BMJ Open

Performance and quality indicators for the management of non-cancer chronic pain: a scoping review protocol

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2015-010487
Article Type:	Protocol
Date Submitted by the Author:	10-Nov-2015
Complete List of Authors:	Zidarov, Diana; University of Montreal, School of Public Health; Centre de Recherche Interdisciplinaire en Réadaptation du Montréal Métropolitain Visca, Regina; McGill University Health Center, Clinical Epidemiology Gogovar, Amédé; McGill University, School of Physical and Occupational Therapy Ahmed, Sara; McGill University, School of Physical and Occupational Therapy
Primary Subject Heading:	Health services research
Secondary Subject Heading:	Rehabilitation medicine
Keywords:	Non-cancer chronic pain, indicators, performance, quality of care, scoping review

Performance and quality indicators for the management of non-cancer chronic pain: a scoping review protocol

Diana Zidarov [1, 2], **Regina Visca**[3] **Amédé Gogovar** [4], **Sara Ahmed** [2,3,4]

Affiliations

1. School of Public Health, University of Montreal, Montreal, Quebec
2. Centre de Recherche Interdisciplinaire en Réadaptation du Montréal Métropolitain, Montreal, Quebec, Canada
3. McGill University Health Center, Clinical Epidemiology, Montreal, Quebec, Canada
4. Faculty of Medicine, School of Physical and Occupational Therapy, Epidemiology, Biostatistics, and Occupational Health, McGill University, 3654 Prom. Sir William Osler, Montreal, Quebec, Canada

Corresponding author:

Dr. Sara Ahmed
School of Physical and Occupational Therapy
McGill University
3654 Prom. Sir William Osler, Montreal, Quebec, Canada

Office Phone: 514-398-4400 ext 00531

E-mail : sara.ahmed@mcgill.ca

Abstract

Introduction: Chronic pain is a public health problem of epidemic proportion in most countries with important physical, psychological, social, and economic consequences. The management of chronic pain is complex and requires an integrated network approach between all levels of the health care system and the involvement of several health professionals from different disciplines. Measuring the performance of organizations that provide care to individuals with chronic pain is essential to improve quality of care and requires the use of relevant performance and quality indicators. A scoping review methodology will be used to synthesise the evidence on performance and quality indicators developed for non-cancer chronic pain management across the continuum of care.

Methods and analysis: The following electronic databases will be searched from 2000 onwards**:** Cochrane Effective Practice and Organisation of Care (EPOC) Review Group Specialised Register; Cochrane Library; EMBASE; PubMed; CINAHL; PsycINFO; ProQuest Dissertations and Theses. All types of studies will be included if they are concerned with performance or quality indicators in adults with chronic non-cancer pain. In addition, searches will be conducted on provincial, national, and international health organisations as well as health professional and scientific associations' websites. A qualitative description approach will be used to describe characteristics of each indicator. All identified indicators will be classified according to dimensions covered by Donabedian and the Triple Aim frameworks.

Ethics and dissemination: The scoping review findings will inform the development of a performance measurement system comprising a list of performance indicators, with their level of evidence which can be used by stakeholders to evaluate the quality of care for individuals with chronic non-cancer pain at the patient, institutional and system level. The results will be disseminated via several knowledge translation strategies including two stakeholder meetings, publication and presentation at conferences.

Key words: Non-cancer chronic pain, indicators, performance, quality of care, scoping review

Strengths and limitations of this study

Study strengths:

- This study protocol will provide needed information to support chronic pain quality improvement initiatives;
- Stakeholders, who will be the knowledge users of the study results, will be actively involved in the study;
- Identifying quality improvement domains where developed indicators are lacking has the potential to improve patient care;

Study weaknesses

- no formal assessment of included studies using standardized tool;
- it may be challenging to identify indicators across levels of care and covering all non-cancer chronic pain conditions;

Introduction

Chronic pain (CP) is a public health problem of epidemic proportion in most countries [1]. In fact, CP is very prevalent with estimates in the adult population varying from 11.5 to 55.2% internationally [2 3] with severe or highly limiting chronic pain that may be present in 11% of adults [2]. CP is recognized as a multidimensional and complex phenomenon that may have severe consequences on the physical, psychological, social, and economic dimensions of the lives of sufferers and families [2]. Some of the negative consequences of CP include reduced quality of life, increased rates of depression and an increased risk of suicide [1 4]. Moreover, CP can lead to job loss or reduced work responsibilities and a significant decrease in productivity [1 5]. For example, in Canada the direct health care costs were estimated at more than $ 6 billion a year, and productivity costs related to job loss and sick days at $ 37 billion per year [5]. In the United States, the direct and indirect costs related to CP are estimated to be over $100 billion annually [6]. Furthermore, prevalence of CP increases with age [2 3] and demographic research suggests that chronic pain conditions will become even more of a health problem and socioeconomic burden in the coming years since the population is aging, and consequently usage of the healthcare system will increase [1].

CP is defined as “pain that has persisted beyond the normal tissue healing time, usually taken to be 3 months [7]. There are many categories of CP including musculoskeletal, neuropathic, headaches and “other,” with many subtypes within these groups [8]. Patients with CP require a multi-dimensional therapeutic approach that provides simultaneous assessment and management of somatic, behavioural and psychosocial components of CP that interact in a complex manner resulting in a particular expression of CP in each individual [2 3]. A consequence being that type, intensity, frequency and prognosis varies greatly among CP patients. Hence, given the complexity of CP management, patients receive care at all levels of the health-care system (primary, secondary and tertiary) and require the involvement of many health professionals from different disciplines (anaesthesiologists, pain specialists, nurses, psychologists, physiotherapists, etc.) [8 9].

There is a trend in Canada [10] and elsewhere [11] to organize care around an integrated continuum of services in which patients progressively receive more complex and specialized care according to need and in a coordinated manner between primary, secondary and tertiary providers. In an effort to improve quality of care, measuring the performance of organizations providing care to CP patients is essential to evaluate the extent to which intended results have been achieved and to create a more efficient and effective healthcare system [12]. Implementation of performance and quality indicators can be used by organizations and policy makers to assess the gap between actual and targeted performance in order to improve outcomes, increase health system accountability and reduce the gap between actual and optimal patterns of care [13 14] based on evidence-based guidelines for chronic pain. The identification of existing indicators is the first step for the development of a performance measurement system comprising a core set of reliable, valid, useful and actionable indicators [15 16].

As part of the provincial action plan of the centers of expertise in chronic pain in Quebec, Canada, clinicians, administrators, and decision makers want to define quality indicators to evaluate and improve quality of care for chronic pain across the continuum of care. Therefore, the purpose of this scoping review is to synthesise the evidence on performance and quality indicators (QIs) developed for non-cancer chronic pain management regardless of country, clinical setting or level of care (primary, secondary or tertiary care). More specifically, we aim to 1) identify performance or quality indicators developed for CP care; 2) map the dimensions covered by those indicators according to the conceptual frameworks we will use (see conceptual framework section for description) in order to identify the quality domains which have benefited from more attention or those that have been undervalued; 3) examine the evidence base in support of indictors and 4) produce recommendations about the use of indicators when sufficient evidence exists and identify domains where developed indicators are lacking.

Conceptual frameworks

Donabedian's framework (2005) for examining health services and evaluating quality of care and the Triple Aim framework [17] will be used as a guide for synthesizing the literature and determining which dimensions of performance were favoured and which lack developed indicators. In Donabedian's framework, the three components of health care quality are structure, process, and outcome. The *structure* includes all the factors that affect the context in which care is delivered and includes equipment, human resources, as well as organizational characteristics such as staff training and payment methods. The *process* contains all actions and activities relating to how healthcare is delivered. These can include diagnosis, treatment, preventive care, and patient education. The *outcome* is the result or effect of healthcare on patients or populations, including changes to health status, behaviour, or knowledge as well as patient satisfaction and health-related quality of life. The Triple Aim is a framework developed by the Institute for Healthcare Improvement that describes an approach to optimizing health system performance. According to this model, development or reorganization of healthcare delivery that focuses on three critical dimensions simultaneously will potentially optimize health system performance. These three dimensions are:

1) Improving the patient experience of care (including quality and satisfaction);
2) Improving the health of populations; and
3) Reducing the per capita cost of health care

Table 1 shows in more detail core dimensions and constructs that will be used to categorize performance and quality indicators.

Table 1 Conceptual framework for categorization of performance and quality indicators

Triple Aim framework	Donabedian framework		
	Structure	**Process**	**Outcome**
Population health - Health/functional status - Disease burden - Risk status - Mortality	Indicators	Indicators	Indicators
Patient experience - Safe - Efficient - Effective - Timely - Patient centered - Equitable	Indicators	Indicators	Indicators
Per Capita cost - Total cost per patient per month - Hospital and emergency department - Utilization rate	Indicators	Indicators	Indicators

Methods and analysis

We will employ the scoping review methodology described by Arksey and O'Malley [18] and further clarified by Levac et al. [19] which comprises six stages. For the purpose of this review a performance indicator is defined as a "unit of information, which reflects the performance of the health care system in maintaining or increasing the well-being of its target population" [20]. Furthermore, a performance indicator is a measure of structure, process of care or outcome that is useful at one or more levels of the health system (patient care, organization, community, regional or provincial) to support planning, management or quality improvement. A performance indicator can also measure a specific dimension of performance (e.g. safety, mortality, etc.). Performance indicators focus on desired outcomes or processes of care that are evidence-based [21].

Stage 1: Identifying the research question

The researcher team defined the concepts, target population and have drafted one main research question for the scoping review which is the following: "What are the patient, institutional and system level indicators that are currently in use or proposed for measuring quality of care across the continuum for individuals with chronic non-cancer pain?"

Stage 2: Identifying eligible studies

Studies concerned with performance or quality indicators in adults (18+) with chronic non-cancer pain receiving any treatment or assessment in primary, secondary or tertiary care setting will be included in this review. Studies with the following types of non-cancer chronic pain will be included: *musculoskeletal* (e.g. back pain, arthritis, fibromyalgia, etc.); *neuropathic* (e.g. phantom limb pain; diabetic neuropathy; etc.); *headaches* and *other* (e.g. haemophilia, irritable bowel syndrome, etc.). Studies that include a mix population of adult patients with chronic non-cancer pain and cancer chronic pain will be included if results for non-cancer pain patients are reported separately.

Studies reporting indicators related to acute pain (e.g. post-surgical pain, acute pregnancy/labor pain, etc.), paediatric pain and cancer chronic pain will be excluded considering that these patients have different healthcare needs thus assessing performance of these healthcare services would require different measures.

We will include any type of study design (e.g. randomized control trials, systematic reviews, case studies, quasi-experimental studies, mixed-methods studies, clinical guidelines, qualitative studies, audits or quality assessment reports to assess management of non-cancer chronic pain). Studies published in English or French since 2000 onward will be included to ensure results are relevant to healthcare context. However, limiting the search to those languages only may result in bias towards English and French speaking countries.

Search strategy and information sources

We will search for publications in the following electronic databases**:** the Cochrane Effective Practice and Organisation of Care (EPOC); Review Group Specialised Register; the Cochrane Library; EMBASE; PubMed; CINAHL; PsycINFO; ProQuest Dissertations and Theses.

We will hand search the reference lists of included studies and we will review proceedings and abstracts from relevant conferences on CP held in the last 3 years. We will also search for grey literature in provincial, national, and international health organisations' Web sites and in health professional and scientific associations' websites.

More specifically the following Web sites of organizations/associations will be searched: the NICE; INESSS; CIHI; International Association for the Study of Pain; American Pain Society; Canadian Pain Mechanisms, Canadian Pain Society, Canadian Pain Coalition, Canadian Neuropathy Association, Diagnosis and Management Consortium, Pain Alliance Europe, European Pain Federation**.** Another source for grey literature will be the Internet using a search engines like Google and Yahoo. Because of the large number of results that this search strategy may yield, we will analyze only the first 50 results in each search engine to identify publications about performance indicators developed for non-cancer CP. Literature search strategies will be developed and conducted by an information specialist using medical subject headings (MeSH) and text words related to non-cancer chronic pain performance indicators. This strategy will be peer reviewed by another information specialist to assure that the proposed search strategy is accurate and sensitive enough to capture most of the relevant literature [22].

Stage 3: Study selection

Study selection will be performed in four major stages [23]. First, search results will be merged and duplicates will be removed using reference management software (End Notes X5). Second, a data extraction form based on eligibility criteria described above will be developed by the research team. Third, a pilot test of this data extraction form will be performed: two reviewers, with expertise in CP management, will independently screen the first 25 titles, abstracts, and grey literature of retrieved publications according to eligibility criteria and using the data extraction form. Agreement for study inclusion between the two reviewers will be calculated with the kappa statistic [23]. If agreement is inferior to 75%, reasons for disagreement will be explored, eligibility criteria will be refined and clarified accordingly, and pre-testing will be repeated until the mean inter-rater reliability is satisfactory (kappa >0.75). Fourth, all eligible studies and those classified as unclear (needing more information) will be reviewed as full-text articles by each reviewer independently to determine if all inclusion criteria are met and if the article is to be included or not in the study. Inter-rater agreement will be again calculated on a random sample of 25 publications. Disagreement on study eligibility will be discussed and resolved by consensus. If disagreement remains a third reviewer, also knowledgeable in CP management, will be available to resolve discrepancies.

Stage 4: Data extraction process

A more detailed data extraction form for eligible studies will be developed by the research team. Two reviewers will use the form to extract data for the first 15 eligible publications. Then they will meet to compare consistency of data extraction and coding. Thus clarification and an update of the extraction form will take place in an iterative process until the research team reaches consensus on a final form. All eligible studies will be reviewed as full-text articles by the same two reviewers independently according to this detailed extraction form. The reviewers will meet at the beginning, during the middle, and at the end of the review process to compare and discuss their extraction results. If they disagree, a third reviewer will resolve the discrepancies.

Extracted data will include the following variables: authorship, year of publication, country, status of publication (i.e., published or grey literature), journal, study design (e.g. RCT, qualitative study mixed-methods studies, etc.), indicator description including numerator and denominator when available, study setting where the indicator was used (primary, secondary or tertiary), data source from where the indicator was collected, purpose of the indicator, level in which the indicator was used (patient level, organisational level or population level), measurement properties of the indicator (validity, fidelity if available) and authors' recommendations regarding the indicator. Other variables may be added by the researchers' team when revising and updating the form after analysis of 15 first eligible publications.

Stage 5: Data synthesis

A quantitative and a qualitative synthesis will be performed for all identified indicators. The quantitative synthesis will comprise numerical counts such as number of indicators by setting, by level of use, and per dimension according to the conceptual framework. A deductive content analysis will be performed as indicators will be classified according to the dimensions covered by the conceptual framework described above. All indicators which could not be classified according to the included performance dimensions will be grouped and analysed by the research team by categorizing them to new performance dimensions. Furthermore, a qualitative description approach [24] will be used to describe characteristics of each indicator (e.g. definition of indicator, source of data collection, frequency of collection and reporting, audience for reporting, format of reporting). This overall synthesis of published performance indicators will permit to describe the current state and trends of performance measurement in non-cancer CP management across the continuum of care (primary, secondary and tertiary) and identify gaps in the literature.

Stage 6: Stakeholder consultation

This phase of the recommended methodology for conducting a scoping review offers opportunities to involve stakeholders in different steps of the review process [19]. Besides providing feedback on the research process, stakeholder involvement is an ideal first strategy to start translating findings among potential knowledge users. We will initiate contact with stakeholders at the beginning of the review process and after preliminary results are available. Groups of stakeholders that will be contacted include representatives of researchers in CP, decision makers (hospital, regional and provincial levels), healthcare professionals (e.g. physical therapists, psychologists, doctors, nurses, etc.) and clients from CP programs. Stakeholders will be identified through CP programs listed in the web and via the research team's network. Persons suffering from CP will be contacted via the **Quebec Association of Chronic pain**. Consultations will be held through meetings using a blended format i.e. face-to-face and internet technology (videoconference) to allow for broad participation and to reduce costs. Special attention will be paid to assure that all groups of stakeholders are equally represented. The goal of the first consultation will be to solicit stakeholders' feedback on our approach. Specifically, we will validate our research question, refine or develop additional research questions that can be addressed by this scoping review, validate the data extraction form for eligible studies, gather stakeholders' input to align better with their information needs concerning performance indicators in CP management and gather suggestions for appropriate studies to include. The goal of the second meeting will be to validate preliminary results and get suggestions as how to best disseminate our results to various stakeholder groups. All meetings will be audio-recorded, and an inductive thematic analysis will be performed [24].

Dissemination and ethics

We will ensure the dissemination of our research findings through several strategies. We will engage stakeholders at the beginning and at the end of the research project through the consultation process to identify optimal methods and content to disseminate the results and identify knowledge translations strategies to better align with stakeholders needs. We will also ask stakeholders to disseminate the results across their networks. Furthermore, we will present results of the scoping review at national and international conferences, publish them in a peer-reviewed journal and propose to stakeholders an adapted content (e.g. plain language conclusions) to be posted on their websites.

A scoping review of published articles is a secondary analysis and does not require ethics approval. However, the project will be submitted to an ethics committee for approval for the consultation phase and informed consent will be obtained from stakeholders participating in the project prior to any data collection.

Conclusion

This synthesis of published performance indicators will provide a comprehensive evaluation of current performance measurement in non-cancer CP management across the continuum of care (primary, secondary and tertiary) and identify gaps in the literature. More specifically, the outputs will be a list of performance indicators with their level of evidence and application across the continuum. The indicators will be classified using the Triple Aim Framework, and can be used by stakeholders to evaluate the quality of care for individuals with chronic non-cancer pain at the patient, institutional and system level.

Authors' contributions:

DZ was involved in writing protocol, content expert input; AG was involved in editing the protocol; RV was involved in editing the protocol, stakeholder input; SA was involved in project conception, content expert input, editing protocol.

Funding statement: This project is supported in part by a Knowledge transfer in Rehabilitation Grant from the Richard and Edith Strauss Foundation. SA is funded by an FRQS research career award and AG is funded by an FRQS doctoral fellowship.

Competing interests: authors declare that they have no competing interests.

References

1. Sessle B. The Pain Crisis: What It Is and What Can Be Done. *Pain Research and Treatment* 2012;2012:1-6.

2. Ospina M, C. H. Multidisciplinary Pain Programs for Chronic Pain: Evidence from Systematic Reviews. *HTA 30: Series A Health Technology Assessment*: Alberta Heritage Foundation for Medical Research 2003:48.

3. van Hecke O, Torranc N, Smith BH. Chronic pain epidemiology and its clinical relevance. *British Journal of Anaesthesia* 2013;111(1):13-18.

4. Choiniere M, Dion D, Peng P, Banner R, Barton P.M., A. B. The Canadian STOP-PAIN project - Part 1: Who are the patients on the waitlists of multidisciplinary pain treatment facilities? *Can J Anaesth* 2010;57(6):539-48.

5. Lynch M. The need for a Canadian pain strategy. *Pain Res Manage* 2011;16(2):77-80.

6. Khouzam HR. Chronic pain and its management in primary care. *South Med J* 2000;93(10):946-52.

7. International Association for the Study of Pain (IASP). Classification of chronic pain: Descriptions of chronic pain syndromes and definitions of pain terms. In:. Merskey H, Bogduk N, editors. (2nd ed). Seattle: IASP Press, 1994.

8. AETMIS. Management of Chronic (Non-Cancer) Pain: Organization of Health Services (AETMIS 06-04). Montréal: AETMIS 2006:85.

9. Turk CD, Wilson HD, Cahana A. Treatment of chronic non-cancer pain. *Lancet* 2011;377:2226-35.

10. Canadian Pain Society. National pain strategy, draft v.8, 2010:41.

11. IOM (Institute of Medicine). Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research. Washington, DC: The National Academies Press, 2011.

12. McDavid J, Huse I, Hawthorn L. *Program Evaluation and Performance Measurement: An Introduction to Practice*. 2 ed. Thousand Oaks, CA: SAGE Publications, 2013.

13. Behn RD. Why Measure Performance? Different Purposes Require Different Measures. *Public Administration Review* 2003;63(5):586-606.

14. Kanji G, Moura e Sá P. Sustaining healthcare excellence through performance measurement. *Total Quality Management & Business Excellence* 2003;14(3):269-89.

15. Kötter T, Blozik E, Scherer M. Methods for the guideline-based development of quality indicators–a systematic review. *Implement Sci* 2012;7(21):1-22.

16. Stelfox HT, Straus SE. Measuring quality of care: considering measurement frameworks and needs assessment to guide quality indicator development. *Journal of Clinical Epidemiology* 2013;66:1320e27.

17. Berwick DM, Nolan TW, Whittington J. The triple aim: care, health, and cost. *Health Aff (Millwood)* 2008;27:759-76.

18. Arksey H, O'Malle L. Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology* 2005;8(1):19-42.

19. Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implement Sci* 2010;5(69).

20. Boyce N, McNeil J, Graves D, D. D. Quality and Outcome Indicators for Acute Healthcare Services: National Hospital Outcomes Program Canberra: Department of Health and Family Services, Australian Government Publishing Services, 1997.

21. Health Quality Ontario. A Primary Care Performance Measurement Framework for Ontario: Report of the Steering Committee for the Ontario Primary Care Performance Measurement Initiative: Phase One, Toronto: Queen’s Printer for Ontario, 2014.

22. Sampson M, McGowan J, Cogo E, Grimshaw J, Moher D, Lefebvre C. An evidence-based practice guideline for the peer review of electronic search strategies. *J Clin Epidemiol* 2009;62:944-52.

23. The Cochrane Collaboration. Chapter 7: Selecting studies and collecting data. In: Higgins JPT, Deeks JJ, editors. *Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 (updated March 2011)*. 2011.

24. Miles MB, Huberman M. *Qualitative Data Analysis: An Expanded Sourcebook*. 2 ed: Beverly Hills, CA: Sage Publications, 1994.

BMJ Open

Performance and quality indicators for the management of non-cancer chronic pain: a scoping review protocol

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2015-010487.R1
Article Type:	Protocol
Date Submitted by the Author:	30-Dec-2015
Complete List of Authors:	Zidarov, Diana; University of Montreal, School of Public Health; Centre de Recherche Interdisciplinaire en Réadaptation du Montréal Métropolitain Visca, Regina; McGill University Health Center, Clinical Epidemiology Gogovor, Amede; McGill University, School of Physical and Occupational Therapy Ahmed, Sara; McGill University, School of Physical and Occupational Therapy
Primary Subject Heading:	Health services research
Secondary Subject Heading:	Rehabilitation medicine
Keywords:	Non-cancer chronic pain, indicators, performance, quality of care, scoping review

Performance and quality indicators for the management of non-cancer chronic pain: a scoping review protocol

Diana Zidarov [1, 2], **Regina Visca**[3] **Amédé Gogovor** [4], **Sara Ahmed** [2,3,4]

Affiliations

1. School of Public Health, University of Montreal, Montreal, Quebec
2. Centre de Recherche Interdisciplinaire en Réadaptation du Montréal Métropolitain, Montreal, Quebec, Canada
3. McGill University Health Center, Clinical Epidemiology, Montreal, Quebec, Canada
4. Faculty of Medicine, School of Physical and Occupational Therapy, Epidemiology, Biostatistics, and Occupational Health, McGill University, 3654 Prom. Sir William Osler, Montreal, Quebec, Canada

Corresponding author:

Dr. Sara Ahmed
School of Physical and Occupational Therapy
McGill University
3654 Prom. Sir William Osler, Montreal, Quebec, Canada
Office Phone: 514-398-4400 ext 00531
E-mail : sara.ahmed@mcgill.ca

Abstract

Introduction: Chronic pain is a public health problem of epidemic proportion in most countries with important physical, psychological, social, and economic consequences. The management of chronic pain is complex and requires an integrated network approach between all levels of the health care system and the involvement of several health professionals from different disciplines. Measuring the performance of organizations that provide care to individuals with chronic pain is essential to improve quality of care and requires the use of relevant performance and quality indicators. A scoping review methodology will be used to synthesise the evidence on performance and quality indicators developed for non-cancer chronic pain management across the continuum of care.

Methods and analysis: The following electronic databases will be searched from 2000 onwards**:** Cochrane Effective Practice and Organisation of Care (EPOC) Review Group Specialised Register; Cochrane Library; EMBASE; PubMed; CINAHL; PsycINFO; ProQuest Dissertations and Theses. All types of studies will be included if they are concerned with performance or quality indicators in adults with chronic non-cancer pain. In addition, searches will be conducted on provincial, national, and international health organisations as well as health professional and scientific associations' websites. A qualitative description approach will be used to describe characteristics of each indicator. All identified indicators will be classified according to dimensions covered by Donabedian and the Triple Aim frameworks.

Ethics and dissemination: The scoping review findings will inform the development of a performance measurement system comprising a list of performance indicators, with their level of evidence which can be used by stakeholders to evaluate the quality of care for individuals with chronic non-cancer pain at the patient, institutional and system level. The results will be disseminated via several knowledge translation strategies including two stakeholder meetings, publication and presentation at conferences.

Key words: Non-cancer chronic pain, indicators, performance, quality of care, scoping review

Strengths and limitations of this study

Study strengths:

- This study protocol will provide needed information to support chronic pain quality improvement initiatives;
- Stakeholders, who will be the knowledge users of the study results, will be actively involved in the study;
- Identifying quality improvement domains where developed indicators are lacking has the potential to improve patient care;

Study weaknesses

- no formal assessment of included studies using standardized tool;
- it may be challenging to identify indicators across levels of care and covering all non-cancer chronic pain conditions;

Introduction

Chronic pain (CP) is a public health problem of epidemic proportion in most countries [1]. In fact, CP is very prevalent with estimates in the adult population varying from 11.5 to 55.2% internationally [2 3] with severe or highly limiting chronic pain that may be present in 11% of adults [2]. Although CP is recognized to be a global health problem, management of CP is distributed unequally across the population and globally, with evidence that people living in adverse socio-economic circumstances are far from receiving optimal evaluation, treatment and care [4]. Furthermore, racial and ethnic minorities consistently receive less adequate treatment for CP than the white population [5]. There are also substantial gender differences in the clinical experience of CP with women being substantially at greater risk for many clinical pain conditions [6].

CP is recognized as a multidimensional and complex phenomenon that may have severe consequences on the physical, psychological, social, and economic dimensions of the lives of sufferers and families [2]. Indeed, the unpredictable fluctuation of the intensity of pain has a significant impact on the family and social functioning of the individual. Persons suffering from CP reported greater tensions and breakdown of conjugal relationships as compared to healthy individuals [7 8]. Regarding social functioning, CP sufferers consistently report avoidance and withdrawal from social contact that may lead to additional psychological distress such as feelings of frustration, anger, guilt and despair [7 8]. Other negative consequences of CP include reduced quality of life, increased rates of depression and an increased risk of suicide [1 9]. Moreover, CP can lead to job loss or reduced work responsibilities and a significant decrease in productivity [1 10]. For example, in Canada the direct health care costs were estimated at more than $ 6 billion a year, and productivity costs related to job loss and sick days at $ 37 billion per year [10]. In the United States, the direct and indirect costs related to CP are estimated to be over $100 billion annually [11]. Furthermore, prevalence of CP increases with age [2 3] and demographic research suggests that chronic pain conditions will become even more of a health problem and socioeconomic burden in the coming years since the population is aging, and consequently usage of the healthcare system will increase [1].

CP is defined as "pain that has persisted beyond the normal tissue healing time, usually taken to be 3 months [12]. There are many categories of CP including musculoskeletal, neuropathic, headaches and "other," with many subtypes within these groups [13]. Patients with CP require a multi-dimensional therapeutic approach that provides simultaneous assessment and management of somatic, behavioural and psychosocial components of CP that interact in a complex manner resulting in a particular expression of CP in each individual [2 3]. A consequence being that type, intensity, frequency and prognosis varies greatly among persons with CP. Hence, given the complexity of CP management, patients receive care at all levels of the health-care system (primary, secondary and tertiary) and require the involvement of many health professionals from different disciplines (anaesthesiologists, pain specialists, nurses, psychologists, physiotherapists, etc.) [13 14].

There is a trend in Canada [15] and elsewhere [16] to organize care around an integrated continuum of services in which patients progressively receive more complex and specialized care according to need and in a coordinated manner between primary, secondary and tertiary providers. In an effort to improve quality of care, measuring the performance of organizations providing care to patients with CP is essential to evaluate the extent to which intended results have been achieved and to create a more efficient and effective healthcare system [17]. Implementation of performance and quality indicators can be used by organizations and policy makers to assess the gap between actual and targeted performance in order to improve outcomes, increase health system accountability and reduce the gap between actual and optimal patterns of care [18 19] based on evidence-based guidelines for chronic pain. Understanding how indicators may or may not function differently across different sociodemographic subgroups is also an important consideration to reduce disparities in care. The identification of existing indicators is the first step for the development of a performance measurement system comprising a core set of reliable, valid, useful and actionable indicators [20 21].

As part of the provincial action plan of the centers of expertise in chronic pain in Quebec, Canada, clinicians, administrators, and decision makers want to define quality indicators to evaluate and improve quality of care for CP across the continuum of care. Therefore, the purpose of this scoping review is to synthesise the evidence on performance and quality indicators (QIs) developed for non-cancer chronic pain management regardless of country, clinical setting or level of care (primary, secondary or tertiary care). More specifically, we aim to 1) identify performance or quality indicators developed for CP care; 2) map the dimensions covered by those indicators according to the conceptual frameworks we will use (see conceptual framework section for description) in order to identify the quality domains which have benefited from more attention or those that have been undervalued; 3) examine the evidence base in support of indictors and 4) produce recommendations about the use of indicators when sufficient evidence exists and identify domains where developed indicators are lacking.

Conceptual frameworks

Donabedian's framework (2005) for examining health services and evaluating quality of care and the Triple Aim framework [22] will be used as a guide for synthesizing the literature and determining which dimensions of performance were favoured and which lack developed indicators. In Donabedian's framework, the three components of health care quality are structure, process, and outcome. The *structure* includes all the factors that affect the context in which care is delivered and includes equipment, human resources, as well as organizational characteristics such as staff training and payment methods. The *process* contains all actions and activities relating to how healthcare is delivered. These can include diagnosis, treatment, preventive care, and patient education. The *outcome* is the result or effect of healthcare on patients or populations, including changes to health status, behaviour, or knowledge as well as patient satisfaction and health-related quality of life. The Triple Aim is a framework developed by the Institute for Healthcare Improvement that describes an approach to optimizing health system performance. According to this model, development or reorganization of healthcare delivery that focuses on three critical dimensions simultaneously will potentially optimize health system performance. These three dimensions are:

1) Improving the patient experience of care (including quality and satisfaction);

2) Improving the health of populations;

3) Reducing the per capita cost of health care

Table 1 shows in more detail core dimensions and constructs that will be used to categorize performance and quality indicators.

Table 1 Conceptual framework for categorization of performance and quality indicators

Triple Aim framework	Donabedian framework		
	Structure	Process	Outcome
Population health • Health/functional status • Disease burden • Risk status • Mortality	Indicators	Indicators	Indicators
Patient experience • Safe • Efficient • Effective • Timely • Patient centered • Equitable	Indicators	Indicators	Indicators
Per Capita cost • Total cost per patient per month • Hospital and emergency department • Utilization rate	Indicators	Indicators	Indicators

Methods and analysis

We will employ the scoping review methodology described by Arksey and O'Malley [23] and further clarified by Levac et al. [24] which comprises six stages. For the purpose of this review a performance indicator is defined as a "unit of information, which reflects the performance of the health care system in maintaining or increasing the well-being of its target population" [25]. Furthermore, a performance indicator is a measure of structure, process of care or outcome that is useful at one or more levels of the health system (patient care, organization, community, regional or provincial) to support planning, management or quality improvement. A performance indicator can also measure a specific dimension of performance (e.g. safety, mortality, etc.). Performance indicators focus on desired outcomes or processes of care that are evidence-based [26].

Stage 1: Identifying the research question

The researcher team defined the concepts, target population and have drafted one main research question for the scoping review which is the following: "What are the patient, institutional and system level indicators that are currently in use or proposed for measuring quality of care across the continuum for individuals with chronic non-cancer pain?"

Stage 2: Identifying eligible studies

Studies concerned with performance or quality indicators in adults (18+) with chronic non-cancer pain receiving any treatment or assessment in primary, secondary or tertiary care setting will be included in this review. Studies with the following types of non-cancer chronic pain will be included: *musculoskeletal* (e.g. back pain, arthritis, fibromyalgia, etc.); *neuropathic* (e.g. phantom limb pain; diabetic neuropathy; etc.); *headaches* and *other* (e.g. haemophilia, irritable bowel syndrome, etc.). Studies that include a mix population of adult patients with chronic non-cancer pain and cancer chronic pain will be included if results for non-cancer pain patients are reported separately.

Studies reporting indicators related to acute pain (e.g. post-surgical pain, acute pregnancy/labor pain, etc.), paediatric pain and cancer chronic pain will be excluded considering that these patients have different healthcare needs thus assessing performance of these healthcare services would require different measures.

We will include any type of study design (e.g. randomized control trials, systematic reviews, case studies, quasi-experimental studies, mixed-methods studies, clinical guidelines, qualitative studies, audits or quality assessment reports to assess management of non-cancer chronic pain). Studies published in English or French since 2000 onward will be included to ensure results are relevant to healthcare context. However, limiting the search to those languages only may result in bias towards English and French speaking countries.

Search strategy and information sources

We will search for publications in the following electronic databases**:** the Cochrane Effective Practice and Organisation of Care (EPOC); Review Group Specialised Register; the Cochrane Library; EMBASE; PubMed; CINAHL; PsycINFO; ProQuest Dissertations and Theses (a search strategy in PubMed is shown in appendix A).

We will hand search the reference lists of included studies and we will review proceedings and abstracts from relevant conferences on CP held in the last 3 years. We will also search for grey literature in provincial, national, and international health organisations' Web sites and in health professional and scientific associations' websites.

More specifically the following Web sites of organizations/associations will be searched: the NICE; INESSS; CIHI; International Association for the Study of Pain; American Pain Society; Canadian Pain Mechanisms, Canadian Pain Society, Canadian Pain Coalition, Canadian Neuropathy Association, Diagnosis and Management Consortium, Pain Alliance Europe, European Pain Federation**.** Another source for grey literature will be the Internet using a search engines like Google and Yahoo. Because of the large number of results that this search strategy may yield, we will analyze only the first 50 results in each search engine to identify publications about performance indicators developed for non-cancer CP. Literature search strategies will be developed and conducted by an information specialist using medical subject headings (MeSH) and text words related to non-cancer chronic pain performance indicators. This strategy will be peer reviewed by another information specialist to assure that the proposed search strategy is accurate and sensitive enough to capture most of the relevant literature [27].

Stage 3: Study selection

Study selection will be performed in four major stages [28]. First, search results will be merged and duplicates will be removed using reference management software (End Notes X5). Second, a data extraction form based on eligibility criteria described above will be developed by the research team. Third, a pilot test of this data extraction form will be performed: two reviewers, with expertise in CP management, will independently screen the first 25 titles, abstracts, and grey literature of retrieved publications according to eligibility criteria and using the data extraction form. Agreement for study inclusion between the two reviewers will be calculated with the kappa statistic [28]. If agreement is inferior to 75%, reasons for disagreement will be explored, eligibility criteria will be refined and clarified accordingly, and pre-testing will be repeated until the mean inter-rater reliability is satisfactory (kappa >0.75). Fourth, all eligible studies and those classified as unclear (needing more information) will be reviewed as full-text articles by each reviewer independently to determine if all inclusion criteria are met and if the article is to be included or not in the study. Inter-rater agreement will be again calculated on a random sample of 25 publications. Disagreement on study eligibility will be discussed and resolved by consensus. If disagreement remains a third reviewer, also knowledgeable in CP management, will be available to resolve discrepancies.

Stage 4: Data extraction process

A more detailed data extraction form for eligible studies will be developed by the research team. Two reviewers will use the form to extract data for the first 15 eligible publications. Then they will meet to compare consistency of data extraction and coding. Thus clarification and an update of the extraction form will take place in an iterative process until the research team reaches consensus on a final form. All eligible studies will be reviewed as full-text articles by the same two reviewers independently according to this detailed extraction form. The reviewers will meet at the beginning, during the middle, and at the end of the review process to compare and discuss their extraction results. If they disagree, a third reviewer will resolve the discrepancies.

Extracted data will include the following variables: authorship, year of publication, country, status of publication (i.e., published or grey literature), journal, study design (e.g. RCT, qualitative study mixed-methods studies, etc.), indicator description including numerator and denominator when available, study setting where the indicator was used (primary, secondary or tertiary), data source from where the indicator was collected, purpose of the indicator, level in which the indicator was used (patient level, organisational level or population level), measurement properties of the indicator (validity, fidelity if available) and authors' recommendations regarding the indicator. Other variables may be added by the researchers' team when revising and updating the form after analysis of 15 first eligible publications.

Stage 5: Data synthesis

A quantitative and a qualitative synthesis will be performed for all identified indicators. The quantitative synthesis will comprise numerical counts such as number of indicators by setting, by level of use, and per dimension according to the conceptual framework. A deductive content analysis will be performed as indicators will be classified according to the dimensions covered by the conceptual framework described above. All indicators which could not be classified according to the included performance dimensions will be grouped and analysed by the research team by categorizing them to new performance dimensions. Furthermore, a qualitative description approach [29] will be used to describe characteristics of each indicator (e.g. definition of indicator, source of data collection, frequency of collection and reporting, audience for reporting, format of reporting). This overall synthesis of published performance indicators will allow us to describe the current state and trends of performance measurement in non-cancer CP management across the continuum of care (primary, secondary and tertiary) and identify gaps in performance domains not addressed by the literature.

Stage 6: Stakeholder consultation

This phase of the recommended methodology for conducting a scoping review offers opportunities to involve stakeholders in different steps of the review process [24]. Besides providing feedback on the research process, stakeholder involvement is an ideal first strategy to start translating findings among potential knowledge users. We will initiate contact with stakeholders at the beginning of the review process and after preliminary results are available. Groups of stakeholders that will be contacted include representatives of researchers in CP, decision makers (hospital, regional and provincial levels), healthcare professionals (e.g. physical therapists, psychologists, doctors, nurses, etc.) and clients from CP programs. Stakeholders will be identified through CP programs listed in the web and via the research team's network. Persons suffering from CP will be contacted via the **Quebec Association of Chronic pain**. Consultations will be held through meetings using a blended format i.e. face-to-face and internet technology (videoconference) to allow for broad participation and to reduce costs. Special attention will be paid to assure that all groups of stakeholders are equally represented. The goal of the first consultation will be to solicit stakeholders' feedback on our approach. Specifically, we will validate our research question, refine or develop additional research questions that can be addressed by this scoping review, validate the data extraction form for eligible studies, gather stakeholders' input to align better with their information needs concerning performance indicators in CP management and gather suggestions for appropriate studies to include. The goal of the second meeting will be to validate preliminary results and get suggestions as how to best disseminate our results to various stakeholder groups. All meetings will be audio-recorded, and an inductive thematic analysis will be performed [29].

Dissemination and ethics

We will ensure the dissemination of our research findings through several strategies. We will engage stakeholders at the beginning and at the end of the research project through the consultation process to identify optimal methods and content to disseminate the results and identify knowledge translations strategies to better align with stakeholders needs. We will also ask stakeholders to disseminate the results across their networks. Furthermore, we will present results of the scoping review at national and international conferences, publish them in a peer-reviewed journal and propose to stakeholders an adapted content (e.g. plain language conclusions) to be posted on their websites.

A scoping review of published articles is a secondary analysis and does not require ethics approval. However, the project will be submitted to an ethics committee for approval for the consultation phase and informed consent will be obtained from stakeholders participating in the project prior to any data collection.

Conclusion

This synthesis of published performance indicators will provide a comprehensive evaluation of current performance measurement in non-cancer CP management across the continuum of care (primary, secondary and tertiary) and identify gaps in the literature. More specifically, the outputs will be a list of performance indicators with their level of evidence and application across the continuum. The indicators will be classified using the

Triple Aim Framework, and can be used by stakeholders to evaluate the quality of care for individuals with chronic non-cancer pain at the patient, institutional and system level.

Authors' contributions:

DZ was involved in writing protocol, content expert input; AG was involved in editing the protocol; RV was involved in editing the protocol, stakeholder input; SA was involved in project conception, content expert input, editing protocol.

Funding statement: This project is supported in part by a Knowledge transfer in Rehabilitation Grant from the Richard and Edith Strauss Foundation. SA is funded by an FRQS research career award and AG is funded by an FRQS doctoral fellowship.

Competing interests: authors declare that they have no competing interests.

References

1. Sessle B. The Pain Crisis: What It Is and What Can Be Done. *Pain Research and Treatment* 2012;2012:1-6.

2. Ospina M, Harstall C. Multidisciplinary Pain Programs for Chronic Pain: Evidence from Systematic Reviews. *HTA 30: Series A Health Technology Assessment*: Alberta Heritage Foundation for Medical Research 2003:48.

3. van Hecke O, Torranc N, Smith BH. Chronic pain epidemiology and its clinical relevance. *British Journal of Anaesthesia* 2013;111(1):13-18.

4. Goldberg DS, McGee SJ. Pain as a global public health priority. *BMC Public Health* 2011;11(1):1-5.

5. Mossey JM. Defining Racial and Ethnic Disparities in Pain Management. *Clinical Orthopaedics and Related Research* 2011;469(7):1859-70.

6. Fillingim RB, King CD, Ribeiro-Dasilva MC, Rahim-Williams B, Riley JL. Sex, Gender, and Pain: A Review of Recent Clinical and Experimental Findings. *J Pain* 2009;10(5):447-85.

7. Bunzli S, Watkins R, Smith A, Schütze R, O'Sulliva P. Lives on Hold: A Qualitative Synthesis Exploring the Experience of Chronic Low-back Pain. *Clin J Pain* 2013;29:907-16.

8. Ojala T, Häkkinen A, Karppinen J, Sipilä K, Suutama T, Piirainen A. Chronic pain affects the whole person–a phenomenological study. *Disability and Rehabilitation* 2015;37(4):363-71.

9. Choiniere M, Dion D, Peng P, Banner R, Barton P.M., A. B. The Canadian STOP-PAIN project - Part 1: Who are the patients on the waitlists of multidisciplinary pain treatment facilities? *Can J Anaesth* 2010;57(6):539-48.

10. Lynch M. The need for a Canadian pain strategy. *Pain Res Manage* 2011;16(2):77-80.

11. Khouzam HR. Chronic pain and its management in primary care. *South Med J* 2000;93(10):946-52.

12. International Association for the Study of Pain (IASP). Classification of chronic pain: Descriptions of chronic pain syndromes and definitions of pain terms. In:Merskey H, Bogduk N, editors. 2nd ed. Seattle: IASP Press, 1994.

13. AETMIS. Management of Chronic (Non-Cancer) Pain: Organization of Health Services (AETMIS 06-04). Montréal: AETMIS 2006:85.

14. Turk CD, Wilson HD, Cahana A. Treatment of chronic non-cancer pain. *Lancet* 2011;377:2226-35.

15. Canadian Pain Society. National pain strategy, draft v.8, 2010:41.

16. IOM (Institute of Medicine). Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research. Washington, DC: The National Academies Press, 2011.

17. McDavid J, Huse I, Hawthorn L. *Program Evaluation and Performance Measurement: An Introduction to Practice*. 2nd ed. Thousand Oaks, CA: SAGE Publications, 2013.

18. Behn RD. Why Measure Performance? Different Purposes Require Different Measures. *Public Administration Review* 2003;63(5):586-606.

19. Kanji G, Moura e Sá P. Sustaining healthcare excellence through performance measurement. *Total Quality Management & Business Excellence* 2003;14(3):269-89.

20. Kötter T, Blozik E, Scherer M. Methods for the guideline-based development of quality indicators–a systematic review. *Implement Sci* 2012;7(21):1-22.

21. Stelfox HT, Straus SE. Measuring quality of care: considering measurement frameworks and needs assessment to guide quality indicator development. *Journal of Clinical Epidemiology* 2013;66:1320e27.

22. Berwick DM, Nolan TW, Whittington J. The triple aim: care, health, and cost. *Health Aff (Millwood)* 2008;27:759-76.

23. Arksey H, O'Malle L. Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology* 2005;8(1):19-42.

24. Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implement Sci* 2010;5(69).

25. Boyce N, McNeil J, Graves D, D. D. Quality and Outcome Indicators for Acute Healthcare Services: National Hospital Outcomes Program Canberra: Department of Health and Family Services, Australian Government Publishing Services, 1997.

26. Health Quality Ontario. A Primary Care Performance Measurement Framework for Ontario: Report of the Steering Committee for the Ontario Primary Care Performance Measurement Initiative: Phase One: Toronto: Queen’s Printer for Ontario, 2014.

27. Sampson M, McGowan J, Cogo E, Grimshaw J, Moher D, Lefebvre C. An evidence-based practice guideline for the peer review of electronic search strategies. *J Clin Epidemiol* 2009;62:944-52.

28. The Cochrane Collaboration. Chapter 7: Selecting studies and collecting data. In: Higgins JPT, Deeks JJ, editors. *Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 (updated March 2011)*. 2011.

29. Miles MB, Huberman M. *Qualitative Data Analysis: An Expanded Sourcebook*. 2 ed: Beverly Hills, CA: Sage Publications, 1994.

Appendix A: search strategy for PubMed (2000 to present)

Core Search:

(("Pain"[Mesh]) AND "Pain Management"[Mesh]) AND "Quality of Health Care"[Mesh])

Combined with each of the following using Boolean term "AND"

1. ((performance indicator*[Title/Abstract] OR quality indicator*[Title/Abstract] OR health care quality[Title/Abstract] OR clinical indicator*[Title/Abstract] OR quality improvement[Title/Abstract] OR quality of health care[Title/Abstract] OR quality of care[Title/Abstract] OR performance of health care[Title/Abstract] OR performance of care services[Title/Abstract] OR process of care[Title/Abstract] OR performance measure*[Title/Abstract] OR outcome measure*[Title/Abstract] OR benchmark*[Title/Abstract] OR care outcome*[Title/Abstract] OR health outcome*OR effectiveness[Title/Abstract] OR accessibility[Title/Abstract] OR safety[Title/Abstract] OR equity[Title/Abstract]))

2. (chronic pain[Title/Abstract] OR non cancer chronic pain[Title/Abstract] OR chronic pain management[Title/Abstract] OR chronic pain care[Title/Abstract])

3. (English[lang] OR French[lang])

4. ("2000/01/01"[PDAT])