Study Protocol

Official Title: Consensus-based algorithms to address opioid misuse behaviors among individuals prescribed long-term opioid therapy: developing implementation strategies and pilot testing

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ClinicalTrials.gov ID (NCT number): NCT05182606

Protocol Date: May 29, 2025

Scientific Background

Long-term opioid therapy (LTOT) remains a common treatment for chronic pain, despite growing awareness of its associated risks. Although recent data from the Centers for Disease Control and Prevention (CDC) shows a reduction in opioid prescribing, an estimated 19 million opioid prescriptions are still written each month. In 2017, clinicians wrote 58.5 opioid prescriptions per 100 persons nationally, and 57.6 per 100 in Allegheny County, highlighting the ongoing relevance of opioid prescribing both locally and nationally. Primary care providers (PCPs), who prescribe more opioids than any other specialty, face significant challenges in managing the care of patients on LTOT, including opioid misuse behaviors.

Opioid misuse behaviors, or concerning behaviors, are extremely common among patients on LTOT. These behaviors include missing appointments, using more opioid medication than prescribed, and illicit substance use, with some studies estimating that up to 85% of LTOT patients exhibit such behaviors. Managing these behaviors is crucial as they may lead to opioid use disorder (OUD) and other negative outcomes. However, existing guidelines, including the 2016 CDC Guideline for Prescribing Opioids for Chronic Pain, do not provide clear recommendations on how to address these behaviors when they arise. As a result, the responsibility often falls to PCPs, who may lack the necessary tools to effectively manage these complex situations.

To address this gap in knowledge and practice, we used a Delphi approach to identify the most common and challenging concerning behaviors and develop consensus-based management algorithms. These algorithms provide structured guidance for PCPs, helping them adopt best practices in managing LTOT patients with concerning behaviors. Our preliminary data from a rigorous 4-round Delphi study, which included pain experts, established consensus on these behaviors and management strategies. If successful, these algorithms will ultimately serve as essential tools for PCPs, accelerating the research-to-practice pipeline and improving the management of LTOT patients, with the potential to reduce opioid misuse-related harms and mitigate the impact of the opioid epidemic. This project is supported by the NIH Helping to End Addiction Long-term (HEAL) initiative, aligning it with national efforts to address the opioid crisis. If successful, these algorithms will ultimately serve as essential tools for PCPs, accelerating the research-to-practice pipeline and improving the management of LTOT patients, with the potential to reduce opioid misuse-related harms and mitigate the impact of the opioid epidemic.

Study Objectives

Aim 1
To a) identify and b) operationalize implementation strategies for the algorithms. Our approach will be guided by the Consolidated Framework for Implementation Research (CFIR) and the Expert Recommendations for Implementing Change (ERIC). Optimal implementation strategies will be uncovered through primary care provider experiences with Standardized Patients (SPs) followed by CFIR- and ERIC-guided group interviews. Using our prior expertise developing clinic-wide opioid risk reduction strategies and a Patient-Provider advisory board, we will

develop a comprehensive implementation package that can be delivered to primary care practices.

Aim 2

To conduct a pilot trial of the algorithms. Guided by the CFIR-based implementation plan and using the implementation package developed in Aim 1b, we will conduct a pilot trial to investigate the algorithms' feasibility, acceptability, and preliminary effectiveness.

Integrate algorithms into the EHR

To develop, evaluate, and test a risk score for the presence of opioid misuse behavior from documentation in the electronic health record including structured data such as encounters, diagnoses and prescriptions, and incorporating unstructured, free-text clinical documentation. The resulting risk score will be used as an outcome measure in the pilot study.

Study Design & Methods

Aim 1

We will conduct several study sessions involving 2 Standardized Patients (SPs), each portraying different cases, who will be seen by 2 primary care providers (PCPs) per session. SPs are healthy individuals trained to consistently and reproducibly portray patients in medical or communication-based scenarios. Each encounter will simulate a patient-PCP appointment in which the PCP must address opioid misuse behaviors exhibited by the SP. To ensure consistency across sessions and facilitate productive group interviews, each session will feature the same 2 SPs. The sessions will last five hours, including a half-hour orientation, three consecutive hour-long SP encounters, an hour-long group interview, and short breaks. These sessions will be conducted virtually via Zoom.

At the beginning of each session, PCP participants will be consented, enrolled in the study, and will complete a demographic and practice characteristics survey, along with questions about their knowledge and attitudes toward treating chronic pain and addiction. The surveys will be adapted from previous work and conducted via REDCap. During the study, PCPs will use the algorithms provided to create treatment plans for managing the concerning behaviors exhibited by the SPs. Each case will focus on one branch of an algorithm, but PCPs will have access to laminated cards (sent via email) containing all algorithms to simulate real-world decision-making.

Study staff will facilitate the Zoom sessions, utilizing breakout rooms for the SP encounters. PCPs will have 15 minutes to review patient information, such as urine drug tests and prescription monitoring data, and evaluate the patient. They will see patients longitudinally up to 3 times, with 5-minute intervals between each visit to write orders for lab tests, referrals, and medications, and complete a brief electronic survey. The longitudinal case will take

approximately 60 minutes in total. After each SP encounter, PCPs will participate in a structured group interview to discuss the session.

Aim 2

We will conduct a pilot trial at 3 UPMC sites: 2 UPMC CMI community primary care practices and 1 UPMC Presbyterian practice, to assess the feasibility, acceptability, and preliminary effectiveness of the algorithms. All PCPs at each site will participate. The pilot trial aims to mimic key elements of the future effectiveness-implementation hybrid trial, including PCP recruitment and consent, PCP orientation to the algorithms, and outcome assessment. The intervention will be implemented at the pilot sites for 6 months or longer, depending on the clinic's discretion.

A survey will be administered to PCPs to assess algorithm use, asking which algorithms were used, how often, and any resulting changes in outcomes, such as opioid dose reduction. The primary feasibility benchmark will be that 80% of PCPs report using at least one algorithm during the study period. Feasibility and acceptability will also be assessed qualitatively through interviews with the PCPs.

In addition to the study sessions, algorithm integration into the Electronic Health Record (EHR) will be developed through the Electronic Health Record Research Request (R3). For the development of an opioid misuse risk score, we will conduct a retrospective analysis of EHR data, including structured and primary care textual documentation, for patients engaged in primary care at the practices enrolled in the overall study. This analysis will include clinical records of all patients prescribed chronic opioid therapy. We will extract both structured and textual data from the EHR and identify patients who developed opioid use disorder (OUD) using encounter diagnoses. Additionally, patients with documented evidence of opioid misuse behavior will be identified through clinician chart review.

To develop the risk score, we will apply machine learning techniques to identify over-represented terms, phrases, and concepts in the textual documentation of patients who developed OUD or exhibited opioid misuse behaviors. The structured and scored textual data will then be fed into further machine learning algorithms to create a risk score specifically tailored for the practices participating in the study. This risk score for opioid misuse and OUD will then be used as an outcome measure in the pilot study of the consensus-based algorithm to address opioid misuse behaviors.

To improve the model, we may use a sample of notes from patients identified with opioid misuse behaviors, which will be de-identified by an honest broker before integration into the training data set for the machine learning model.

After completing Aim 1, we will pilot an implementation strategy bundle for the algorithms in three clinics. The pilots will be staggered, so they do not all begin simultaneously. Each pilot will last six months, and the clinics will maintain access to some materials, such as the website, even after the pilot period is complete.

Inclusion Criteria

Aim 1:
Primary care providers at UPMC practices
18 years+

Aim 2:
-Providers from the 4 identified pilot sites for Aim 2
-Patients from the 4 identified pilot sites who are on long-term opioid therapy (LTOT)
-18 years+

Exclusion Criteria

Aim 1:
Non-UPMC affiliates, trainees (residents and fellows), those with < 2 years of experience, and PCPs from the practices identified as pilot sites in Aim 2

Aim 1 and Aim 2:
Children under 18 years of age

Statistical Analysis Plan

Aim 1: As 2 SP cases will be presented per session, 12 SP sessions will be required to present all 23 cases. Group interviews will be analyzed using thematic analysis. There may be cases that we would like to revisit, either because we did not receive sufficient feedback or because feedback from subsequent cases makes it useful to revisit an earlier case.

Aim 2: For EPIC tool usage report, analysis will be conducted in the following way:
- Monitoring the number of total encounters within the past 2 weeks
- For sub-group analysis: exclude people with 32 or fewer encounters per week
- For these encounters, obtain data on use of Epic tools designed for the study, which are documentation tools and decision and ordering support
- Analyses will be conducted by provider but de-identified

Analysis for Aim 2 will be conducted using descriptive statistics and pre/post analysis. The effectiveness of the implementation strategy bundle will be analyzed using t-tests to compare outcomes at pre- and post-intervention with baseline values.