

Research paper

Comprehensive assessment of chronic pain management in primary care: a first phase of a quality improvement initiative at a multisite Community Health Center

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ABSTRACT

Background The objective of this study was to conduct a comprehensive formative assessment of chronic pain management in a large, multisite community health centre and use the results to design a quality improvement initiative based on an evidence-based practice model developed by the Veterans Health Administration. Improving quality and safety by incorporating evidence-based practices (EBP) is challenging, particularly in busy clinical practices such as Federally Qualified Health Centers (FQHCs). FQHCs grapple with financial constraints, lack of resources and complex patient populations.

Methods The Promoting Action on Research Implementation in Health Services (PARIHS) Framework served as a basis for the comprehensive assessment. We used a range of measures and tools to examine pain care from a variety of perspectives. Patients with chronic pain were identified using self-reported pain scores and opioid prescription records. We employed multiple data collection strategies, including querying our electronic health records system, manual chart reviews and staff surveys.

Results We found that patients with chronic pain had extremely high primary care utilisation rates while referral rates to pain-related specialties were

low for these patients. Large gaps existed in primary care provider adherence to standards for pain care documentation and practice. There was wide provider variability in the prescription of opioids to treat pain. Staff surveys found substantial variation in both pain care knowledge and readiness to change, as well as low confidence in providers' ability to manage pain, and dissatisfaction with the resources available to support chronic pain care.

Conclusions Improving chronic pain management at this Community Health Center requires a multifaceted intervention aimed at addressing many of the problems identified during the assessment phase. During the intervention we will put a greater emphasis on increasing options for behavioural health and complementary medicine support, increasing access to specialty consultation, providing pain-specific CME for providers, and improving documentation of pain care in the electronic health records.

Keywords: chronic pain management, Community Health Centers, evidence-based medicine, primary health care

Introduction

Chronic pain management is a challenging and important element of primary care. Approximately half of all patients suffering from chronic pain are cared for by primary care providers (PCPs).¹ However, evidence suggests that primary care providers are not well equipped to manage chronic pain effectively. Most PCPs express low confidence in their ability to effectively manage pain,²⁻⁵ and pain management education is scant to non-existent in most training programmes.^{6,7} Studies suggest that in primary care there is wide variation in the use of opioids⁸⁻¹¹ and in the adherence of PCPs to guidelines for documentation and management of pain.^{9,12} With increasing evidence of the potential harm caused by overuse and misuse of opioids, strategies are clearly needed to promote the safe, effective management of chronic pain in primary care.

Effective models for pain management have been developed and implemented. The Stepped Care Model for Pain Management (SCM-PM) is an evidence-based model advocated by the American Academy of Pain Medicine.¹³ It emphasises an individualised approach to managing pain in three steps, beginning with primary care. Step 1 involves the primary care physician identifying and discussing the patient's pain concerns and developing a treatment plan emphasising self-management and primary-care-based interventions. Step 2 involves more active, collaborative treatment, including psycho-educational assessment and intervention, medication, and consultations with specialists from appropriate disciplines. Depending on the setting, Step 2 interventions can often be delivered on-site within a primary care delivery system. Step 3 targets patients with chronic pain requiring significantly more care and involvement from other members of a pain management team.¹⁴ Implementation of this model across five Veterans Health Administration (VHA) primary care clinics resulted in improved pain-specific outcomes.¹⁵ While the SCM-PM has been shown to be successful within the VHA, it has not been applied to other healthcare settings, such as Community Health Centers. Project STEP-ing Out is a 3-year quality improvement project aimed at improving the care of medically underserved patients suffering from chronic painful conditions such as chronic low back pain, myofascial pain syndromes, and other musculoskeletal conditions, cared for at a large, multisite, statewide Community Health Center. The project focuses on adapting the SCM-PM to the local context of the health centre and maximising access and adherence to evidence-based care. As part of the project we conducted a comprehensive, formative assessment of pain management at the health centre and used the findings to develop a

multifaceted intervention to improve operational and patient-centred outcomes. In this paper we present the results of our assessment and describe how they are being used to inform the implementation of a comprehensive pain quality improvement strategy.

Methods

Setting

Community Health Center Inc. (CHCI) is a multisite Federally Qualified Health Center located in Connecticut. CHCI provides comprehensive primary care services in 12 primary care health centres across the state. Additional sites of care include school-based clinics, homeless shelters, and mobile dental sites. CHCI cares for over 100 000 medically underserved patients in the state. Over 60% of CHCI patients are racial/ethnic minorities; over 90% are below 200% federal poverty level, 60% are on Medicaid or state insurance, and 22% are uninsured.

Each CHCI patient has a designated primary care provider. Primary care is delivered by a team comprised of nurses, medical assistants, and primary care providers, including internists, paediatricians, and family practitioners as well as family practice nurse practitioners. These frontline primary care teams are supported by on-site behavioural health providers. Specialist care, including pain-related specialties, is available through outside consultation, but many patients face substantial barriers to securing such specialist care. All patient care at CHCI is documented in an integrated electronic health record system.

Project STEP-ing Out: This project, so named to reflect the project's goal of taking the VHA's Stepped Care Model outside the walls of the VA health system, is a 3-year quality improvement initiative, using SCM-PM as a conceptual model, aimed at improving chronic pain management in primary care. The project includes an assessment phase to evaluate current pain care management by PCPs, appropriateness of the SCM-PM, the organisation's readiness to change and its capacity to implement the new model. The results of the assessment will be used to help design a quality improvement intervention in the second phase and will also serve as a baseline from which to evaluate the impact of the intervention in the final phase. Improvement will be measured by evaluating the impact of the intervention on provider pain management knowledge and adherence to standards of care as well as selected patient pain-specific outcomes. In the third phase, we will concentrate on integration and sustainability of the model. This study was reviewed and approved by the Institutional Review Board of the Community Health Center, Inc.

Promoting Action on Research Implementation in Health Services (PARIHS) Framework: We chose the PARIHS theoretical framework to design the formative assessment. This framework has been successfully utilised by practices to identify critical elements and to design an appropriate implementation strategy for evidence-based practice.²³ PARIHS defines context, evidence and facilitation as the three key interacting elements determining success of an implementation.^{16–22} Using these elements and their respective subelements, we selected a variety of assessment methods to evaluate the areas that were deemed important and relevant to the project (Table 1). Data on context and evidence were collected from the electronic health records system and staff surveys. For the third element, facilitation, a robust facilitation plan was developed to be employed in the implementation phase of the project.

Identification of patients with chronic pain

Identifying patients with chronic pain is challenging. Pain is measured subjectively and treated in myriad ways. We deliberately avoided using the few specific ICD-9 codes for chronic pain because of the wide variation in the use of coding to record the presence of various disease states and painful conditions. We identified a cohort of patients with chronic pain using two methods of identification. One involved patient self-reported pain scores and the other involved opioid prescriptions.

All medical assistants at CHCI are trained to include the pain score as part of the vital signs process. At every visit patients are asked to rate their level of pain on a scale from one to ten, with 10 indicating the highest level of pain; pain scores are recorded in the electronic health record. The patients in the '*pain score cohort*' in this study were chosen according to the following set of criteria: (a) age > 18 years; and (b) two or more pain scores of 4 or greater (moderate to severe pain) separated by 90 days or more during the measurement timeframe.

The criteria for identifying the '*chronic opioid cohort*' included: (a) age > 18 years; and (b) receipt of prescription opioid medications for a total of 90 days or more during the measurement timeframe.

It was judged that using pain scores would identify a large number of patients with chronic pain, but with less specificity, while using the opioid-prescribing method would identify chronic pain patients with more certainty but exclude large numbers of patients not managed with such medications. All analyses were conducted on both cohorts.

Data preparation and processing

CHCI uses the eClinicalWorks (ECW) Electronic Medical Record (EMR) in conjunction with GE Centricity Practice Solution for billing and scheduling management. All electronic data were retrieved from these two systems, de-identified, and analysed by the study team. For our analyses we used data that were documented in the EMR by CHCI clinical providers as part of routine clinical practices at CHCI during a 1-year time period (1 March 1 2010 through 28 February 2011). All database retrieval queries were validated by random chart reviews of at least 25 records. Data elements included the patient's primary care provider name, their demographics, self-reported pain scores, medication-prescribing records, laboratory results, opioid agreement use, and behavioural health and medical referrals. The primary care provider panel to which each patient belongs is assigned in the EMR for each patient. While patients may see other providers occasionally for urgent visits if their own provider is unavailable, the identified primary care provider is responsible for all longitudinal care, and pain management issues are handled by the patient's assigned primary care provider. When a provider leaves CHCI, their patients are assigned to a new provider who assumes their care, including their pain management.

Survey instruments and administration

The Organisational Change Manager (OCM) is a validated survey designed to measure subjective probability estimates for predicting success and failure of healthcare improvement projects.²⁴ The survey assesses staff perception of the effectiveness of the following domains: the project start-up phase, the exploration of the stated problem, team solution development, and the process of implementation and testing. It is intended to be administered longitudinally over the course of the duration of a project. Many of the questions contained in the OCM map closely to elements of the PARIHS framework. The OCM survey was distributed at an agency-wide Grand Rounds conducted by video conference. All CHCI primary care providers, behavioural health providers and nurses who care for adult patients were eligible to complete this anonymous survey. A study information sheet was provided to each potential participant. Informed consent was indicated by the participant's completion of the survey.

The KnowPain-50 Survey (KP50) is a validated tool for assessing physician knowledge regarding pain management²⁵ in the following domains: initial pain assessment, defining treatment goals and expectations, development of a treatment plan, implementation of a treatment plan, reassessment and management, and management of environmental issues. The KP50 con-

Table 1 PARIHS Framework Application for Project STEP-ing Out: SI = function of E,C,F

Element	Subelement	Assessment tool/data sources	Planned implementation intervention	Comments
Evidence	Research	Literature review	SCM-PM	Presence of well-established evidence from large, primary care delivery system (VHA) with similarities to CHCI
	Clinical experiences	<ul style="list-style-type: none"> – KnowPain50²⁵ – Attitudes survey from Dobscha² – Chart reviews – Organisational Change Manager (OCM) questions²⁴ 	<ul style="list-style-type: none"> – Agency-wide annual interactive, online pain CME – Project Grand Rounds – Project ECHO intervention 	<ul style="list-style-type: none"> – Pain care knowledge deficit identified – Lack of specialist support a prominent finding
	Patient experiences	<ul style="list-style-type: none"> – Pain score analysis from EHR – Patient demographic data 	<ul style="list-style-type: none"> – Pain interference survey (NIH PROMIS tool) – Patient satisfaction with chiropractic survey 	Need for patient-centred outcomes identified
	Local context information	<ul style="list-style-type: none"> – Utilisation data – Opioid use assessment – Referral pattern data 	<ul style="list-style-type: none"> – On-site behavioural health interventions – Chiropractic services on site – Project ECHO – Policy revision focused on safe and appropriate prescribing of opioids 	High on-site utilisation with low use of multidisciplinary care
Context	Receptive context	OCM	<ul style="list-style-type: none"> – Communication plan – Front-line team involvement using Clinical Microsystems 	
	Culture	<ul style="list-style-type: none"> – Attitudes survey – OCM 		Aligned with agency culture
	Leadership	– OCM	<ul style="list-style-type: none"> – Communication plan between project leaders and organisation to include frequent agency-wide presentations, newsletter updates, and biweekly report to management team – Clear commitment of time/resources to coaching and facilitation 	
	Evaluation	<ul style="list-style-type: none"> – Outcomes data from EHR at individual, team and system level – Chart review 	Feedback through project outcomes dashboard: individual, team and system-wide	
Facilitation	Role of facilitator	In development	Clinical Microsystems ³⁵ <ul style="list-style-type: none"> – Internal facilitation 	– Coach training

tains multiple-choice questions as well as questions scored on a Likert scale. With five points given for each correct answer, the total possible score for the survey is 250. To gain contextual information on primary care providers' attitudes and beliefs regarding pain care and the STEP-ing Out Project we added 11 survey questions taken from a VHA-developed survey² to the KP50 (Box 1).

All CHCI primary care providers who care for adult patients (internists, family physicians, family nurse practitioners) were offered the opportunity to complete the KnowPain-50 survey as well as the 11 questions from the VA-developed survey. The survey questions were distributed during weekly staff meetings. A study information sheet was provided to each potential participant. Informed consent was indicated by the participant's completion of the survey.

Chart reviews: Manual chart reviews were conducted to determine the extent to which primary care providers were adhering to current guidelines for documenting care for patients with chronic pain. The review process used a detailed abstraction protocol developed by pain specialists at the VHA. Reviewed were medical visit records from the two chronic pain patient cohorts – the '*pain score cohort*' and the '*chronic opioid cohort*'. Using a random number generator 150 records were chosen from each cohort. All records were reviewed by a trained research assistant; 5% of records were randomly spot-checked by the project director to ensure data integrity and accuracy.

Multimodal care: To gauge the extent to which patients with chronic pain were receiving multimodal care that included additional pain-related specialists we evaluated referrals generated through the EMR. All CHC referrals are ordered electronically and managed by a central referral team. We queried the database for all referrals for patients with chronic pain during the measurement timeframe to pain-related disciplines including orthopaedics, rheumatology, pain management, physical therapy, psychiatry, chiropractic, acu-

puncture and all behavioural health disciplines, including addiction medicine.

Opioid prescribing: All data on opioid prescribing were collected from the electronic prescribing record within the EMR. All medications belonging to the opioid family were included in the analysis except suboxone, which is not used for pain management at CHCI. The medication data were cleansed extensively to adjust for variation in free text charting, particularly in data fields containing medication frequency and dosages. For example, medication frequency indicating that a patient was taking a medication three times daily might have been written as 'TID', 'Q8hrs', or 'three times daily'. All possible frequency notations were analysed and combined to ensure an accurate assessment of actual medication use frequency. All decisions were made by the research team and reviewed by a senior clinician to ensure accuracy.

Chronic opioid use was defined as the use of any individual or combination of opioids for 90 days or more during the measurement year. For prescriptions without an identified duration, such as '14 days' or 'one month', the duration was calculated by dividing the total number of pills dispensed by the daily frequency ordered. For prescriptions written as 'PRN' (as needed), the maximum frequency indicated was used in this calculation. For example, an opioid prescription with instructions to take two pills BID, dispense 60 pills would account for 15 days of opioid use. A prescription with instructions to take one pill BID PRN, dispense 40 would account for 20 days of opioid use.

Results

Patient demographic characteristics

In both cohorts patients were predominantly female, aged 30–60 years, and covered by Medicaid insurance

Box 1 Additional survey questions

Skilled chronic pain management is a high priority for me.

My management of chronic pain is influenced by experience with addicted patients.

My management of chronic pain is influenced by fear of contributing to dependence.

I have adequate time to manage most patients with chronic pain.

Fear of narcotic regulatory agencies/administration influences my decisions regarding chronic pain management.

Analgaesic side effects hinder my efforts to treat patients with chronic pain.

Patients I treat become addicted to opioids.

I use an opioid agreement with my patients.

I use a pain assessment or monitoring tool.

I am confident in my ability to manage chronic pain.

I am satisfied with the quality of resources available to help me manage patients with chronic pain.

(Table 2). Hispanic/Latino patients accounted for a larger percentage in the pain score cohort than in the chronic opioid cohort. Among patients with two or more pain scores ≥ 4 , 40% were Hispanic/Latino, and 43% were Caucasian. By contrast, in the chronic opioid cohort, only 25% were Hispanic/Latino, and 67% were Caucasian.

Frequency and utilisation

Chronic pain was highly prevalent in the adult CHCI patient population. Patients with pain accounted for a substantial portion of primary care providers' daily schedules. There were 33,254 adult patients treated in primary care during the measurement year, accounting for 138,614 primary care visits. During 36% of these visits, the patient provided a pain score of 4 or greater (moderate pain) and for 17% of the visits, the pain score offered by the patient was 8 or greater (severe pain). Patients in the 'pain score cohort', defined as having two or more pain scores ≥ 4 separated by 90 days during the measurement year accounted for 59% of all adult visits. Patients in the 'chronic opioid cohort', defined as receiving opioid medications for 90 days or more (chronic opioids), accounted for 11% adult primary care visits. Patients

in both cohorts had an average of 12 and 15 visits to primary care, respectively, compared with six visits on average for all adult primary care patients. These results suggest that a significant portion of visits in primary care involve a relatively small, select population of patients with chronic pain, and that patients with chronic pain utilise primary care services at a substantially higher rate than patients without pain.

Survey results

There were 127 OCM Surveys distributed and 54 (43%) collected for analysis. Results indicate a range of responses suggesting areas of strength as well as weakness (Table 3). Responses suggest that staff perceived strong advantages to the proposed project and felt that leadership had been effective at communicating a mandate for change and establishing a climate conducive to making change. Low scores suggest that primary care staff were not confident in their ability to develop new skills related to the project, and that they question whether sufficient money, time and personnel will be allocated to accomplish the project. Staff gave an intermediate score, 47%, on how well the intervention fitted with the agency's culture and practice.

Table 2 Demographics

		Pain Score cohort (<i>n</i> = 6746)	Chronic opioid cohort (<i>n</i> = 1019)
Gender	Male	2216 (33%)	417 (41%)
	Female	4529 (67%)	602 (59%)
Age	Age ≤ 30	1047 (16%)	60 (6%)
	Age >30 and ≤ 40	1324 (20%)	167 (16%)
	Age >40 and ≤ 50	2000 (30%)	302 (30%)
	Age >50 and ≤ 60	1589 (24%)	308 (30%)
	Age >60 and ≤ 70	572 (8%)	141 (14%)
	Age >70	214 (3%)	41 (4%)
Race/ethnicity	Hispanic/Latino	2732 (40%)	252 (25%)
	Black/African American	821 (12%)	128 (13%)
	Asian	109 (2%)	4 (0%)
	Caucasian	2917 (43%)	616 (61%)
	American Indian/Alaska Native	26 (0%)	6 (1%)
	Unknown	141 (2%)	13 (1%)
Insurance	Medicare	1106 (16%)	283 (28%)
	Medicaid	2726 (40%)	445 (44%)
	Medicaid managed care fee for service	1844 (27%)	172 (17%)
	Uninsured	617 (9%)	59 (6%)
	Private managed care fee for service	354 (5%)	50 (5%)
	Private non-managed care	87 (1%)	10 (1%)
	Other public insurance	12 (0.002%)	0 (0%)

Table 3 Staff-perceived readiness for organisational change (*n* = 53)

	Average actual	Potential	Maximum score	Percentage of maximum
Communication of the mandate for change	4.196	1.20	5.40	78%
Change agent has established a climate for creating, implementing and sustaining change	5.755	2.05	7.80	74%
Change effort is consistent with and contributes to achieving leadership's organisational goals	4.455	3.65	8.10	55%
Emphasis of networking and negotiating of clinical staff in change process	1.411	1.09	2.50	56%
Project team understands employee needs and how project will meet needs	1.206	1.29	2.50	48%
Dissatisfaction with current process	1.704	2.10	3.80	45%
The organisation looks outside for innovation and ideas	2.906	3.79	6.70	43%
The organisation's circumstances, problems and needs were analysed	1.370	1.93	3.30	42%
Perceived powerful advantages to proposed change	2.102	0.50	2.60	81%
Sufficient money, time and personnel are allocated	0.825	2.58	3.40	24%
Design can be easily adapted to fit into existing culture and practices	0.668	0.73	1.40	48%
Subjective opinions were obtained from peers	0.591	0.81	1.40	42%
Well-defined tasks and a schedule for implementing change	0.764	0.64	1.40	55%
Fear that employees cannot develop new skills required	0.553	1.65	2.20	25%
Monitoring and feedback	0.323	0.48	0.80	40%

The KnowPain-50 was distributed to 58 primary care providers at 11 CHCI practice sites, and 47 (81%) were returned for analysis. Results demonstrated a wide distribution of scores, with an agency-wide average score of 150 out of a total possible score of 250. These results were similar to those seen in other primary care practices²⁵ and suggest an opportunity to improve pain care knowledge (Figure 1).

Responses to the 11 additional survey questions added to the KP50 to assess attitudes and beliefs about pain management issues provided important additional information regarding primary care providers' perspectives about pain care (Figure 2). Providers placed a high priority on being able to provide effective pain care but expressed dissatisfaction with pain manage-

ment resources and support. In contrast to other studies in primary care,^{6,10,26,27} CHCI providers generally did not cite fear of regulation, side effects, or fear of contributing to addiction as factors affecting their care for patients with pain.

Chart reviews

Chart reviews demonstrated substantial gaps in adherence to standards of care for documentation and management of chronic pain. Although presence, cause and source of pain were documented fairly consistently, a functional assessment was rarely documented. In addition, follow-up assessments for pain at subsequent visits were infrequently performed for both

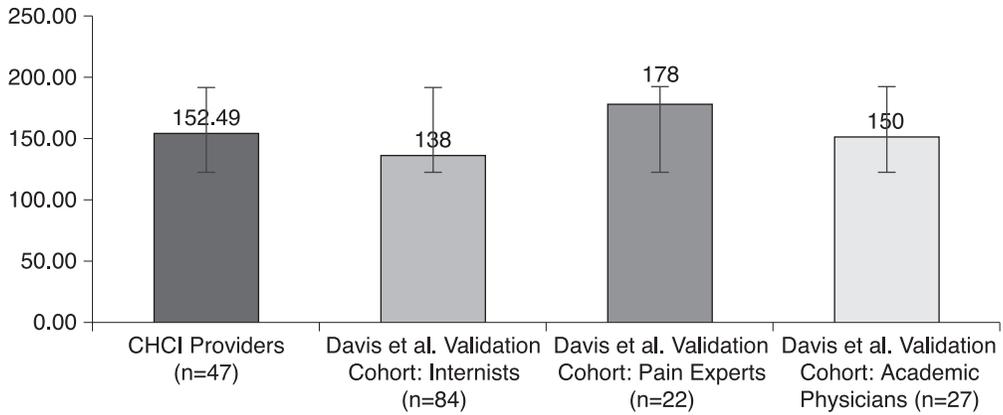


Figure 1 Average CHCI KP50 baseline score comparison (2 standard deviations)

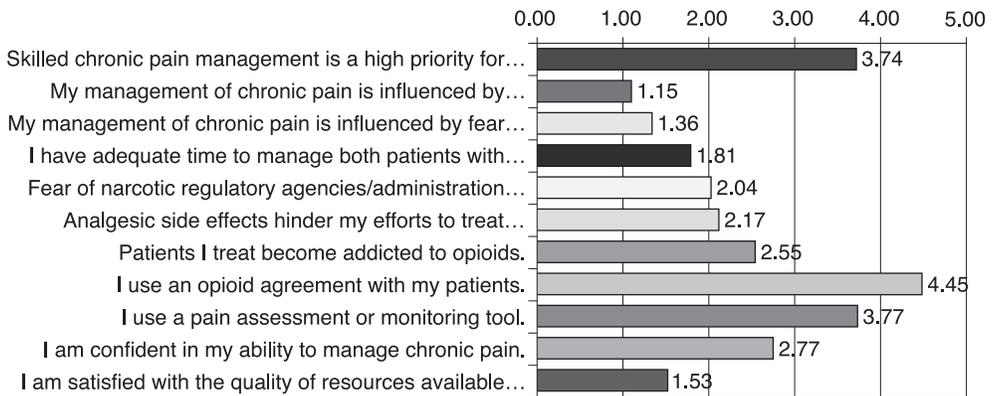


Figure 2 CHCI Clinician Attitudes Survey score ($n = 47$)

cohorts. Pain treatment plans were noted as being present in 81% and 96% of charts reviewed for patients in the 'pain score' and 'chronic opioid' cohorts, respectively (Figure 3). For patients in the pain score cohort, 36% of documented treatment plans contained a pain medication prescription only, and for patients in the chronic opioid cohort, 69% of treatment plans documented contained medication prescribing as the only element. Treatment plans rarely included patient education or referral to other specialists. Patients taking opioid medications chronically had a documented opioid agreement 68% of the time, and a documented toxicology screening test 66% of the time.

Multimodal care

Referral to other pain-related specialties or to behavioural health was fairly uncommon. Referral rates are low for all specialties. Figure 4 shows the

percentage of patients in each cohort that were referred to specialties including physical medicine and rehabilitation, orthopaedics, pain management, physical therapy and chiropractic services. Despite the existence of on-site behavioural health in individual and group formats at nearly all CHCI sites, fewer than 25% of patients in the two cohorts had been seen by an on-site behavioural health provider.

Opioid prescribing

Opioid prescribing varied widely across the agency. The number of patients in each provider's panel being prescribed chronic opioids ranged from 0 to 110 out of an average patient panel size of 803. From these numbers we calculated the 'percentage panel on chronic opioids' (PPCO) to further explore this variability. The PPCO is defined as the total number of patients in a provider's panel receiving 90 days or more of an opioid medication, over the total number

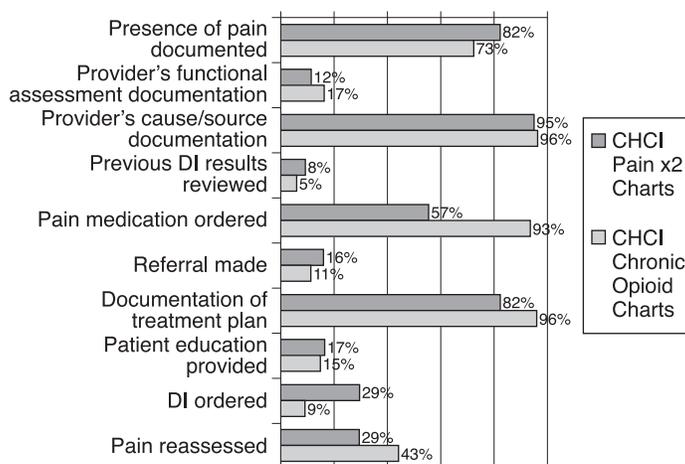


Figure 3 Chart review of adherence to pain care documentation standards (n = 150 per cohort)

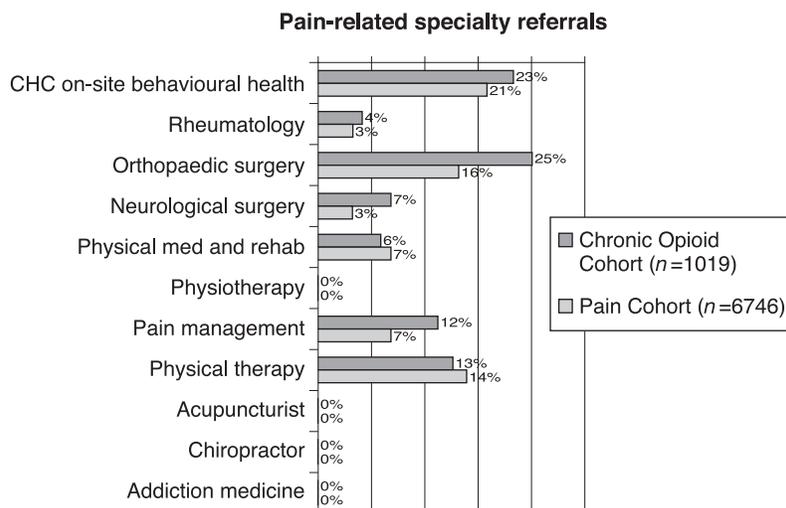


Figure 4 Specialty referrals for patients with pain

of adult patients in that provider's panel. Results ranged from 0–10% (Figure 5). A wide range of opioids were prescribed, with oxycodone and hydrocodone the most common (Table 4).

Discussion

The data from this detailed assessment of pain care at CHCI provided extremely useful information to inform the development and implementation of Project STEP-ing Out. Many of the results from this baseline assessment, such as providers' knowledge, attitudes and adherence to standards of pain care will serve as

outcome measures with which to evaluate the impact of the intervention. In the SCM-PM, the primary care provider provides pain care management for the majority of patients with pain (Step 1). One of the principal findings from our assessment is primary care providers' need for additional knowledge and skill in pain management. The KnowPain 50 showed variability in pain knowledge and an average score of 60% of the total possible score. These findings are consistent with the growing literature suggesting the need for enhanced competency for pain management in primary care.^{6,7,9,28,29} The additional questions assessing attitudes and beliefs regarding pain management suggested that providers have low confidence in their ability to manage pain, and in the Organisational Change

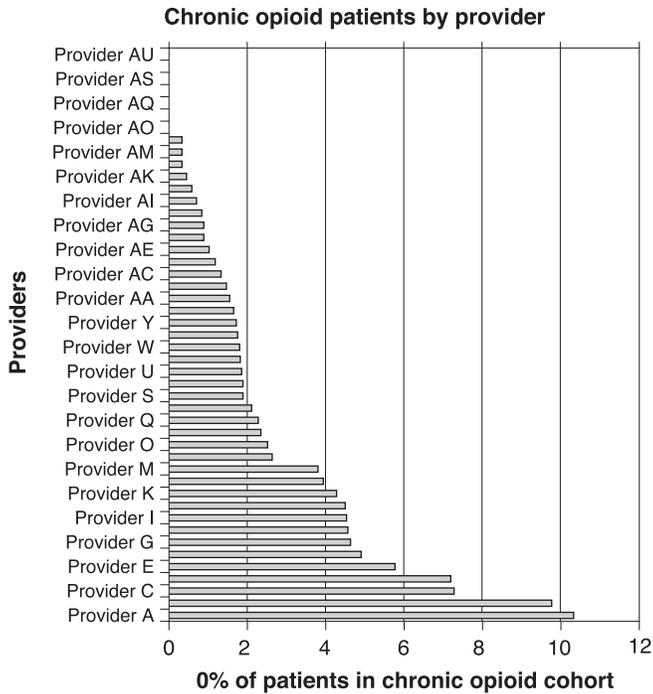


Figure 5 Number of individual patients prescribed 90 days or more of opioid medications in 1 year, by provider

Table 4 Frequency of individual opioid prescriptions

Opioid	Prescriptions written
Oxycodone	8418
Hydrocodone	4281
Morphine	1039
Codeine	951
Fentanyl	854
Methadone	193
Darvocet	85
Hydromorphone	44

Manager, respondents expressed fear that they would not be able to develop the new skills needed for the intervention. Based on these findings, Project STEP-ing Out will focus substantial resources on skill building and knowledge acquisition. Agency-wide education on pain care will be provided in a variety of formats and made a standard requirement for all primary care providers.

An additional important finding was the relative paucity of referrals to pain-related specialists and

behavioural health providers. The SCM-PM calls for multimodal care involving specialists in behavioural health, physical medicine and complementary/alternative medicine (CAM) for patients with pain that is not improving with primary care management. Patients with publicly funded insurance or without medical insurance face significant barriers to accessing specialty care, which may partially explain these findings. However, a survey in the VA system in which patients have ready access to such specialists found equally low rates of multimodal care.⁹ Primary care provider survey responses suggest dissatisfaction with resources available to support them in caring for patients with chronic pain. Based on these findings, project STEP-ing Out is focusing on creative ways to provide more multimodal support, including the use of video conferencing, on-site CAM offerings, and building internal capacity to provide behavioural health interventions focused on pain. In particular, the project is planning to provide primary care clinicians with access to specialist consultation via video conferencing, using the Project Extension for Community Healthcare Outcomes (ECHO) model.^{30,31}

Opioid treatment agreements and urine toxicology monitoring for patients using opioids chronically are supported by evidence³² and part of pain care practice guidelines.¹³ We found moderate rates of adherence to these practices. Adherence to standards of care for documentation of pain care was also poor. These findings led to our placing greater emphasis in the

implementation on the use of templates in the electronic health record, and the creation of a new standardised follow-up protocol. The use of clinical registries and performance report cards will be used to provide audit and feedback to individual providers on these elements of the intervention as well.

The PARIHS framework provided a useful theoretical construct for the formative assessment in preparation for a challenging project implementation. We observed limitations to operationalising PARIHS that are similar to those observed by others.²³ We struggled with the lack of clarity and substantial overlap in the various subelements in the Evidence and Context domains. In particular we found it challenging to map PARIHS variables to specific tools, and struggled to choose appropriate tools that were both effective and practical given limited resources and the busy nature of the practice we were studying.

Our approach has several strengths. With a fully integrated electronic health record we were able to access a large amount of data and information on pain care including labs, medications, referrals and utilisation. This detail was critical for understanding the local context, the practice patterns at each individual site, and the patient population potentially being impacted on by the implementation. Using a model that has been implemented and tested in the VHA, a health system with some similarities to CHCI added credibility and promoted acceptance of the new model by the CHCI staff. While there were differences between VHA patients and CHCI patients, both systems emphasised comprehensive primary care, use of an electronic health record, and care for patients at the lower end of the socio-economic spectrum.

One of the principal weaknesses of our approach was the difficulty in accurately identifying patients with chronic pain. Identifying patients with chronic pain using pain scores is problematic. Pain scores are self-rated and have been shown to be poorly accepted by primary care providers and of limited accuracy.³³ Our use of two or more pain scores ≥ 4 likely substantially overcounted the chronic pain cohort. Our second approach, using opioid use as a marker for chronic pain, is likely to be more specific, but less sensitive, missing patients using non-opioid medications or non-pharmacologic treatments. We chose not to use ICD9 codes, due to the poor reliability of coding and the lack of a specific code or set of codes for chronic pain.

An additional weakness was the limited use of assessment tools and other qualitative methods of evaluation. We administered three different survey instruments but relied heavily on the OCM for many elements of the PARIHS Context domain. The OCM had the lowest response rate (43%) of all the surveys employed. This low response rate limits our ability to interpret staff perceptions regarding the implemen-

tation of our project. Additional survey tools and a higher response rate would have strengthened our assessment. Work published subsequent to our evaluation has identified a toolkit of assessment tools mapped to specific PARIHS subdomains.³⁴ These tools would have been extremely helpful for this project.

Conclusion

Frontline health systems increasingly face the need to redesign practices and implement new models and system of care. Innovations such as electronic health records, Patient-Centred Medical Homes, Accountable Care Organisations, and a growing emphasis on outcomes-driven, evidence-based care will all require systems redesign and large-scale implementations. Designing an implementation based on evidence-based practice, a strong conceptual model and a thorough assessment of local context is critical to maximise the likelihood of implementation success.

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CONFLICTS OF INTEREST

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