted Treatment (MAT) programs available for the population is important to address this crisis (NIDA, n.d.).

Objective: To evaluate if MAT improves retention rates for those with opioid use disorder (OUD) for one Arizona organization's (AZOrg) seven treatment facilities.

Methods: ASU IRB approval obtained, and de-identified data were abstracted from the electronic records of AZOrg, for a year, March 2020 to February 2021. The data included patient age, sex, date of admission, length of stay, substance abused, and if MAT (buprenorphine, naltrexone, Methadone) was prescribed. Intellectus statistical package was used for analysis.

Results: Among 3261 patients with a mean age of 35.81(18-82) years, 1528 (46.85%) were admitted for OUD that included 371 (24.28%) females, 686 of whom (44.9%) received MAT. For those treated with MAT mean length of stay was 35.78 (SD 30.34) days compared to a mean of 27.46 (30.79) days for those without MAT treatment. This finding was significant, for all forms of MAT, based on a *two-tailed Two-Tailed Independent Samples t-Test* test, $p<.001$.

Discussion/Conclusion: Increasing awareness about OUD and MAT is needed when providing care to patients with OUD. Providing organization-specific information regarding MAT benefits can enhance the adoption of this intervention and aid in the recovery of those being treated for OUD. This analysis did not include the possible confounding factors such as a history of incarceration, duration of OUD before admission, or structural differences of individual facilities.

Keywords: MAT, Suboxone, Naltrexone, Methadone, opioid use disorder

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Benefits of Medically Assisted Treatment in Opioid Use Disorder

Opioid use disorder (OUD) is the persistent use of opioids despite the adverse consequences (Blanco & Volkow, 2019). It is characterized by a strong internal drive to use opioids, which manifests as impaired ability to control use with increasing priority given to use over other activities (Blanco & Volkow, 2019). Many approaches are available to treat this disorder. Medications predominantly target the opioid system and have been underutilized, mainly due to their potential for abuse and heavy regulatory burden for patients and clinicians (Hurd & O'Brien, 2018). Studies have shown that MAT is associated with high treatment retention rates during the induction and stabilization phases, and also reduced opioid craving and opioid withdrawal symptoms (Heo & Scott, 2018).

Background and Significance

Description of the Problem

This is currently a major issue in the United States, and in recent years, the number of opioid users along with the number of deaths has increased (Henck, 2015). The disorder is associated with a range of mental and general medical comorbid conditions, often leading to clinically significant impairment or distress (Blanco & Volkow, 2019)**.** Since opioids can be used intravenously, many risks are inherent in intravenous drug use, including but not limited to Hepatitis and HIV/AIDS (Henck, 2015). It is important to note that addiction does not only affect the person who is using the substance, but also affects the people around them, especially close family, and friends. (Henck, 2015).

Purpose and Rationale

The effectiveness of medications for opioid use disorder is limited by problems at all levels of the care system, including diagnosis, entry into treatment, and retention in treatment (Blanco &

Volkow, 2019). The purpose of this paper is to increase awareness about the medication options for treatment and to create a guide for implementation to enhance the number of Medication Assisted Treatment (MAT) programs available for people with opioid use disorder. By creating awareness of implementing a Suboxone program, it is hoped that more outpatient and inpatient treatment facilities will attempt the process of putting a Suboxone program into action (Blanco & Volkow, 2019). It would create an opportunity for administrators to implement MAT programs for people seeking help with opioid addiction (Henck, 2015). The emphasis on the urgent need for expanding the use of medications for OUD in addition to training of healthcare professionals would result in the expansion of capabilities for personalized interventions (Blanco & Volkow, 2019).

Epidemiological Data

According to the CDC in 2019, more than 70,000 people were reported to have died from drug overdoses, making it a leading cause of injury-related death in the United States. Of those deaths, more than 72% involved a prescription or illicit opioid (CDC, 2021).

Other Advantages of MAT

Although opioid use disorder often follows a chronic course, MAT is effective in all the stages of treatment (Blanco & Volkow, 2019). The correct use of medications to treat opioid use disorder markedly improves outcomes, facilitates recovery, and protects against overdoses (Blanco & Volkow, 2019). It has been found that MAT remains one of the best treatment options for treating opioid addiction (Henck, 2015). The importance of this treatment exists in many different patient populations. It is known that psychiatric disorders increase the risk of an opioid use disorder, although the risk varies by the type of disorder (Blanco & Volkow, 2019). For example, a history of anxiety disorder increases the risk of opioid use disorder by 50%, whereas

a history of another substance use disorder increases the risk by 300% (Blanco & Volkow, 2019).

Global Problem

Among the most important comorbid conditions, HIV and hepatitis C are considered a continuous risk with opioid use disorder (Blanco & Volkow, 2019). The World Health Organization (WHO) estimates that injection drug use accounts for approximately 10% of HIV infections globally and 30% of those who are outside Africa (Blanco & Volkow, 2019). In the USA, the prevalence of opioid use disorder is greater among Native Americans, black people, and non-Hispanic white people than among the Hispanic or Asian American populations (Blanco & Volkow, 2019).

Medical Consequences

Treatment of OUD can result in a reduction of HIV risk associated with sexual activity or injection drug use (Blanco & Volkow, 2019). An important goal in research and the clinic is to improve the integration of treatment for opioid use disorder and HIV as well as for hepatitis C infection which are high especially in new intravenous drug users (Blanco & Volkow, 2019). Effective treatments for hepatitis C exist but are expensive and under-prescribed to individuals with opioid use disorder. Since opioid use disorder medication treatment is associated with reduced hepatitis C incidence, it represents an important strategy to prevent the spread of hepatitis C among people with OUD (Blanco & Volkow, 2019). Increases in the prevalence of opioid use in the general US population have led to a rise in opioid use in pregnancy and the numbers of infants treated for neonatal abstinence syndrome (Tolia et al., 2015). The adverse consequences of OUD are not limited to psychological or physical problems, but also include issues related to social, economic, legal, and housing (Blanco & Volkow, 2019).

Benefits in Recovery

MAT induction among primary care and mental health clinics offers a model to enable partnerships to better serve numerous patients with diverse clinical needs and with varying levels of social support (Polydorou et al., 2017). When used correctly and as recommended, it increases the chances of success in recovery, decreases physical withdrawal symptoms, and cravings (Henck 2015).

Benefits

MAT is an evidence-based, safe, effective treatment option for OUD in an emergency department (ED) setting (Cisewski et al., 2019). Though successfully utilized by many ED-based treatment programs, the stigma of replacing one opioid with another remains a barrier (Cisewski et al., 2019). Studies have also shown superior effects for low-dose buprenorphine in comparison to morphine (Blanco & Volkow, 2019)**.**

The use of Suboxone has been found to decrease inpatient utilization and substantially lower total medical, behavioral health, and pharmacy costs (Kessel et al., 2018). According to a study conducted in the UK, the use of opioid substitution therapies especially involving suboxone in the treatment of opioid use disorder are found to be cost-effective (Kenworthy et al., 2017).

Most patients who undergo medically supervised withdrawal without the subsequent support of opioid use disorder medications relapse shortly thereafter (Blanco & Volkow, 2019)**.** MAT is also associated with increased treatment retention, decreased illicit opioid use, decreased overdose risk, and reduced HIV and hepatitis C risk behaviors (Blanco & Volkow, 2019)**.**

Internal Evidence

A substance use disorder rehab that has seven branches in Arizona provides treatment to a population consisting of men and women who are eighteen years or older from different ethnicities. Many providers here acknowledge the benefits of MAT and its effectiveness in treating this population, only a few patients are prescribed MAT here. Several patients obtain a prescription from an outside source that utilizes a lot of time and resources.

PICO Question

The above-mentioned significance has led to the clinically relevant PICO question: In prescribers who care for clients with OUD (P), does MAT implementation (I), versus treatment as usual (C), improve client outcomes (O)?

Evidence Synthesis

Literature Review and Search Strategy

To answer the PICO question, an exhaustive search was carried out to find the most recent evidence-based literature. PsycINFO, PubMed, and CINAHL databases were searched by using combinations of the key terms and appropriate filters. Mesh and Boolean terms were used to broaden the search. The titles and abstracts of all articles were assessed for searches yielding under 100 results. Rapid critical appraisal checklists as well as outlined inclusion and exclusion criteria were used to narrow the article pool down to the 10 most relevant and higher-quality studies.

An exception was with CINHAL where an initial search using key terms opioid addiction, Medication Assisted Treatment or MAT, benefits or advantages, and research study or methods or qualitative or quantitative was searched. This search yielded only 2 results, therefore mesh terms were added as mentioned above, and the key terms were made less specific to widen the search.

Inclusion criteria included results obtained after MAT use in a population with opioid use disorder. Exclusion criteria included interventions without MAT treatment, population under 18 years, or where the authors had a conflict of interest. Care was taken not to include those systematic reviews (SR) where many studies were similar. For selecting the final 10 articles to be included in the table (Appendix A, Table A 3), preference was given to higher levels of evidence.

Evidence of the Clinical Issue

Ten studies were retained for this review. Retained studies include one systematic review and meta-analysis, four randomized control trials, two retrospective cohort studies, one mixed-methods study, and two quantitative studies (Appendix A, Tables A1 & A2). The quality and strength of the evidence were determined by Melnyk and Fineout-Overholt's (2019) rapid critical appraisal. All included studies of MAT use in an adult population with opioid use disorder. No bias was found in the included articles (Appendix A). All the studies were conducted in the United States except for Sordo et al., (2017) where the meta-analysis included studies from Australia, Ireland, Canada, and the US. All studies involved a mix of males and females except for Nguyen's (2018) study that was 100% females due to the focus on the opioid disorder in pregnant women (Appendix A). Measurement tools were heterogeneous and included self-report surveys and phone and in-person interviews and conversations. Measurement tools varied greatly with some studies feeling the need to create their own measurement tool specific to the effects of the drug on different populations. Similarly, heterogenicity was seen in variables of different studies, suggesting that the most accurate way of evaluating a drug on different populations is yet to be established. Primary outcomes of interest mainly focused on the benefits of the therapy and showed decreased withdrawal symptoms of opioid use, improvement in the quality of life, and

improvement in mortality rates due to decreased incidences of overdose. Strong reliability and validity can be assumed for all the selected studies due to the rigorous methodology, the high quality of measurement tools, and the prevalence of statistically significant results. Most studies reported confidence intervals, means, standard deviations, effect sizes, and level of evidence (Appendix A).

Influence of Evidence on the Project

The strength of the evidence is immense in demonstrating the benefits of this treatment. Research articles show a great amount of heterogeneity in the sample demographics, variables of interest and measurements but the outcomes remain very similar. Therefore, it was decided to conduct the project to enhance the awareness of the benefits of MAT in providers as well as people with opioid use disorder. The amount of evidence available on the benefits of MAT provided the foundation of the project. This would help the population with OUD to stay in treatment until completion, which would also help with decreasing withdrawal symptoms as well as the chances of relapse.

Theoretical Framework & Implementation Framework

Theory Application

Theory of change (Appendix B, fig. B2) is selected for the anticipated project because of its outcome-based approach and its support to wider problem-framing and monitoring evaluation. The theory of change helps by identifying the need for change and developing a vision which is also the basis of this project. It describes the needed change and the steps involved in making that change happen. Theories of change also depict the assumptions that lie behind the reasoning, and where possible, these assumptions are backed up by evidence with the final step of reviewing and adapting to the change (Birney, 2018).

Implementation Framework

The evidence-based practice model chosen for this project is Rosswurm and Larrabee's model (Appendix B, Fig. B1). This was preferred because of its impact in guiding healthcare professionals through a systematic process for the change. It is based on theoretical and research literature related to evidence-based practice and encourages change theory and research utilization (Rosswurm & Larrabee, 1999). This model has an exclusive ability to guide practitioners during the entire process of developing and integrating an evidence-based practice change. By combining the quantitative and qualitative data, evidence-based practice changes are supported by coalescing clinical expertise, and contextual evidence essential for this project (Rosswurm & Larrabee, 1999).

Methods

Ethical considerations and human subject protection, IRB approval

An expedited IRB approval was received in September 2020. There were no risks to the participants, or any other person related to this project. No personal identifiers were included in the data collected which was stored onsite on computers that were password protected.

Description of population and setting

The population consists of men and women 18 years and older who have been involved in opioid addiction and seeking treatment at the substance abuse disorder residential treatment facility. There are seven branches of the facility in one county in Arizona out of which one is for women.

Project description, data collection, and analysis

To find the benefits of MAT treatment in the mentioned population, the duration of stay at the treatment facility was measured. Twelve-month de-identified data were collected from the

Electronic Health Record (EHR) related to numbers of individuals who were admitted, and out of these how many were in treatment for OUD, and numbers receiving MAT. Data included demographics for age (not DOB), sex, which facility they were residing in, and whether there was polysubstance abuse related to their treatment. If MAT treatment was initiated, name of the prescriber/organization was included. The drug prescribed for MAT (Suboxone, Naltrexone, or Methadone) was identified and the lengths of stay. Analysis was done using Intellectus software and the results were analyzed based on statistical significance using two-tailed Independent sample *t*-tests and the two-tailed Mann-Whitney *U* tests.

Project Funding

No funding was received for the project nor was any compensation offered for project participation.

Results

Admissions to the facilities totaled 3261 patients over a 12-period. The mean age was 35.81(18-82) years. Of this number 1528 (46.85%) were for OUD that included 371 females (24.28%) and 1157 males. MAT was received by 686 (44.9%) of OUD admitted patients. Of those 415 received Suboxone, 216 received Methadone and 141 received Naltrexone, and 96 received various different forms of MAT over the course of their stay at the facility.

For the 686 who received any of the three (3) forms of M AT the mean length of stay was 35.78 (SD, 30.34)) days compared to a mean of 27.46 (SD,30.79) days for those without MAT based on an alpha value of 0.05, t (1526) = 5.35, $p < .001$ which reached statistical significance ($p <.001$) by analysis using the two-tailed independent samples *t*-test for length of stay.

The suboxone only recipients had a median length of stay of 27 days while those who were not treated had a median of 19 days. The result of the two-tailed Mann-Whitney *U* test was

significant based on an alpha value of 0.05, $U = 208905.5$, $z = -2.87$, $p = .004$. (p,.004). The result of the two-tailed independent samples t-test was not significant based on an alpha value of 0.05, $t(1526) = -1.71$, $p = .088$.

For the 96 methadone only residents the median LOS was 33 days for those treated with methadone and 19 days for those who were not. The result of the two-tailed Mann-Whitney U test was significant based on an alpha value of 0.05, $U = 166812$, $z = -4.18$, $p < .001$. The result of the two-tailed independent samples t-test was significant based on an alpha value of 0.05, $t(1526) = 3.51$, $p < .001$.

Naltrexone only as treatment was provided to 141 residents with a median length of stay of 43 days if treated and 19 days if there was no treatment. The result of the two-tailed Mann-Whitney U test was significant based on an alpha value of 0.05, $U = 72216.5$, $z = -5.12$, $p < .001$. The result of the two-tailed independent samples t-test was significant based on an alpha value of 0.05, $t(1526) = -4.61$, $p < .001$,

A smaller portion of the residents were treated with more than one type of MAT. These 96 residents had a median length of stay of 42 days compared to 20 days for those with no treatment. The result of the two-tailed Mann-Whitney U test was significant based on an alpha value of 0.05, $U = 84736.5$, $z = -3.82$, $p < .001$. The result of the two-tailed independent samples t-test was significant based on an alpha value of 0.05, $t\ (1526) = 3.66$, $p < .001$. The results of these tests are compiled in the following two tables. (Table. 1, and Table 2)

Table 1

Two-Tailed Mann-Whitney U Test for Length of Stay by MAT Type

MAT Type	N=1528	%	Length of Stay (LOS) measured in days		
			Median LOS with MAT	Median LOS without MAT	*p* value
[*]MAT any	686	44.9%	31	14	<.001
[*I] Suboxone only	415	61%	27	19	<.004
[*iii]Methadone only	216	32%	33	19	<.001
[*ii] Naltrexone only	141	21%	43	19	<.001
[**]MAT multiple	96	14%	42	20	<.001
NO MAT Treatment	842	55%			

[*]MAT any- identifies those receiving any type of MAT to treat OUD (Suboxone, Naltrexone, Methadone).
[**]MAT multiple- identifies those who were prescribed more than one type of MAT at any time during their stay these would not have been prescribed at the same time (Suboxone, Naltrexone, Methadone).
[*I] Suboxone only- identifies those who were only treated with Suboxone.
[*ii] Naltrexone only- identifies those who were only treated with Naltrexone.
[*iii]Methadone only- identifies those who were only treated with methadone.

Table 2

Two-Tailed Independent Samples t-Test for Length of Stay by MAT type

MAT Type	N=1528	% of N	Length of Stay (LOS) Measured in Days		
			Mean LOS (SD) with MAT	Mean LOS (SD) without MAT	*p* value
[*]MAT any	686	44.9%	35.78(30.34)	27.46(30.79)	<.001
[*I] Suboxone only	415	61%	33.45(29.06)	30.42(31.48)	.088
[*ii] Naltrexone only	141	21%	42.57(31.08)	30.09(30.61)	<.001
[*iii]Methadone only	216	32%	38.04 (31.36)	30.12(30.64)	<.001
[**]MAT multiple	96	14%	42.35(31.58)	30.50(30.68)	<.001
NO MAT Treatment	842	55%			

[*]MAT any- identifies those receiving any type of MAT to treat OUD (Suboxone, Naltrexone, Methadone).
[*I] Suboxone only- identifies those who were only treated with Suboxone—*This did not reach significance.*
[*ii] Naltrexone only- identifies those who were only treated with naltrexone.
[*iii]Methadone only- identifies those who were only treated with methadone.
[**]MAT multiple- identifies those who were prescribed more than one type of MAT at any time during their stay these would not have been prescribed at the same time (Suboxone, Naltrexone, Methadone).

Impact of project and sustainability

With increased awareness within the staff and residents about the options available for the treatment of opioid use disorder, MAT could potentially be made more accessible. This would enable the residents to stay in recovery with fewer chances of relapsing. Extending treatment would prevent this population from the hazards faced in its absence and potentially lead to a better quality of life. This intervention can be sustained by regular participation of providers in sessions on the benefits of MAT.

Discussion /Conclusion

Evidence suggests that MAT is associated with reduced withdrawal symptoms, decreased prevalence of illicit drug use, and greater quality of life (Brinkley-Rubinstein et al., 2019). Suboxone (buprenorphine, naltrexone) is not recommended for pregnant women, however Subutex which contains only buprenorphine and methadone are considered the appropriate treatment for OUD in pregnancy (Nguyen et al., 2018). MAT is associated with substantial reductions in the risk for overdose mortality in people with opioid dependence disorder (Sordo et al., 2017). It is also found to help prevent relapses and sustain recovery (Farahmand et al., 2017). The benefits of MAT have the potential to significantly impact the health of a nation (Morgan et al., 2019).

Based on the evidence, supported by this study, it is recommended that MAT be used more frequently. At this time prescribers must complete the required training to be eligible to prescribe Suboxone, and methadone can only be prescribed in specified methadone clinics. Education and access to both physical and informational resources are important for progression along the treatment-seeking road. Nurse Practitioners have the ability to serve as educators and prescribers and using these qualities enable a system change making MAT more widely accessible to the residents of treatment facilities as well as outpatients.

Limitation

This was an observational study. The nature of the data analysis did not allow for clearly identifying when during the stay the various types of MAT were prescribed or discontinued. In addition, the OUD history of the individuals represented in the data is missing, frequently individuals are recovering from multiple substances and opioids are just one of them. Some individuals in treatment are on court ordered treatment or are in treatment as an alternative to incarceration. These factors can play a role in length of stay.

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Appendix A

Evaluation and Synthesis Tables

Table A1

Evaluation Table Qualitative Studies

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
Brinkley-Rubinstein et al., (2019). The benefits and implementation challenges of the first state-wide comprehensive medication for addictions program in a unified jail and prison setting. Drug and Alcohol Dependence, 205, 107514. **Funding:** Funding for this project was provided by the National Institute of Drug Abuse and the John and Laura Arnold	Chronic disease model	**Design**: RCT **Purpose:** To examine the benefits and implementation challenges of the first state-wide comprehensive medication for addictions program in a unified jail and prison setting. .	**N:** 40 **Setting:** Unified jail and prison in Cranston, Rhode Island. **Sample Demographics**: Age 22 to 66 years with mean age of 37.2; 50% were receiving methadone, 47.5% were receiving buprenorphine, and one person (2.5%) was receiving depot naltrexone; male (70%) and White (82.5%). Five percent were Black,	**Control Variables**: Age (in years), Race, Gender, Drugs used.	Semi-structured, qualitative interviews that were cross coded. Dividing the research into codes and themes in line with the research objectives.	Analysis by employing a general, inductive approach in NVivo 12.	MAT reduced withdrawal symptoms, decreased prevalence of illicit drug use in the facility, improved general environment, and increased post-release intentions to continue MAT.	**LOE:** II **Strengths:** RCT design, detailed discussion of intervention program. Qualitative evaluation of the first statewide program of its kind that provides access to all three FDA approved MAT options and provides insight into how best to optimize future program implementation at correctional sites. **Weaknesses:** Discrepancy in results between buprenorphine and methadone treatment programs in the RIDOC MAT program. **Conclusions:** MAT helped to decrease post-program overdoses among those incarcerated at the state-level and improved facility environment.

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Foundation. The authors have declared no conflict of interest. **Bias:** None recognized **Country:** USA			12.5% identified as "other" racial group, and 10% were Hispanic. (95%; n = 38) used heroin before incarceration; thirty (75%; n = 30) used prescription opioids non-medically, 21 (53%) used cannabis, 12 (30%) reported non-medical benzodiazepine use, and 8 (20%) used alcohol. **Inclusion Criteria:** Current enrollment in the MAT program, being at least 18 years old, and being able to read and write in English. **Attrition**: Not discussed					**Feasibility/Applicability to pt. population:** The study helps to answer the PICOT question. It also helps to recognize the efficacy of the drug under study. The application of this study would be beneficial in educating the providers about the benefits of implementing MAT.

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Farahmand, Modesto, Lowe, & Chaplin, (2017). Prescribing Opioid Replacement Therapy in U.S. Correctional Settings. Journal of the American Academy of Psychiatry and the Law Online, 45(4), 472–477. **Financial** or other potential conflicts of interest: None **Bias:** None recognized **Country:** USA	General linear mixed model	**Design**: RCT **Purpose:** To offer a rationale for providing ORT for continued treatment to addicted prisoners while incarcerated.	**N:** 104 **Setting:** Prerelease male and female inmates in a US prison. **Sample Demographics**: 69.23% males and 30.77% females; buprenorphine recipients, 64 (37 males, 27 females) remained on medication at release from prison **Inclusion Criteria:** Inmates with a history of opioid use disorder who were not opioid tolerant **Attrition**: 8.6%	Patients receiving buprenorphine treatment with counseling and those receiving counseling only.	Rates of treatment initiation; rates of completion of treatment. Comparing population receiving buprenorphine versus counseling only.	Analysis was done using generalized estimated equations to determine changes over time in side effects.	Formerly opioid-dependent prisoners were more likely to enter community drug abuse treatment when they were inducted in prison onto buprenorphine/naloxone than when they received counseling without buprenorphine in prison (47.5% vs. 33.7%, $p = 0.012$)	**LOE:** II **Strengths:** RCT design, detailed discussion of intervention program. **Weaknesses:** Sampling limited to patients belonged to one US prison only. **Conclusions:** ORT is a well-established treatment for opioid addiction in correctional populations and in the community. The failure to provide ORT places inmates at risk of relapse, overdose upon release, and drug-related illnesses. **Feasibility/Applicability to pt. population:** The study helps to answer the PICOT question. It helps to recognize the efficacy of the drug under study. The application of this study would be beneficial in achieving the desired results in the facility where the project is planned to be conducted as a lot of patients here are admitted after serving sentence at a correctional facility.

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Hewell, Vasquez, & Rivkin, (2017). Systemic and individual factors in the buprenorphine treatment-seeking process: A qualitative study. Substance Abuse Treatment, Prevention, and Policy, 12(1). Gale OneFile: Contemporary Women's Issues. **Funding:** Provided by Turning Point Counseling Services. The authors' state that they did not have a financial interest in the outcome of the study, nor do they have financial affiliations with the community partners or organizations	Inherent frameworks that served as models of addiction and included Explanatory models of addiction	**Design:** Qualitative analysis mixed-methods study **Purpose:** The aim of the current project was to explore what factors influenced Alaskan MAT consumers (including those who sought or considered using MAT) treatment-seeking process.	**N:** 11 n: 4 n:3 n:4 **Setting:** Fairbanks in Interior region of Alaska with higher rates of substance abuse, limited access to health care, and stigma associated with behavioral health services **Sample Demographics**: 64% female, 36% male. **Inclusion Criteria:** 18 years or older living in Alaska who: (1) met criteria for an opioid use disorder at some point in their life, and (2) had been impacted by medication-assisted service	1. Patients who were currently engaged in MAT. 2. Individuals who were opioid-free at the time of the interview. 3. Individuals who were receiving support from a mutual self-help group.	Qualitative data from 2 focus groups (each including 4 participants) and 3 in-depth interviews with people who had used or considered using buprenorphine in treatment for an opioid use disorder were analyzed using grounded theory and directed content analysis approaches.	Using grounded theory, data were coded using open, axial, and selective coding techniques. Each transcript was coded into the major content domains. Discrepancies were collaboratively discussed to enhance reliability and protect against coder drift.	The conceptual model demonstrated an overarching meta-theme. Education an d access to both physical and informational resources are important for progression along the treatment-seeking road.	**LOE:** V **Strengths:** In-depth perspective of MAT treatment seeking, using participants; qualitatively examining the perceptions of those who would benefit from buprenorphine treatment **Weaknesses:** Small sample size; convenience sample; study limited to only one town in Alaska. **Conclusions:** It is important to increase access to MAT programs that integrate medication with psychosocial components in substance use disorder treatment **Feasibility/Applicability to pt. population:** The study helps to answer the PICOT question. It helps to recognize the importance and benefits of MAT treatment. The application of this study would be beneficial in achieving the desired results of creating awareness of this treatment among providers.

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used to recruit participants. **Bias:** None recognized **Country:** USA			delivery (e.g., received services, been denied of services). **Exclusion criteria**: Individuals that were actively suicidal, experiencing psychosis, or who directly received services from the researchers who collected data. **Attrition**: Not mentioned					

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Mitchell et al., (2015) Changes in Quality of Life following Buprenorphine Treatment: Relationship with Treatment Retention and Illicit Opioid Use. Journal of Psychoactive Drugs, 47(2), 149–157. https://doi.org/10.1080/02791072.2015.1014948 **Funding:** Funding for this study was provided by the National Institute on Drug Abuse. Authors' state this did not play a role in study design; in the collection, analysis, and interpretation of data; in the writing of the report; or in the decision to	General linear mixed model	**Design**: RCT (pre- 3-mn and 6-mn follow up) **Purpose:** To examine the association between changes in QoL and: (a) retention in treatment and (b) opioid use as measured by self-report and urine testing.	**N:** 300 **Setting:** African American men and women starting outpatient buprenorphine treatment **Sample Demographics**: 37.7% female, with a mean age of 46.1 (SD=6.5) 51% had experience with buprenorphine treatment prior to the current treatment episode. All participants used heroin, with an average age of first heroin use of 22.8 years (*SD*=7.4). 61.3% had pre-treatment cocaine use **Inclusion Criteria:**	Each of the QoL scales corresponding to the physical, psychological, social, and environmental QoL domains was analyzed separately as dependent variables. Control Variables: Age (in years), Gender, Drug User, Days of Cocaine Use, Past 30 days, 3 months, 6 months	QoL scale and urine testing for the presence of opioids.	All model equations were generated using the statistical software environment R and the add-on packages lme4 and multcomp. In addition to examining the four WHOQOL-BREF scale scores, participants' ratings of their overall quality of life at 6 months by treatment enrollment status was compared by using the Mann-Whitney U test.	Participants in treatment at 6 months had significantly higher QoL values than their counterparts who had left treatment by 6 months ($p < .001$). Compared to participants who left buprenorphine treatment, active enrollment in treatment was associated with significantly higher QoL scores in two of the four models. Treatment enrollment was associated with nearly 5-point higher mean scores in	**LOE:** II **Strengths:** RCT design, detailed discussion of intervention program. Assessments made at baseline, 3 mn & 6 mns **Weaknesses:** Sampling limited to African Americans. Patients belonged to one US city only and treated in two publicly funded treatment centers. **Conclusions:** Opioid dependent patients entering buprenorphine treatment who remained in treatment benefitted from it. Their quality of life improved and showed significant improvement in 6 months on the psychological and environmental QoL scales. **Feasibility/Applicability to pt. population:** The study helps to answer the PICOT question. It helps to recognize the efficacy of the drug under study. The application of this study would be beneficial in achieving the desired results of the population suffering from

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submit the paper for publication. **Bias:** None recognized **Country:** USA			Opioid-dependent African Americans in the intensive outpatient condition, or a standard outpatient condition who used heroin. **Attrition**: 4.3% at 3-mn and 7% at 6-mn follow up.			Participants completed assessments at baseline, 3- and 6-months consisting of the World Health Organization's Quality of Life brief scale, Addiction Severity Index, and urine testing for opioids.	the *psychological* (b= 4.89; *SE* =1.62; p< .01) and *environmental* (b= 4.94; *SE* =1.55; p< .01) QoL domains. Treatment enrollment was not significantly associated with higher QoL scores, above and beyond the effects of the other variables in the models, in either the *physical* or *social* QoL domains.	opioid use disorder and to improve their quality of life.

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Nguyen et al., (2018). Brief Report: Treating Women with Opioid Use Disorder during Pregnancy in Appalachia: Initial Neonatal Outcomes Following Buprenorphine +Naloxone Exposure. *The American Journal on Addictions*, *27*(2), 92–96. **Funding:** Not mentioned. The authors report no conflicts of interest. **Bias:** None recognized **Country:** USA	Quality caring model	**Design:** A retrospective cohort analysis **Purpose**: To examine the relationship of prenatal buprenorphine +naloxone exposure to neonatal outcomes.	**N:** 26 **Setting**: OPP for pregnant women with OUD in Morgantown, WV exclusively receiving BUP/NX during pregnancy. **Sample Demographics**: White women with a mean age of 28.2 (SD =5.0) and receiving Medicaid. Mean age of first opioid use of 18.5 (SD =5.7) Mean length of stay in OAT was 129.0 days (SD =110.0). **Inclusion Criteria:** Pregnant females active in outpatient MAT. **Attrition**: 15.3%	Race, age, insurance type, duration of treatment, treatment status at time of delivery, maintenance dose of BUP/NX, and urine drug screening test results at time of delivery. Control Variables: All deliveries occurred between 1/1/2016 and 5/1/2017	Gestational age at delivery, 5-minute Apgar scores, weight, length, and head circumference at birth, NAS treatment status (treated vs. not-treated-for-NAS).	Nonparametric tests were used to conduct all inferential analyses. Spearman's correlation was used to measure association between continuous variables. In the case of testing the association between categorical variables, Fisher's exact test was used. All Wilcoxon tests of significance used exact tests to calculate *p* values.	All neonatal birth outcome parameters were within normal ranges.	**LOE:** IV **Strengths:** Neonatal result measured by multiple outcomes. **Weaknesses:** Data were collected retrospectively, and data for every variable were not available in each chart; Small sample may not be representative of the larger OUD pregnant population; Data were limited to the antenatal and neonatal period. **Conclusions:** Use of buprenorphine +naloxone shows relative safety in pregnancy. **Feasibility/Applicability to pt. population:** The study helps to answer the PICOT question. It helps to recognize the efficacy of the drug under study. The application of this study would be beneficial in educating providers about prescribing it safely in pregnant women.

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Norton et al., (2017). Retention in Buprenorphine Treatment is Associated with Improved HCV Care Outcomes. Journal of Substance Abuse Treatment, 75, 38–42. **Funding:** This study was funded in part by NIH, National Institute on Drug Abuse **Bias**: None declared **Country**: USA	Innovative models of care	**Design**: Retrospective cohort study **Purpose:** To investigate if retention in buprenorphine treatment improved HCV care in population with a history of OUD.	**N:** 123 **Setting:** Patients with opioid use disorders who initiated buprenorphine treatment at a primary-care clinic in the Bronx, NY between January 2009-January 2014. **Sample Demographics**: the median age was 47 years (IQR 38,54), men (80.5%), Latino (64.2%) and had comorbid psychiatric disorders (63.4%). Active polysubstance use [cocaine (21.7%), marijuana (25.5%), and alcohol (49.6%)]. At 6 months, 61.8% were retained in	Active buprenorphine prescription for ≥ 6 months after the initial buprenorphine visit. Other variables include patient demographic information (age, race/ethnicity, and gender), and clinical characteristics (HIV status, cirrhosis, psychiatric disorder, substance use.	HCV cascade of care milestones among patients with chronic HCV infection	Chi-square or Fisher exact tests for categorical variables and t-tests for continuous variables for each HCV milestones	Only those patients that were on buprenorphine treatment completed HCV care milestones.	**LOE:** IV **Strength:** This study provides an opportunity to access and treat persons with HCV, that may help in reducing HCV transmission, morbidity and mortality. **Weaknesses:** Data are limited to that which was available in the EHR; all potential confounders that are specific to HCV may not have been captured; HCV cascade of care milestones for patients receiving buprenorphine conducted by treating HCV with interferons. **Conclusions:** buprenorphine treatment is beneficial in completion of HCV treatment in patients with OUD. **Feasibility/Applicability to pt. population:** The study helps to answer the PICOT question. It helps to recognize the efficacy of the drug under study. The application of this study would be beneficial in educating the providers to treat patients with OUD having HCV.

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			buprenorphine treatment. **Inclusion Criteria:** Patients who received buprenorphine treatment with positive HCV antibody and confirmatory HCV viral load testing. **Attrition:** Not discussed					

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Nosyk et al., (2015). Short term health-related quality of life improvement during opioid agonist treatment. Drug and Alcohol Dependence, 157, 121–128. **Funding:** This research was supported in part by the National Institute on Drug Abuse. **Bias:** None recognized **Country:** USA	Linear mixed effects regression model	**Design:** RCT Purpose: To investigate short-term changes in HRQoL following enrollment into OAT across treatment modalities and patient subgroups.	**N:** 1097 n: 158 n:545 n:155 n:239 **Setting:** Four distinct subject groups were defined from the START and POATS study populations for this analysis: (i) PO-dependent and (ii) heroin-dependent individuals receiving maintenance, or TUT with either BUP/NX or methadone in START; and PO-dependent individuals receiving either (iii) short-term taper or (iv) taper after 12 weeks of BUP/NX stabilization in POATS. **Sample**	**Control Variables**: age, gender, ethnicity, education, criminal activity, marital status, employment, indicators of psychiatric conditions, use of a range of illicit drugs as well as chronic medical problems.	Data was measured from the Starting Treatment with Agonist Replacement Therapies (START) and Prescription Opioid Addiction Treatment Studies (POATS).	Health related quality of life, or health utility, was measured using the SF-6D.	Treatment had an immediate and modest positive association with HRQoL in each patient subgroup. The association of OAT on HRQoL was statistically significant in each model, with effect sizes between 0.039 (Heroin-users receiving BUP/NX) and 0.071 (PO-users receiving MET). After initial improvement, HRQoL decreased slightly, or increased at a diminished rate.	**LOE:** II **Strengths:** RCT design, detailed discussion of intervention program. diverse patient populations **Weaknesses:** All the subgroups were selected from clinical trials with multiple exclusion criteria; potential for unmeasured confounding **Conclusions:** OAT, whether delivered in time-limited or unlimited form, using BUP/NX or MET, is associated with modest immediate HRQoL improvements. **Feasibility/Applicability to pt. population:** The study helps to answer the PICOT question. It helps to recognize the efficacy of the drug under study. The application of this study would be beneficial in educating providers about Suboxone and its ability to improve the quality of life of patients with OUD.

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			Demographics: Those enrolled in TUT had high levels of mental health comorbidity; PO dependent individuals were primarily white and were younger than those receiving -TUT, and fewer reported mental health conditions (34.9% and 36.2% of short term and extended detoxification participants, respectively). **Inclusion Criteria:** Men and women seeking opioid agonist treatment; ≥18 years; able to provide written, informed consent **Attrition**: Not discussed					

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Citation	Conceptual Framework	Design/Method	Sample/Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
Sordo et al., (2017). Mortality risk during and after opioid substitution treatment: Systematic review and meta-analysis of cohort studies. *The BMJ*, *357*. **Funding:** Partially supported by the ISCIII Network on Addictive Disorders and by the EMCDDA in the context of the activities related to identification, promotion, and monitor of best practices. **Bias:** One of the authors received grants from Indivior and Mundipharma outside the submitted work. No other	Meta regression model.	**Design**: Systematic review and meta-analysis **Purpose**: To compare the risk for overdose mortality in people with opioid dependence during and after substitution treatment with buprenorphine and to characterize trends in risk of mortality after initiation and cessation of treatment.	N: 15831 **Setting:** Multiple settings in Australia, Canada, Ireland and US **Inclusion Criteria:** Cohort studies comparing mortality among people with opioid dependence. To be eligible, studies had to include follow-up data during and after opioid substitution treatment with methadone or buprenorphine. **Attrition:** Not mentioned	Age, severity of opioid dependence, injecting drug use, other drug use, comorbidities, prison history, overdose history, patient's preference, characteristics of treatment	Mortality during first and subsequent treatment episodes was measured.	Sensitivity simulation analysis.	Mortality rates were reduced to 4.3 and 9.5 in and out of buprenorphine treatment (unadjusted out-to-in rate ratio 2.20, 95% confidence interval 1.34 to 3.61). Findings also suggest a significantly increased mortality in the first four weeks after cessation of treatment compared with the remaining time out of treatment (32.0 versus 10.9/1000 person years), while during the treatment period there was no difference	LOE: I **Strength:** Meta-analysis **Weaknesses**: Potential for confounding in comparisons of crude mortality risk in and out of treatment; studies were conducted in high income countries, with the follow-up often spread over many calendar years **Conclusions:** Retention in buprenorphine treatment is associated with substantial reductions in the risk for all cause and overdose mortality in people dependent on opioids. **Feasibility/Applicability to pt. population:** The study helps to answer the PICOT question. It helps to recognize the efficacy of the drug being studied. The application of this study would be beneficial in educating providers about prescribing it safely in patients with OUD.

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Citation	Conceptual Framework	Design/Method	Sample/Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
relationships or activities that could appear to have influenced the submitted work. **Countries:** USA, Australia, Ireland and Canada							between the first four weeks and the remaining time in treatment.	

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Table A 2 (continued)

Evaluation Table Quantitative Studies

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
Morgan et al., (2019). Overdose following initiation of naltrexone and buprenorphine medication treatment for opioid use disorder in a United States commercially insured cohort. *Drug and Alcohol Dependence*, *200*, 34–39. https://doi.org/10.1016/j.drugalcdep.2019.02.031 **Funding:** This study was funded in part by the National Institute on Drug Abuse. Funder had no role in design or	Cox hazards model	**Design:** Retrospective cohort study, longitudinal analysis **Purpose:** To examine the effectiveness of medications for opioid use disorder in preventing opioid-related overdose.	**N:** 46,566 n: 863 (XR-NTX) n: 6357 (O-NTX) n: 39346 (BUP) **Setting**: Commercially insured individuals in office-based settings in the US, diagnosed with opioid use disorder and initiating medication treatment between 2010 and 2016 **Sample Demographics:** The Cox model controlled for demographic and clinical covariates	**Clinical** characteristics: Polypharmacy, ever Admitted to detox, ever Concurrent substance use disorder diagnosis with alcohol, amphetamines, Cannabis, Cocaine, Hallucinogens, Sedatives **Non-Clinical** characteristics: Sex: Male or female Relation to primary beneficiary: Employee, spouse or child	Opioid-related overdose on an inpatient or outpatient medical claim identified by ICD-9 and ICD-10.	For each category the incidence rate of overdose per 100 person years was calculated and associated 95% confidence interval. A Cox hazards model was developed on a weekly timescale to predict time from MOUD initiation to first opioid related overdose as a function of	Individuals receiving buprenorphine therapy were at significantly reduced risk of opioid-related overdose compared to no treatment (adjusted hazard ratio (HR) = 0.40, 95% CI 0.35−0.46)	**LOE:** III **Strengths:** Retrospective study, large sample size, nationally representative data Detailed discussion of intervention program. **Weaknesses:** Study does not identify the substances linked to each overdose event, 7% of individuals exited the data within 30 days. Data included only individuals with commercial insurance and exclude vulnerable populations such as those incarcerated, covered by public insurance, or uninsured. Large variation in sizes of different samples studied. **Conclusion:** In patients who initiate medications for opioid use disorder, buprenorphine, was associated with lower risk of

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Citation	Conceptual Framework	Design/Method	Sample/Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
conduct of the study. **Conflict of interest:** Authors have no conflicts to declare. **Bias:** None recognized **Country:** United States			including an individual's sex, age, and region of residence (Northeast, Midwest, South, West); type of commercial insurance coverage. **Inclusion Criteria:** 1) evidence of a diagnosis of OUD based on ICD-9 or ICD-10 codes in medical claims; and 2) prescription of naltrexone or buprenorphine Exclusions: individuals who had no evidence of having OUD prior to their initial MOUD prescription to avoid including individuals who	Region: South, Midwest, Northeast, West, Unknown Insurance type: PPO, HMO, POS		medication type. The demographic differences were confounded by incorporating these characteristics in the hazards model		overdose during active treatment. **Feasibility/Applicability to pt. population:** The study helps to answer the PICOT question. It helps to recognize the safety and efficacy of the drug under study. The application of this study would be beneficial in achieving the desired results of the population suffering from opioid use disorder especially in preventing overdose.

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Citation	Conceptual Framework	Design/Method	Sample/Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
			were prescribed medications for other conditions **Attrition:** 7%					
Polydorou et al., (2017). Integrating Buprenorphine Into an Opioid Treatment Program: Tailoring Care for Patients With Opioid Use Disorders. Psychiatric Services, 68(3), 295–298. https://doi.org/10.1176/appi.ps.201500501 **Funding:** Support for this work was provided by a National Institutes of Health. The authors report no financial relationships with commercial interests.	OTP recovery model	**Design**: A descriptive Quantitative analysis **Purpose:** To identify benefits of buprenorphine maintenance treatment (BMT) integration in an established hospital-based opioid treatment program (OTP).	**N:** 735 **n:** 39 (OTP) **n**: 224 (OPC) **n**: 472 (PC) **Setting**: Hospital outpatients in New York City treated with buprenorphine **Sample Demographics:** Mean age of OTP: 43 OPC: 45 PC: 47 Male gender of OTP: 95% OPC: 75% PC: 84% Multiple ethnicities in all samples, Time in treatment (months) OTP:7.2 OPC:8.1 PC:18.4	Variation in time consumed to ingest sublingual buprenorphine and liquid methadone. 40% of patient population is from hospital's detoxification unit. Medication cost differences Variation in compatibility of methadone-dispensing software and hardware	Positive urine toxicology results for patients using opioids during the initial 20 months of implementation of the program.	Descriptive quantitative analysis of data on all hospital outpatients treated with buprenorphine by using procedures approved by Bellevue's Institutional Review Board	During the initial 20 months of implementation, patients enrolled in OTP demonstrated lower rates of positive urine toxicology results for opioids compared with patients in primary care and outpatient psychiatry.	**LOE:** III **Strengths:** A unique perspective on the experience of one of the first public hospitals in New York City to implement new regulatory guidelines permitting the integration of buprenorphine into an OTP. Detailed discussion of intervention program. **Weaknesses:** Interpretation of the results was limited because of each clinic's differing policies on toxicology testing frequency and threshold detection. Procedures approved by Bellevue's Institutional Review Board are not mentioned. No discussion of attrition rate. **Conclusion:** Buprenorphine integration offers a model for other OTPs to facilitate

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Citation	Conceptual Framework	Design/Method	Sample/Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
Bias: None recognized **Country:** United States			**Inclusion Criteria:** Patients within the OTP as well as those being admitted for treatment with buprenorphine; Patients in buprenorphine care who were referred by hospital's primary care and psychiatry clinics and were experiencing continued relapse, elevated medication diversion risk, or other factors for which a higher level of care was recommended. **Attrition:** Not discussed					partnerships among primary care and mental health clinics to better serve diverse patients with varying clinical needs and with varying levels of social support. **Feasibility/Applicability to pt. population:** The program design is feasible in the population. Since the purpose of the study is to implement buprenorphine in populations with opioid use disorder, it provides a guide to implement systematic changes necessary to undertake integration of buprenorphine. It also helps to recognize barriers to and advantages of integration. This increases the applicability and shows that the program would be effective in different ethnicities.

Key: BUP – Buprenorphine; **CI** - Confidence Interval; **HMO** - Health Maintenance Organization; **HR** - Hazard ratio; **ICD** - International Classification of Disease; **mn** – month; **MOUD** - Medications for opioid use disorder; **O-NTX** - Oral Naltrexone; **OPC** - Outpatient Psychiatry Clinic; **OTP** - opioid treatment program; **OUD** - Opioid Use Disorder; **PC** - Primary Care; **POS** - Point-of-Service; **PPO** - Preferred Provider Organization; **QoL** - Quality of Life; **RCT** – randomized control trial; **SD –** standard deviation; **XR-NTX** - Injectable Naltrexone

Table A3

Synthesis Table

Author	Brinkley-Rubinstein et al.	Farahmand et al.	Hewell et al.	Mitchell et al.	Nguyen et al.	Norton et al.	Nosyk et al.	Sordo et al.	Morgan et al.	Polydorou et al.
Study Characteristics										
Year	2019	2017	2017	2015	2018	2017	2015	2017	2019	2017
Study type	Qual	Qual	Qual	Qual	Qual	Qual	Qual	Qual	Quan	Quan
Design	RCT	RCT	MMS	RCT	RCA	RCA	RCT	SR-MA	RCA	DQA
LoE	II	II	V	II	IV	IV	II	I	IV	III
Number of subjects	40	104	11	300	26	123	1097	15831	46,566	735
Bias	none	none	none	none	none	none	none	none	none	none
Mean Age	37			46	28	47				43
% Males	70	69	36	62	0	80	NA	NA	NA	95
Setting	Jail/Prison	Prison	OP	OP	OP	OP	OP	MT	OB	Hospital OP
Measurement	Interviews	RoCT	Interviews	QoL scale Urine test	APGAR, NAS	HCV CoC	ATS	Mortality rates	ICD-9 & 10	Urine test
Duration of intervention				6 months		6 months				20 months
Independent Variables										
Opioid Use disorder	X	X	X	X	X	X	X	X	X	X
HCV						X				
Pregnant					X					
With Mental disorder				X		X	X			X
With other comorbidities						X	X	X		X
Have Health Insurance					X				X	

Key: **ATS** - Addiction treatment Studies; **CMP** - Chronic medical problem; **CoC** - Cascade of Care; DQA - Descriptive Quantitative analysis; **DWS** - Decreased Withdrawal Symptoms; **HCV** - Hepatitis C virus; **LoE** - Level of Evidence; **MMS** - Mixed methods study; **MT** - Multiple type; **NA** – Not available; **NAS** - Neonatal Abstinence Syndrome; **OB** - Office based; **OP** – Outpatient; **QoL** - Quality of Life; **Qual** - Qualitative Study; **Quan** – Quantitative Study; **RCA** - retrospective cohort analysis; **RCT** - Randomized Controlled Trial; **RIT** - Retention in Treatment; **RoCT** - Rate of Treatment Completion; **SR-MA** - Systematic Review & meta-analysis.

Dependent Variables										
Already Receiving MAT	X		X							
Opioid free at intervention			X							
Abusing other Substances also	X			X		X	X	X	X	
Age at treatment	X			X	X	X				
Receiving only Counseling		X								
Received detox treatment										X
Findings										
Improved QoL				X			X			
Decrease in Mortality Rate								X		
Increased RIT		X	X	X		X				X
Decreased relapse		X								
DWS	X		X							
Decreased OD	X	X						X	X	
Safe in pregnancy					X					

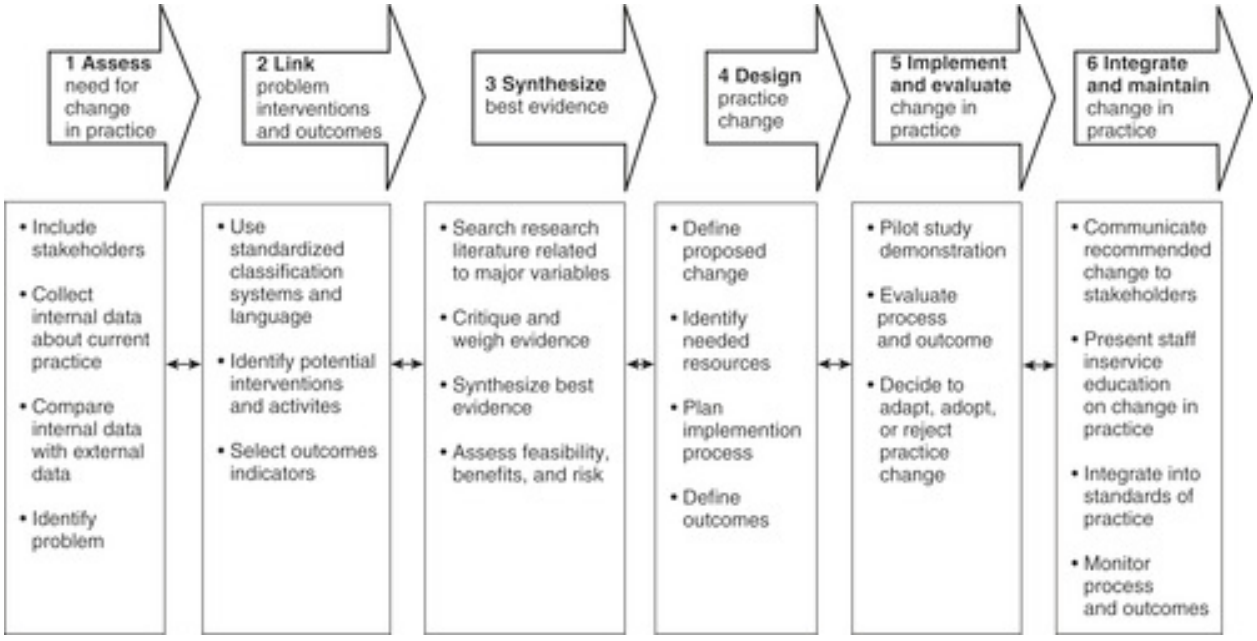
Key: **ATS** - Addiction treatment Studies; **CMP** - Chronic medical problem; **CoC** - Cascade of Care; DQA - Descriptive Quantitative analysis; **DWS** - Decreased Withdrawal Symptoms; **HCV** - Hepatitis C virus; **LoE** - Level of Evidence; **MMS** - Mixed methods study; **MT** - Multiple type; **NA** – Not available; **NAS** - Neonatal Abstinence Syndrome; **OB** - Office based; **OP** – Outpatient; **QoL** - Quality of Life; **Qual** - Qualitative Study; **Quan** – Quantitative Study; **RCA** - retrospective cohort analysis; **RCT** - Randomized Controlled Trial; **RIT** - Retention in Treatment; **RoCT** - Rate of Treatment Completion; **SR-MA** - Systematic Review & meta-analysis.

Appendix B

Model and Framework

Figure B1

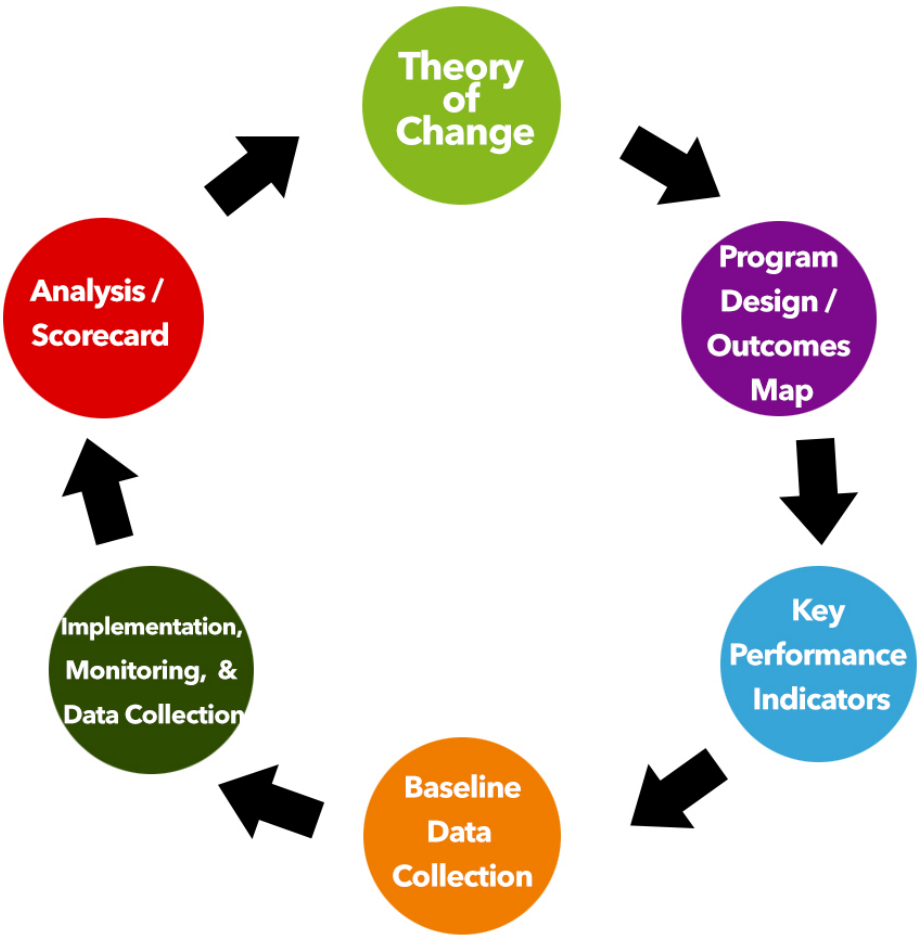
Rosswurm & Larrabee Model



Rosswurm & Larrabee, (1999).

Figure B2

Theoretical Framework



(Weiss, 1998)

Appendix C

Table C1

Two-Tailed Mann-Whitney Test for Length of Stay by Suboxone

	Mean Rank				
Variable	No	Yes	*U*	*z*	*p*
Length of Stay	727.09	838.95	221801.00	-4.68	< .001

Fig C1

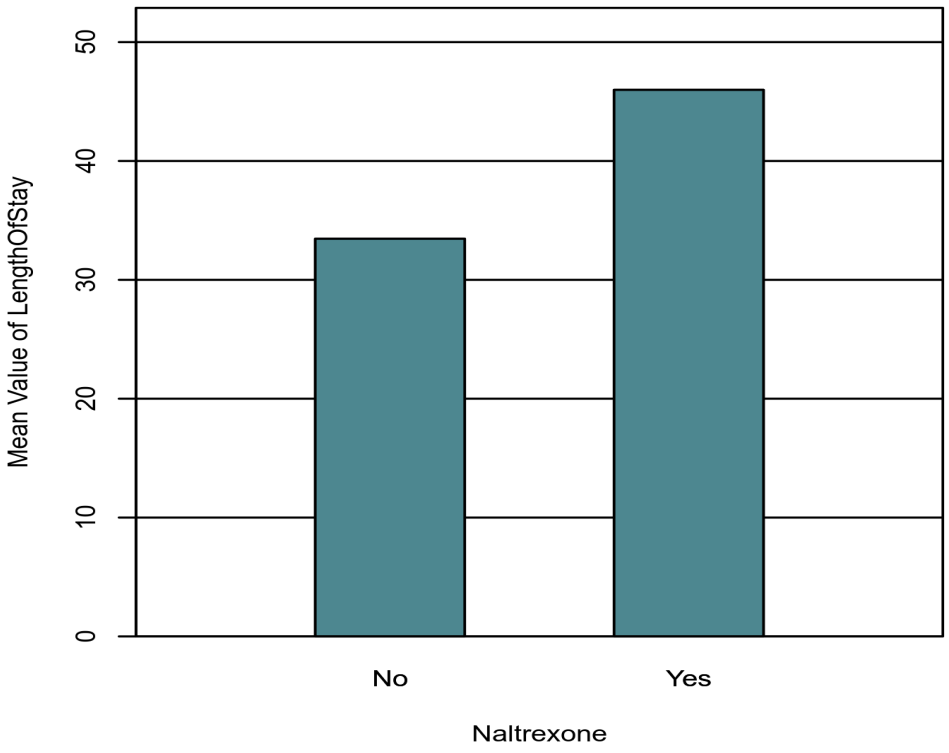


Fig C2