# *Addressing Pain, Reducing Risk*



**January 2015 – December 2017**

**Pfizer Independent Grants for Learning and Change**

***Grant Award Number:*** **16213567**

***Title of Project:*** *Addressing Pain, Reducing Risk*

***Principal Investigators and Team Members:***

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## Table of Contents

## 1. Structured Abstract

***Purpose**:* Assess whether augmenting "rollout" of a health system-wide policy on opioid prescribing with tailored education and a rigorous quality improvement (QI) approach is superior to general "rollout" alone in implementing opioid therapy guidelines in primary care.
**Scope**: Clinicians from primary care clinics within a large academic health system caring for adults with opioid-treated chronic non-cancer pain (target population).
**Methods**: The intervention included academic detailing, online education and 4-6 practice facilitation sessions. It was implemented in 9 clinics using a stepped-wedge design. The outcomes, assessed during the 24-month period with clinic-level electronic health record data, included: 1) percentage of target population with active treatment agreement (primary outcome), 2) completed urine drug testing, opioid misuse risk and depression screening, Prescription Drug Monitoring Program check, co-prescription of benzodiazepines (secondary outcomes), and 3) morphine-equivalent daily dose (MEDD) of opioids.
**Results**: The stepped-wedge analysis and a comparison of the intervention clinics to other health-system clinics did not show a statistically significant change in the primary or secondary outcomes. However, the incidence of signed treatment agreements and the prevalence of the PDMP checks increased significantly during the intervention but was not sustained post-intervention. The intervention clinics tended to reduce MEDD, especially in patients at higher-risk for opioid-related harm. The intervention was well-received and rated as useful by clinicians.
**Conclusions:** The QI intervention has the potential to increase some aspects of guideline-concordant monitoring of opioid therapy and reduce opioid prescribing in primary care, thus improving safety of patients treated with long-term opioids for chronic pain.
**Key words:** chronic pain; opioids; long-term opioid therapy; quality improvement; guideline implementation

## 2. Purpose

***Objectives:***
- Assess whether augmenting general "rollout" of a health system-wide policy on opioid prescribing with clinician-tailored education and a rigorous quality improvement (QI) approach is superior to general "rollout" alone in implementing opioid therapy guidelines for chronic non-cancer pain (chronic pain) in primary care; and
- To meet our objective of increased patient-clinician education and discussion surrounding issues relevant to the care of adult patients with opioid-treated chronic pain (Target Population).

***Main Outcome Measures:***
***Primary Outcome Measure:*** Proportion of Target Population with a treatment agreement signed within the past 12 months. ***Secondary Outcome Measures:*** Proportion of Target Population with: (1) assessment of the risk of opioid misuse with DIRE, (2) urine drug testing in last 12 months, (3) depression screening with PHQ2 or PHQ9 in last twelve months, (4) co-

prescription of opioids and benzodiazepines, and (5) check of the state Prescription Drug Monitoring Program (PDMP) database in last 12 months.

## 3. Scope

***Background:***
Systematic implementation of guidelines for opioid therapy management in chronic pain can reduce opioid-related harms. However, implementation of guideline-recommended practices in routine care is subpar. The project team decided to develop, execute and evaluate the impact of a tailored, multi-pronged QI intervention aimed at increasing primary care clinicians' education about and adherence to guideline-recommended practices for long-term opioid therapy in chronic pain. The UW Health system was initiating a guideline-driven opioid management policy for the chronic pain patient population. The routine rollout efforts by the UW Health system to implement this policy served as a platform on which to build and test the effects of the project's intervention, targeting safe and competent opioid prescribing. The goal of this project was to assess whether the augmented clinic-tailored education and QI intervention would improve the implementation of the health system-wide, guideline-driven policy on opioid prescribing in primary care above and beyond the effect of the standard system-wide "rollout."

The policy provided multiple recommendations for the monitoring of safety and treatment response in patients with chronic pain who were treated with long-term opioids, with long-term defined as 3 or more months of opioid therapy. The recommendations included universal use of treatment agreements, urine drug testing, opioid misuse and depression risk screening, and periodic accessing of the PDMP. Of note, the policy did not address opioid and benzodiazepine co-prescribing. We tested whether an additional multi-faceted QI intervention is superior to UW Health rollout alone in increasing: 1) signed treatment agreements (past 12 months), our primary outcomes measure; 2) completing urine drug testing (past 12 months); 3) assessing the risk of opioid misuse and 4) assessing depression; 5) decreasing co-prescribing of opioids and benzodiazepines, and 6) accessing the state PDMP database.

***Context:***
Our partnership was developed to support and supplement the systematic implementation of guidelines for opioid management in chronic pain. The UW Health system rollout of the new opioid policy provided the context to our partnership.

***Setting:***
The University of Wisconsin Health system (UW Health) includes more than 35 primary care clinics caring for approximately 350,000 patients. These clinics utilize the same electronic health record EPIC Systems platform, and administrative processes and procedures.

In January 2016, among approximately 241,637 adult patients receiving care in these clinics, 8,570 were issued at least one opioid prescription, and 3,184 received at least 3 opioid prescriptions in the "prior 3 months."

***Participants:***
Participants were volunteer clinical staff (prescribers, others) of the enrolled UW Health primary care clinics providing outpatient long-term opioid therapy for adults with chronic pain.

***Incidence and Prevalence:***
Chronic pain is common, affecting over 100 million Americans.(1) It is often refractory to existing treatments, with patients achieving inadequate pain control and suffering from disability. Historically, opioid analgesics have been prescribed for those with severe, refractory chronic pain. However, long-term opioids are controversial for chronic pain; there is a paucity of research on their long-term benefits while there is strong evidence for dose-dependent harm, including addiction and overdose death.(2),(3) Prescribed opioids serve as the main drug supply for approximately 85% of those who misuse opioids.(4) In the US, opioid-related overdose deaths have dramatically increased, making this a national public health crisis.

Systematic implementation of guidelines for opioid therapy has the potential to reduce inappropriate prescribing and its harmful effects.(5–8) Because primary care clinicians account for about half of opioid prescribing,(9,10) primary care clinical teams are a logical target for QI initiatives focused on improving opioid prescribing practices. A modest reduction in opioid prescribing rates was noted in a single academic medical system after a month-long QI effort that focused on the dissemination of information on opioid prescribing guidelines at meetings and via individual in-person or email communication with primary care clinicians.(7) A QI project at two rural emergency departments in Maine, aimed at reducing prescribing of controlled substances for painful dental conditions, led to an absolute reduction in opioid prescribing by 17%.(8) A multi-pronged, statewide effort in Utah, consisting of formal presentations and ongoing QI efforts with primary care physicians, led to a 14% decrease in the state's opioid-related deaths.(5)

Dissemination of evidence-based recommendations into routine practice is critical for system-wide QI. Historically, however, adoption of guidelines has been slow and challenging,(11) and research on effective methods for dissemination and implementation of guidelines is limited.(12,13) In addition, guidelines on opioid therapy management are complex and based largely on expert consensus with limited research evidence, factors that likely affect the adoption of these guidelines in routine care.(10,14–16)

## 4. Methods

***Project Design***
We enrolled 9 clinics into a stepped-wedge trial. With the stepped-wedge design, each enrolled clinic starts as a control site, then, in waves of 3, clinics sequentially receive the intervention until all 9 become intervention sites. The project team recruited the clinics from among the 35 UW Health primary care clinics by approaching clinics that did not engage in other, additional opioid-focused QI initiatives, starting with those with the highest number of patients

representing the target population. The first 9 interested and agreeable clinics were enrolled, with the start-date of the project's QI intervention (i.e., wave assignment) assigned per each clinic's preference.

The stepped-wedge design, coupled with outcome measures assessed via EHR-based data, allowed for an efficient, rigorous and controlled evaluation of the effectiveness of the project intervention, i.e., the enrolled clinics served as their own control (prior to the intervention delivery), and provided the basis for *primary efficacy-focused analyses*. To increase power to detect statistically significant change due to the project's intervention, the change in outcomes of interest in the 9 intervention clinics was additionally assessed by including in the analyses the change over the same time period in 17 UW Health "comparison clinics," which did not engage in any other, additional opioid-focused QI initiatives (*secondary efficacy-focused analyses*).

The target population of eligible patients included individuals 18 years of age or older treated for chronic non-cancer pain with long-term opioids on an outpatient basis who met at least one of the following two criteria, developed by the health system for tracking of the target population: 1) At least one opioid prescription issued in the prior 45 days AND three or more opioid prescriptions issued in the most recent 4 months. 2) At least one opioid prescription issued in the prior 45 days AND presence of chronic pain diagnosis AND presence of an active treatment agreement (regardless of when signed). We excluded individuals with the diagnoses of palliative or hospice care status, or cancer (except basal or squamous cell skin cancer). The diagnosis data was extracted from three EHR data sources: problem list, encounter, and billing records. Buprenorphine, a partial-agonist opioid, was excluded from the "eligible opioid" list due to its primary utility in the assessed health system as the treatment for opioid addiction.

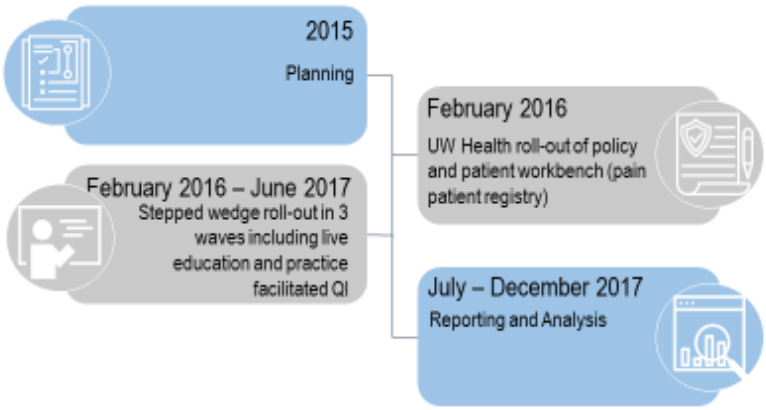
***Project Timeline***

The project was awarded in December 2014. Project implementation planning began in January 2015, with the intervention roll-out starting in February 2016. Figure 1 provides an overview of the project timeline.

*Health system's policy development and rollout*

A multi-disciplinary team of UW experts, which included one of the Investigators, Dr. Zgierska, developed a guideline-driven policy for primary care on long-term opioid therapy in adults with opioid-treated chronic pain. The policy rollout was pilot-tested in the fall of 2015, with the full rollout in all UW Health primary care clinics in February 2016. At that time, a new EHR reporting workbench and patient registry were created to help clinicians better track adherence to the policy-recommended elements of therapy monitoring: treatment agreements, urine drug testing, opioid misuse and depression risk screens, and PDMP checks.

**Figure 1: Project Timeline.**




*Project intervention development and implementation*
This project was designed and implemented collaboratively with physicians, practice-based research professionals, QI and educational specialists. The project team began meeting twice a month upon project award in January 2015. These initial meetings established our timeline and finalized project design, roles, and responsibilities. The project was determined to be a QI initiative based on the team's evaluation of the project's scope and design, consultation with the UW Institutional Review Board (IRB) staff members and the online UW IRB's QI decision tool directions. The appropriate IRB documentation was completed prior to the clinic and clinical staff recruitment.

Clinic recruitment began in spring 2015; the enrollment of 9 participating UW Health family and internal medicine clinics was finalized in fall 2015. The initial plan stipulated implementation of our first wave of interventions in fall 2015. However, it was postponed to February 2016 due to a delay in the system-wide rollout of the UW Health policy and reporting workbench related to the target patient population. The intervention was delivered over a 4-6 month period, with specific timing dependent on the clinic enrollment wave.

Data was collected from the EHR on the primary and secondary outcomes of interest during the entire project. Data from the participating clinicians and their staff was collected from each clinic during the intervention period. Following data collection, entry and clean-up, the data were then analyzed by the study database analyst and statistician. The project team guided the approach to the analyses and reviewed quantitative and qualitative results for project outcomes, sharing, and reporting.

***Project intervention***
The intervention included the following elements: 1) academic detailing; 2) spaced education modules; 3) practice facilitation (PF) sessions, and 4) supplemental patient education videos.

*Academic detailing (live education session) and the kick-off meeting*: The project team drew upon existing guidelines and standards of care for safe opioid prescribing as well as the newly

developed health system policy to develop a one hour academic detailing session, which was presented live in each clinic as part of the project kick-off meeting. The clinical investigators delivered the presentation to clinic staff about the study goals, a brief summary of the health system's opioid policy and dangers of co-prescribing opioids and benzodiazepines; and an overview of the QI intervention. It also provided clinicians and other staff with printed summaries of the policy objectives and suggested workflows, and fliers for two online patient education modules (described below). The academic detailing session was approved for 1 *AMA PRA Category 1™ Credit*. Following the academic detailing session, clinicians and staff participating in the kick-off meeting filled out a "baseline" survey asking about existing clinical practices and needs/plans related to the management of chronic pain patients, and were offered the opportunity to enroll in the spaced education modules.

*Online spaced education*: Two spaced (online) education modules were developed by the project team members to supplement education in opioid prescribing and shared decision making when caring for patients with opioid-treated chronic pain. The health system's opioid policy, and the expertise of team members and invited external experts shaped the development of these modules. Both modules incorporate evidence-based, system-specific, process-related information to make the knowledge gained relevant to "real-life" primary care in the health system's clinics. The "Responsible Opioid Prescribing" module emphasized real-life implementation of the opioid management policy in the context of the health system-specific clinical settings. The "Shared Decision Making" module included clinical cases linking information about shared decision making principles to the care for patients with opioid-treated chronic pain. Each module consisted of 20-21 questions, delivered via email (1-2 questions every 1-2 days), with multiple-choice answers and a brief rationale for correct and incorrect answers, and was approved for 1 *AMA PRA Category 1™ Credit*.

*Practice facilitation (PF):* Trained practice facilitators from the Wisconsin Research and Education Network (WREN) worked with the clinic staff to identify each clinic's incremental goals for change, developed a plan to accomplish the selected change, assessed the need for modification to the implemented processes and evaluated outcomes. For this QI intervention, the project team developed materials pertinent to workflow optimization, including a summary of the health system's opioid policy recommendations and a clinical workflow summary for opioid therapy management (see Section 6). These documents included a summary of available EHR-based tools (e.g., "smartsets," "smartphrases") and general workflow recommendations for policy adherence. The PF portion of the intervention included four elements: 1) Four to six PF sessions held over a 4-6 month period with clinic staff representing all clinical roles to identify opportunities and preferences for workflow improvements. 2) Use of the Plan, Do, Study, Act (PDSA) model to discuss and identify barriers, problem-solve, and summarize the implementation of actionable goals through small-scale tests of change in workflows. The identified changes were then implemented, and discussed in the subsequent PF session. 3) Identification of clinic-wide tools for effective communication between staff members. 4) Utilization of clinic-level outcome data to provide feedback on how the selected changes in workflow and clinical practices impacted the clinic's adherence to the opioid policy elements. Clinic staff that (i) attended at least 4 sessions, (ii) participated in the clinic-level initiative and

(iii) completed evaluation and reflection documentation received 20 *AMA PRA Category 1™ Credits.* Practice facilitators tracked attendance, documented the clinic-planned and then implemented changes, and planned follow-up for each session. These notes were shared with each team prior to the next PF session and with the project team at each team meeting. In addition, 2 patient education videos, developed by Emmi Solutions, a patient engagement and education organization, for commercial distribution, were made available to all clinics during the PF sessions to provide to their patients. The videos focused on treatment agreement (5-minute video) and opioid therapy for chronic pain (20-minute video). The clinics were provided printed cards with information on how to access the videos online that could be offered to patients. Each clinic decided how to use the patient materials (if at all), e.g., make them a part of the pre-clinic visit or a rooming process, or encourage patients to watch them at home.

***Data Sources/Collection***

*Primary and secondary outcome data* were collected at baseline and then monthly during the project using the UW Health EHR-based clinic-level data extracted to assess the prevalence in the target population of completed treatment agreements, urine drug testing, opioid misuse and depression screening, co-prescribing of opioids and benzodiazepines, and recorded checks of the Wisconsin PDMP database.

*Explanatory or process measure quantitative and qualitative data* were additionally collected from the participating clinicians and clinic staff, and the practice facilitator to better understand the processes underlying the hypothesized change in primary and secondary outcomes.

***Measures***

***Primary and secondary outcome data****,* extracted monthly from the UW Health EHR-based database, included the following clinic-level variables:

- Treatment agreement (primary outcome): percent of target population with treatment agreement signed within the past 12 months.
- Urine drug testing (UDT): Percent of target population with UDT completed within the past 12 months.
- Opioid misuse risk screening: Percent of target population with completed opioid misuse risk screen using the health system-recommended D.I.R.E. tool.
- Depression screening: Percent of target population with completed depression screen using the health system-recommended PHQ-2 or PHQ-9 tool within the past 12 months.
- Co-prescription of opioids and benzodiazepines: Percent of target population prescribed benzodiazepines in at least one of the prior 3 months.
- PDMP check: Percent of target population with a PDMP database check recorded in the past 12 months.

***Additional clinic-level measures and subgroups used to assess the project's impact:***

- *Target population prevalence:* Proportion of practice population included in the target population was calculated using the number of target patients and the total number of adult patients cared for by the clinic.

- *Daily opioid dose:* Average morphine-equivalent dose (MED, morphine-equivalent mg/day) of prescribed opioids was calculated for the target patient population of each clinic by adding the MED of all opioids (except buprenorphine, which is primarily used at UW Health to treat opioid addiction) prescribed per each target population patient during the prior 90 days, then dividing this total dose by 90 to estimate the average MED per patient.
- *High-dose opioid therapy:* MED ≥ 90 mg/day, a dose which has been identified in the recent opioid prescribing guidelines as "high" and "high-risk" for opioid-related harm, including overdose and addiction.

***Explanatory or process measures*** included the following:
*Online educational module derived measures* included measures on each module enrollment and completion, and the number of days to complete. Those who completed a given module were given a choice to fill out an evaluation survey, which used 10 questions to rate on a 5-point Likert scale the module's content, usefulness and quality, and meeting of the learning objectives. This evaluation also included one open-ended question, which gathered qualitative data on anticipated practice changes as a result of participating in the education.

*Clinicians and clinical staff survey derived measures*, developed by the project team, were administered in person pre-intervention (at the kick-off meeting) and post-intervention (at the last PF session). They assessed clinician and other clinical staff confidence and attitudes toward the management of patients with opioid-treated chronic pain, using 23 questions with 5-point Likert scale responses and three yes/no questions on presentation effectiveness and bias. The baseline survey also included one open-ended question about the anticipated barriers to practice change. The exit survey additionally asked to rate the effectiveness of the PF sessions (5-point Likert scale) and included 3 open-ended "reflection questions," which provided qualitative data on clinician and clinic staff experience with the project's QI process.

*Practice facilitator derived measures* included attendance by the clinical staff of the PF sessions and notes on the changes that each clinic teams decided to implement.

## 5. Results

### *Sample characteristics*

#### *Enrolled clinics*
Working within the UW Health primary care leadership and clinic system, the project team recruited 9 (4 family medicine and 5 general internal medicine) of the 35 health system's primary care clinics, located in or near Madison, Wisconsin, into a stepped-wedge 18-month project. Each enrolled clinic started as a control site; then, in waves of 3, clinics sequentially received the intervention until all became intervention sites (Table 1).

**Table 1: Stepped-Wedge Design: The Enrolled Clinics Received the Intervention in Waves.**

| Clinic | Wave 1 (Mar – Jul 2016) | Wave 2 (Sept – Dec 2016) | Wave 3 (Jan – Jun 2017) | Follow-up |
|---|---|---|---|---|
| IM #1 | Intervention | Follow-up | Follow-up | Follow-up |
| IM #2 | Intervention | Follow-up | Follow-up | Follow-up |
| FM #1 | Intervention | Follow-up | Follow-up | Follow-up |
| FM #2 | Control | Intervention | Follow-up | Follow-up |
| IM #3 | Control | Intervention | Follow-up | Follow-up |
| FM #3 | Control | Intervention | Follow-up | Follow-up |
| IM #4 | Control | Control | Intervention | Follow-up |
| IM #5 | Control | Control | Intervention | Follow-up |
| FM #4 | Control | Control | Intervention | Follow-up |

Abbreviations: FM: family medicine, IM: internal medicine primary care clinic

Across the enrolled 9 clinics, a total of 219 unique health care providers participated in the project (Table 2): 70 prescribers (31 family medicine, 39 internal medicine) and 149 staff (53 from family medicine, 96 from internal medicine clinics).

**Table 2: Prescriber-clinicians and other clinical staff participation in the project.**

| Clinic per wave | Prescribers (MD, DO, NP, PA) | Other Clinical Staff |
|---|---|---|
| **Wave #1** | | |
| IM #1 Residency clinic | 9 | 25 |
| IM #2 Community clinic | 8 | 32 |
| FM #1 Residency clinic | 8 | 15 |
| **Wave #2** | | |
| FM #2 Residency clinic | 5 | 9 |
| FM #3 Residency clinic | 14 | 20 |
| IM #3 Residency clinic | 10 | 17 |
| **Wave #3** | | |
| FM #4 Community clinic | 4 | 9 |
| IM #4 Residency clinic | 6 | 12 |
| IM #5 Residency clinic | 6 | 10 |
| **Total** | 70 | 149 |

Abbreviations: FM: family medicine, IM: internal medicine primary care clinic

***Target patient population at the enrolled clinics***

In January 2016 (baseline), a total of 1,431 patients (58% women; mean age 54 ± standard deviation, SD 13.5 years) representing the target population, as identified using the EHR based criteria and data, received care across the enrolled 9 clinics (Table 3). They were treated, on average, with 83 ± 150 of MED/day. Overall, 25% of the target population were treated with MED ≥ 90 mg/day and 53% were prescribed at least one opioid prescription per month over the prior 3 months. Across the clinics, at baseline, among the target patients, 23% had treatment agreements signed within the prior 12 months and 63% had an active treatment agreement (regardless of the date when it was signed); 26% had urine drug testing completed in the prior 12 months; 0% had opioid misuse risk and 8% had depression screening completed; 0% had a

PDMP database check documented within the past 12 months; and 21% were co-prescribed benzodiazepines and opioids.

**Table 3: Target population at baseline: adult patients with opioid-treated chronic pain per enrolled clinic.**

| Clinic | N (% women) | Age, mean±SD years | MED, mean±SD mg/day/patient | % clinic's adult patient panel |
|---|---|---|---|---|
| **Wave #1** | | | | |
| IM #1 Residency clinic | 258 (63.2%) | 51.5 ± 12.7 | 113.1 ± 180.6 | 3.0% |
| IM #2 Community clinic | 212 (54.2%) | 59.0 ± 12.2 | 65.9 ± 126.7 | 1.4% |
| FM # Residency clinic | 105 (56.2%) | 50.8 ± 13.6 | 87.2 ± 131.5 | 2.1% |
| **Wave #2** | | | | |
| FM #2 Residency clinic | 164 (61.6%) | 52.9 ± 13.7 | 54.6 ± 82.0 | 2.1% |
| FM #3 Residency clinic | 228 (60.1%) | 52.7 ± 12.0 | 128.2 ± 185.1 | 3.8% |
| IM #3 Residency clinic | 103 (51.5%) | 54.8 ± 12.8 | 45.2 ± 55.2 | 1.1% |
| **Wave #3** | | | | |
| FM #4 Community clinic | 75 (62.7%) | 48.5 ± 14.8 | 51.4 ± 75.9 | 1.8% |
| IM #4 Residency clinic | 133 (43.6%) | 55.6 ± 14.1 | 50.4 ± 67.5 | 1.2% |
| IM #5 Residency clinic | 153 (66.7%) | 56.3 ± 15.1 | 84.9 ± 214.1 | 1.8% |
| **Total** | 1,431 (58.4%) | 53.9 ± 13.5 | 82.9 ± 149.6 | 1.9% |

Abbreviations: FM: Family medicine, IM: Internal medicine primary care clinic

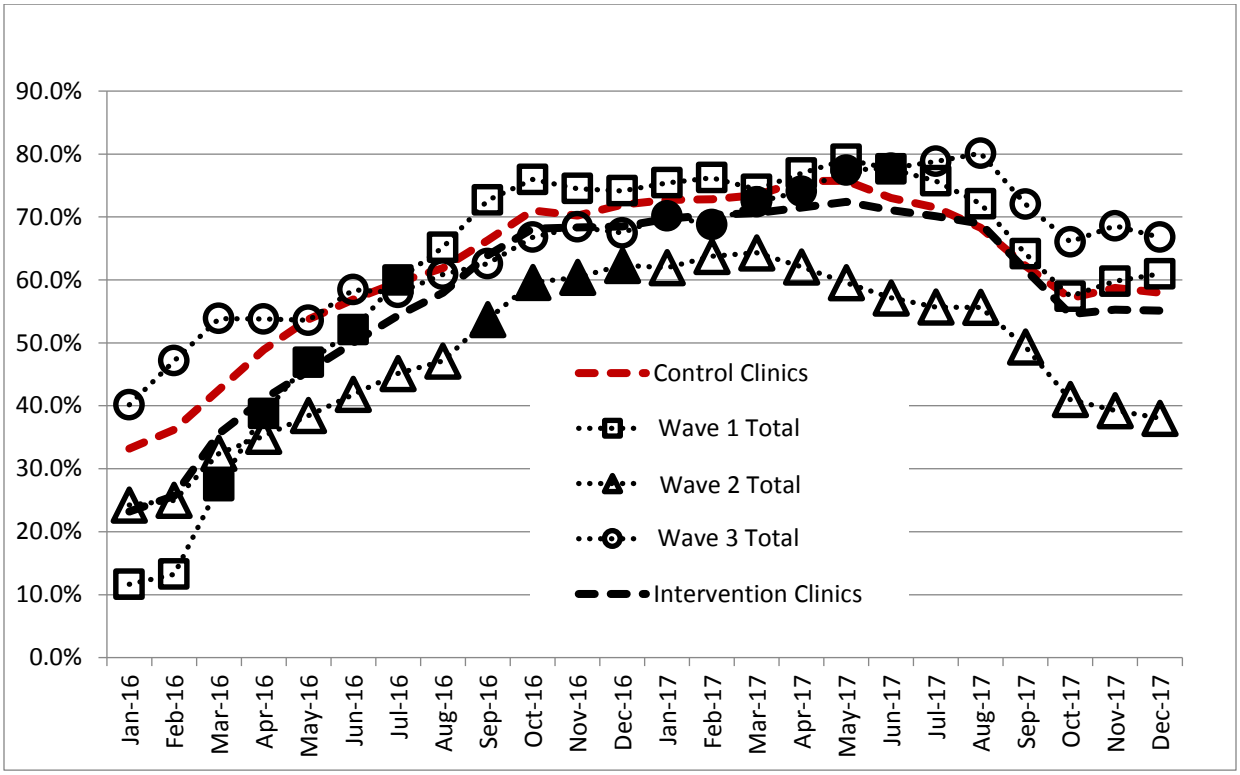
***Principal Findings***

Primary and secondary outcomes assessing the effectiveness of the QI intervention were defined a priori. A stepped-wedge design enabled each of the 9 enrolled clinics to serve as a control (prior to the intervention), and served as a basis for the primary efficacy-focused analyses. Secondary analyses augmented the primary ones by expanding the control experience through an incorporation of other UW Health primary care clinics ("comparison clinics," N=17) that were not subjected to additional opioid-focused QI initiatives.

***Primary Outcome***

A clinic-level percentage of target population with signed treatment agreement (prior 12 months) served as a primary outcome measure to assess the intervention's effectiveness (Figure 2). Overall, during the 24-month duration of the entire project, the prevalence of treatment agreements signed in the past 12 months increased by 24% for the enrolled and comparison clinics combined (p=0.008). While the increase for the enrolled clinics exceeded the change for comparison clinics by 2.1%, the difference was not statistically significant. However, enrolled clinics exhibited an increase in the prevalence of signed treatment agreements (past 12 months) by an additional 18% during the intervention period (p=0.163), two thirds of which was lost during the first six months after the end of the intervention period. Additional analyses indicated that the monthly incidence of signed treatment agreements increased by 9.4% during the intervention period in the enrolled clinics, a statistically significant change (p=0.023) that was not sustained post-intervention.

**Figure 2: Percent of target population with a signed treatment agreement (past 12 months).** Filled shapes (black) indicate the intervention period for a given wave of enrolled clinics.




***Secondary Outcomes***

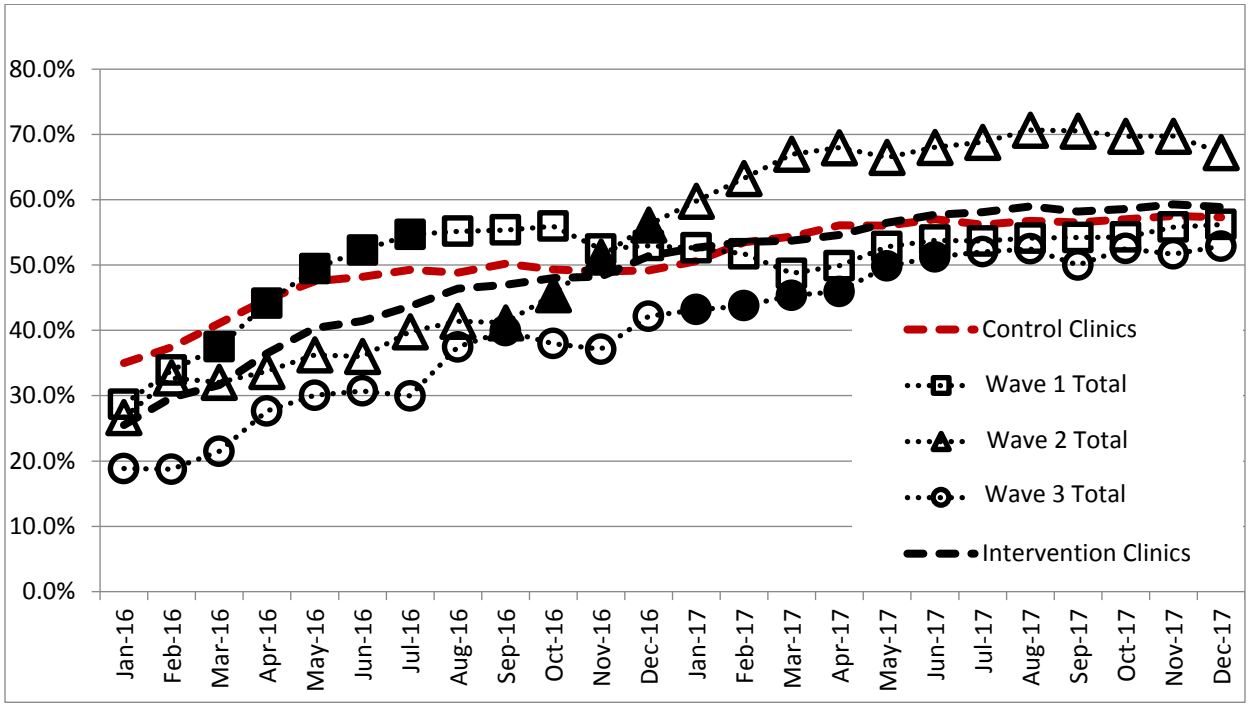
Secondary outcomes included a clinic-level percentage of the target population with: urine drug testing in prior 12 months; documented screening of the opioid misuse risk; depression screening in the past 12 months; co-prescription of opioids and benzodiazepines; and documented check of the PDMP database in the past 12 months. Of note, the ability of clinical staff to document the PDMP check, and opioid misuse and depression screens as a part of the chronic pain care workbench was enabled in the health system's EHR in February 2016. Therefore, the prevalence of a documented PDMP checks and opioid misuse/depression screens was zero or near zero at baseline.

*Urine drug testing* (Figure 3) During the 24-month project, the enrolled clinics overall increased the utilization of urine drug testing, completed within the past 12 months, by 31.2% (p=0.010). At the same time, the comparison clinics (N=17) increased by 24.0%, a 7.2% smaller difference, although the difference was not found to be statistically significant (p=0.536). When assessing the change in the completion of urine drug testing in the enrolled clinics specifically during the intervention period, and as compared to pre-intervention outcomes, these effects were not statistically significant (p≥0.05).

*Opioid misuse risk screen* The percentage of documented screening (past 12 months) for opioid misuse risk in the target population increased by 7.3% (p=0.004) over the 24 months of the

study for enrolled and comparison clinics combined. The increase for enrolled clinics did not differ significantly from that of the comparison clinics.

**Figure 3: Percent of target population with completed urine drug testing (past 12 months).** Filled shapes (black) indicate the intervention period for a given wave of clinics.

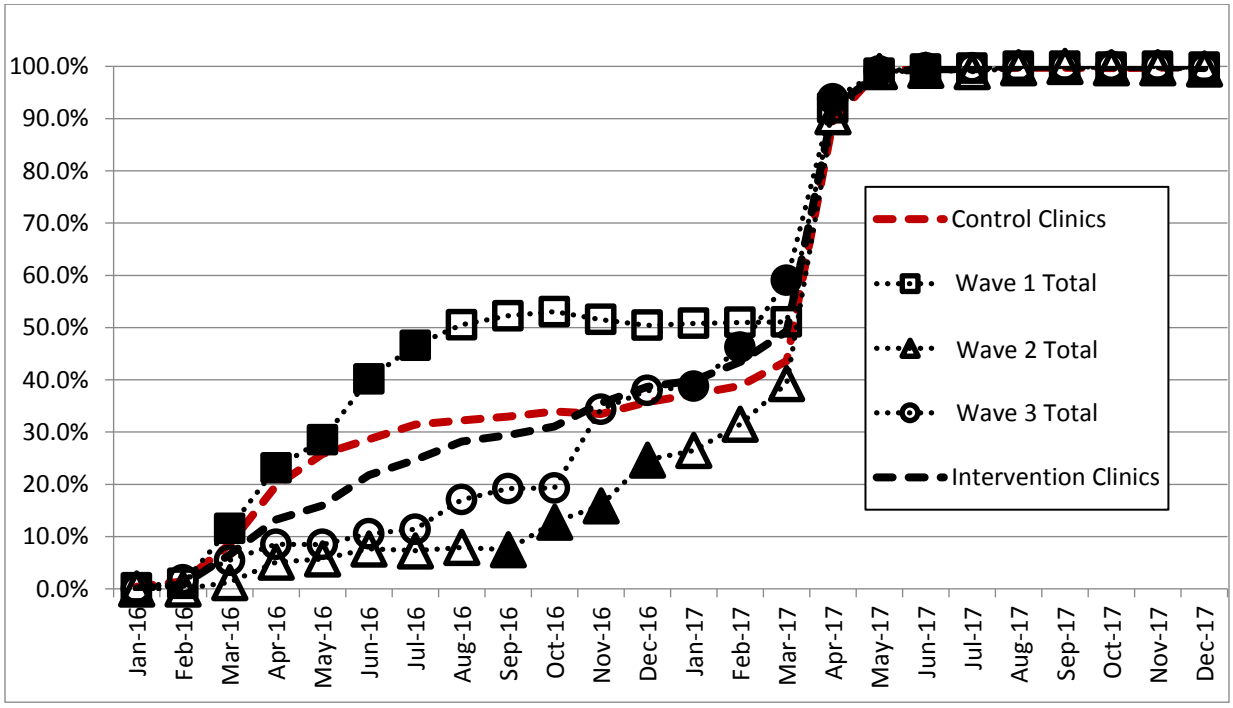



*Depression screen* Although the enrolled and comparison clinics increased their screening for depression among the target population during the 24-month project (an increase of 13.3%, $p<0.001$), there was no statistically significant difference in this change for enrolled versus comparison clinics. There was also no significant acceleration in depression screening during the intervention or post-intervention periods for the enrolled clinics.

*Co-prescribing of benzodiazepines and opioids*
The co-prescribing of benzodiazepines and opioids decreased by 3.8% for the enrolled and comparison clinics combined ($p=0.008$) during the project. While the comparison clinics appeared to reduce co-prescribing by 3.7% more than the enrolled clinics, this difference was not statistically significant ($p=0.268$). There was no noted acceleration in the reduction of co-prescribing during the intervention or post-intervention periods for the enrolled clinics.

*Documented PDMP check* (Figure 4) Both enrolled and comparison clinics increased their prevalence of the PDMP database check (through March 2017 - see below) by 51% ($p<0.001$) from January 2016 through March 2017. There was no statistically significant difference in improvement between enrolled and comparison clinics. There was some evidence ($p=0.084$) that the increase for enrolled clinics was concentrated during the intervention and post-intervention periods.

**Figure 4: Percent of target population with documented PDMP database check (past 12 months).** Filled shapes (black) indicate the intervention period for a given wave of clinics.




Of note, the efficacy-related analyses were conducted through March 2017. This is because in April 2017 a state law went into effect requiring a prescriber to check a patient's PDMP record before issuing a prescription for controlled substances. As an outcome, the health system introduced a mandatory PDMP check documentation when issuing a prescription for controlled substances. This led to an abrupt increase starting in April 2017, to nearly 100% adherence across all clinics (Figure 4), in the percentage of target population with documented PDMP check; therefore, the PDMP-related outcome data were censored and analyzed through March 2017 to assess the effectiveness of the intervention.

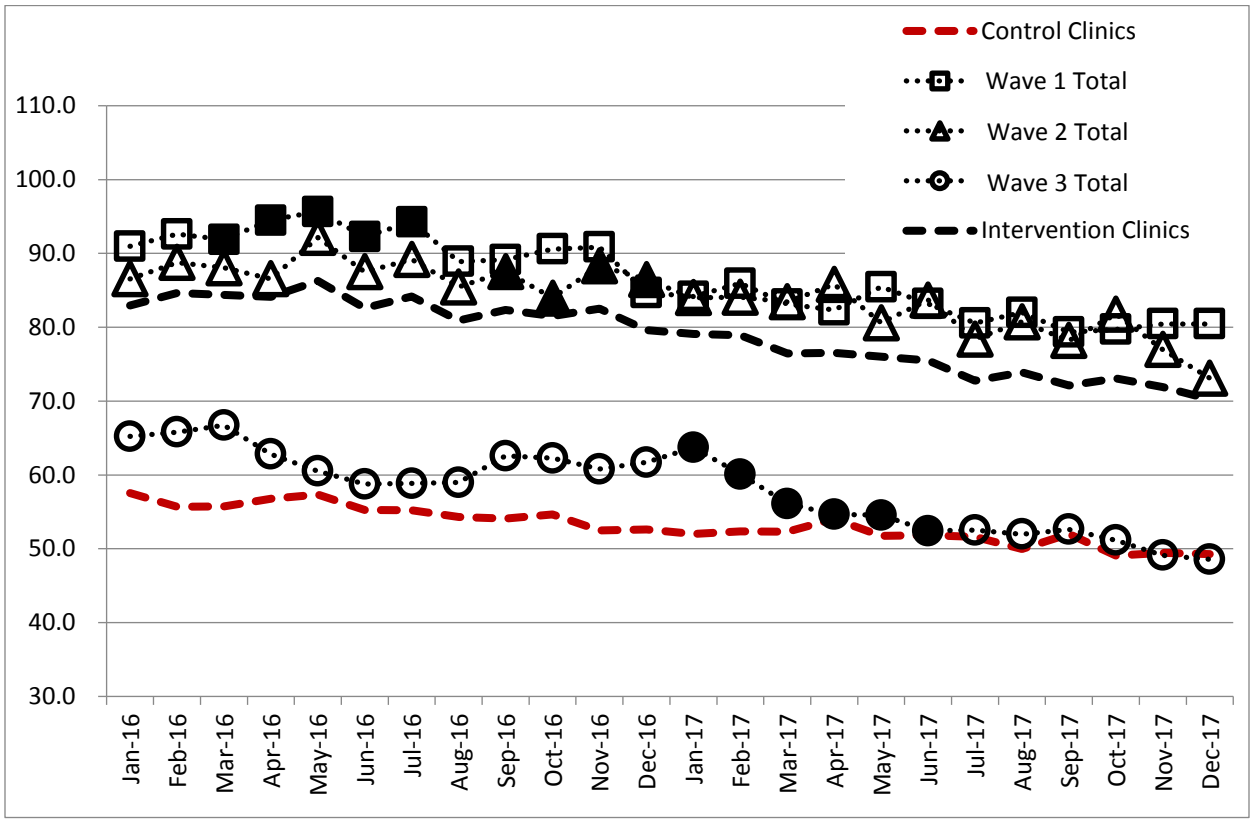
***Additional outcomes***

*Prevalence of target population patients*
At baseline, target patients represented 1.9% of the enrolled clinics' adult patient panel. Over the 24 months of project duration, the enrolled and comparison clinics combined reduced the percentage of target population by 0.32%, a statistically significant reduction ($p<0.001$). The difference in the reduction between enrolled and comparison clinics was not significant ($p=0.779$). There was also no evidence that the reduction for enrolled clinics was greater after the start of the intervention ($p=0.439$).

*Daily morphine-equivalent opioid dose* (Figure 5) At baseline, the average MED per target patient in the enrolled clinics was 82.9 mg/day. Over the course of the 24 month follow-up, the

daily MED for enrolled and comparison clinics combined decreased by 11.6 mg/day (p<0.001). While the enrolled clinics decreased MED (14.7 mg/day, p=0.0003) to a larger extent than the comparison clinics (10.0 mg/day, p=0.0009), this difference was not statistically significant (p=0.343). There was evidence (p=0.022) that the rate of MED decrease in the enrolled clinic was greater in the post-intervention period than in earlier months.

**Figure 5: Target population: average daily opioid dose (morphine-equivalent mg, past 3 months).** Filled shapes (black) indicate the intervention period for a given wave of clinics.




The reduction of daily MED was most pronounced in the *subgroup of target patients* treated with high-dose opioids, defined as MED ≥ 90 mg/day (average MED: 249.4 mg/day/patient). Patients treated with high-dose opioids in the enrolled clinics showed a tendency to opioid dose reduction, which, over the 24 month project period totaled 36.3 mg/day/patient reduction (p=0.063). While the enrolled clinics experienced a 22.9 mg/day greater reduction than the comparison clinics, which experienced a reduction of 13.4 mg/day/patient, the difference was not statistically significant (p=0.317). However, the enrolled clinics experienced a statistically significant acceleration in MED reduction post-intervention, with MED decrease by additional 16.2 mg/day/patient during that period (p=0.030). Stepped-wedge analysis did not reveal a statistically significant MED reduction in the enrolled clinics when considering the entire 24 month project (p=0.496).

### *Process (explanatory) outcomes*

***Intervention participation*** A total of 219 unique clinicians or clinical staff participated in at least one of the intervention components. The academic detailing session, held in each clinic during the project kick-off meeting, was attended by 148 prescribers and other clinic staff from across the enrolled clinics (Table 4). A total of 69 unique individuals completed at least one spaced intervention module, with 68 completing the opioid-focused and 50 completing the shared decision making module. Fifty-nine prescribers and other clinical staff completed PF component of the intervention, with completion defined as attending at least 4 PF sessions and filling out the post-intervention survey (Table 4). It took the participants who completed the spaced education modules on average 68± 46.12 days to complete the opioid and 52± 21.47 days to complete the shared decision making module.

**Table 4: Prescriber and other clinical staff participation in the intervention components.**

| Intervention participants across the 9 enrolled clinics | Academic Detailing participation | Spaced Education (Opioid Module) Completion | Spaced Education (SDM Module) Completion | Practice Facilitation Completion* |
|---|---|---|---|---|
| **Prescribers** | | | | |
| MD/DO | 46 | 22 | 16 | 21 |
| NP/PA | 12 | 5 | 4 | 2 |
| Total | 58 | 27 | 20 | 23 |
| **Other clinical staff** | | | | |
| RN | 34 | 15 | 11 | 10 |
| MA/LPN/Other | 56 | 26 | 19 | 26 |
| Total | 90 | 41 | 30 | 36 |
| **Total** | **148** | **68** | **50** | **59** |

Abbreviation: SDM: shared decision making

* Completion was defined as attending at least 4 sessions and filling out the post-intervention survey.

### *Perceived needs at baseline and after the intervention among clinicians and clinical staff*

Of the 219 unique individuals who participated in the intervention, 187 returned the pre-intervention survey and 97 returned the post-intervention survey. At baseline, clinicians and other clinical staff filled out a survey assessing their perceived needs, competencies and practices related to caring for patients with opioid-treated chronic pain. A similar set of questions, which additionally inquired about the self-reported change in these perceptions, was administered at the last PF session (post-intervention survey). Seventy-nine individuals completed both the pre- and post-intervention surveys and were included in the "change" analysis, which contrasted the pre- and post-intervention responses of each individual.

When asked at baseline about the management of patients with opioid-treated chronic pain, the survey responders rated their "current" confidence in management of the target population as "neutral", and their desire to learn more about such management as "strong," and expressed wanting to change their current approach to such management (Table 5). After the intervention, the respondents overall reported increased confidence in managing opioid-

treated chronic pain, and did not feel the need for additional education/learning or change, with an overall similar pattern of change among prescribers and other clinical staff (Table 5).

**Table 5: Management of patients with opioid-treated chronic pain: perceptions of prescribers and other clinical staff (N=79) before and after the intervention.**

| Current Management | All Responders, N=79 | | | Prescriber-Responders, N=24 | | | Other Staff-Responders, N=55 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Pre (mean±SD) | Post (mean±SD) | p value | Pre (mean±SD) | Post (mean±SD) | p value | Pre (mean±SD) | Post (mean±SD) | p value |
| **Confidence in Management** | 3.36± 0.82 | 3.89 ± 0.79 | 0.000 | 3.46 ± 0.78 | 3.88 ± 0.74 | 0.019 | 3.31 ± 0.85 | 3.90 ± 0.82 | 0.000 |
| **Desire to Learn More About Management** | 4.13 ± 0.92 | 3.55 ± 0.78 | 0.000 | 4.50 ± 0.66 | 3.54 ± 0.72 | 0.000 | 3.96 ± 0.98 | 3.56 ± 0.81 | 0.006 |
| **Plan to Change Management** | 3.77 ± 0.80 | 3.58 ± 0.95 | 0.013 | 4.08 ± 0.88 | 3.83 ± 0.82 | 0.114 | 3.62 ± 0.71 | 3.46 ± 0.99 | 0.031 |

[1] Response scale: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5).

When asked at baseline (Table 6) about the frequency of their current use of clinical practices recommended for the monitoring of long-term opioid therapy in chronic pain, the clinicians and their staff reported, on average, from "sometimes" to "very often" the utilization of treatment agreements, urine drug testing, and depression screening, as well as applying a shared decision making principles and working together as a team. They rated as less frequent the screening for opioid misuse risk and checking the PDMP database. After the intervention, the self-reported frequency of these practices increased, representing a positive change (Table 6).

**Table 6: Frequency of practices related to the monitoring of long-term opioid therapy in chronic pain before and after the intervention among the prescribers and other staff (N=79).**

| Current Use | All Responders, N=79 | | | Prescribers Responders, N=24 | | | Other Staff-Responders, N=55 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Pre (mean±SD) | Post (mean±SD) | p value | Pre (mean±SD) | Post (mean±SD) | p value | Pre (mean±SD) | Post (mean±SD) | p value |
| **Treatment agreements*** | 3.83 ± 1.15 | 4.11 ± 1.05 | 0.003 | 4.35 ± 0.65 | 4.63 ± 0.65 | 0.035 | 3.50 ± 1.28 | 3.81 ± 1.13 | 0.017 |
| **Urine Drug Testing*** | 3.38 ± 1.19 | 3.79 ± 1.09 | 0.001 | 3.61 ± 1.12 | 4.21 ± 0.69 | 0.001 | 3.26 ± 1.28 | 3.57 ± 1.21 | 0.024 |
| **Opioid misuse risk screen *** | 1.92 ± 1.19 | 2.85 ± 1.30 | 0.000 | 2.17 ± 1.27 | 3.04 ± 1.08 | 0.000 | 1.71 ± 1.08 | 2.67 ± 1.49 | 0.001 |
| **Depression screen*** | 3.63 ± 1.05 | 3.83 ± 1.12 | 0.017 | 3.46 ± 0.93 | 4.00 ± 0.85 | 0.004 | 3.73 ± 1.12 | 3.73 ± 1.26 | 0.293 |
| **Check PDMP*** | 2.79 ± 1.46 | 4.11 ± 1.06 | 0.000 | 3.08 ± 1.25 | 4.29 ± 0.86 | 0.000 | 2.62 ± 1.57 | 4.00 ± 1.17 | 0.000 |
| **Apply SDM*** | 3.28 ± 1.30 | 3.81 ± 1.05 | 0.001 | 3.67 ± 1.09 | 4.21 ± 0.66 | 0.015 | 3.07 ± 1.37 | 3.56 ± 1.17 | 0.011 |
| **Work together*** | 3.84 ± 1.11 | 4.36 ± 0.75 | 0.000 | 4.04 ± 1.04 | 4.50 ± 0.72 | 0.023 | 3.75 ± 1.14 | 4.30 ± 0.76 | 0.001 |

SDM: shared decision making

* Response scale: Never (1), Rarely (2), Sometimes (3), Very Often (4), Extremely Often (5)

Prescribers and staff were also asked to evaluate how much change they would like to make in their current practices related to the monitoring of the target population. At baseline, both prescribers and other staff were very interested in changing their existing management practices (Table 7). These responses did not change in a statistically significant way post-intervention, with the exception of opioid misuse risk screen: both the prescribers ($p<0.05$) and other clinical staff reduced their desire for change in this specific practice (Table 7).

**Table 7: Desire to change the management practices related to long-term opioid therapy in chronic pain before and after the intervention among the clinicians and other staff (N=79).**

| How Much Change Would You Like to Make? | All Responders n=79 | | | Prescriber Responders n = 24 | | | Other Staff-Responders n = 55 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Pre (mean±SD) | Post (mean±SD) | p value | Pre (mean±SD) | Post (mean±SD) | P value | Pre (mean±SD) | Post (mean±SD) | p value |
| **Treatment Agreements** | 4.26 ± 1.59 | 4.51 ± 1.29 | 0.229 | 4.13 ± 1.71 | 4.75 ± 1.33 | 0.087 | 4.34 ± 1.53 | 4.36 ± 1.27 | 0.378 |
| **Urine Drug Testing** | 4.21 ± 1.62 | 4.37 ± 1.25 | 0.417 | 4.09 ± 1.56 | 4.63 ± 1.10 | 0.115 | 4.29 ± 1.68 | 4.24 ± 1.32 | 0.237 |
| **Opioid Misuse Risk Screen** | 3.94 ± 1.31 | 3.31 ± 1.55 | 0.005 | 4.17 ± 1.23 | 3.17 ± 1.49 | 0.003 | 3.73 ± 1.37 | 3.48 ± 1.63 | 0.318 |
| **Depression Screen** | 4.19 ± 1.56 | 4.39 ± 1.41 | 0.298 | 4.17 ± 1.33 | 4.25 ± 1.36 | 0.500 | 4.21 ± 1.69 | 4.48 ± 1.46 | 0.258 |
| **Check PDMP** | 4.19 ± 1.49 | 4.52 ± 1.28 | 0.266 | 4.22 ± 1.45 | 4.58 ± 1.28 | 0.202 | 4.18 ± 1.53 | 4.47 ± 1.29 | 0.460 |
| **Apply SDM** | 4.12 ± 1.49 | 4.00 ± 1.59 | 0.303 | 3.74 ± 1.63 | 3.96 ± 1.65 | 0.353 | 4.30 ± 1.40 | 4.03 ± 1.58 | 0.185 |
| **Work Together** | 4.30 ± 1.54 | 4.51 ± 1.47 | 0.220 | 4.30 ± 1.64 | 4.71 ± 1.40 | 0.200 | 4.30 ± 1.52 | 4.41 ± 1.51 | 0.375 |

SDM: shared decision making

* Response scale: No Change (1), A Little Change (2), Some Change (3), Moderate Change (4), A Great Deal of Change (5), I Already Did This Consistently (6)

***Participant satisfaction*** The post-intervention survey administered at the last PF session and the evaluation survey administered after the completion of spaced education modules assessed the usefulness of and satisfaction with these intervention components.

*The academic detailing* was assessed ("yes/no" questions) as both effective and "appropriate for my practice" by 98% of 189 participants who completed the survey.

*The online spaced education modules* were rated by participants who completed these modules using survey on usefulness, quality, appropriateness and effectiveness of the education provided (Table 8). 16 of the 68 completers of the opioid-focused module completed the survey. 10 of the 50 completers of the shared decision module completed the survey. The opioid-focused module received high ratings across the evaluated domains, with the shared decision making module rated on average as good (Table 8). In addition, participants were asked to provide qualitative comments about anticipating making changes as a result of what they had learned through the spaced education modules. The majority (75%) of the 16 opioid-focused module respondents anticipated making change in their practice, with the most common change planned (25% of respondents) was to use urine drug testing more regularly with better understanding of results. Thirty percent of the 10 shared decision making module

respondents anticipated making change in their practice, with no well-identified theme in their responses.

**Table 8: Participant Satisfaction with Online Spaced Education Modules.**

| Module | Usefulness[1] (mean ± SD) | Educational Quality[1] (mean ± SD) | Appropriateness[1] (mean ± SD) | Effectiveness[1] (mean ± SD) |
|---|---|---|---|---|
| **Responsible Opioid Prescribing (N=16)** | 4.06 ± 0.77 | 4.13 ± 0.64 | 4.06 ± 0.77 | 4.06 ± 0.57 |
| **Shared Decision Making (N=10)** | 2.80 ± 1.32 | 2.90 ± 1.45 | 3.56 ± 0.88 | 3.60 ± 0.70 |

[1]Response scale: Poor (1), Fair (2), Good (3), Very Good (4), Excellent (5).

*The practice facilitation component* was highly rated by the 97 responders (Table 9).

**Table 9. Participant Satisfaction with Practice Facilitation (N=97)**

| | Addressed Protocol & Process Changes[1] (mean ± SD) | Provided Ongoing Support for Shared Learning[1] (mean ± SD) | Provided Tools & Recommendations for Long-Term[1] (mean ± SD) |
|---|---|---|---|
| **Wave #1 Clinics** | 3.92 ± 0.80 | 4.04 ± 0.60 | 4.00 ± 0.71 |
| **Wave #2 Clinics** | 4.13 ± 0.58 | 4.03 ± 0.68 | 3.84 ± 0.82 |
| **Wave #3 Clinics** | 4.0 ± 0.59 | 3.89 ± 0.47 | 3.78 ± 0.55 |

[1]Response scale: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5).

*Open-ended reflection questions*, administered as a part of the post-intervention survey, gave participants (N=82) an opportunity to provide additional comments on: 1) what improvements in care they experienced; 2) what they learned; and 3) what part of the PF process helped them the most with making change (Table 10). Eighty-two of the survey respondents provided comments, which identified the following main themes in response to these 3 reflection questions: 1) Overall, 5 enrolled clinics chose to focus their QI initiatives on general workflow, and 4 clinics chose to focus on specific areas related to the practices recommended when caring for the target population. The responses to the first reflection question corresponded to these QI focus choices, with clinicians identifying changes in workflows and related processes, and a better application to care of urine drug testing, PDMP checks, and treatment agreements. 2) The respondents identified learning the formal approach to the change process (PDSA model: Plan, Do, Study, Act) and gaining confidence in their ability to meaningfully implement change, and the appreciation for team work and their team members as the most important learned lessons. 3) The benefits of an organized approach to change and tracking of its impact, and importance of teamwork were highlighted as the most helpful in accomplishing change.

**Table 10. Open-ended reflection questions completed by the prescribers and other clinical staff (N=82) as a part of the exit (post-intervention) survey.**

| Response Themes Per Reflection Question | Responses (n, % of total) |
|---|---|
| **Question 1: What care improvements occurred?** | |
| Improvement in processes related to pain patients (not one specific process) | 27, 33% |

| Response Themes Per Reflection Question | Responses (n, % of total) |
|---|---|
| Improvement in urine drug testing | 13, 16% |
| Increase in check of PDMP | 4, 4% |
| Increase in use and review of treatment agreement | 7, 9% |
| Decreased opioid use in pain patient population | 5, 6% |
| Increase in patient education for pain patients | 3, 4% |
| Increase in Dire risk assessments | 1, 1% |
| No change | 8, 10% |
| No answer | 14, 17% |
| **Question 2: What have you learned from this process?** | |
| Confidence in change process | 32, 39% |
| Appreciation for team | 20, 24% |
| Didn't learn from PF | 5, 6% |
| Other | 9, 11% |
| No answer | 16, 20% |
| **Question 3: What part of the PF process helped you the most for accomplishing change?** | |
| Addressing Workflows and Process changes | 21, 26% |
| Understanding team roles | 21, 26% |
| Facilitated meetings with team | 13, 16% |
| Outcome data presentation | 10, 12% |
| Other | 5, 6% |
| No answer | 11, 13% |

PF: practice facilitation

**Discussion:**

The findings of this project, which included a 24-month follow-up spanning pre-intervention, intervention and post-intervention periods, suggest that the implemented QI intervention focused on guideline-driven opioid therapy management can increase some aspects of guideline-concordant monitoring of opioid therapy and reduce opioid prescribing, thus improving safety of patients treated with long-term opioids for chronic pain. Although positive trends were noted, the stepped-wedge analysis or comparison of the intervention clinics to the comparison clinics during the 24 month project period did not show a statistically significant difference in the rate of improvement for enrolled clinics versus comparison in the prevalence of treatment agreements signed within the "prior 12 months" (primary outcome) or other clinical practices important to the monitoring of opioid therapy (secondary outcomes): urine drug testing, opioid misuse risk and depression screening, benzodiazepine co-prescribing or the PDMP checks. However, an intervention effect was noted on the incidence of signed treatment agreements during the intervention period, but it was not sustained post-intervention suggesting the need for ongoing QI efforts, and on the prevalence of the PDMP checks.

Because the harm of opioid therapy is dose-dependent, we also explored the impact of the project intervention on opioid dose. These results are optimistic, indicating the potential for the intervention to reduce the daily dose of prescribed opioids among those treated with high-dose therapy (≥ 90 mg/day). This subgroup is a critical target for the QI efforts related to opioid

prescribing, because of the increased risk for opioid harms, such as overdose or addiction. Noticing a positive impact on the higher-risk population is, therefore, particularly important.

Process measures assessed during the project broadened our understanding of the potential impact and suggest optimal ways for the implementation of QI initiatives, especially complex ones, such as related to opioid therapy management in chronic pain. The clinicians and other staff identified responsible opioid prescribing practices, shared decision making, and the management of patients with chronic pain as areas of educational need, which was met through the QI intervention's components, as indicated by post-intervention evaluations. In addition, the intervention participants also identified learning how to formally conduct the QI initiative and assess its impact, and working better as a team as important outcomes of the project and skills that are "transferrable" toward other, future initiatives. Throughout the QI process across the clinics, it was apparent to the project team that, to be positively received, the intervention required tailoring to each clinic and clinical team needs and environment, and that presenting the "change teams" with the data on the impact of the applied changes were critical, corroborating existing evidence on the optimal ways for QI implementation. Consistent with the existing literature, the project team also observed that team-based effort was the basis for better results; interestingly, the reception staff were sometimes not included in the initial stages, but were then added into the "change team" after the PF meeting because of their role as the first channel for scheduling clinical appointments and handling medication refills.

***Limitations:***

Although promising, these findings should be viewed as preliminary due to the scope and limitations of the project. The QI intervention was delivered only to a subset of volunteer clinical staff (prescribers, others) who were the minority of each clinic's staff, and not all enrolled clinics participated equally in the intervention. Yet, the outcome analysis was conducted on the clinic level, without accounting for how many staff members participated in the QI efforts or the clinic internal leadership and motivation to change. Should the QI initiative be rolled out to all clinic staff, its impact would likely be stronger, and the positive trends noted in this project could have reached a statistical significance. In addition, the clinics were not randomly assigned into the project or the specific waves of intervention rollout, which could have introduced a selection bias.

The project and its findings were likely additionally influenced by other QI initiatives and legislative changes, which had taken place during the project's duration. The project start date was delayed and the specifics of defining the target population and outcome measures were impacted by the health system's opioid management policy rollout and recommendations. In April 2017, a state law went in effect requiring prescribers to check a patient's PDMP record before prescribing any controlled substances, such as opioids; as a result, many health systems across the state, including the assessed health system, implemented "hard stops," requiring documentation of the PDMP check prior to issuing prescriptions for controlled substances. This led to an essentially 100% adherence to this practice starting in April 2017, impacting our ability to measure any change in the PDMP checks after March 2017, thus, shortening the duration of

the follow-up period for this outcome. In addition, the State of Wisconsin Medical Examining Board introduced in 2017 a new requirement for all prescribers, mandating them to complete 2 hours of approved CME on opioid prescribing guidelines for chronic pain.

***Conclusions:***

Our findings reinforce those from previous QI initiatives, emphasizing the importance of tailoring the QI intervention to each clinic's needs and preferences, and engagement of the broader clinical team. They also lend support to the effectiveness of the intervention in improving clinician adherence to the monitoring practices in long-term opioid therapy for chronic pain and reducing opioid prescribing. We will continue to evaluate these data as we prepare this work for publication and consider future research and QI initiatives, which are likely to stem from this project.

***Significance and Implications:***

The implication for the health system is that policy makers must weigh the incremental benefits of augmented interventions such as ours against any additional costs (value model). Our findings suggest that sustained effects will require long-term QI efforts, including practice facilitation. Health systems should consider integrating this approach into their business models to optimize the value of the evidence-based health care they deliver.

The following implications were identified by our project team:

- Primary care clinicians and their teams can improve practices recommended for treating and monitoring of their patients with opioid-treated chronic pain.
- Ongoing work is needed to link development of standardized processes to improved patient outcomes.
- Opioid policy items, specifically the use of opioid misuse risk assessments, need to be continuously re-evaluated for applicability.
- Support delivered to the clinics is necessary for quality improvement; planning for this support increases the chance for success.

## 6. List of Publications and Products

***Additional attached documents***

There are a number of documents used for education and evaluation in this project that have been included as attachments.

1. Clinician Pre-Evaluation and Post-Evaluation tools
2. Academic Detailing Session Slide Set
3. Clinical Workflow Summary for Opioid Therapy Management
4. Clinical Policy Summary of UW Health Opioid Management Policy

***Spreading our Results and Work:***

The project team has already started spreading the word of this project's success:

1. A poster was presented at the NAPCRG 2017 conference in Montreal, Canada (attached).
2. A submitted methods paper is under review with BMC Health Services Research.
3. We plan to submit an application to the summer 2018 PBRN meeting in Bethesda, Maryland.

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