**Title of Project:** Using an Integrated Model of Care to Improve Patient Safety and Quality of Life by Improving Chronic Pain Management in the Patient-Centered Medical Home

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#### **Structured Abstract**

**Purpose:** The goal of this initiative was to improve patient safety and health outcomes by improving the management and quality of care provided to patients with non-cancer chronic pain. Using the frameworks of the Chronic Care Model to enhance chronic illness care and the Patient Centered Medical Home (PCMH) model for redesigning primary care practice, we provided education to providers to increase their knowledge and self-efficacy in treating chronic pain, while simultaneously working with practice sites to implement standardized, systematic and team-based processes for chronic pain management. We sought to determine whether this quality improvement (QI) intervention would result in improved quality of care and reduced patient risk as shown by increased adherence to evidence-based protocols for chronic pain management and safe prescribing of opioids; increased utilization of guideline-recommended treatment options, including behavioral health co-management; improved assessment of chronic pain and documentation of pain management; and decreased inappropriate use of opioid medications for chronic pain.

**Scope:** Multiple factors contribute to the ineffective management of chronic pain, unsafe opioid prescribing, and the risk of drug misuse and/or diversion. Medical providers often inherit their chronic pain patients from others and are unfamiliar with the source of the original problem and the course of treatment over extended periods of time. Providers may not be well versed in the risks associated with high dose opioid use, nor in the range of alternative treatments for chronic pain. Lacking the time to develop a deep understanding of a patient's pain and functional capacity and fearful of entering into potentially difficult conversations with patients about the need to reduce their opioid dependency, providers are often challenged to have the time and skills to adequately address these issues.

**Methods:** We conducted pre- and post-intervention surveys of medical and behavioral health providers at each of the eight participating practice sites, as well as with providers at three control sites that were not part of the Collaborative, to measure changes in their knowledge, skill levels and self-efficacy. In addition, we performed pre- and post-intervention chart reviews at each of the participating sites to determine whether exposure to the various education components, peer coaching, and other resources resulted in an increase in the documentation of chronic pain assessment and treatment in the patient record, along with changes in prescribing practices and consideration of the patient's functional capacity.

**Results:** Provider's pain-related knowledge and self-efficacy to treat patients with chronic pain increased between pre- and post-intervention. We saw a significant increase in the utilization of functional assessments by providers, as well as more frequent assessment of treatment effectiveness. In addition, there was a strong improvement in the percentage of patients with current opioid agreements and more consistent use of urine screenings to monitor patient compliance.

Key Words: chronic pain management, functional assessment, opioids, prescribing practices

### Purpose

### **Objectives of the Study**

A great many primary care providers in Maine identify the risks associated with caring for patients with non-cancer chronic pain as among the most challenging issues they face in their day-to-day role as physicians, especially given the very high rate of opioid misuse and diversion in the state. The over-arching goal of the Maine Chronic Pain Collaborative (MCPC) was to improve patient safety and outcomes by strengthening the management and quality of care provided to patients with non-cancer pain using the frameworks of the Chronic Care Model for improving chronic illness care and the Patient Centered Medical Home (PCMH) model for redesigning primary care practice. We aimed to achieve this goal by bringing together a powerful partnership of primary care leaders in Maine with national experts in chronic pain management and leveraging existing PCMH efforts across the state, driven by the following core objectives:

- 1) Provide structured quality improvement (QI) support to eight PCMH practice sites to implement standardized, systematic and team-based processes to improve comprehensive chronic pain management. This approach focuses on implementing reliable processes of care that adhere to current best practice guidelines that advance a comprehensive, multi-disciplinary and patient-centered methodology for chronic pain management and safe prescribing of opioids.
- 2) Provide education, peer support and specialty expert consultation to primary care providers in these PCMH sites to increase their knowledge and self-efficacy to manage chronic pain effectively. This includes developing a Chronic Pain Key Change Package to serve as the learning framework for site team members; providing peer consultation and support to providers through outreach, education, problem-solving and collaborative learning opportunities; and offering expert guidance to medical and behavioral health providers through Project ECHO Pain, in partnership with Community Health Center in Connecticut and the Integrative Pain Center of Arizona.

While improving chronic pain management and increasing the functional capacities of patients was front and center in our study, the high rates of opioid misuse and diversion in Maine led us to devote attention to educating providers about the serious risks associated with high dose opioids; the importance of securing patient agreements; ways to monitor patients for potential abuse (e.g. urine drug screens, pill counts, and review of the State's Prescription Monitoring Program, or PMP); and how to engage patients in difficult conversations about the need to reduce/eliminate their opioid use and explorer healthier treatment options.

During the course of the project, we proposed to *test* the following evaluation questions and hypotheses:

**Question 1:** Will a quality improvement (QI) intervention improve quality of care as measured by patient, provider and process outcomes?

**Hypothesis 1a:** Implementing the QI intervention will result in improved quality of pain management by participating providers through:

- Increased adherence to evidence-based protocols and guidelines for chronic pain management and safe prescribing/monitoring of opioids;
- Increased utilization of guideline-recommended multidisciplinary treatment options, including behavioral health co-management for pain;
- Improved assessment of chronic pain and safe opiate prescribing;
- Improved documentation of pain management; and
- Decreased inappropriate use of opioid medications for chronic pain.

**Hypothesis 1b:** Implementing the QI intervention will result in improvement in patient functional status and quality of life for patients with chronic pain receiving care from the intervention providers.

**Question 2:** How satisfied are participating primary care providers with the overall quality improvement initiative, and specifically with the learning collaborative and Project ECHO Pain?

**Hypothesis 2:** Providers taking part in the QI intervention will express greater knowledge, confidence and satisfaction with their ability to manage pain by the end of the intervention, as compared to providers in the control group.

The implementation of this initiative was made possible through the longstanding collaborative relationships between the co-sponsors – Maine Quality Counts, Maine Medical Association, Maine Primary Care Association, and Penobscot Community Health Care – and our strong working connection with our evaluation partner, the Weitzman Institute at Community Health Center, Inc. in Connecticut.

# Scope

# **Context, Setting and Participants**

Participants in the Maine Chronic Pain Collaborative included primary care providers (PCPs), behavioral health providers (BHPs) and other clinical staff (NPs, RNs, MAs, care managers, etc.) from eight Patient Centered Medical Home (PCMH) practice sites in Maine. The sites included: Bucksport Regional Health Center; Central Maine Medical Center – Family Medicine Residency; Eastern Maine Medical Center – Family Medicine Residency; Harrington Family Health Center; DFD Russell Medical Center; Sacopee Valley Health Center; Scarborough Family Medicine; and St. Joseph's Hospital Internal Medicine.

The evaluation was conducted with medical and behavioral health providers who were active participants in their practice's chronic pain team and regularly attended the weekly Project ECHO Pain videoconferences. Those videoconferences, coordinated by the Weitzman Institute at Community Health Center, Inc., are hosted by a multi-disciplinary faculty of chronic pain experts affiliated with the Integrative Pain Center of Arizona (IPCA) in Tucson, AZ. IPCA

achieved the American Pain Society designation as a "Center of Excellence" in pain medicine and employs an inter-professional team (physician, pharmacist, physical therapist, behavioral health counselor, acupuncturist, alternative medicine provider, etc.) dedicated to optimizing health care through an individualized, patient-centered approach.

The assessment consisted of several surveys given pre- and post-intervention to 14 medical providers and 6 behavioral health providers across the eight participating primary care practices. Identical surveys were conducted at the same time with our small "control group" - 3 medical providers and 3 behavioral health providers who worked at three primary care practices affiliated with Penobscot Community Health Care that did not participate in any of the Collaborative's activities. In addition, pre- and post-intervention chart reviews were carried out at the eight practice sites involved in the Collaborative to determine whether increased knowledge and skills on the part of providers would be reflected in the documentation contained in the charts of their chronic pain patients.

# Methods

# **Study Design**

The Maine Chronic Pain Collaborative pilot utilized a controlled quasi-experimental design with comparison group methodology. Intervention and control group participants were recruited from eleven sites using quantitative and qualitative data collection and analysis and a composite of metrics to provide greater validity and enhanced understanding of the results of this multifaceted intervention. For control purposes, we utilized a comparison group to gather information on provider knowledge and attitude using provider surveys. Data were collected in a cross-sectional manner at baseline and at the end of the intervention. The time interval between pre-intervention and post-intervention data collection was 9 months. An important aspect of this evaluation design was the use of the same data collection tools and procedures that provided data on the same metrics we specified in our needs/baseline assessment. This allowed us to collect, analyze and report on data with the same metrics pre-intervention and post-intervention, making it easier to compare data and results. Data on intervention activities were collected on a regular basis throughout the intervention period (weekly for all ECHO sessions and monthly/quarterly for the Collaborative activities).

The first level of outcomes was designed to measure the extent to which the intervention was adopted using a series of surveys that were administered both pre-intervention and post-intervention. The provider surveys measured knowledge, self-efficacy, adherence to pain management standards of care, and attendance and satisfaction with the intervention activities, while patient measures included the impact of pain on function and quality of life.

# **Selection Criteria**

*Providers and Practice Teams:* Each participating practice site was asked to identify an interested primary care provider and behavioral health provider to serve as members of the Chronic Pain Improvement Collaborative and Project ECHO team. Selection was based on level of interest and ability to attend Project ECHO sessions and Collaborative learning sessions. The selected providers were invited to participate in the intervention and research study and reviewed

and signed an informed consent document. Each participating practice was also asked to identify two additional members of their improvement team, including an administrative leader and support staff, to participate in the Learning Collaborative. Each member of the team was asked to commit to attending learning sessions, as well as weekly performance improvement team meetings during the action phases. In addition, the primary care provider and behavioral health provider were expected to attend weekly telehealth Project ECHO sessions. Fourteen primary care providers (PCPs) and six behavioral health providers (BHPs) from a total of eight sites were recruited for the intervention group.

**Provider Control Group:** Since randomization was not feasible, we utilized the next most suitable evaluation approach for estimating intervention effect on provider's pain knowledge and self-efficacy - the quasi-experimental, pre-post with a comparison group design, adjusting for known differences. Maine Quality Counts (QC) identified a control group of clinicians from non-participating PCMH practices in Maine to complete knowledge and self-efficacy surveys. QC assisted in identifying a suitable cohort of clinicians to comprise the control group, matching control and intervention group on the basis of size, technical capacity, and populations served. In total, there were three PCPs and three BHPs from three sites in the control group.

**Patients:** All adult patients (age  $\geq 18$ ) with chronic pain, cared for at sites participating in the study were eligible to be reviewed as part of the evaluation. We used a validated algorithm that uses a combination of visit codes, medication data, and pain scores<sup>1</sup> to identify patients with chronic pain. This algorithm has been shown in previous studies to be 95% accurate in correctly identifying patients with chronic pain using large data sets.

# Interventions

Practices selected to participate in the Maine Chronic Pain Collaborative pilot received an intervention with the following attributes:

- Structured quality improvement (QI) support for PCMH practices, which was designed to implement consistent and reliable processes of care that promote consistent adherence to current best practice guidelines, including a comprehensive, multi-disciplinary, teambased and patient-centered approach that focuses on implementing a set of key changes reflecting best practices for chronic pain management and safe opioid prescribing within the framework of the Chronic Care model. Structured quality improvement support included self-management support, delivery system design, decision support and improved techniques for using clinical information systems.
- Provision of education, peer support, and specialty expert consultation for primary care providers to increase their knowledge and self-efficacy to deliver effective chronic pain management. This included use of a chronic pain curriculum, chronic pain learning collaborative and Project ECHO for chronic pain management.

<sup>&</sup>lt;sup>1</sup> Tian TY, Zlateva I, Anderson DR. Using electronic health records data to identify patients with chronic pain in a primary care setting. JAm Med Inform Assoc. 2013 Dec;20(e2):e275-80. doi: 10.1136/amiajnl-2013-001856. Epub 2013 Jul 31.

**Project ECHO for Chronic Pain Management:** An interactive videoconference technology platform was deployed to participating sites to support weekly Project ECHO Pain sessions for providers participating in the intervention. Primary care medical and behavioral health providers participating in Maine Chronic Pain Collaborative attended weekly, 2-hour Project ECHO Pain sessions held via live videoconference between participating sites and the faculty team's practice site at the Integrative Pain Center of Arizona. During the videoconference sessions, primary care medical and behavioral health providers were invited to co-present difficult multi-factorial pain-related patient cases to the faculty team at the Integrative Pain Center of Arizona. Between three and four patient cases were scheduled for discussion each week, alongside a didactic on a pain-related topic that was delivered by a member of the IPCA Pain ECHO faculty or by an invited guest presenter. All Maine Chronic Pain Collaborative participants were given access to a secure project website and case submission and presentation forms. Maine Chronic Pain Collaborative participants were given the option of viewing recordings of each case and didactic presentation on the secure project website.

### **Data Sources, Data Collection and Measures**

The following measures were used to evaluate the Maine Chronic Pain Collaborative:

### Table 1. Data Sources

Data Source	Frequency	Units of Data Analysis	Measures	Method of Administration
(1) Patient Charts	Pre and Post	Patients with Chronic Pain	Documentation of chronic pain, opioid prescribing, pain scores, urine toxicology screening, functional assessment	Chart review of EHR data conducted by a research assistant
(2) Know-Pain-50 (KP-50) Survey	Pre and Post	Primary Care Medical Providers (Intervention and Control)	A 50-item validated measure designed to assess primary care medical providers' pain management knowledge.	Online via Survey Monkey
(3) University of New Mexico Project ECHO® Pain Self- Efficacy Survey	Pre and Post	Primary Care Medical Providers (Intervention and Control)	A 21-item measure designed to assess primary care medical providers' self-efficacy to treat patients with pain	Online via Survey Monkey
(4) Dobscha Self- Efficacy Survey	Pre and Post	Primary Care Medical Providers	An 11-item measure of primary care medical providers' attitudes and	Online via Survey Monkey

Data Source	Frequency	Units of Data Analysis	Measures	Method of Administration
		(Intervention and Control)	self-efficacy regarding provision of care to patients with pain.	
(5) Behavioral Health Attitudes and Knowledge Regarding Chronic Pain Survey	Pre and Post	Behavioral Health Providers (Intervention)	A 33-item measure of behavioral health providers' pain-related attitudes and knowledge	Online via Survey Monkey
(6) Behavioral Health Decision Making Regarding Pain	Pre and Post	Behavioral Health Providers (Intervention)	A 35 -item measure of behavioral health providers' decision making abilities regarding pain	Online via Survey Monkey
(7) ECHO Satisfaction Surveys	Weekly, at Pain ECHO sessions	ECHO participants	Satisfaction with content and conduct of Project ECHO Pain sessions	Completion and submission of Continuing Medical Education (CME) evaluation forms for each ECHO session
(8) ECHO Operational Data	During each ECHO session	ECHO participants	Provider participation in ECHO, case presentations	Data collected in Project ECHO Pain Operational Database
(9) Collaborative Session Satisfaction Surveys	After each collaborative session	All providers who attend Collaborative sessions	Satisfaction with content and process of Collaborative sessions	Paper Surveys and Online via Survey Monkey

**Chart Review Methodology:** All patients ages  $\geq 18$  with a medical visit during the measurement timeframe (baseline: May 1, 2013 through May 1, 2014; follow up: October 1, 2014 through February 28, 2015), were eligible for inclusion in the chart review. Patient visits were selected randomly from a list generated from the electronic health record from each of the eight independent sites based on the following criteria: patients with at least one visit with a designated Primary Care Provider (PCP) with a coded visit or problem list entry with a specific

ICD9 code and confirmation that the condition continued for 90 days. Charts were chosen at random using a random number generator. All charts were reviewed by a trained research assistant, using a chart abstraction Microsoft Access database.

# Results

# **Principal Findings and Outcomes**

The response rates for each of the surveys varied by intervention and control group as shown in the table below. While up to six attempts were made to prompt providers to complete the surveys through reminders sent by evaluation staff at Weitzman Institute, and providers were asked inperson by a research assistant to complete surveys on paper during chart review site visits, optimal response rates of at least 70% were not achieved for some of the surveys.

Survey	Intervention Group		Control Group	
	Baseline	Follow Up	Baseline	Follow Up
KP-50	71% (10/14)	50% (7/14)	100% (3/3)	67% (2/3)
Self-Efficacy	64% (9/14)	57% (8/14)	100% (3/3)	67% (2/3)
Dobscha	71% (10/14)	50% (7/14)	100% (3/3)	33% (1/3)
Pain	57% (8/14)	64% (9/14)	67% (2/3)	67% (2/3)
Knowledge				
Assessment				

#### **Table 2. Response Rate: Medical Providers**

#### Table 3. Response Rates: Behavioral Health Providers

Survey	Intervention Providers		Control Providers	
	Baseline	Follow Up	Baseline	Follow Up
Decision Making	83% (5/6)	83% (5/6)	67% (2/3)	67% (2/3)
Attitudes and	83% (5/6)	83% (5/6)	100% (3/3)	67% (2/3)
Knowledge				

As recruitment of control providers and survey response rates from controls were not optimal, it was determined that only results from the intervention providers would be reported. However, a brief review of control provider results showed that of the two providers who completed the KP-50, one had a decrease of 5 points while another had an increase of 15 points. For remaining surveys, scores declined or showed modest improvement.

**Primary Care Medical Provider Knowledge:** Results from pre-intervention and postintervention administration of the Know-Pain-50 (KP-50) survey to the PCPs who participated in Project ECHO Pain sessions indicated an increase in pain management knowledge between baseline (mean = 168) and post-intervention (mean = 188). The two control providers who completed the KP-50 survey had a modest increase from pre-intervention to post-intervention administration, from 158 to 163 (mean scores). (Total possible score KP-50 score is 250 points.)

<b>Provider ID</b>	<b>Baseline Score</b>	Follow Up Score
А	160	167
С	202	240
D	146	N/A
E	172	182
F	156	189
Κ	145	N/A
L	172	N/A
Μ	172	173
Ο	188	189
Р	163	177

Table 4. KP-50 Scores by Provider: Baseline and Follow Up Scores

\*N/A indicates not available as the provider did not submit a completed survey.



**Primary Care Medical Provider Self-Efficacy to Treat Patients with Pain:** Results from a 21-item survey asking each respondent to rate his or her skills, knowledge or competence on topics related to Project ECHO Pain reveal that at baseline the control group (n=2) had a total mean score of 97 (out of 147) and the intervention group (n=8) had a total mean score of 102. The control group's score decreased to a mean of 88 at follow up while the intervention group's

score increased to a mean of 115.25 at follow up. Response options range from 1 to 7, with 1 indicating "None or no skill" and 7 indicating "Expert, teach others". These results indicate that after participating in Project ECHO Pain sessions for eight months, PCPs had increased self-efficacy to manage and treat patients with complex chronic pain.

<b>Provider Id</b>	<b>Baseline Score</b>	Follow Up Score
А	101	101
С	136	145
D	104	131
Е	103	113
F	105	105
Κ	90	N/A
Μ	106	116
Ο	83	123
R	81	88

Table 5. Self-Efficacy Scores by Provider: Baseline and Follow Up

**Primary Care Medical Provider Attitudes and Beliefs Regarding Pain:** Results from an 11item survey that measures providers' self-efficacy, attitudes and beliefs regarding pain<sup>47</sup> indicate that after participation in Project ECHO Pain, primary care medical providers were more likely to use a pain assessment or monitoring tool and were more confident in their ability to manage patients with chronic pain. Because of the small sample size and missing data in the follow up statistical significance was not tested.

Item #	Item	Baseline	Follow Up
1	Skilled chronic pain management is a high priority for me.	5.50	5.63
2	My management of chronic pain is influenced by experience with addicted patients.	2.75	2.63
3	My management of chronic pain is influenced by fear of contributing to dependence.	2.38	3.00
4	I have adequate time to manage most patients with chronic pain.	3.13	3.00
5	Fear of narcotic regulatory agencies/administration influences my decisions regarding chronic	4.13	4.00

Table 6. Medical Providers' Attitudes and Beliefs Regarding Pain

Item #	Item	Baseline	Follow Up
	pain management.		
6	Analgesic side effects hinder my efforts to treat patients with chronic pain.	2.63	3.13
7	Patients I treat become addicted to opioids.	3.75	3.63
8	I use an opioid agreement with my patients.	5.63	5.88
9	I use a pain assessment or monitoring tool.	4.50	5.63
10	I am confident in my ability to manage chronic pain.	4.50	5.00
11	I am satisfied with the quality of resources available to help me manage patients with chronic pain.	3.25	4.00

**Behavioral Health Provider Pain-Related Knowledge and Attitudes:** Results from a 33-item survey designed to assess behavioral health providers' attitudes and knowledge about treating patients with pain and administered to five behavioral health intervention clinicians participating in the Maine Chronic Pain Collaborative showed no change in mean score between preintervention (M =19.2) and post-intervention (M =19.6, maximum score = 33). Results from a 35-item survey about decision making for patients with pain administered to the group of five behavioral health intervention providers who participated in the Maine Chronic Pain Collaborative showed a decline in health decision-making ability between the pre-intervention (M = 41) and post-intervention periods (M = 58; ideal score is 0).

Table 7. Behavioral Health Providers'	Knowledge and Attitude:	<b>Baseline and Follow-Up</b>
Scores		

	Baseline		Follo	ow Up
Provider	Raw Score	Percent Correct	Raw Score	Percent Correct
Т	17	51.5%	21	63.6%
V	22	66.7%	15	45.5%
W	18	54.6%	17	51.5%
Y	26	78.8%	26	78.8%
Ζ	13	39.4%	19	57.6%

Provider	Baseline	Follow Up
S	N/A	57
Т	36	42
V	38	59
W	46	48
Y	23	N/A
Ζ	61	73

 Table 8. Behavioral Health Decision Making: Baseline and Follow-Up Scores

**Chart Review Data:** A total of 175 charts were reviewed at baseline and 151 at follow up. As the graph below shows, providers were more likely to document a functional assessment in the patient's medical record in the follow-up period than in the baseline period ( $X^2 = 74.61$ , N = 326, p =.000). Providers were also more likely to document assessment of treatment effectiveness in the follow-up period than in the baseline period ( $X^2 = 20.29$ , N = 326, p =.000).



**Chronic Opioid Use:** Medical records were also assessed for documentation indicating that the patient had been taking opioids for 90 days or more. This was a qualifying criterion to assess whether the patient had had a urine toxicology screening in the past six months or if they had *ever* had an opioid agreement documented in the medical record. The percentage of patients who were chronic opioid users increased from baseline to follow-up as shown in Table 9.

### Table 9. Chronic Opioid Users: Baseline and Follow Up

	Chronic Opioid Users		
	n	%	
Baseline (from 175 patients)	121	69%	
Follow Up (from 151			
patients)	129	85%	



# Conclusions

PCPs' pain-related knowledge and self-efficacy to treat patients with pain increased between preintervention and post-intervention, indicating that participation in Maine Chronic Pain Collaborative activities instilled information and confidence in frontline clinical providers who participated. Primary care providers were significantly more likely to document functional assessment, to assess treatment effectiveness and to document the patient's pain score in the follow-up analysis period than in the baseline analysis period (p<.001). Primary care providers who participated in the intervention demonstrated an increase in documentation of opioid agreements and urine toxicology assessments for their patients with chronic pain during the postintervention analysis period. Providers and care team members who participated in Learning Collaborative sessions and Project ECHO Pain sessions rated them favorably, and interest in Project ECHO Pain participation was further demonstrated by providers having submitted 16 patient cases for presentation during the study period, which comprised a significant portion (21.9%) of the 73 cases discussed by all ECHO participants during this timeframe.