# Implementing Population Medicine in a Pain Management Practice

Barbara Koschak, DNP; David A. Bryce, MD; J. Timothy Harrington, MD

## ABSTRACT

**Purpose:** To document and improve the quality of our chronic pain management using population management methods.

**Methods:** An analytic registry was developed, and all new patients were enrolled for 12 months. Patient demographics, standardized pain and function measures, and treatments were recorded. Usual care was provided. The registry was used to organize care and analyze management and outcomes.

**Results:** Of 454 total patients, only 154 (34%) completed a 6-month cycle of care. High no-show rates were documented for follow-up appointments for several reasons. The majority of 6-month completers showed improved pain levels.

**Discussion:** This quality improvement project identified assessment and care gaps and led to improvements. An ongoing need to improve measures of pain and function was documented.

## INTRODUCTION

Managing chronic pain and its underlying causes presents a continuing challenge to health systems, clinicians, patients, and health planners in the United States.[1] Diagnoses and treatments for similar patients vary greatly by individual physician and across specialties. Opioid dependency is but one highly visible problem associated with current approaches to pain management. In fact, the fragmented and variable care processes, high costs, and suboptimal outcomes of chronic pain management differ little from those of most chronic diseases.[2]

Population medicine utilizes a disease registry to identify all patients within a population and to then guide care teams to provide and document necessary care on time. This approach changes the focus of care from one patient at a time to the population as a whole, with individual patient's care provided within this broader context. It allows practices to identify and close care gaps that cannot otherwise be appreciated or addressed. In general, population medicine is proving more effective than traditional approaches for managing chronic diseases.[3]

We have implemented population medicine methods within our pain management practice in an effort to improve our care and patient outcomes. This report describes our quality improvement project and initial results.

## METHODS

### Participants

An interventional pain physician (DAB) and a nurse practitioner (BK) conducted this project in a community-based pain management practice at 3 clinic sites in south central Wisconsin. A physician consultant (JTH) provided quality improvement and population medicine coaching. Our processes were developed to support best clinical practices and high clinical utility, and usual treatments were provided.

### Procedure

We began by defining a set of standard disease and treatment data that we intended to collect routinely at baseline and each follow-up patient assessment. A data collection sheet was developed to capture this information (Figure 1). Treatments reported were those provided since the last assessment. The Patient Pain and Provider Global Scores (PGS) were reported on 0-10 segmented

• • •

**Author Affiliations:** Department of Physical Medicine and Rehabilitation, University of Wisconsin (UW) Medical Foundation, Madison, Wis (Koschak); Clinical Faculty, UW School of Medicine and Public Health; Advanced Pain Management, Madison, Wis (Bryce); Professor of Medicine, Retired, UW School of Medicine and Public Health; Harrington Consulting LLC, Madison, Wis (Harrington).

**Corresponding Author:** J. Timothy Harrington, MD, 309 W Johnson St, #1138, Madison, WI 53703; phone 608.233.2622; e-mail jtharringtonmd@gmail.com.

CME

**CME available. See page 78 for more information.**

**Figure 1.** Data Collection Sheet

| Date | Name | Date of Birth | Registry Number |
|---|---|---|---|
| | | | |

| Parameters | | Treatments | |
|---|---|---|---|
| | *Patient derived* | | *Medications* |
| VAS- current rating | | Opioids | |
| VAS- maximum rating | | Neuroleptics | |
| Oswestry score | | Non steroidals | |
| | *Provider derived* | Local anesthetics | |
| Opioid risk score | | Antidepressants | |
| MEDD | | Mood stabilizers | |
| Practitioner Global Score | | | *Interventional* |
| | *Cycle of Care - 6 months* | Diagnostic | |
| Initial visit | | Therapeutic | |
| One | | Neuromodulation | |
| Two | | Radiofrequency | |
| Three | | | *Psychology Evaluation* |
| | | Cognitive therapy | |
| | | Group therapy | |
| | | Individual therapy | |
| | | | *Therapy* |
| | | Physical therapy | |
| | | Occupational therapy | |
| | | | |

Standardized pain, function, and global measures and current treatments are collected at each patient assessment visit, generally at baseline, 6, 12, and 24 weeks.

Abbreviations: VAS, visual analogue scales; MEDD, Morphine Equivalent Daily Dose.

visual analogue scales (VAS) with 0 to .99 = Controlled, 1 to 3.9 = Low, 4 to 6.9 = Moderate, and 7 to 10 = High levels of pain and disability.[4] Opioid use was calculated as morphine equivalent daily dose (MEDD) from a standard conversion table, and the Oswestry Disability Index was calculated from a patient-generated questionnaire and segmented into low, moderate, and high levels.[5,6] The PGS was used to capture the clinician's overall impression based on patient history, other objective patient-derived measures, and examination findings. A PGS has been used widely in clinical trials and for documenting the activity of other chronic diseases[,7] but, to our knowledge, not to capture the provider's overall impression in pain management.

We then determined the intervals at which we wished to follow patients after baseline evaluation and initiation of medical or procedural treatments, recognizing that these would vary in some cases. We assumed that our cycle of care was generally 6 months in duration and that assessments would be performed at 6 weeks, 12 weeks, and 24 weeks.

We next developed a disease population registry in an Excel database, backed up and protected on our practice's HIPAA-compliant information technology platform. We enrolled each new patient with their identifying information, referral source, date of consultation, and International Classification of Diseases, Ninth Revision (ICD-9) diagnoses. Each patient's clinical data were entered at baseline and at each follow-up assessment. Our analytic registry format is shown in Figure 2.

A nurse practitioner (BK) managed the registry. Data from collection sheets were entered real-time or batched and then entered separately as time permitted. The registry spreadsheet was sorted regularly by encounter dates to identify overdue patients and to analyze other data as indicated in Results. Encounters for each patient were also documented in our electronic medical record (EMR), including scanned data collection sheets.

We did not obtain Institutional Review Board oversight since quality improvement projects are generally exempt, as their purpose is to improve care delivery processes and not to perform research or deviate from usual treatments.[8,9]

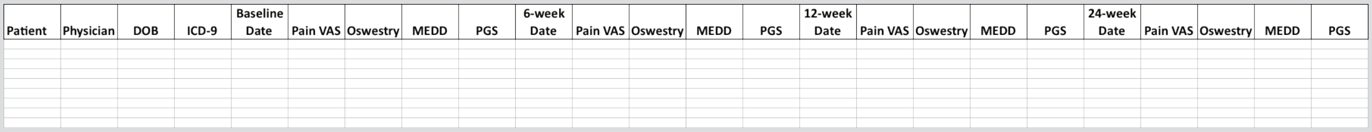
## RESULTS

The study population included all new patients seen for initial evaluation during a 12-month interval beginning on January 2, 2014 (N = 520). These patients were referred either by community primary (84%) and specialty (15.5%) physicians or were self-referred (0.5%). Patients were 54% male and 46% female and ranged from 20 to 89 years (median = 57). Sixty-six patients with more than 1 pain problem at enrollment were excluded from this analysis, leaving a total of 454. Initial ICD-9 codes included spine disorders (68%), other musculoskeletal conditions (18%), neuropathies (10%), and a variety of other diagnoses (3.5%).

Only 154 (34%) of these 454 enrollees had both baseline and 6-month assessments. An additional 146 (32%) did not keep their first scheduled follow-up appointment with major reasons being lack of insurance coverage and patient decisions to decline recommended care. The remaining 154 (34%) completed specialty pain management in less than 6 months. They were returned to their referring physician for medication management, referred to other specialists, continued in rehabilitation, and/or had resolved their pain problem. Many of this latter cohort did not have a discharge visit and assessment.

A variety of interventional procedures were performed on 170

**Figure 2.** Example Pain Population Registry



| Patient | Physician | DOB | ICD-9 | Baseline Date | Pain VAS | Oswestry | MEDD | PGS | 6-week Date | Pain VAS | Oswestry | MEDD | PGS | 12-week Date | Pain VAS | Oswestry | MEDD | PGS | 24-week Date | Pain VAS | Oswestry | MEDD | PGS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |

This spreadsheet provides a template for entering a standardized patient data set and the analytic functions to sort and study the enrolled population.

Abbreviations: VAS, visual analogue scales; MEDD, Morphine Equivalent Daily Dose; PGS, Provided Global Scores.

(37%) of the 454 patients, and on 110 (71%) of the 154 6-month completers. Outcomes documented for the 6-month completers included reduced patient pain in 66 of 124 patients (53%) with moderate and high baseline pain scores. The MEDD, Oswestry, and PGS measures were unchanged in the majority of 6-month completers. The majority of baseline patient pain and PGS levels (58%) were concordant, and discordance was most frequent in patients with moderate baseline pain scores. We are unable to evaluate the effectiveness of individual treatments or the relationship of follow-up compliance to outcomes because of the relatively small patient numbers, lack of standardized treatment protocols for specific underlying disorders, the use of multiple treatments in some patients, and the lack of a clinical trial design.

Baseline opioid use was analyzed (N=454). No opioid use was reported by 200 patients (44%), 1-120 MEDDs was reported by 212 (47%), and greater than 120 MEDDs was reported by 42 (9%). No correlation was found between opioid use at enrollment and loss to follow up after initial evaluation.

## DISCUSSION

Population medicine using disease registries and multidisciplinary care teams is an emerging alternative to traditional care of chronic diseases that has improved practice performance and outcomes.[3] Our experience suggests that this is also feasible and valuable in pain management practice. We hope that other pain specialists will consider adopting this alternative approach to traditional care processes.

We were unable to identify any other examples of population medicine approaches in pain specialty practices through a literature review and the authors' communications with other specialists. In addition, we are not aware of more comprehensive care coordination programs for chronic pain populations in health systems. One of us (JTH) has published the methods and results of an interdisciplinary system-level improvement project for low back pain management that utilized a similar population medicine approach.[10] This experience is what initially motivated the current project, and spine disorders represented 68% of our patients in this study.

A simple disease registry and standardized disease activity measures are essential for managing care reliably at the population level.[2] Enrolling all new patients provides a fully representative cohort for analyzing the managed population and the care provided. Electronic medical records generally do not provide the analytic registry functions needed for population medicine.

Pain measures are subjective by their nature. We adopted a standard measures set and intended frequencies of assessments to determine whether this would improve our documentation of patients' status and their improvement during treatment. Completing this assessment as intended proved difficult for the majority of patients who either did not return for follow-up care or did not have a discharge visit after completing pain management. The results in those who did complete a 6-month care cycle emphasize the continuing challenge for improving measurement in chronic pain populations.

Population medicine is allowing us to see patterns and care gaps that we had not recognized before, including the numbers of patients who were lost to follow-up, and why. We now define new patients' interest in interventional pain management and insurance eligibility before scheduling follow-up visits. We also have initiated follow-up calls to "no-shows" and encouraged a discharge visit for all patients completing pain management to document their status and plan for further care.

We also have developed a better-defined team care approach. Our nurse practitioner is our registry manager, coordinates patient encounters and assessments, contacts overdue patients, and provides medical follow-up care and education. The physician focuses on new patient evaluations, problem solving, and procedures. The team collaborates in care planning for those patients with high pain and high PGS metrics. The physician is able to see more new patients in a timely manner.

Many of the patients referred to our interventional pain management practice were using opioid analgesics prior to their initial visit; however, loss to follow-up did not correlate with baseline opioid use, as we had expected. Our care includes efforts to reduce opiate use through education, drug contracting, and alternative treatments. Our baseline and 6-month MEDD results suggest a need to increase these efforts.

The major study limitation is the short duration of follow-up within the specialty practice cycle of care for this complex chronic pain patient population. By the end of this 1-year study, we were substantially modifying our practice processes to address our care gaps and creating new cycles of improvement. These iterative process changes precluded a longer study duration and larger patient cohort.

In conclusion, this population medicine project has improved our interventional pain management practice. We hope our experiences will encourage others to adopt population medicine approaches and standardized measures of patients' status and outcomes, not only in pain management practices, but also within other specialties and broader health systems. Documenting and improving care and outcomes for chronic disease populations are critical to increasing the value of care and overcoming barriers to payment for effective services.

**Funding/Support:** None declared.

**Financial Disclosures:** None declared.

**Planners/Reviewers:** The planner and reviewers for this journal CME activity have no financial relationship to disclose.

---

## REFERENCES

**1.** Institute of Medicine. *Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research.* Washington, DC: The National Academies Press; 2011. https://www.nap.edu/read/13172/. Accessed May 25, 2017.

**2.** Institute of Medicine Committee on Quality of Health Care in America. *Crossing the Quality Chasm: A New Health System for the 21st century.* Washington, DC: National Academies Press; 2001.

**3.** Harrington JT, Newman ED, eds. *Great Health Care: Making It Happen.* New York, NY: Springer; 2012.

**4.** Wolfe F, Michaud K, Pincus T, Furst D, Keystone E. The disease activity score is not suitable as the sole criterion for initiation and evaluation of anti-tumor necrosis factor therapy in the clinic: discordance between assessment measures and limitations in questionnaire use for regulatory purposes. *Arthritis Rheum.* 2005;52:3873-879.

**5.** Fairbank JCT, Pynsent PB. The Oswestry Disability Index. *Spine.* 2000;25(22):2940-2953.

**6.** Davidson M, Keating JL. A comparison of five low back disability questionnaires: reliability and responsiveness. *Phys Ther.* 2002;82(1):8-24.

**7.** Harrington JT. The uses of disease activity scoring and the physician global assessment of disease activity for managing rheumatoid arthritis in rheumatology practice. *J Rheumatol.* 2009;36(5):925-929.

**8.** Berwick DM. Broadening the view of evidence-based medicine. *Qual Saf Health Care.* 2005;14(5):315-316.

**9.** Baily MA, Bottrell M, Lynn J, Jennings B. Hastings Center special report: the ethics of using QI methods to improve health care quality and safety. *Hastings Center Report.* 2006;36(4):S1-S40.

**10.** Harrington JT, Dopf CA, Chalgren CS. Implementing guidelines for interdisciplinary care of low back pain: a critical role for pre-appointment management of specialty referrals. *Jt Comm J Qual Improv.* 2001;27(12):651-663.

CME

**To earn CME credit for this journal article, visit https://www.wisconsinmedicalsociety.org/professional/wmj/journal-cme/ where you will be directed to complete an online quiz.**

advancing the art & science of medicine in the midwest

WMJ

*WMJ* (ISSN 1098-1861) is published through a collaboration between The Medical College of Wisconsin and The University of Wisconsin School of Medicine and Public Health. The mission of *WMJ* is to provide an opportunity to publish original research, case reports, review articles, and essays about current medical and public health issues.

**Visit www.wmjonline.org to learn more.**