Predictors of Short-term Residential Treatment Completion Preceded by Detoxification for Opioid Use Disorder

Christopher Gideon

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PREDICTORS OF SHORT-TERM RESIDENTIAL TREATMENT COMPLETION
PRECEDED BY DETOXIFICATION FOR OPIOID USE DISORDER

A DISSERTATION
SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN NURSING

THE UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER AT HOUSTON
CIZIK SCHOOL OF NURSING

BY
CHRISTOPHER L. GIDEON, MSN

DECEMBER, 2019
Approval Form D-3

The University of Texas Health Science Center at Houston
Cizik School of Nursing
Houston, Texas

10/21/19
Date

To the Dean for the School of Nursing:

I am submitting a dissertation written by Christopher L. Gideon and entitled "Predictors of Short-Term Residential Treatment Completion Preceded by Detoxification for Opioid Use Disorder." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Nursing.

Rebecca Casarez, PhD, RN
Committee Chair

We have read this dissertation and recommend its acceptance:

[Signatures]

Dean for the School of Nursing
Acknowledgements

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To the members of my dissertation committee: Angela Nash, PhD, APRN, CPHP-PC, PMHS, Joy Schmitz, PhD, and Geraldine LoBiondo-Wood, PhD, RN, FAAN. Thank you, all, for your advice and support for this dissertation.

Many thanks to Cenikor Foundation for access to its data, providing the basis for this dissertation.

To my family, including my mother, Carol, and brothers and sister, Kevin, Timothy, and Emily, and their families, as well as my Aunt RaDonna. Thank you so much for your support. Also to my father, Kenneth W. Gideon, who passed away shortly before I started this PhD program. Your unwavering guidance helped to make this dissertation possible. I love you all.

Most importantly to my wife, Kate Hughes. Your unending support, patience, and love throughout has been so important to me. I could not have done this without you, Kate. Thank you. I love you so very much.

Christopher Gideon
Abstract

Background and Significance: Deaths related to opioid overdose are increasing. Treatment for opioid use disorder (OUD) is necessary to help prevent future opioid abuse, and often involves opioid detoxification, followed by short-term residential treatment, typically lasting about 28 days. Literature regarding OUD and short-term residential treatment is limited. The purpose of this study was to determine predictors of short-term residential OUD treatment completion, and whether detoxification prior to entering residential treatment predicts residential treatment completion.

Method: De-identified data regarding detoxification and short-term residential treatment was obtained from a Texas substance abuse treatment center. A set of predictors from three domains of interest were assessed: demographics, social factors, and drug history factors. Chi-square and Mann-Whitney U tests for categorical and continuous variables, respectively, were used to examine associations between independent variables and residential treatment completion. The same tests were run between the primary independent variable of detoxification prior to residential treatment and the other independent variables. Variables statistically significant for short-term residential completion and the primary independent variables were entered into binomial logistic regression models, assessing odds ratios of potential predictors of residential treatment completion.

Results: Of the total sample of 1001 patients, males were more likely to complete short-term residential treatment in both detoxification models tested
Full-time employment was 2.132 times more predictive of residential completion than was unemployment ($p = .049$). Those reporting inhaled opioid abuse were 2.342 times more likely to complete short-term residential treatment than those who injected opioids ($p = .022$). Detoxification prior to residential treatment did not predict residential completion (Adjusted odds ratio = 1.302, $p = .123$). For every day spent in detoxification, one was less likely to complete residential treatment (aOR = .960, $p = .032$). Medicaid participants were less likely than those in a state-sponsored program to complete residential treatment in both detoxification models ($p = .019$ and $p = .013$).

**Conclusion:** Health providers can reinforce that detoxification is not a cure for OUD, but a beginning of recovery. The use of medication-assisted treatment programs may be one option to improve treatment completion.

**Key words:** Opioid Use Disorder; Detoxification; Residential Treatment
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Summary of Study

The proposal for this study was approved November 21, 2018, by the University of Texas Health Science Center at Houston. Proposed demographics of interest were age, sex, race, level of education, area of residence, length of stay in treatment. Proposed social factors included legal problems, living situation, and employment. Drug history data was to include opioid of choice, route of drug administration, length of drug use, age of first use, as well as history of prior treatments. Comorbid medical and psychiatric diagnoses were also proposed for examination. Data regarding detoxification will be examined, to include length of detoxification, number of prior detoxifications, and specific opioid(s) of abuse. Detoxification as a predictor of short-term residential treatment completion was also to be examined.

Data regarding detoxification was to be examined, to include length of detoxification, number of prior detoxifications, and specific opioid(s) of abuse. Detoxification as a predictor of short-term residential treatment completion will also be examined.

Modifications to the final study were necessitated due extensive missingness in the data set provided. Specifically, no data was available regarding education, medical diagnoses, or psychiatric diagnoses (other than opioid use disorder diagnoses). Data on living situations was also not available. Large amounts of missing data prevented using the variables of martial status and legal classification into the final regression equations.
Predictors of Short-term Residential Treatment Completion

Preceded by Detoxification for Opioid Use Disorder

Christopher L. Gideon, MSN, APRN, ENP, PhD(c)

Dissertation Proposal

The University of Texas Health Science Center at Houston

Cizik School of Nursing
Proposal Abstract

In 2014, mortality from drug overdose surpassed motor vehicle accidents as the number one cause of accidental death in the United States (Rudd, Aleshire, Zibbell, & Gladden, 2016). The current opioid epidemic has contributed to this new statistic. Treatment opioid use disorder (OUD) is necessary to decrease further morbidity and mortality.

Treatment for OUD often includes residential treatment centers (RTC) for the patient, consisting approximately 30 days. Treatment may include initial detoxification, coupled with counseling and other forms of therapy (Substance Abuse and Mental Health Services Administration, 2017). The purpose of this study is to determine predictors for completing residential treatment for OUD, and whether detoxification prior to entering RTC may also be factor in completing RTC. The specific aims of this project include:

1: To examine if demographics, social factors, drug history, and co-morbid diagnosis predict completion of a short-term residential treatment center;

2: To investigate if there is a relationship between undergoing detoxification or not prior to entry into RTC that predicts completion of short-term residential treatment, and answer the hypothesis that necessity for OUD detoxification prior to RTC entry will predict poor RTC completion.

Data from an RTC program in Texas (four different sites in total) will be examined. Predictors of completion of RTC will be examined, including demographics, drug history, social factors, and co-morbidities. Logistic regression will be used to examine whether these factors help predict RTC
completion. Data from the corresponding detoxification centers at the four sites will be examined and compared to RTC completion to determine if there is a difference between those undergoing detoxification prior to RTC entry and those entering RTC directly.

The significance of this project will help to provide further evidence for OUD for those in residential treatment. This study is innovative in that it seeks to examine predictors of RTC completion with and without prior detoxification, which may result in a clinical paradigm shift, as more specific interventions can be tailored to those with OUD.
Specific Aims

In 2014, mortality from drug overdose surpassed motor vehicle accidents as the number one cause of accidental death in the United States (Rudd, Aleshire, Zibbell, & Gladden, 2016). The current opioid epidemic has contributed to this new statistic. Treatment is key for those who are addicted to opioids.

Treatment for OUD often involves residential or inpatient treatment. Short-term residential treatment centers (RTC) typically includes a patient residing in the RTC community for about 30 days (SAMHSA, 2017). Frequently treatment includes medically supervised detoxification coupled with counseling and an introduction to social support groups, such as Alcoholics Anonymous and Narcotics Anonymous. Treatment may also consist of medication-assisted treatment, (MAT) (SAMHSA, 2016).

Several studies have been conducted examining drop-out from different treatment modalities, such as detoxification only, long-term therapeutic communities, and outpatient therapies (Brorson, Arnevik, Rand-Hendriksen, & Duckert, 2013). However, few studies have examined predictors of completion in short-term treatment, representing a gap in the literature. Therefore, there is a critical need to understand these predictors in order to develop interventions for this population. The overall objective of this study is to determine predictors for completing RTC and to answer the question of what variables are related to completion of RTC among adult OUD patients that undergo medical detoxification prior to entering RTC and those not requiring detoxification upon RTC entry?
The specific aims of this project are:

1: To examine if demographics, social factors, drug history, and co-morbid
diagnosis predict completion of a short-term residential treatment center.

The hypothesis is that demographics, social factors, drug history, and co-
morbid diagnosis predict completion of a short-term residential treatment
center.

- determining predictors of completion will provide data for providers that will
  assist to further tailor the treatment program to the individual.

2: To investigate if there is a relationship between undergoing detoxification or
not prior to entry into RTC that predicts completion of short-term
residential treatment. The hypothesis is that those who undergo OUD
detoxification prior to RTC entry are less likely to complete short-term
residential treatment than those who do not undergo OUD detoxification.

-determining whether undergoing detoxification for OUD helps or hinders
  one’s chances of completing residential treatment may help further tailor
  the treatment program to the individual.

This study is innovative in its approach in that it seeks to examine RTC
completion for OUD and whether detoxification prior to RTC is a disadvantage for
Significance

Overdose mortality is on the rise. Death from heroin, synthetic opioids, cocaine and benzodiazepines overdoses have each increased (NIDA, 2017a; NIDA 2017b). About 2.5 million visits to the emergency department involved drug or alcohol abuse or misuse (Substance Abuse and Mental Health Services Administration [SAMHSA], 2013).

Mortality from drug overdose (OD) has been increasing, particularly among opioid abusers. Mortality from OD has increased from 2005 to 2015, from 29,813 to 52,404 (NIDA, 2017a). Heroin has seen a steep increase in OD deaths from just over 2,000 in 2010 to 15,446 deaths in 2016, equating to a six-fold increase over six years. Synthetic opioids like fentanyl (other than methadone) have seen an even greater spike in OD deaths: 2013 witnessed around 3,000 deaths and over 20,000 in 2016 (NIDA, 2017b). Treatment for OUD is necessary to help prevent relapse to opioid use and continued addiction to opioids, which in turn should help to decrease the number of opioid overdoses.

Medically-Supervised Opioid Detoxification

Detoxification for opioid dependence often may be the first step in seeking treatment. Medically-supervised detoxification typically includes the patient remaining in an inpatient facility and being monitored while the symptoms of withdrawal from the opioid are managed pharmacologically. The patient may also undergo individual and group therapy during this phase of treatment.

Buprenorphine is an opioid receptor partial-agonist often used for detoxification and maintenance of OUD recovery. It has a strong affinity for
these receptors, making it difficult to be removed by other powerful opioid agonists such as heroin. Buprenorphine is available in a single-drug sublingual tablet or, as a sublingual tablet or strip combined with the opioid antagonist, naloxone. The naloxone portion acts as a prevention for abuse of the medication. When taken sublingually, buprenorphine is able to provide its opioid effects, as naloxone does not work well when taken sublingually. However, should the medication be tampered with, such as injecting the buprenorphine/naloxone combination, naloxone then becomes the dominant medication and will send the user into withdrawals (SAMHSA, 2016a).

By using buprenorphine as a replacement opioid, the patient is slowing weaned off the medication over a period of several days, depending on the individual’s severity of opioid abuse (Hakansson & Hallén, 2014). Buprenorphine was successfully used to transition 89% of participants from detoxification into a therapeutic community setting for continued therapy of their opioid addiction (Collins, Horton, Reinke, Amass, & Nunes 2007). When compared with a control group using clonidine for detoxification, buprenorphine was also associated with longer lengths of stay (mean 5.74 vs. 3.51 days) (Kovas, McFarland, McCarty, Boverman, & Thayer, 2007). Completion of the detoxification program was also higher with buprenorphine vs. clonidine (67 vs. 46 completions, respectively) (Kovas et al., 2007). Typically buprenorphine, or the buprenorphine/naloxone combination, is started early in the detoxification process. The patient is then slowly weaned off the medication over several days.
Short-Term Residential Treatment and Completion of RTC

Short-term residential treatment programs has long been a mainstay of treatment of substance use disorders. Many programs are based on the Minnesota Model, which typically involves a 28-day stay for treatment. This may include individual counseling and group therapy (Henninger & Sung, 2014).

Several indicators have been suggested as predictors of success in substance use disorder (SUD) treatment, including demographics, history of drug use, and various comorbidities. Dreifuss et al. (2013) found never having used heroin or extended-release oxycodone, and no prior treatments for opioid misuse were indicators of success (N = 360). Males have been found to have higher lengths of success than females for treatment of opioid abuse in terms of detoxification completion (N = 126) (Ekhtiar, Dezfooli, Zamanian, Ghodousi, & Mokri, 2013). Males also were found to have better retention in treatment for opioid use (N = 165) (Marsch et al., 2005). Older age predicted success when defined as treatment retention at twelve months (N = 382) (Alford et al., 2011), survey and UDS results (Dreifuss et al., 2013), or successful detoxification (Ekhtiar et al., 2005).

Comorbidities of may include depression and antisocial personality. Depression at high levels appears to improve chances of success in treatment for cocaine and opioid misuse as measured by negative UDS (Marsch et al., 2005) and retention (Dreifuss et al., 2013; Marsch et al., 2005). Antisocial personality has been implicated with poor treatment success, demonstrated by positive UDS for cocaine (Marsch et al., 2005).
History of drug use may affect treatment success. Success in detoxification was poor if heroin was the main drug of choice (Odds ratio [OR] = .25, p = .01) as well as longer duration of opioid misuse (OR = .89, p = .024), based on having negative UDS and last methadone daily dosage less than 15 mg as study measures (N=126) (Ekhtiari et al., 2013). Using prescription opioids for euphoric effects only, as well as obtaining opioids from an illegitimate source, were also predictors of poor success in completing a 12-week stabilization program with buprenorphine/naloxone and a corresponding four-week taper (Dreifuss et al., 2013).

RTC's frequently are used once a patient has completed detoxification treatment. Typically lasting around 30 days, patients in RTC stay for further SUD treatment which includes counseling and introduction to social support groups, such as Alcoholics Anonymous or Narcotics Anonymous (Henninger & Sung, 2014; SAMHSA, 2018). RTC also appeared to enhance the likelihood of continued engagement in 12-step programs and improved coping skills in emerging adults (N = 292) (Schuman-Olivier, Greene, Bergman, & Kelly, 2014). Opioid users (n =1160) were found to have a length of stay in RTC that was approximately 2 days shorter (30.9 vs. 32.8 days) than non-opioid users (n = 768) (Bride et al., 2016). Those experiencing a nonfatal opioid overdose were more likely to favor an RTC than other treatment options, including outpatient MAT (N = 485) (Stein et al., 2017).

Several studies have examined success at different types of clinical sites. Success in a primary care buprenorphine treatment program for OUD was
defined as program retention demonstrated by negative UDS testing for illicit
drugs while still testing positive for buprenorphine, and attending required
counseling appointments (Alford et al., 2011). Primary care benzodiazepine
detoxification success was measured as not receiving a benzodiazepine from the
general practitioner in the follow-up period of 15 months ($N = 170$) (Voshaar et
al., 2006). Success in an outpatient therapy group for alcohol dependence was
defined as attending all therapy sessions and abstaining from alcohol for 12
weeks ($N = 298$) (Young et al., 2011). Successful outpatient buprenorphine
detoxification for OUD in youth aged 15-21 was defined as opiate-negative UDS
at 12 weeks ($N = 152$) (Subramaniam et al., 2011). Successful outpatient OUD
detoxification with methadone was defined as negative UDS and retention in the
program, as well as last daily methadone dosage of 15mg or less (Ekhtiari et al.,
2013).

Few studies have examined short-term RTC completion, as well as examining
detoxification prior to RTC as a predictor of RTC completion. Both of these
factors indicate a gap in knowledge of treatment of OUD. It is imperative to have
an understanding of predictors of completion, particularly in short-term residential
treatment. Predictors of completion in RTC may be different from those in other
settings, necessitating alterations in treatment approaches. This study will
address this gap in knowledge by examining predictors of RTC completion so
interventions can be developed to improve health outcomes as well as increase
the potential for recovery in individuals with OUD. As there is a current opioid use
crisis in the U.S., knowledge of effective treatment is essential for these individuals.

**Conceptual Framework**

This study is conceptually guided by Barker's Tidal Model of Mental Health Recovery (Buchanan-Barker & Barker, 2015). The Tidal Model acknowledges that recovery is a process, with the healthcare provider helping OUD patients to discover their own path to recovery. The model accepts that recovery is possible, and that the provider needs to be creative in approaching the patient's recovery (Young, 2010). The idea of recovery is at the heart of overcoming any addiction (Alcoholics Anonymous, 2013; Narcotics Anonymous, 2018).

The Tidal Model emphasizes encouraging patients to learn what they can do in the face of a problem - in this case, opioid addiction. The premise of the Model is not to relieve patients of their addiction, but to allow them to find within themselves the means to deal with addiction, and thus live a productive life (Buchanan-Barker & Barker, 2015). This is essential to recovery. Predictors of completion may mirror an individual's lived experience. Understanding the lived experience is also essential in promoting recovery (University of Birmingham, 2008).

Creativity in tailoring treatment to the individual is essential, and understanding predictors of completion will help nurses, counselors, physicians tailor care to such predictors present in an individual.
Innovation

Understanding those variables that do or do not predict completion of RTC is key. Understanding of variables that lead to RTC completion can assist with treatment modification. This study is innovative in seeks to understand predictors of RTC completion and decrease the gap of knowledge regarding the linkage between medically supervised detoxification and completion of RTC for OUD. This may result in a clinical paradigm shift, as more specific interventions can be tailored to those with OUD.

Research Approach

Design and Setting

The design of this study will be of a retrospective cohort study in the form of a record review of clients who received treatment for OUD from Cenikor Foundation. Cenikor provides treatment for substance use disorder in Texas and Louisiana. The four short-term RTC locations are in Texas: Austin, Houston, Tyler, and Waco.

Population, Sample, Sampling Procedures

Only those with any type of opioid as a primary drug of choice and who were clients of Cenikor’s RTC from 2012 to July 2018 will be included. Exclusion criteria will be individuals less than 18 years of age. The population size will be fixed based on the data provided for each of the four RTC locations.

Cenikor will provide de-identified data from the four RTCs along with the corresponding detoxification data for analysis. The study team will not know names of individuals. The study protocol will be approved by the Committee for
the Protection of Human Subjects at the University of Texas Health Science Center at Houston (UTHSCH).

Measurements

Specific aim 1

To examine if demographics, social factors, drug history, and co-morbid diagnoses predict completion of a short-term residential treatment center in those with OUD.

The hypothesis is that demographics, social factors, drug history, and co-morbid diagnosis predict completion of a short-term residential treatment center.

Completion will be measured by indicating if participants finished the 28-day RTC program at Cenikor. The Appendix illustrates the intake form utilized by Cenikor, providing demographic and other background information on the client. Demographic data to be collected will include age, sex, race, level of education, area of residence as determined by first two numbers of client's zip code, length of stay in treatment, and reason for discharge.

Social factors will include legal problems, living situation, and employment. Legal problems will be measured by participants answering “Yes” or “No” to a series of legal questions. For living situation, participants will check which of the following are true: adult living independently; homeless; jail; living with friends; single adult living with family; transient living situation; other.

Data on drug history will include type of opioid(s) used and subclassified into primary, secondary, tertiary drug of choice, where available. Methods of drug administration, length of use, and age of first use will also be variables for drug
history. Prior history of treatment will also be examined, with number of prior treatments examined, where available.

Comorbid medical and psychiatric diagnoses will be measured by participants using a checklist of diagnoses as to whether they have ever been diagnosed with a specific disorder. Information regarding age of diagnosis and history will also be noted.

**Specific aim 2**

*To investigate if there is a relationship between undergoing detoxification or not prior to entry into RTC that predicts completion of short-term residential treatment.*

*The hypothesis is that those who undergo OUD detoxification prior to RTC entry are less likely to complete short-term residential treatment than those who do not undergo OUD detoxification.*

Data regarding detoxification will be examined, to include length of detoxification, number of prior detoxifications, and specific opioid(s) of abuse. Characteristics of those not continuing into RTC will be examined. Detoxification as a predictor of RTC completion will also be examined.

**Data Analysis**

**Specific aim 1**

*To examine if demographics, social factors, drug history, and co-morbid diagnoses predict completion of a short-term residential treatment center in those with OUD.*
The hypothesis is that demographics, social factors, drug history, and comorbid diagnosis predict completion of a short-term residential treatment center.

Data provided from Cenikor’s four RTC’s will be transposed to SPSS for statistical analysis. Using SPSS, descriptive statistics will be computed on all variables. Data will be examined for outliers, as well as potential data errors. Data errors that are verifiable will be corrected; errors that cannot be verified will be coded as missing. To determine correlation of continuous and binomial variables, correlation tables using Pearson’s correlation and Spearman’s rank order coefficient (rho) will be generated. Histograms will be generated for each continuous variable to determine normality.

Power analysis was computed using G-Power 3.0.10. Based on a Chi Square with effect size of .3, alpha of .05, beta of .95, with one degree of freedom (based on completion of RTC with the nominal answers of yes or no), a total sample size for each treatment location was determined to be 145.

Generalized linear models will be generated with logistic regression. Categorical variables will be regressed against length of stay to determine if length of stay is predictable. Length of use will also be regressed against LOS as well and RTC completion. Survival analysis of time to drop-off will also be examined. As data has already been collected, it is expected that the project will be completed in three to four months, with the majority of that timeframe spent on data translation to SPSS.
Specific aim 2

To investigate if there is a relationship between undergoing detoxification or not prior to entry into RTC that predicts completion of short-term residential treatment.

The hypothesis is that those who undergo OUD detoxification prior to RTC entry are less likely to complete short-term residential treatment than those who do not undergo OUD detoxification.

Data provided from Cenikor’s four RTCs’ corresponding detoxification facilities will be transposed to SPSS for statistical analysis. Using SPSS, descriptive statistics will be computed on all variables. Data will be examined for outliers, as well as potential data errors. Data errors that are verifiable will be corrected; errors that cannot be verified will be coded as missing. To determine correlation of continuous and binomial variables, correlation tables using Pearson’s correlation and Spearman’s rank order coefficient (rho) will be generated. Histograms will be generated for each continuous variable to determine normality.

Logistic regression will be utilized to examine whether detoxification is predictive of completion of RTC, as well as number of prior detoxifications. Differences between those who completed detoxification prior to RTC and those entering directly into RTC will also be examined.

Study Limitations

The main risk of this project is managing the confidentiality of the data provided by Cenikor. The data will be de-identified by Cenikor before it will be
given to the PI. However, the data set is expected to be large, and the potential for identifying data being passed on does exist. In such circumstances, Cenikor will be made aware of the identifiable data. Such instances will be excluded from the study.

**Human Subjects**

Risks to the individual clients will be quite minimal, as all data will be de-identified by Cenikor prior to release to the study team. Individual clients will only be identified by a code. All data will be stored on a password-protected flash drive to also ensure data privacy. At the end of the study, all data will be destroyed and any papers containing data will be shredded.

Benefits will include a better understanding of predictors of RTC completion regarding whether detoxification was necessary or not. Such knowledge would be helpful in tailoring an individual's treatment program to increase the likelihood of RTC completion.

**Timeline**

As data have already been collected, the length of time for this project is expected to be about two to three months. The majority of time spent on this project will involve examining the de-identified data provided by Cenikor and "cleaning" the data so that it may be used in an SPSS format, which perhaps may take up to three to four months. Once examined in SPSS, the results will be interpreted, and a written analysis of the findings will be produced.
Budget

Since data have already been collected, and the primary investigator (PI) leases SPSS for concurrent schoolwork with UTHSCH Cizik School of Nursing, no other budgetary needs are anticipated. A security-coded flash drive will be used to store all data and material for this project and will be maintained by the PI.

Facilities & Other Resources

The University of Texas Health Science Center at Houston

Established in 1972 by The University of Texas System Board of Regents, The University of Texas Health Science Center at Houston (UTHealth) is Houston’s Health University and Texas’ resource for health care education, innovation, scientific discovery and excellence in patient care. The most comprehensive academic health center in The UT System and the U.S. Gulf Coast region, UTHealth is home to schools of biomedical informatics, biomedical sciences, dentistry, nursing and public health and the John P. and Kathrine G. McGovern Medical School. UTHealth includes The University of Texas Harris County Psychiatric Center and a growing network of clinics throughout the region. The university’s primary teaching hospitals include Memorial Hermann-Texas Medical Center, Children’s Memorial Hermann Hospital and Harris Health Lyndon B. Johnson Hospital.

UTHealth Cizik School of Nursing

The University of Texas Health Science Center at Houston (UTHealth) Jane and Robert Cizik School of Nursing, established in 1890 as part of the John
Sealy Hospital Training School for Nurses in Galveston, is one of the oldest schools of nursing in the southwestern United States. The baccalaureate nursing program of the UT System expanded to Houston in 1972, the same year that the UT Health Science Center came into being. The Cizik School of Nursing was organized in 1972 and began offering the master of nursing degree in the same year. In 1976, the system structure dissolved and the School of Nursing was reorganized under the control of the health science center. The School initiated the Doctor of Science in Nursing degree program in 1995 (changed to the PhD in Nursing in 2007) and the Doctor of Nursing Practice degree program in 2006.

Cizik School of Nursing is ranked in the top five percent of graduate nursing programs in the country, according to the latest survey results by U.S. News and World Report. The School of Nursing is one of six academic units of UTHealth, which is a component health institution of The University of Texas System. The other UTHealth units, in chronological order of operation, are: School of Dentistry (1905), Graduate School of Biomedical Sciences (1963), School of Public Health (1967), Medical School (1970), and School of Biomedical Informatics (2000). The campus is located in the world-famous Texas Medical Center, where students enjoy the resources of a distinguished health science center combined with the expertise and inter-disciplinary collaborative opportunities of the world's largest medical center. Faculty members hold joint appointments at the Medical School, School of Public Health, School of Biomedical Informatics, and many Houston-area hospitals and health care agencies, including the UT MD Anderson Cancer Center.
Cenikor Foundation

The Cenikor Foundation is a not-for-profit, CARF accredited, organization that provides substance abuse services to adolescents & adults. Cenikor provides four treatment options for clients struggling with their addiction: Detox programs, Residential Treatment, Intensive Outpatient programs and long term Therapeutic Communities. Cenikor offers evidenced-based treatment and accredited programming, within a credentialed infrastructure, with the support of licensed clinical staff to support men, women and adolescents on their individual path to recovery. With a continuum of care, clients have the opportunity to seek the program that best suits their immediate needs and to move into other programs as their need changes. Cenikor is dedicated to finding the right level of care for individual client's path to sobriety.
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https://doi.org/10.1016/j.drugalcdep.2014.09.009


*Treatments for substance use disorders.* Retrieved from:

https://www.samhsa.gov/treatment/substance-use-disorders


Appendix A

Long Term Screen
Long-Term Screen

Client Information

First: ______________________ Middle: ______________________ Last: ______________________
DOB: ______________________ Age: ______________________
Have you ever been a Cenikor Client? □ Yes □ No Discharge status: ______________________
Referral from: □ Community/Family/Friend □ Hospital/Treatment Center □ Insurance □ Internet □ Legal
□ Media □ OSAR □ School District Referring agency: ______________________
How did you hear about Cenikor? □ Billboard □ Family/Friend □ Internet □ Magazine/Newspaper
□ Radio/Television

Insurance (for medical/mental health purposes only) □ N/A
Insured Name/First: ______________________ Last: ______________________
Insured SSN: __________ - __________ - __________ Insured DOB: ______________________
Associated Payer: ______________________ Policy/Plan #: ______________________
Insurance Phone #: ______________________ Group #: ______________________ Payer Issue Date: ______________________

Client Details

Primary Phone: (________) - ________ - ________ Alternate phone: (________) - ________ - ________
OK to leave phone message: □ Yes □ No E-mail: ______________________
Address: ______________________
City: ______________________ State: ______________________ ZIP: ______________________
Ethnicity: ______________________ Race: □ African American □ American Indian/Alaska Native
□ Asian/Pacific Islander □ Biracial □ Latino/Hispanic □ White/Not Hispanic □ Other ______________________
Gender: □ Female □ Male Client SSN: __________ - __________ - __________
Marital Status: □ Divorced □ Married □ Separated □ Single □ Widowed
ID Provided: □ Driver License □ Birth Certificate □ Passport □ Social Security Card □ Other
U.S. Citizen: □ Yes □ No Proof of ID: □ Yes □ No If yes, ______________________
Current living situation: □ Adult living independently □ Child with parent or legal guardian □ Homeless □ Jail
□ Living with friends □ Single adult living with family □ Transient living situation □ Other: ______________________
Risk of Harm
Current Suicidal Ideations? □ Yes  □ No  History of suicidal ideations? □ Yes  □ No
Date of last ideation/attempt (details):
Current Homicidal Ideations? □ Yes  □ No  History of homicidal ideations? □ Yes  □ No
Date of list ideation/attempt (details):

Medical Information
History of seizures? □ Yes  □ No  If yes, while in withdrawal? □ Yes  □ No
History of hallucinations? □ Yes  □ No  If yes, while in withdrawal? □ Yes  □ No
What current medical/mental conditions do you have?

What medications are you prescribed?

<table>
<thead>
<tr>
<th>Medication(s)</th>
<th>Reason for Diagnosis</th>
<th>Dosage</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

Are conditions stable with medications? □ Yes  □ No
Are you taking medications as prescribed? □ Yes  □ No  If no, date last taken?

Legal
Have you ever been convicted of a felony? □ Yes  □ No  Weapons charge? □ Yes  □ No  Arson? □ Yes  □ No
Violent crime? □ Yes  □ No  Sexual offense? □ Yes  □ No  Aggravated charges? □ Yes  □ No
Details on charges:

Custom Fields
Veteran? □ Yes  □ No  If yes, was it an Honorable discharge? □ Yes  □ No

Why are you seeking treatment?

Consent to release information to:

<table>
<thead>
<tr>
<th>Name</th>
<th>Relationship</th>
<th>Contact Number</th>
<th>Leave voice mail?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Yes</td>
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<td>Yes</td>
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<td>No</td>
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</tbody>
</table>
### Drug Abuse History

<table>
<thead>
<tr>
<th>Name of Substance/Drug</th>
<th>Order</th>
<th>Drug Status</th>
<th>Route</th>
<th>Duration (Pattern)</th>
<th>Amount used (Quantity)</th>
<th># of times used in the last 30 days</th>
<th>Date last used</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

### Prior Treatment History (Substance Abuse and Psychiatric)

<table>
<thead>
<tr>
<th>Treatment Program</th>
<th>Level of Care</th>
<th>Admit Date</th>
<th>Date Left</th>
<th>Discharge Status</th>
</tr>
</thead>
<tbody>
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</table>

### Legal History

In the past year, have you been arrested, ticketed, or been under legal supervision? □ Yes □ No
Are you currently on: □ N/A □ Parole □ Probation Are you stipulated to treatment? □ Yes □ No
Do you have active open warrants? □ Yes □ No Do you have any restrictions or fines? □ Yes □ No
Do you have any charges pending? □ Yes □ No

<table>
<thead>
<tr>
<th>Pending Court Case(s)</th>
<th>Date(s)</th>
<th>Case #</th>
<th>Judge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

### Incarceration History

<table>
<thead>
<tr>
<th>Reason for Incarceration</th>
<th>Dates</th>
<th>Length of Time</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

State/Stipulation: ___________________________ County/Parish: ___________________________
Probation/Parole Officer: ___________________________ Email: ___________________________
Address: ___________________________ City ___________________________ State ___________________________
Medical Information

Primary Care Physician: ____________________________  □ None

Address: ________________________________________
City: ____________________________  State: __________  ZIP: __________
Phone: (_______) - _________ - _________  Fax: (_______) - _________ - _________

Date of last medical visit, for any reason (including prison physical and ER visit): ____________________________

Medical Conditions – Check all that apply to you:

<table>
<thead>
<tr>
<th>Issue</th>
<th>N/A</th>
<th>Age at Diagnosis</th>
<th>Current</th>
<th>History</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac</td>
<td></td>
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<tr>
<td>Stroke</td>
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<td>Stomach</td>
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<td>Pancreas</td>
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<tr>
<td>Diabetes</td>
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<tr>
<td>Hypertension (High blood pressure)</td>
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<tr>
<td>Liver/Cirrhosis</td>
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<tr>
<td>Respiratory (e.g., COPD)</td>
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<tr>
<td>Kidney/Bladder</td>
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<tr>
<td>Wounds/Boils</td>
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<tr>
<td>Eating disorder</td>
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<tr>
<td>Knee problems</td>
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<tr>
<td>Back problems</td>
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<tr>
<td>Dental problems</td>
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<tr>
<td>Hearing problems</td>
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<tr>
<td>Signs of weight loss/gain</td>
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<tr>
<td>Neck</td>
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<tr>
<td>Lice/Scabies</td>
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<tr>
<td>Vision</td>
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<tr>
<td>Sleep problems</td>
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</tbody>
</table>

Hepatitis? □ Yes  □ No  Currently being treated? □ Yes  □ No
HIV+? □ Yes  □ No  Currently being treated? □ Yes  □ No

Other/or if yes, explain if “Yes” to above questions, please explain: __________________________________________

Upcoming medical appointments: __________________________________________

Are you physically able to participate in all Cenikor programming? □ Yes  □ No

Medical Hospitalizations:

<table>
<thead>
<tr>
<th>Date:</th>
<th>Reason:</th>
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<tbody>
<tr>
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</tbody>
</table>
Psychiatric Information

Mental Health Provider: ___________________________ □ None

Address: ______________________________________

City: ___________________ State: ___________ ZIP: ___________

Phone: (_______)-________-_________ Fax: (_______)-________-_______

How long in current treatment? _______________________

Upcoming appointments: ___________________________

Psychiatric diagnoses – check all that apply if diagnosed by a professional:

<table>
<thead>
<tr>
<th>Psychiatric Diagnosis by Professional (check all that apply)</th>
<th>NA “X”</th>
<th>Age at Diagnosis</th>
<th>Current Diagnosis</th>
<th>History (Previously Diagnosed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td></td>
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<tr>
<td>Bipolar disorder:</td>
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<tr>
<td>Psychosis:</td>
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<tr>
<td>Schizophrenia:</td>
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<tr>
<td>Post-traumatic Stress Disorder (PTSD):</td>
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<tr>
<td>Violence:</td>
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<tr>
<td>Anxiety:</td>
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<tr>
<td>ADD/ADHD:</td>
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</table>

Were you under the influence when any of the above diagnoses were made? □ Yes □ No

***for office use only***

Interviewer: ___________________________ Position: ___________________________

Admit Date: _______________ Time: ___________ Location: _______________________

Priority Population? □ Yes □ No Details: ___________________________

Level of care recommendation: ___________________________

Notes: ___________________________________________________________

Revised 10/1/16
PREDICTORS OF SHORT-TERM RESIDENTIAL TREATMENT COMPLETION PRECEDED BY DETOXIFICATION FOR OPIOID USE DISORDER

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\textsuperscript{b}The University of Texas Health Science Center at Houston, McGovern Medical School, Behavioral and Biomedical Sciences Building, 1941 East Rd., Houston, TX, 77054, United States of America.

Corresponding author:
5018 Briarbend Drive, Houston, TX, 77035, United States of America.
E-mail address: CGideonNP@gmail.com (C.L. Gideon)
Predictors of Short-term Residential Treatment Completion

Preceded by Detoxification for Opioid Use Disorder

Introduction

Mortality rates from opioid overdose are on the rise. Mortality from opioid overdose increased from 29,813 in 2005 to 52,404 in 2015 (National Institute on Drug Abuse [NIDA], 2017a). Heroin has seen a steep increase in overdose deaths from just over 2,000 in 2010 to 15,446 deaths in 2016, equating to a six-fold increase over six years. Synthetic opioids such as fentanyl (other than methadone) have seen an even greater spike in overdose deaths. In 2013 there were approximately 3,000 deaths and over 20,000 in 2016 (NIDA, 2017b).

Treatment is necessary to help prevent relapse and promote remission for people with opioid use disorder (OUD). This in turn should lead to a decrease in the number of opioid overdoses.

Medically-Supervised Opioid Detoxification

Detoxification for OUD is often the first step for patients seeking treatment. Medically-supervised detoxification typically includes an inpatient hospitalization and monitoring while the symptoms of opioid withdrawal are managed pharmacologically (Kleber, 2007). The patient may also undergo individual and group therapy during this phase of treatment (Kleber, 2007).

Opioid detoxification often involves giving patients opioid replacement medications, such as buprenorphine. Patients in this treatment are slowly weaned off the medication over a period of several days, depending on the severity of withdrawal symptoms experienced (Hakansson & Hallén, 2014).
Although buprenorphine was the medication used for detoxification in the current study, the medication was not continued into short-term residential treatment as a form of medication-assisted treatment (MAT).

**Predictors of Outcome in Substance Use Disorder Treatment**

Several variables have been suggested as predictors of OUD treatment outcome, including demographics and history of drug use. Dreifuss et al. (2013) found that never having used heroin or extended-release oxycodone, and no history of prior treatment for opioid misuse predicted success, defined as negative urine drug screen, in a sample of 360 participants with OUD. Longer lengths of opioid misuse prior to treatment were more likely to continue to misuse when compared to those with lower levels of misuse (Brewer, Catalano, Haggerty, Gainey, & Fleming, 1998). Patients with repeated detoxifications were less likely to pursue further treatment (Carrier et al., 2011). Patients attending rehabilitation only had a longer average length of stay in treatment compared to those requiring detoxification before rehabilitation (Blanchard et al., 2019).

In terms of gender, males have been found to complete OUD detoxification more frequently than females. \(N = 126\) (Ekhtiari, Dezfooli, Zamanian, Ghodousi, & Mokri, 2013). Males were also found to have better retention in OUD treatment than females \(N = 165\) (Marsch et al., 2005). Older age predicted success when defined as treatment retention at twelve months \(N = 382\) (Alford et al., 2011), survey and urine drug screen results (Dreifuss et al., 2013), or successful detoxification (Ekhtiari et al., 2005).
History of drug use may also affect treatment outcomes. Outcome in detoxification was poor if heroin was the main drug of choice (Odds ratio [OR] = .25, \( p = .01 \)) or if the opioid use was of a longer duration. (OR = .89, \( p = .024 \)).

This was based on having a negative urine drug screen and last methadone daily dosage less than 15 mg as study measures (\( N = 126 \)) (Ekhtiari et al., 2013). Having used prescription opioids for euphoric effects only or obtaining opioids from an illegitimate source, were also predictors of poor outcomes in completing a 12-week stabilization program with buprenorphine/naloxone and a corresponding four-week taper (Dreifuss et al., 2013).

Several studies have examined the definitions of treatment completion at different types of clinical sites. Successful completion in a primary care buprenorphine treatment program for OUD was defined by negative urine drug screen testing for illicit drugs (other than buprenorphine) and attending required counseling appointments (Alford et al., 2011). Primary care benzodiazepine detoxification completion was defined as not receiving a benzodiazepine from the general practitioner in the follow-up period of 15 months (\( N = 170 \)) (Voshaar et al., 2006). Attendance at all therapy sessions and abstaining from alcohol for 12 weeks (\( N = 298 \)) (Young et al., 2011) defined success in an outpatient therapy group for alcohol dependence. Completion of outpatient buprenorphine detoxification for OUD in youth aged 15-21 years old was defined as opiate-negative urine drug screen at 12 weeks (\( N = 152 \)) (Subramaniam et al., 2011). The definition of successful outpatient OUD detoxification with methadone was a
negative urine drug screen and retention in the program, as well as last daily methadone dosage of 15mg or less (Ekhtiari et al., 2013).

**Short-Term Residential Treatment**

Short-term residential treatment programs have long been a mainstay of treatment of substance use disorders and frequently are used once a patient has completed detoxification treatment. Patients in short-term residential treatment stay for approximately 30 days, receiving further substance use disorder treatment which includes counseling and introduction to mutual support groups, such as Alcoholics Anonymous or Narcotics Anonymous (Henninger & Sung, 2014; SAMHSA, 2018). Short-term residential treatment was found to enhance the likelihood of continued engagement in 12-step programs and improve coping skills in emerging adults aged 18 to 25 years ($N = 292$) (Schuman-Olivier, Greene, Bergman, & Kelly, 2014). Patients with OUD ($n = 1160$) were found to have a length of stay in short-term residential treatment that was approximately 2 days shorter (30.9 vs. 32.8 days) than those who did not use opioids ($n = 768$) (Bride et al., 2016). People experiencing an opioid overdose were more likely to favor a short-term residential treatment than other treatment options, including outpatient medication-assisted treatment ($N = 485$) (Stein et al., 2017).

Employment is a form of recovery capital, representing a strength in maintaining recovery for the long-term. Employment recovery capital has been shown to predict successful completion (defined as reported abstinence at six months post-treatment) across various methods of substance use disorder treatment, including as residential treatment and intensive outpatient (Sahker, Ali,
Employment has also been shown to be related to a cessation or a decreased use of heroin (Hser, Evans, Grella, Ling, and Anglin, 2015).

Few studies have examined short-term residential treatment completion, as well as examining detoxification prior to short-term residential treatment as a predictor of short-term residential completion for OUD. It is imperative to have an understanding of predictors of completion, particularly in short-term residential treatment, as these predictors of may be different from those in other treatment settings, necessitating alterations in treatment approaches.

The current study addresses this gap in knowledge by examining predictors of short-term residential treatment completion as a first step to developing and testing interventions that can improve health outcomes as well as increase the potential for remission and recovery in individuals with OUD. As there is a current opioid use crisis in the U.S., knowledge of effective treatment is essential for these individuals.

Based on previous studies, expected predictors of short-term residential completion include males (Ekhtiari et al., 2013; Marsch et al., 2005) and older age (Alford et al., 2001), and employment (Sahker, Ali, & Arndt, 2019). Heroin use (Ekhtiari et al., 2013) and higher frequency of use (Brewer et al., 1998) would not be predictive of completion. In regards to completion of short-term residential treatment preceded by detoxification, it was expected that detoxification would not be predictive of short-term residential treatment completion (Blanchard et al., 2019; Carrier et al., 2011).
The specific aims and hypotheses of this study were to: (1) Examine if demographics, social factors, and drug history predict completion of a short-term residential treatment center. It was hypothesized that male gender, older age, and being employed would be predictive of short-term residential treatment completion, while opioids stronger than or equal to morphine, and higher frequency of opioid misuse would not be predictive of completion; and (2) investigate whether there is a relationship between undergoing detoxification or not prior to entry into short-term residential treatment. It was hypothesized that individuals who undergo OUD detoxification prior to short-term residential treatment entry are less likely to complete short-term residential treatment than those who do not undergo OUD detoxification.

Methods

Design and Setting

The design of this study was a retrospective cohort study. Data was obtained from a review of client’s records who received OUD treatment in a substance abuse disorder treatment organization located in Texas. This organization operates four short-term residential treatment programs for adults at four locations: Central Texas (sites 1 and 3), one in Northeast Texas (site 2), and Southeast Texas (site 4).

Population and Sampling Procedures

Adults with a diagnosis of OUD and who participated in one of the four short-term residential treatment programs from July 2014 to December 2018 were included. Individuals less than 18 years of age were excluded. The population
size was determined by the data provided by each of the four treatment locations. De-identified data extracted from the client records and corresponding detoxification data was provided by the organization’s four short-term residential treatment sites. The study protocol was approved by the Committee for the Protection of Human Subjects at the University of Texas Health Science Center at Houston.

Measurements

Appendix A illustrates the intake form utilized by the treatment organization, providing demographic and other information on the client. Demographic data collected included age, sex, religion, marital status, race, veteran status, type of insurance/payment, and area of residence as determined by first three numbers of the patient’s zip code.

Social factors included employment and legal problems classification. Legal problems were classified based on a multilevel categorical independent variable, including walk-ins, parole, probation, legally suggested referral, and court mandated. Levels of employment included unemployed, employed full-time, and employed part-time.

Data on drug use history and primary opioid of choice were examined. The opioid of choice variable was categorized based on relative strength using morphine milligram equivalents (MME) as recommended by the State of Ohio Board of Pharmacy (2017). MME levels included (a) MME stronger than morphine (buprenorphine, fentanyl, hydromorphone, methadone, and oxycodone); (b) MME equal to morphine (morphine and hydrocodone); and (c)
MME weaker than morphine (codeine, tramadol, and others). Heroin was kept as a separate level due to its illegal status. Routes of drug administration, frequency of use in the last 30 days, and age of first use were also variables of interest for drug history. Prior history of treatment was also examined by the number of prior treatments, whether those treatments were completed or not.

To accommodate the large range of abbreviated first 3-digit zip codes represented in this study, the codes were condensed to geographic regions: Austin Area, Dallas/Ft. Worth Area, Houston Area, North and West Texas, Northeast Texas, San Antonio/South Texas, Waco Area, and Outside Texas.

Completion of short-term residential treatment was defined as staying in the program for 28 days, or as deemed by the organization’s clinical staff as having reached completion goals. Data examined regarding residential treatment completion included length of stay in detoxification, number of prior treatment episodes, and specific opioid of choice. Detoxification as a predictor of short-term residential treatment completion was the primary independent variable of interest, and was examined first as a dichotomous (yes or no) variable, and then as a continuous variable by length of stay in detoxification. This was to address possible collinearity between the two primary independent variables of interest.

**Data Analysis**

Data provided from the organization’s four treatment sites were transposed to the *Statistical Package for the Social Sciences (SPSS, version 24)*, for statistical analysis. Descriptive statistics were computed on all variables. Verifiable data
errors were corrected; errors that could not be verified were coded as missing. Chi-square and Mann-Whitney U tests were calculated to determine statistically significant association between the dependent variables and independent variables. Significant variables were to be entered into the binomial logistic regression analyses. To determine association of continuous and binomial variables, Mann-Whitney U tests were conducted on continuous independent variables and both the dichotomous dependent variable of short-term residential treatment completion and the primary independent variable of detoxification before short-term residential treatment. Pearson’s Chi-square was calculated for all categorical independent variables and the dependent variable.

Power analysis was computed using G-Power 3.0.10 (Faul, Erdfelder, Lang, & Buchner, 2007). Based on a Chi-square with effect size of .3, alpha of .05, beta of .95, with one degree of freedom (based on completion of short-term residential treatment with the nominal answers of yes or no), a total sample size for each treatment location was determined to be 145.

Data from the combined treatment sites were used to assess odds ratios for each separate independent variable using binary logistic regression for the dependent variable. Odds ratios were adjusted by adding the other statistically significant independent variable identified by Chi-square and Mann-Whitney U results into the binary logistic regressions. Patient age and variables that were not significant, but related to history of drug use, were also added to the regression to examine drug use history.
Separate binary logistic regressions were run for the dependent variable of completion of short-term residential treatment and the primary independent variables. One regression examined the dichotomous primary independent variable of detoxification prior to short-term residential treatment (yes or no), as well as variables with statistically significant Mann-Whitney or Chi-Square results for both the dependent variable and primary independent variables. The second regression replaced the dichotomous detoxification variable with the continuous primary independent variable of length of stay in detoxification, while keeping the previously mentioned significant independent variables. This was to examine if length of stay in detoxification affected short-term residential treatment completion.

The dichotomous primary independent variable of detoxification prior to short-term residential treatment was examined as a predictor of completion of short-term residential treatment. Detoxification length of stay was separately regressed against the dependent variable (without the dichotomous detoxification variable) to see if the continuous variable yielded different results in regards to short-term residential completion.

**Results**

The total study population was 1001. The sample sizes for sites 3 and 4 ($n = 181$ and $n = 169$, respectively) were smaller than sites 1 and 2 ($n = 423$ and $n = 228$, respectively). The average age was 36.06 years, while the average age of first opioid use was 24.35 years. Males accounted for 57.5% of the sample. Seven hundred forty-four clients underwent detoxification. The average length
of stay in short-term residential treatment was 16.85 days, while the average length of stay in detoxification was 5.37 days. The average number of prior treatment episodes was 0.16. Heroin was the most frequent opioid of choice (n=514) and intravenous injection the most common form of drug use (45.6%). The Houston, Texas area was the most common area of residence (22.00%). Frequencies of demographics and other variables may be found in Table 1. Several cases (n = 239) had larger amounts of missing data, particularly for Legal Classification and Marital Status, as well as specific drug use data, requiring those cases to be excluded from the study prior to statistical testing, resulting in the total population size of 1001.

Specific Aim One

For specific aim one, it was hypothesized that demographics, social factors, and drug use history would predict completion of short-term residential treatment. Mann-Whitney U tests were conducted for the continuous independent variables and the dependent variable of short-term residential treatment completion. The same tests were run for the primary independent variable of detoxification prior to short-term residential treatment (Table 2). Length of stay in detoxification was statistically significant in relation to completion of short-term residential treatment (p < .001), as was detoxification prior to short-term residential treatment (p < .001; Table 2). Frequency of use during the last 30 days was also significantly associated in relation to both short-term residential completion and detoxification prior to short-term treatment (p = .005 and p < .001, respectively).
Chi-square tests were performed to examine associations between the categorical independent variables and the dependent variable of short-term residential completion and the dichotomous primary independent variable of detoxification prior to short-term residential treatment (Table 3). Treatment Location ($p = .024$), Gender ($p = .001$), Route of Administration ($p = .035$), Opioid of Choice ($p = .041$), and Employment Status ($p = .014$) emerged as significant predictors. Treatment Location ($p < .001$), Opioid of Choice ($p = .013$), Legal Classification ($p = .011$), Payer Type ($p < .001$), and Geographic Location ($p = .025$) were significantly associated with detox prior to residential treatment. Although Legal Classification was significant, it was not entered into the regression due to the large amount of missing data ($n = 365$, or 36.5%).

Each statistically significant variable was examined for odds ratios (OR) and adjusted odds ratios (aOR) for short-term residential treatment completion (Table 4). Those treated at Site 2 were 1.497 (aOR) times more likely to complete short-term residential treatment ($p = .041$) than those at Site 1. Clients at site 3 were 2.967 times more likely to not complete short-term residential treatment when compared to those from Site 1 (aOR = .337, $p = .042$).

Males were 1.689 times (aOR) times more likely to complete short-term residential treatment than females ($p = .002$). Those who inhaled opioids was 2.342 times (aOR) more likely to complete short-term residential treatment compared to those using intravenous injection ($p = .022$). Those that were employed full-time were more than twice as likely to complete short-term residential treatment compared to those who were unemployed (aOR = 2.231, $p$
Frequency of opioid use over the 30 days prior to entering treatment was not statistically significant for completion of short-term residential treatment ($p = .051$).

**Specific Aim Two**

For specific aim two, it was hypothesized that individuals who undergo OUD detoxification prior to short-term residential treatment entry are less likely to complete short-term residential treatment than those who do not undergo OUD detoxification. This was examined with prior detoxification as a dichotomous variable, and then as a continuous variable in the form of length of stay in detoxification as the primary independent variable.

**Detoxification prior to short-term residential treatment as main predictor**

Referring to Table 5, detoxification prior to short-term residential treatment yielded an OR 1.402 ($p = .022$), indicating that those who did not undergo detoxification prior to short-term residential treatment were more likely to complete; however, the aOR of 1.302 for the same primary independent variable was not significant ($p = .123$). Males were 1.556 (aOR) times more likely to complete short-term residential treatment ($p = .001$). Those using Medicaid as a primary method to pay for treatment had an aOR of .516 ($p = .019$), translating to being 1.938 times more likely to not complete short-term residential treatment when compared to those using another state-sponsored program to pay for treatment.
PREDICTORS OF SHORT-TERM RESIDENTIAL

**Detoxification length of stay as main predictor**

For every day in detoxification, a client was 1.042 times more likely to not complete short-term residential treatment (aOR = .960, \( p = .032 \)). Males were 1.554 times more likely to complete short-term residential treatment (\( p = .001 \)). Those using Medicaid had an aOR of .496 for completing short-term residential treatment (\( p = .013 \)).

**Discussion**

This study found that males, full-time employment, and nasal use of opioids were predictors of short-term residential treatment completion. Those treated at Site 2 were more likely to complete short-term residential treatment, while those at Site 3 were less likely to complete residential treatment for OUD. Frequency of use during prior to entering treatment was not statistically significant to short-term residential treatment completion. Detoxification prior to short-term treatment did not predict completion of short-term residential treatment for OUD, supporting the second hypothesis.

Results from this study found that the more days individuals spent in detoxification for OUD, the less likely they were to complete short-term residential treatment. This may arise from a belief that one is “cured” once the detoxification process is complete. Kleber (2007) noted that therapists reported many patients taking buprenorphine or methadone for maintenance of OUD may refuse counseling due to their feeling of wellness. Fifty-two per cent of OUD clients using extended-release naltrexone patients “felt cured,” and opted to discontinue the treatment (Williams et al., 2017). These sentiments may be
similar for not completing short-term residential treatment. Other possibilities include lack of funding to continue short-term residential treatment, or insurance cutting off funding at a given number of days in short-term residential treatment. Stein et al. (2017) found that only 11% of those completing detoxification preferred short-term residential treatment, while a majority preferred outpatient medication-assisted treatment. The current findings suggest the use of medication-assisted treatment into short-term residential treatment, as this may allow the patient to help fight cravings for opioids (U.S. Department of Health and Human Services, Office of the Surgeon General [HHS], 2018), and thus remain in treatment for a longer length of time.

Treatment Site 2 demonstrated a higher odds ratio for completing short-term residential treatment compared to Site 1. One possibility is that heroin was not the most frequently reported opioid of choice; rather, opioids with an MME equal to morphine were more frequently reported, which included hydrocodone.

Those using nasal inhalation of opioids demonstrated better chances of completing short-term residential treatment when compared to those using intravenous injections of drugs. This was an interesting finding, but may be due to the lower number of those reporting nasal usage (n = 76 compared to n = 744 for intravenous injection). Frequency of opioid use in the last 30 days was not statistically significant for the model of demographics and drug use (aOR = .984, p = .051). The same was true in the other regressions examined with the primary independent variable of detoxification before short-term residential treatment (p =
PREDICTORS OF SHORT-TERM RESIDENTIAL

.180), as well as for the primary independent variable of length of stay in
detoxification ($p = .260$).

Older age was not statistically significant for completion of short-term
residential treatment; this is in contrast to others studies that found improved
retention with older age (Alford et al., 2011; Dreifuss et al., 2013; Ekhtiari et al.,
2005). Males were more likely to complete short-term residential treatment for
OUD. Barriers for women and OUD treatment may include economic difficulties,
family responsibilities, and feelings of shame (Green, 2006).

Being employed full-time demonstrated a higher aOR for completing short-
term residential treatment when compared to those who were unemployed. This
is consistent with Hser et al. (2015), who suggest employment helps provide
structure to those in recovery. Type of vocation was not examined in this study,
but may be of interest for future research. Employment may also allow one to
afford health insurance, although commercial insurance or private pay did not
figure significantly with short-term residential treatment completion with either
primary independent variable (Table 5). Employment recovery capital has been
shown to predict treatment completion, particularly when there is an improvement
in employment recovery capital (Sahker et al., 2019). Those using Medicaid
were 1.94 times less likely to complete short-term residential treatment
(dichotomous primary independent variable aOR = .516 for short-term residential
treatment completion, $p = .019$) than those in a state-sponsored program. This
was also true for the continuous primary independent variable of length of stay in
detoxification (aOR = .496, $p = .013$).
Limitations

Limitations to this study involve the available data set. The sample sizes for sites 3 and 4 were smaller than sites 1 and 2, possibly owing to the fact that sites 3 and 4 are the most recent additions to the organization’s short-term residential treatment locations in Texas, and therefore fewer clients. As this study was retrospective in nature, data was limited to what had been entered into the data base. Since the data had been de-identified, it was not possible to speak with specific clients to verify missing data, particularly for the variables of Legal Classification and Marital Status.

Missing data for legal status and marital status prevented those variables from being entered into the regression equation by SPSS; this was part of the reason for only examine the combined sites population and not each site individually. Logistic regression requires larger sample sizes to provide reliable results (Leech, Barrett, & Morgan, 2015); site 3 and 4 had smaller populations (n = 181 and n = 169, respectively). The sample sizes themselves were adequate for regressions, but when cases with missing data were removed by SPSS, the resulting sample sizes were inadequate for reliable regression results.

Implications for Practice and Research

The findings from this study raise implications for practice and future research. Knowing that detoxification does not predict that one will complete short-term residential treatment, addiction specialists should find ways of reinforcing that detoxification is not a cure for OUD, but merely a beginning on the road to recovery. The feeling of being cured once withdrawal symptoms
have subsided presents a difficult barrier to overcome for continued OUD recovery.

Future research should assess the differences among different treatment locations in clients’ completion of short-term residential treatment. Site 2 exhibited higher odds ratios of residential completion, when compared to Site 1; Site 3 subjects demonstrated lower odds ratios of residential completion. Assessing specific predictors for each location may help tailor treatment plans for clients at each treatment location.

Further research examining factors related to gender and completion of short-term residential treatment would also be of interest, including links to socioeconomic factors. This may also be extended to full-time employment being predictive of completion of short-term residential treatment, which may influence what time of insurance or payment program is utilized. Having Medicaid was also not predictive of short-term residential treatment completion in this study. Further investigation into the relationship between gender, employment status, and Medicaid should be examined, which may help in developing interventions for completion of short-term residential treatment.

The treatment organization in the current study did not utilize medication-assisted treatment during short-term residential treatment. The United States Surgeon General recent recognized medication-assisted treatment, along with other rehabilitation services, as the gold-standard for treating OUD (HHS, 2018). Use of medication-assisted treatment, however, may be blunted by certain philosophical beliefs regarding treatment and recovery. Barriers to medication-
assisted treatment include insufficient training, lack of institutional support, lack of support by clinician peers, provider bias, and regulatory requirements (Haffajee, Bohnert, & Lagisetty, 2018). It would be of interest to repeat the current study, but with the addition of medication-assisted treatment, such as buprenorphine.

**Conclusions**

This study found that detoxification prior to short-term residential treatment does not enhance one’s chance of completing short-term residential treatment. This may be due to one’s belief of being cured once one undergoes detoxification. Clients with Medicaid were not as likely to complete short-term residential treatment, which is an aspect that bears further investigation. Nasal inhalation of opioids predicted successful completion of short-term residential treatment. Further investigation into route of administration may be of use, as well as the influence of gender and full-time employment on short-term residential treatment completion. Understanding that detoxification prior to short-term residential treatment does not predict completion of residential treatment may be useful in helping addiction specialists in promoting continuation of care for opioid use disorder recovery.
References


http://dx.doi.org/10.1155/2014/96526


https://doi.org/10.1097/HRP.0000000000000052


https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6450a3.htm


https://doi.org/10.1016/j.drugalcdep.2014.09.009


Appendix A

Table 1 – Demographics and Frequencies
Table 1

Demographics and Frequencies

<table>
<thead>
<tr>
<th></th>
<th>Combined Sites N = 1001</th>
<th>Site No. 1 N = 423</th>
<th>Site No. 2 N = 228</th>
<th>Site No. 3 N = 181</th>
<th>Site No. 4 N = 169</th>
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<tbody>
<tr>
<td>Age in Years (mean)</td>
<td>36.06</td>
<td>35.56</td>
<td>36.43</td>
<td>35.40</td>
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<td>Detox LOS (days, mean)</td>
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<td>5.13</td>
<td>4.54</td>
<td>5.48</td>
<td>6.98</td>
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<td>STR LOS (days, mean)</td>
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<td>15.46</td>
<td>17.76</td>
<td>14.82</td>
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<td>Detox before STR? (%)</td>
<td>744</td>
<td>337 (79.7%)</td>
<td>142 (64%)</td>
<td>122 (67.4%)</td>
<td>143 (84.6%)</td>
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<td># of Prior Treatments (mean)</td>
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<td>.09</td>
<td>.13</td>
<td>.22</td>
<td>.27</td>
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<td>Age First Use, Years (mean)</td>
<td>24.35</td>
<td>23.86</td>
<td>24.78</td>
<td>23.24</td>
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<td>Male (%)</td>
<td>576 (58%)</td>
<td>246 (52%)</td>
<td>134 (59%)</td>
<td>101 (56%)</td>
<td>95 (56%)</td>
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<td>STR Completion? (%)</td>
<td>538 (54%)</td>
<td>222 (52%)</td>
<td>142 (62%)</td>
<td>92 (51%)</td>
<td>82 (49%)</td>
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<tr>
<td>Race – White, Not Hispanic</td>
<td>760 (76%)</td>
<td>342 (81%)</td>
<td>197 (86%)</td>
<td>114 (63%)</td>
<td>107 (63%)</td>
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<td>Race – African American, Not Hispanic</td>
<td>69 (7%)</td>
<td>27 (6%)</td>
<td>14 (6.1%)</td>
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<td>Race – American Indian/Native American</td>
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<td>3 (2%)</td>
</tr>
<tr>
<td>Race – Other</td>
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<td>33 (20%)</td>
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<td>0</td>
<td>1 (.6%)</td>
<td>1 (.6%)</td>
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<td>Route – Oral</td>
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<td>191 (45%)</td>
<td>123 (54%)</td>
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<td>76 (45%)</td>
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<td>Route – IV Injection</td>
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<td>79 (35%)</td>
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<td>71 (42%)</td>
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<td>Route – Nasal</td>
<td>76 (8%)</td>
<td>32 (8%)</td>
<td>17 (8%)</td>
<td>8 (4%)</td>
<td>19 (11%)</td>
</tr>
<tr>
<td>Route – Smoking</td>
<td>22 (2%)</td>
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<td>6 (3%)</td>
<td>5 (3%)</td>
<td>3 (2%)</td>
</tr>
<tr>
<td>OOC – Heroin</td>
<td>514 (51%)</td>
<td>214 (51%)</td>
<td>89 (39%)</td>
<td>127 (70%)</td>
<td>86 (51%)</td>
</tr>
<tr>
<td>OOC – Stronger than Morphine (MME)</td>
<td>148 (15%)</td>
<td>64 (15%)</td>
<td>36 (16%)</td>
<td>19 (10%)</td>
<td>29 (17%)</td>
</tr>
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<td>OOC – Equal to Morphine (MME)</td>
<td>314 (31%)</td>
<td>138 (33%)</td>
<td>99 (43%)</td>
<td>32 (18%)</td>
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<td>OOC – Weaker than Morphine (MME)</td>
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<td>11 (7%)</td>
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</tbody>
</table>

a: Missing Data   OOC: Opioid of Choice   STR: Short-term Residential
### Demographics and Frequencies

<table>
<thead>
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<th>Demographics</th>
<th>Combined Sites N = 1001</th>
<th>Site No. 1 N = 423</th>
<th>Site No. 2 N = 228</th>
<th>Site No. 3 N = 181</th>
<th>Site No. 4 N = 169</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal Classification – Walk-in</td>
<td>544 (54%)</td>
<td>344 (81%)</td>
<td>147 (64%)</td>
<td>13 (7%)</td>
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<td>Legal Classification – Parole</td>
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<td>Legal Classification – Probation</td>
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<td>41 (10%)</td>
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<td>5 (3%)</td>
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<td>Legal Classification – Legally Suggested</td>
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<td>1 (.6%)</td>
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<td>Legal Classification – Court Mandated</td>
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<td>Marital Status – Married</td>
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<td>5 (3%)</td>
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<td>Marital Status – Widowed</td>
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<tr>
<td>Veteran - Yes</td>
<td>10 (1%)</td>
<td>4 (1%)</td>
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<td>Veteran - No</td>
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<td>180 (99%)</td>
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<td>Unemployed</td>
<td>594 (59%)</td>
<td>371 (88%)</td>
<td>158 (69%)</td>
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<td>Employed Full-time</td>
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<tr>
<td>Religion – Protestant</td>
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<td>80 (8%)</td>
<td>58 (25%)</td>
<td>30 (17%)</td>
<td>39 (23%)</td>
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<tr>
<td>Religion – Other</td>
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<td>28 (7%)</td>
<td>25 (11%)</td>
<td>30 (17%)</td>
<td>35 (21%)</td>
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<td>9 (5%)</td>
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<td>Payer – State Sponsored</td>
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<td>339 (80%)</td>
<td>174 (76%)</td>
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<td>7 (3%)</td>
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<td>Payer – Private Pay</td>
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<td>3 (1%)</td>
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<td>Reside – Dallas/Ft. Worth Area</td>
<td>182 (18%)</td>
<td>104 (25%)</td>
<td>55 (24%)</td>
<td>13 (7%)</td>
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<tr>
<td>Reside - Houston Area</td>
<td>220 (22%)</td>
<td>35 (8%)</td>
<td>17 (8%)</td>
<td>14 (8%)</td>
<td>154 (91%)</td>
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<tr>
<td>Reside - Austin Area</td>
<td>194 (19%)</td>
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<td>8 (4%)</td>
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<td>Reside – Northeast Texas</td>
<td>213 (21%)</td>
<td>67 (16%)</td>
<td>140 (61%)</td>
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<td>3 (2%)</td>
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<td>Reside - Waco Area</td>
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<td>95 (22%)</td>
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<td>53 (5%)</td>
<td>17 (4%)</td>
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<td>Reside - North &amp; West Texas</td>
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<td>2 (.4%)</td>
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a: Missing Data  OOC: Opioid of Choice  STR: Short-term Residential
Appendix B

Table 2 – Mann-Whitney U Results
Table 2
Mann-Whitney U Results

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<tr>
<th>Combined Sites</th>
<th>Mann-Whitney U for STR Completion</th>
<th>Sig.</th>
<th>Mann-Whitney U for Detox Prior to STR</th>
<th>Sig.</th>
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<td>.010</td>
<td>514.000</td>
<td>&lt;.001</td>
</tr>
<tr>
<td># of Prior Detox or STR</td>
<td>119457.500</td>
<td>.060</td>
<td>94714.000</td>
<td>.737</td>
</tr>
<tr>
<td>Frequency Last 30 Days</td>
<td>108208.500</td>
<td>.005</td>
<td>56879.500</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

LOS: Length of Stay  STR: Short-term Residential
Appendix C

Table 3 – Pearson Chi-Square Crosstabulations
### Table 3

**Pearson Chi-Square Crosstabulations**

<table>
<thead>
<tr>
<th>Combined Sites</th>
<th>Pearson Chi-Square with STR Completion</th>
<th>Sig.</th>
<th>Pearson Chi-Square with Detox Prior to STR</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment Location</td>
<td>9.428</td>
<td>.024</td>
<td>37.585</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Gender</td>
<td>11.483</td>
<td>.001</td>
<td>.178</td>
<td>.673</td>
</tr>
<tr>
<td>Race</td>
<td>.669</td>
<td>.995</td>
<td>4.424</td>
<td>.619</td>
</tr>
<tr>
<td>Opioid of Choice</td>
<td>8.268</td>
<td>.041</td>
<td>10.767</td>
<td>.013</td>
</tr>
<tr>
<td>Route</td>
<td>8.606</td>
<td>.035</td>
<td>6.831</td>
<td>.077</td>
</tr>
<tr>
<td>Legal Classification</td>
<td>4.868</td>
<td>.301</td>
<td>13.118</td>
<td>.011</td>
</tr>
<tr>
<td>Marital Status</td>
<td>4.163</td>
<td>.384</td>
<td>7.591</td>
<td>.108</td>
</tr>
<tr>
<td>Veteran Status</td>
<td>1.073</td>
<td>.300</td>
<td>1.086</td>
<td>.297</td>
</tr>
<tr>
<td>Employment Status</td>
<td>8.482</td>
<td>.014</td>
<td>1.111</td>
<td>.574</td>
</tr>
<tr>
<td>Religion</td>
<td>7.381</td>
<td>.496</td>
<td>8.291</td>
<td>.406</td>
</tr>
<tr>
<td>Payer Type</td>
<td>6.843</td>
<td>.233</td>
<td>47.063</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Geographic Region</td>
<td>10.579</td>
<td>.158</td>
<td>16.035</td>
<td>.025</td>
</tr>
</tbody>
</table>

Detox: Detoxification  STR: Short-term Residential
Appendix D

Table 4 – Binomial Logistic Regression Results – Demographic and Drug Use History: Combined Treatment Sites
### Binomial Logistic Regression Results – Demographic and Drug Use History: Combined Treatment Sites

<table>
<thead>
<tr>
<th>Treatment Location</th>
<th>Odds Ratio</th>
<th>Sig.</th>
<th>95% Confidence Interval</th>
<th>Adjusted Odds Ratio</th>
<th>Sig.</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 1 (Index)</td>
<td></td>
<td>.025</td>
<td></td>
<td></td>
<td>.016</td>
<td></td>
</tr>
<tr>
<td>Site 2</td>
<td>1.495</td>
<td>.017</td>
<td>[1.076, 2.077]</td>
<td>1.497</td>
<td>.041</td>
<td>[1.016, 2.206]</td>
</tr>
<tr>
<td>Site 3</td>
<td>.936</td>
<td>.709</td>
<td>[.661, 1.326]</td>
<td>.337</td>
<td>.042</td>
<td>[.118, .962]</td>
</tr>
<tr>
<td>Site 4</td>
<td>.853</td>
<td>.384</td>
<td>[.597, 1.219]</td>
<td>1.573</td>
<td>.185</td>
<td>[.806, 3.070]</td>
</tr>
<tr>
<td>Gender (Male)</td>
<td>1.546</td>
<td>.001</td>
<td>[1.201, 1.989]</td>
<td>1.689</td>
<td>.002</td>
<td>[1.280, 3.989]</td>
</tr>
<tr>
<td>Age in Years</td>
<td>1.005</td>
<td>.496</td>
<td>[.991, 1.018]</td>
<td>1.009</td>
<td>.336</td>
<td>[.991, 1.028]</td>
</tr>
<tr>
<td>Opioid of Choice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heroin (Index)</td>
<td>.928</td>
<td>.691</td>
<td>[.644, 1.339]</td>
<td>1.078</td>
<td>.862</td>
<td>[.464, 2.504]</td>
</tr>
<tr>
<td>Stronger than Morphine (MME)</td>
<td>1.296</td>
<td>.073</td>
<td>[.976, 1.721]</td>
<td>1.527</td>
<td>.361</td>
<td>[616, 3.784]</td>
</tr>
<tr>
<td>Equal to Morphine (MME)</td>
<td>.452</td>
<td>.072</td>
<td>[.190, 1.074]</td>
<td>.380</td>
<td>.241</td>
<td>[.075, 1.918]</td>
</tr>
<tr>
<td>Weaker than Morphine (MME)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency Last 30 Days</td>
<td>.986</td>
<td>.021</td>
<td>[.974, .998]</td>
<td>.984</td>
<td>.051</td>
<td>[.969, 1.000]</td>
</tr>
<tr>
<td>Number of Prior Treatments</td>
<td>.861</td>
<td>.236</td>
<td>[.672, 1.103]</td>
<td>.741</td>
<td>.155</td>
<td>[.490, 1.120]</td>
</tr>
<tr>
<td>Route</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV Injection (Index)</td>
<td>1.246</td>
<td>.101</td>
<td>[.958, 1.620]</td>
<td>.826</td>
<td>.664</td>
<td>[.349, 1.956]</td>
</tr>
<tr>
<td>Oral</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nasal</td>
<td>2.031</td>
<td>.007</td>
<td>[1.217, 3.391]</td>
<td>2.342</td>
<td>.022</td>
<td>[1.129, 4.856]</td>
</tr>
<tr>
<td>Smoking</td>
<td>.996</td>
<td>.992</td>
<td>[.423, 2.343]</td>
<td>.931</td>
<td>.912</td>
<td>[.261, 3.316]</td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed (Index)</td>
<td>.996</td>
<td>.992</td>
<td>[.423, 2.343]</td>
<td>.931</td>
<td>.912</td>
<td>[.261, 3.316]</td>
</tr>
<tr>
<td>Employed Full-time</td>
<td>2.815</td>
<td>.005</td>
<td>[1.359, 5.831]</td>
<td>2.132</td>
<td>.049</td>
<td>[1.002, 4.538]</td>
</tr>
</tbody>
</table>

STR: Short-term Residential
Appendix E

Table 5 – Binomial Logistic Regressions for STR Completion –

Detoxification as Main Predictors
<table>
<thead>
<tr>
<th>Table 5</th>
<th>Binomial Logistic Regressions for STR Completion – Detoxification as Main Predictors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single Predictor Results</strong></td>
<td><strong>Detox before STR Results</strong></td>
</tr>
<tr>
<td>Odds Ratio</td>
<td></td>
</tr>
<tr>
<td><strong>Detox before STR (No)</strong></td>
<td>1.402</td>
</tr>
<tr>
<td><strong>Treatment Location</strong></td>
<td></td>
</tr>
<tr>
<td>Site 1 (Index)</td>
<td></td>
</tr>
<tr>
<td>Site 2</td>
<td>1.495</td>
</tr>
<tr>
<td>Site 3</td>
<td>.936</td>
</tr>
<tr>
<td>Site 4</td>
<td>853</td>
</tr>
<tr>
<td><strong>Gender (Male)</strong></td>
<td>1.546</td>
</tr>
<tr>
<td><strong>Age in Years</strong></td>
<td>1.005</td>
</tr>
<tr>
<td><strong>Opioid of Choice</strong></td>
<td></td>
</tr>
<tr>
<td>Heroin (Index)</td>
<td></td>
</tr>
<tr>
<td>Stronger than Morphine (MME)</td>
<td>.928</td>
</tr>
<tr>
<td>Equal to Morphine (MME)</td>
<td>1.296</td>
</tr>
<tr>
<td>Weaker than Morphine (MME)</td>
<td>452</td>
</tr>
<tr>
<td><strong>Frequency Last 30 Days</strong></td>
<td>986</td>
</tr>
<tr>
<td><strong>Payer Type</strong></td>
<td></td>
</tr>
<tr>
<td>State-sponsored Program (Index)</td>
<td></td>
</tr>
<tr>
<td>Medicaid</td>
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<tr>
<td>Commercial Insurance</td>
<td>.927</td>
</tr>
<tr>
<td>Mental Health Program</td>
<td>.721</td>
</tr>
<tr>
<td>Private Pay</td>
<td>1.854</td>
</tr>
</tbody>
</table>

**Detox**: Detoxification  **LOS**: Length of Stay  **MME**: Morphine Milligram equivalent  **N/A**: Not Applicable  **STR**: Short-term Residential
Table 5 - continued
Binomial Logistic Regressions for STR Completion – Detoxification as Main Predictors

<table>
<thead>
<tr>
<th>Residential Area</th>
<th>Single Predictor Results</th>
<th>Detox before STR Results</th>
<th>Detox LOS Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Odds Ratio</td>
<td>Sig.</td>
<td>95% Confidence Interval</td>
</tr>
<tr>
<td>Houston Area (Index)</td>
<td>.163</td>
<td></td>
<td>[.920, 1.967]</td>
</tr>
<tr>
<td>Northeast Texas</td>
<td>1.345</td>
<td>.126</td>
<td>[.920, 1.967]</td>
</tr>
<tr>
<td>Austin Area</td>
<td>1.050</td>
<td>.805</td>
<td>[.713, 1.545]</td>
</tr>
<tr>
<td>Dallas/Ft. Worth Area</td>
<td>1.351</td>
<td>.137</td>
<td>[.909, 2.008]</td>
</tr>
<tr>
<td>San Antonio / South Texas Area</td>
<td>.726</td>
<td>.299</td>
<td>[.397, 1.328]</td>
</tr>
</tbody>
</table>

Detox: Detoxification  
LOS: Length of Stay  
MME: Morphine Milligram equivalent  
N/A: Not Applicable  
STR: Short-term Residential
Appendix F

Proposal Application – The Committee for the Protection Of Human Subjects at The University of Texas Health Science Center at Houston
Gideon, Christopher

The Study Contact(s) will receive all important system notifications along with the Principal Investigator, (e.g., The project contact(s) can typically be someone other than the Principal Investigator themselves).

3.4 For applicable Human Subjects Research, please add a Faculty Advisor:

Casarez, Rebecca

3.5 For applicable Human Subjects Research, please select the Designated Department Approval(s):

Ruppert, Susan
Department Chair

Add the name of the individual authorized to approve and sign off on this protocol from your Department (e.g., the Department Chair or Dean).

3.6 If applicable, please select the Administrative Assistant(s):

Administrative Assistants have READ-ONLY access to submissions in iRIS.

4.0 Contact Information and Additional Study Personnel

4.1 Form Version 10 - published 8/10/15

4.2 The primary mechanism for CPHS communication with you will be through iRIS Correspondence, however, we may need to call you for clarification. Please provide names and contact numbers as outlined below. Please make sure these individuals have a good knowledge of the protocol. For most studies the Principal Investigator and study coordinator are listed as the primary and secondary contacts.

<table>
<thead>
<tr>
<th>Name</th>
<th>Office Phone</th>
<th>Pager/Cell Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Primary Contact</td>
<td>Christopher Gideon</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>713-817-8804</td>
</tr>
<tr>
<td>Secondary Contact</td>
<td>Rebecca Casarez</td>
<td>713-500-2068</td>
</tr>
<tr>
<td></td>
<td></td>
<td>281-854-5174</td>
</tr>
</tbody>
</table>

4.3 List Study Personnel who are not listed in the UT White Pages Directory (not UT employees or guests) and specify their roles on this study.

Key study personnel are defined as personnel responsible for the design, conduct, or reporting of the proposed research or other educational activities.

* NOTE: Human subjects training certification and research conflict of interest forms are required for Key Study Personnel. Only Human subjects training certification is required for Non-key Study Personnel.

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>E-mail address</th>
<th>Role in this study</th>
<th>Comments - describe role on study</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No records have been added
### 5.0 Locations

**5.1 * Is the research being conducted at the Clinical Research Unit (CRU) or are other CRU services being requested?**

*NONE: If YES, you will be required to complete some additional questions within this application and your application will be routed automatically to the CRU for review.*

- Yes
- No

**5.2 * Is the research being conducted at a Memorial Hermann Healthcare System facility?**

*Please note: If the research will be conducted at a Memorial Hermann Healthcare System facility, remember to complete and attach the Memorial Hermann Application Form which you can find under the Review Board Forms section when you are putting together the submission packet.*

- Yes
- No

**5.3 Please identify other locations or facilities not listed above where the research is being conducted.**

- [ ] BBS - Behavioral and Biomedical Sciences Building
- [ ] Ben Taub General Hospital (Harris Health)
- [ ] HCPC - Harris County Psychiatric Center
- [ ] Hermann Medical Plaza (UT Clinics)
- [ ] HISD - Houston Independent School District
- [ ] Houston Medical Center Building
- [ ] IMH - Institute of Molecular Medicine
- [ ] LBJ Hospital (Harris Health)
- [ ] M. D. Anderson
- [ ] Methodist Hospital
- [ ] St. Luke's Episcopal Hospital
- [ ] Texas Children's Hospital
- [ ] Texas Heart Institute
- [ ] Thomas Street Clinic (Harris Health)
- [ ] UT - School of Dentistry
- [ ] UT Professional Building
- [ ] UT - School of Nursing
- [ ] UT - School of Public Health
- [ ] Valley Baptist Medical Center - Brownsville (VBMC)
- [ ] Veterans Affairs Medical Center
- [ ] OTHER

*Please be reminded that if you are conducting research at facilities other that UT, MHH, THI and HCHD, you must ensure you have all the necessary approvals required by that facility including review and approval by their IRB.*

### 6.0 Funding Source

**6.1 * Have you applied for or have you already received funding or support for this research proposal?**
6.2 Please identify how this study is funded or supported. If the agency/sponsor is not listed, please call the iRIS Support line at 713-500-3470 for assistance. You can select more than one agency.

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal - NIH</td>
<td></td>
</tr>
<tr>
<td>Private - Non-profit</td>
<td></td>
</tr>
<tr>
<td>Academic Health Center</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Federal</td>
<td></td>
</tr>
<tr>
<td>Internal - UTHSC-H</td>
<td></td>
</tr>
<tr>
<td>Pharmaceutical or Device Manufacturer</td>
<td></td>
</tr>
<tr>
<td>State Agency</td>
<td></td>
</tr>
</tbody>
</table>

6.3 If this is an industry sponsored clinical trial, provide contact information for the sponsor for IRB fee billing purposes.

<table>
<thead>
<tr>
<th>Contact Name</th>
<th>Contact Phone Number</th>
<th>Contact E-mail address</th>
<th>Additional information (if necessary)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.4 Status of funding:

Please select one:
- ☐ Applied/Pending
- ☐ Approved
- ☐ Not Applicable
6.5 If this is investigator initiated research for which you have applied/received monetary or in-kind support from industry sponsors, please describe in detail. Include details on kind of support, who has oversight over the research project and who has ownership of the data.

7.0 Study Summary

7.1 Summarize the proposed research using non-technical language. Limit to about 250 words. This summary will be used as a reference throughout the course of the study by reviewers and will appear in the “Study Summary” section in IRIS. Please include the following in your summary:

- the purpose
- research design
- procedures to be used
- risks and potential benefits and
- importance of knowledge that may reasonably be expected to result

Purpose: This study will examine factors that predict completion of short-term residential treatment center (RTC) for substance use disorder (SUD), using a statistical predictive model. Data will be extracted from deidentified medical records of patients admitted to short-term residential programs, as well as the corresponding detoxification program, at four Cenikor Foundation locations in Texas. Data will be analyzed to identify predictors of success in four domains of interest. Predictors will be compared across Cenikor RTC locations.

Research Design: The design of this study will be of a retrospective record review (RRR) of clients who received treatment for opioid use disorder (OUD) from the Cenikor Foundation. Cenikor provides SUD treatment in Texas and Louisiana. Short-term RTC locations in Texas include Austin, Houston, Tyler, and Waco.

Procedures to Be Used: Data provided by Cenikor on the four RTC’s will be transposed to SPSS for statistical analysis. Using SPSS, descriptive statistics will be computed. To determine correlation of variables, a correlation table using Spearman’s rank order coefficient (rho) will be generated. Histograms will be generated for each outcome continuous variable to determine normality. Generalized linear models will be generated with logistic regression. Categorical variables will be regressed against LOS to determine if LOS is predictable. LOU will also be regressed against LOS as well and RTC completion for evidence of success. Logistic regression will be utilized to examine whether detoxification is predictive of completion of RTC, as well as number of prior detoxifications. Differences between those who completed detoxification prior to RTC and those entering directly into RTC will also be examined.

Risks & Benefits: Risks to the individual clients will be quite minimal, as all data will be deidentified by Cenikor prior to release to the study team. Individual clients will only be identified by a code. At the end of the study, all data will be destroyed and any papers containing data will be shredded. Benefits will include information on predictors RTC completion for those with OUD, allowing more individualized treatment for OUD.

Importance of Knowledge That May Reasonably Be Expected to Result: Determining predictors of RTC completion for opioid use disorder will help to tailor treatment to the individual.

8.0 Determining Review Type

8.1 The purpose of this panel is to allow IRIS to branch to simpler versions of the application for certain types of proposals (e.g. when you are uncertain whether the activity you are conducting needs to be reviewed and approved by the IRB).

Please select the appropriate option:

NOTE: MEDICAL SCHOOL ONLY: Studies that do not qualify for the exempt or expedited review process will require a Departmental Research Review form to be attached to the submission. The exempt criteria are listed in the next panel and the expedited criteria are listed in the bubble to the right. If you do not believe that your protocol qualifies for either
category, a Departmental Research Review form will need to be uploaded in the Study Documents section of the submission packet. For more information can be found on the Departmental Research Review information page.

Your submission will be returned to you if this form is not included.

- Humanitarian Use Device – NOT as part of a research study
- Request for permission to rely on IRB approval from an IRB with whom UT Houston has signed a reliance agreement (all UT System Component IRBs, NICHD Federated IRB, Baylor College of Medicine, Chesapeake IRB, BRANY IRB, Quorum IRB, WIRB/WCG IRB, IRBshare, etc.)
- Requesting assistance in whether or not formal IRB review is appropriate. See HELP bubble.
- None of the above – Requesting review by UTHealth’s IRB

9.0 Subject Contact Question

9.1 * Does this study involve contact with subjects?

- My study does not involve contact with subjects.
- My study involves contact with subjects (including "in-person", e-mail, phone, anonymous or online surveys, etc.).

If the study involves contact with subjects, select an option below:

- My study ONLY involves normal education practices, educational tests, surveys, interviews, or observations of public behavior.
- My study involves interventions, drugs or devices, clinical observations, or other study procedures.

10.0 Exempt Categories 4a or 4b

10.1 * What is the source of the records/biological specimen? (Choose all applicable options. For example, if you are planning to collect biological specimens and medical records information, choose both options).

- Data - Publicly available data
- Data - Historical dataset from previous research
- Data - Medical Records
- Biological specimen - Tissue repository or bank
- Biological specimen - Historical dataset from previous research
- Biological specimen - Pathology Department (See note below.)
- Other

* Provide a detailed description of the source. (For example - UT Houston Pathology, AllScripts, Care4, or CCFB Biobank.)

Centikor Foundation deidentified data set.

10.2 * Provide a description of the records/ samples that will be analyzed in this research. (For example – prostate cancer from blocks).

Demographics, living situation, comorbidities, history of opioid abuse, legal issues, detoxification data

10.3 * Provide How and where will you obtain your list of eligible records/samples for the study?
Cenikor Foundation will provide a de-identified data set for its short-term residential programs in Texas as well as corresponding detoxification programs.

10.4 * Is the data that will be collected for the research and/or the samples that will be analyzed already existing at the time of this application? (If data/samples are existing at this time, the research may qualify for exemption).

- Yes
- No

10.5 * State the "start date" and "end date" of creation of data or collection of samples used in this research.

For example, data collected will include information that was recorded between Jan 1, 2013 through Dec 31, 2013 or skin biopsies collected from Jan 1, 2013 to Dec 31, 2013.

January, 2012 to July 2013

10.6 How many records/samples are you expecting to use?

About 6000 distinct intake records. Each patient may have >1 intake record.

10.7 * Select the most appropriate statement. If you will be recording identifiers (second option), you must attach your proposed linking log and data collection form for review.

- Investigator has access to identifiers, but the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects,
- Investigator will record identifiers. (Please note that identifiers should not be included in data collection forms. Subjects should be assigned codes and the logs linking the codes and identifiers should be maintained separately from the data.)
- The identifiers are maintained at the source only. The investigator receives de-identified data /samples.

10.8 * How long will the data/samples be stored?

De-identified data set will be held by the PI for approximately one year.

10.9 * Where will the research data/leftover sample be stored and how long will it be protected? Address paper and electronic data separately.

Electronic data sets will be password protected and stored on an encrypted flash drive.

10.10 * Outline the plan to destroy the data following study completion? (Include plan for destroying codes, links, master list and/or PHI that has not been de-identified.)

De-identified data will be erased from flash drive. Paper materials will be shredded.

11.0 Waiver of Consent and Waiver of Authorization for Retrospective Chart Reviews

11.1 CHIS may waive the requirement to obtain informed consent and waiver of authorization of Protected Health Information (PHI) if the study is a retrospective chart review. Please provide protocol specific information to answer each of the following questions.

- Justify why the study poses no more than minimal risk to the subjects.
### 11.2 Explain why the waiver of informed consent and authorization will not adversely affect the rights and welfare of the subjects.

Data will be deidentified by Cenikor prior to release to the PI.

### 11.3 Explain why the study cannot be practically conducted without the waiver of informed consent or waiver of HIPAA authorization.

Only deidentified data by Cenikor will be used.

### 11.4 Whenever appropriate, will the subjects be provided with additional pertinent information after participation?

Subject identities will not be known to the investigation team, so no further information for the subjects is anticipated.

### 11.5 Do you have any additional comments supporting the waiver of informed consent and authorization of HIPAA?

All data will be deidentified by Cenikor Foundation prior to release to the PI.

### 12.0 Statement of Investigator

#### 12.1 "I have discussed the protocol with all of my collaborators. The research is NOT underway and WILL NOT BEGIN until approved by the CPHS."

☐ Agree ☐ Disagree
Appendix G

Proposal Acceptance Letter - The Committee for the Protection Of Human Subjects at the University of Texas Health Science Center at Houston
Christopher Gideon
Cizik School of Nursing

November 21, 2018

HSC-SN-18-1010 - Predictors of Short-term Residential Treatment Completion Preceded by Detoxification for Opioid Use Disorder

The above named project is determined to qualify for exempt status according to 45 CFR 46.101(b)

**CATEGORY #4**: Research, involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified directly or through identifiers linked to the subjects.

**CHANGES**: Should you choose to make any changes to the protocol that would involve the inclusion of human subjects or identified data from humans, please submit the change via iRIS to the Committee for the Protection of Human Subjects for review.

**INFORMED CONSENT DETERMINATION**: Waiver of Consent Granted

**HEALTH INSURANCE PORTABILITY and ACCOUNTABILITY ACT (HIPAA)**: Exempt from HIPAA

**STUDY CLOSURES**: Upon completion of your project, submission of a study closure report is required. The study closure report should be submitted once all data has been collected and analyzed.

Should you have any questions, please contact the Office of Research Support Committees at 713-500-7943.
Appendix H

Curriculum Vitae
Education

The University of Texas Health Science Center at Houston - Cizik School of Nursing
Doctor of Philosophy in Nursing
Research Focus: Opioid Use Disorder
Graduation: December 2019

The University of Texas Health Science Center at Houston - School of Nursing
Master of Science in Nursing, Emergency Nurse Practitioner Program
Graduation: May 2008

The University of Texas Health Science Center at Houston - School of Nursing
Bachelor of Science in Nursing – cum laude
Graduation: May 2005

Texas A&M University – College Station, Texas
Bachelor of Science in Wildlife and Fisheries Sciences
Graduation: December 1995

Licenses & Certifications

Board Certified Family Nurse Practitioner – American Nurses Credentialing Center
Emergency Nurse Practitioner – Texas Board of Nursing
Certified Addictions Registered Nurse – Advanced Practice (CARN-AP)
DEA Registration
Registered to prescribe buprenorphine for opioid use disorder
Registered Nurse – Texas Board of Nursing
Licensed Paramedic – Texas Department of State Health Services
Certified Emergency Nurse (CEN)

Professional Memberships

Sigma Theta Tau Honor Society of Nursing 2005-Present
International Nurses Society on Addiction 2019
American Association of Nurse Practitioners 2008-Present
Professional Positions

Contemporary Medicine Associates, Bellaire, Texas 2017-Present
Nurse Practitioner

Urgent Clinics Medical Care, Katy, Texas 2014-2015
Nurse Practitioner

Excel Urgent Care, Katy, Texas 2013-2014
Nurse Practitioner

Hospital Physician Partners – St. Joseph Medical Center, Emergency Department, Houston, Texas 2013
Nurse Practitioner

Team Health – Memorial Hermann 2008-2012
Memorial City Hospital Emergency Department
Houston, Texas
Nurse Practitioner

St. Joseph Medical Center, Emergency Department 2005-2007
Houston, Texas
Clinical Nurse

Georgetown Hospital / Williamson County 1998-2003
Emergency Medical Services
Georgetown, Texas
Paramedic

Scott & White Emergency Medical Services 1996-1998
Temple, Texas
Field Training Officer
Paramedic

Texas A&M University Emergency Medical Services (Volunteer Work) 1992-1996
College Station, Texas
Assistant Chief of EMS
Advanced Life Support Medic
Field Supervisor
Dispatcher
Publications


Poster Presentations

"Novelty Seeking, Transition, and Opioid Addiction: A Conceptual Framework." The University of Texas Health Science Center School of Nursing Research Symposium, June 9, 2017
Presented with Rebecca Casarez, PhD, RN

Awards

The William Randolph Hearst Foundation Scholarship 2016-2019
The University of Texas Health Science Center at Houston School of Nursing PARTNERS Scholarship 2006-2008
Texas Emergency Nurses Association Scholarship 2004
The Vivian L. Smith Foundation Scholarship 2004-2005

Volunteer Experiences

Texas A&M Emergency Care Team 1991-1996
BP MS-150 Bicycle Tour, Event Medical Support 2006-Present
Chevron Houston Marathon, Medical Team 2007
Ironman Triathlon Medical Team, The Woodlands, Texas 2013-2015