The header features a blue background with a repeating pattern of white medical icons. These icons include a stethoscope, a laptop, a pill, a tablet, and a clipboard, arranged in a grid-like fashion.

# Canadian Best Practices for the Development of Effective Clinical Decision Support Systems for the Management of Chronic Pain in Primary Care

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# Executive Summary

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## Background

Chronic non-cancer pain (CNCP) affects an estimated 20% of Canadians, and if not adequately addressed, can lead to significant suffering, loss of function, increased healthcare use, and additional complications including opioid and substance use disorders.<sup>1,2</sup> For Canadians with chronic non-cancer pain, accessing specialist care can be extremely challenging; it is estimated that approximately 50% of patients living with chronic pain have had to wait six months or more for treatment.<sup>1,3</sup>

Due to this urgency and lack of widespread, timely access to pain centres and specialists, primary care providers (PCPs) are often responsible for the management of complex patients with CNCP. Clinical practice guidelines on the management of patients with CNCP, while important, alone are insufficient as they are often not developed with point-of-care implementation in mind, and are rarely tailored to primary care providers as target end-users. Digital health solutions, such as tools that are integrated into primary care providers' electronic medical records (EMRs), are therefore critical for improving the prevention, assessment, and management of patients with CNCP in primary care.

## Objectives

To help support Canadian PCPs in their care of patients with CNCP, Health Canada's Substance Use and Addictions Program (SUAP) engaged the Centre for Effective Practice (CEP) to establish the Canadian Best Practices for the Development of Effective Clinical Decision Support Systems (CDSS) for the Management of Chronic Pain Initiative.

The purpose of this initiative was to identify and articulate national best practices for the development of CDSS, specifically EMR-integrated, CNCP management tools for use in primary care, through an iterative process of synthesizing key evidence, engaging a National Advisory Committee composed of clinical experts, stakeholders, and primary care users, and by applying, testing, and refining the key principles in practice.

To test and refine the identified best practices, an existing EMR-integrated CNCP tool for Telus PS Suite was adapted to support primary care providers with chronic pain assessments, diagnosis, treatment, and management.

The national best practices developed through this initiative provide practical, adaptable and actionable principles to apply and consider when developing EMR-integrated point-of-care CDSS tools designed to support primary care clinicians managing patients living with CNCP.

## Application of Best Practices

Applying these best practices, an existing point-of-care electronic medical record (EMR) tool for CNCP was adapted using an iterative tool design process. This process included a targeted literature search to identify clinical content updates based on high-quality evidence, the engagement of a National Advisory Committee, two rounds of clinician usability testing, and on-site pilot testing with six clinicians. Feedback was collected throughout the design process with a focus on opportunities to improve and refine tool content, functionality, alignment to primary care clinical workflow, and improvements to patient care. During pilot testing tool performance was gauged through surveys and 1:1 interviews to evaluate the tool for implementation readiness.

Ultimately, the goal of the updated CDSS is to support PCPs in providing more timely, high-quality chronic pain care; improve providers' appropriate prescribing of opioids; mitigate issues of limited specialist access; reduce the amount of strain and burnout PCPs experience; relieve pressure on the healthcare system; and contribute to sustained improvements in patient outcomes.

## Key Findings

The overarching principles that should guide the development of an integrated electronic tool for CNCP include:

1. Providing the right information at the right time. Evidence-based and trustworthy resources should form the foundation of clinical content that is actionable in primary care settings.
2. Supporting a multimodal approach to care by providing comprehensive content on assessment, pharma- and non-pharmacological options for management, and tools and resources to support patient self-management.
3. Creating a practical and functional tool by integrating technical design features and functionality that can be adapted to meet user needs and support clinical workflow.
4. Recognizing the challenges in primary care around time and access to resources, ensuring the tool does not add to the clinical burden, and instead reduces barriers to higher quality care and engagement.
5. Encouraging early and sustained engagement of clinicians and persons with lived and living experience in the development of the tool, and applying the principles of clinical co-design.

## Recommendations for Implementing Best Practices

### 1. Best Practice: Address clinicians' point-of-care information needs

- Organize information for ease of use and encourage flexible engagement with the tool
- Ensure easy access to patient history and details from previous clinical encounters
- Include appropriate fields for entering information and capturing complexities

### 2. Best Practice: Support a patient-centred approach

- Incorporate elements that support the therapeutic relationship and support patient-provider communication
- Provide opportunities to identify, record, and track patient goals and preferences
- Include patient educational materials, tools, and resources that can be easily shared

### 3. Best Practice: Engage target end users throughout the development process

- Incorporate input from users through usability and pilot testing

# Acknowledgements

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## About CEP

The Centre for Effective Practice (CEP) is one of the largest independent knowledge translation organizations for primary care in Canada. It brings together knowledge, evidence, expertise, and resources to support PCPs in delivering high-quality care and improving patients' health outcomes.

In Ontario alone, CEP's work reaches over 16,000 PCPs each year through established relationships with key organizations and institutions for health and medical education.

CEP's mission is to close the gap between evidence and practice in health care.

## About SUAP

This initiative is funded by Health Canada's Substance Use and Addictions Program (SUAP). SUAP supports a wide range of evidence-informed and innovative substance use prevention, harm reduction and treatment initiatives across Canada at the community, regional and national levels.

## Partnerships

The initiative is supported by the guidance of 2 clinical leads, Dr. Arun Radhakrishnan, and Dr. Cameron Ross. The initiative is further guided by the National Advisory Committee, consisting of 13 members. Committee members were selected based on their jurisdiction, expertise (e.g., primary care, CNCP, substance use), practice environment (e.g., solo, group, interprofessional), organizational sign-off (if applicable), lived experience, and/or experience working with Indigenous populations. A brief overview of the Committee members and their profession/role is listed in the table below\*

Name	Province	Profession/Role
Dr. Arun Radhakrishnan	ON	Family physician
Dr. Cameron Ross	BC	Family physician
Dr. Samir Gupta	ON	Respirologist
Dr. Lori Montgomery	AB	Family physician
Jennifer Daly-Cyr	ON	Lived experience advisor
Dr. Peter Selby	ON	Family physician
Dr. Virginia McEwen	ON	Family physician
Ibrahim Omar	ON	Nurse practitioner

Dwayne Patmore	BC	Lived experience advisor
Owen Adams	ON	Senior advisor, CMA
Dr. Maureen Allen	NS	Family physician
Dr. Norm Buckley	ON	Anesthesiologist
Barbara Eddy	BC	Nurse practitioner

\* The involvement of these individuals in an advisory capacity is not intended to imply their endorsement of the best practices report.

Dr. Radhakrishnan and Dr. Ross in conjunction with the National Advisory Committee provided valuable guidance throughout the initiative lifecycle, including input into best practices and feedback on prototypes and potential use cases which were all used to refine and improve the clinical tool.

This initiative was completed in partnership with the eHealth Centre of Excellence (eCE) and McMaster Michael G. DeGroot National Pain Centre (McMaster NPC). The eCE provided support through the technical design, development, and implementation of the EMR tool. The McMaster NPC supported this initiative in conjunction with their efforts on the 2024 national opioid guideline update. The update focuses on refining the phrasing of opioid prescribing content, and the teams worked together to ensure no obsolete content was present in the EMR tool. The guideline update is also a SUAP-funded project, and supports collaboration with other similar projects to encourage sustainability and longevity of the tool.

# Introduction

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## Background

Chronic non-cancer pain (CNCP) is clinically complex in nature and requires significant time and resources to address in primary care. Point-of-care decision support tools for CNCP have the potential to support evidence-based care, ease clinician cognitive burden, improve the patient care experience, and improve patient outcomes.<sup>4</sup>

An integrated EMR tool helps primary care providers provide timely, high-quality chronic pain care, and ultimately contribute to sustained improvements in patient outcomes. It further supports providers and users by providing evidence-based, point-of-care recommendations in addition to supporting assessments.

Clinical decision support systems (CDSS) are tools that can support clinicians in the care of complex patients and improve patient outcomes. CDSS facilitate knowledge translation by incorporating recent evidence and best practices to guide decision-making and improve patient care.

Best practices for the development of a useful CDSS include recommendations to develop a comprehensive, accessible, and collaborative tool. Harle et al identify the need for “system speed, timely information, simplicity, usability, and fit with clinical workflow” with an emphasis on providing the “right information to the right people in the right format through the right channels at the right points in workflow.”<sup>5</sup>

## Methodology

The primary objective of this initiative was to establish a set of national best practices designed to guide the development of effective CNCP EMR-integrated solutions to support primary care providers to efficiently and compassionately manage patients with CNCP.

This was accomplished through the following key activities:

1. **Engaging key stakeholders** from across Canada who have demonstrated expertise in the topics of CNCP, knowledge translation and implementation in primary care, and/or the development of point-of care tools and EMRs. People with lived or living experience with CNCP, and stakeholders from complementary CNCP and/or substance use programs were specifically identified for potential collaboration and input into the initiative. Additional information about the experts engaged throughout the process is provided in the Acknowledgements section.
2. **Conducting a targeted literature search and grey literature environmental scan** to form an understanding of existing digital health solutions and best practices for developing point-of-care tools for CNCP in primary care. This included identifying:

1. Existing EMR-embedded tools designed to support the management of patients with CNCP in primary care
  2. Papers addressing the design process, key features, utilization or usability of these topic-specific electronic supports, and;
  3. The specific information needs and point-of-care support required by primary care clinicians managing patients with CNCP.
3. Iteratively applying and testing potential best practices by **adapting an existing EMR-integrated management tool** for CNCP.
  4. **Pilot testing the adapted CNCP management tool** in primary care sites in a variety of practice models to evaluate usability and provider satisfaction, and to further validate the best practices.

Additional information regarding the literature search for existing CNCP tools and the overall tool design process are available in Appendix 1 and 2.

The best practices described herein include key recommendations and considerations for developing a CDSS to support the appropriate, effective, efficient, and compassionate management of patients with CNCP in primary care.

# Key Factors to Consider When Developing CDSS

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This document focusses on best practices that should be considered in the development of a CDSS tool for CNCP, however, there are overarching principles that should be considered when developing and implementing successful point-of-care supports for any topic.

Tools such as the GUIDES Checklist have been developed to highlight key factors that should be considered when developing a CDSS, regardless of the topic.<sup>6</sup> It is important to incorporate these general principles and topic-agnostic elements into the development of any successful CDSS intervention.

These key success factors include: <sup>6</sup>

## Domain 1: Computerized decision support context

- 1.1 CDS can achieve the defined quality objectives
- 1.2 The quality of the patient data is adequate
- 1.3 Stakeholders and users accept CDS
- 1.4 CDS can be added to the existing workload, workflows and systems

## Domain 2: Computerized decision support content

- 2.1 The content provides trustworthy evidence-based information
- 2.2 The decision support is relevant and accurate
- 2.3 The decision support provides an appropriate call to action
- 2.4 The amount of decision support is manageable for the target user

## Domain 3: Computerized decision support system

- 3.1 The system is easy to use
- 3.2 The decision support is well delivered
- 3.3 The system delivers the decision support to the right target person
- 3.4 The decision support is available at the right time

## Domain 4: Computerized decision support implementation

- 4.1 Information to users about the computerized decision support system and its functions is appropriate
- 4.2 Other barriers and facilitators to compliance with the decision support advice are assessed/addressed
- 4.3 Implementation is stepwise and the improvements in the computerized decision support system are continuous
- 4.4 Governance of the computerized decision support implementation is appropriate

# Best Practices for Developing CDSS for CNCP

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Recognizing that CNCP is a particularly complex area of care, key topic-related best practices have been identified to guide the development and/or adaptation of EMR-integrated, point-of-care management tools for CNCP in primary care.

There is a broad spectrum of potential functionality that can be included in a CDSS, including automated alerts and reminders, order sets, flow sheets, clinical workflow tools, templates for documentation, tools and best resources for patients, and computerized guidelines and other key clinical elements. The purpose of this initiative was to identify which elements and features are of the most use to primary care clinicians treating patients with CNCP, and provide recommendations on how to incorporate these elements into the development of CDSS to support the care of this population.

## Key Principles for Developing CDSS

1. **Provide the right information at the right time:** Ensure that the tool is based on high-quality evidence that meets the needs of primary care clinicians in their practice setting
2. **Support a multimodal approach to care:** Include comprehensive content on the assessment, pharma- and non-pharmacological options for management, and tools and resources to support patient self-management for CNCP.
3. **Create a practical and functional tool:** Integrate design features and technical functionality that supports clinical workflow and meets the need of the primary care clinician.
4. **Ensure that the tool doesn't add additional clinical burden:** Recognizing the challenges in primary care around time and access to resources, the tool should be convenient to use in practice.
5. **Engage stakeholders throughout the process:** Solicit input from a representative sample of target primary care end-users and persons with lived and living experience in the development of the tool to ensure it is useful and meets their needs in practice.

## Recommendations for Implementing Best Practices

Address Clinicians' Point-of-Care Information Needs	
Organize Information for Ease of Use and Flexible Engagement with the Tool	Aggregate key information into one view or dashboard
	Use visual cues and prompts
	Include design elements that make it easy to find information such as sections that can be expanded or collapsed
	Don't impose the use of mandatory fields
Ensure Easy Access to Patient History and Information from Previous Clinical Encounters	Display key information from previous visits
	Provide relevant metrics that allow for comparison over time
	Allow the copying of information from previous encounters
Include Appropriate Fields for Entering Information	Include flexible fields such as free text boxes for documentation
Support a Patient-Centred Approach	
Support the Therapeutic Relationship	Engage persons with lived and living experience when developing the CDSS
	Provide information and tools such as prompts or 'talking tips' to support effective communication, in the areas of: <ul style="list-style-type: none"> <li>• Using person-centred language</li> <li>• Motivational interviewing techniques</li> <li>• Collaborating and discussing options for management</li> </ul>
Provide Opportunities to Identify, Record, and Track Patient Goals and Preferences	Support the setting and documenting of SMART goals
	Allow for flexibility when documenting a customized treatment plan, key measures, and outcomes
	Include an export feature for sharing details about the care plan with the patient and others supporting their care
Include Shareable Patient Tools and Resources	Include educational material, tools and resources for patients
	Ensure that supporting material can be shared through printing, e-mailing, etc.
Engage Target End Users Throughout Development Process	
Conduct Usability and Pilot Testing	Engage a representative sample of primary-care users in the process (e.g. from different types of practices, geographic locations, and doctors and nurse practitioners with different familiarity and experiences with CNCP in practice).
	Elicit feedback on content and functionality of the tool through usability testing
	Conduct pilot testing to gain insight into how the tool will be used in practice and identify potential barriers and facilitators to use

# 1. Best Practice: Address Clinicians' Point-of-Care Information Needs

## 1.1 Organize Information for Ease of Use and Flexible Engagement with the Tool

A key success factor for CDSS management of chronic pain is alignment with clinical workflow, as misalignment to the clinician information environment will increase cognitive load and frustrate decision-making.<sup>7,8</sup> Design elements that should be incorporated into the tool include aggregating pain-related information, using visual cues to focus attention, and employing hierarchical information organization.<sup>8</sup> Incorporating current best evidence and prompts to alert users to areas to consider can further support the management of CNCP in primary care.<sup>7,8</sup>

CNCP is very complex to manage within a primary care setting, and clinical encounters can vary significantly between patients, and across individual patients over time. Appropriate, comprehensive care for patients with CNCP requires an integrated tool that is flexible enough to support a variety of use cases, and can be adapted to the level of granularity appropriate for the clinician during each encounter.

It should be clear to users that the tool is designed to support them in practice, and they can choose to engage with various functionalities to fit their needs. There should be no mandatory elements of the tool that must be completed during an encounter, and it is important to note that blank fields are not a reflection that something was 'missed'. There is no assumption that all elements of the tool will be relevant or applicable to all CNCP patients, and users will use their clinical judgement to determine which pieces will best support them and their patients at each visit.

It is important to recognize that there may be a variety of different supports and technologies enabled in a practice beyond the EMR. The tool must be adaptive enough to complement these other elements, such as providing opportunities for screeners and forms completed by the patient or by other members of the care team to be appropriately captured in the tool.

### Application in Practice

To align with the best practices identified in the literature, the CNCP EMR tool streamlined data collection by implementing a dashboard with a pain summary, relevant past medical history, and pain-related investigations/consults (Appendix 3a). The dashboard acts as the center-point of the tool; aggregating and organizing key information in one view without overloading the user with too much information at once.

Within the pain summary, lengthy vertical expand-and-collapse tabs were avoided in favor of condensed horizontal tabs, supporting ease of navigation between assessment, management, non-pharmacological, and pharmacological treatments, and patient resources. Yellow information flags are embedded to indicate where additional information or

recommendations are available, which can be expanded or collapsed based on the needs of the individual patient, clinic, or clinician. This condenses the look and feel of the tool without sacrificing important clinical content. Where appropriate, the design team opted to include additional information outside the body of the form, through easily accessible links directed to appropriate additional resources. For dosing and prescribing, providers are supported with talking tips and decision support. Opioid prescribing includes unique decision supports with pop-ups detailing the patient's opioid prescriptions, conversion tables, tapering medications, etc. These supports are customized depending on the opioid status of the patient.

Clinicians who pilot tested the tool had positive comments about the organization of information, including that it helped to organize clinical thoughts; that Yellow Flags at fingertips reduced burden of recall; and that the dashboard was helpful. Areas of improvement were constructive and consistent with existing literature on the difficulties of developing CDSS for chronic pain, identifying (among others) the complexity of information and requirement for multiple patient encounters as potential barriers.

## **1.2 Ensure Easy Access to Patient History and Information from Previous Clinical Encounters**

To manage the depth and complexity of information required when managing patients with chronic pain, it is important to ensure clinicians have easy access to relevant patient history, and the ability to pull over key details from previous visits.<sup>5,7</sup> Aggregating key information such as past and current medications, consultation histories, test results, past approaches to management, and discussions around management and goals of care can reduce provider burden.<sup>4</sup>

The CDSS should surface relevant information from the EMR and present key metrics in a way that allows for comparison across time to further reduce the burden of identifying information that may be scattered throughout a patient's record.<sup>4,7</sup> Including this functionality in the tool can save the user a significant amount of time during a visit, and allows the clinician to see cumulative changes and trends over time.

### **Application In Practice**

Based on feedback from users and needs identified in the literature, features were added to the CDSS tool to permit users to copy information from previous visits, such as when documenting the "main reason for visit", patient goals, non-pharmacological and pharmacological treatment plans. Additional functionality was included that enabled relevant metrics to be pulled from the dashboard, and graphed over time, including data from the patient's pain severity score, Brief Pain Inventory (BPI), General Anxiety Disorder 7-item scale (GAD-7), and patient health questionnaire (PHQ-9). This helps providers review trends in scores more easily during follow-up visits. Assessments to capture these metrics such as the BPI, PHQ-9, GAD-7, and urine drug screen (UDS), expand in a separate window when clicked. This encourages entry of

discrete and searchable data with open text boxes as needed to improve ease in finding historical information.

### **1.3 Include Appropriate Fields for Entering Information and Documenting Complexities**

Part of the challenge in addressing CNCP in primary care is the significant amount of information that must be captured, reviewed and addressed in a single visit. If not thoughtfully developed, a CDSS can impose an inappropriately rigid framework that doesn't allow a clinician to adequately capture the necessary information regarding a patient's experience.<sup>9</sup> The CDSS must include flexible areas for recording details that don't necessarily fit easily into a framework, without becoming unwieldy. Appropriate free text fields are important for capturing information regarding socioeconomic factors that may impact care, and should be available for users to appropriately document patients' personal response to treatments, which is often quite nuanced.

#### **Application In Practice**

The CDSS was designed with free text fields for primary care providers to document information according to their needs. An additional feature allows users to easily tab through to select appropriate 'stamp text', formatted blocks of pre-written text that are commonly entered in areas such as the subjective pain information. This can save time entering blocks of repetitive text, and also ensures uniformity across users. If more space is required to enter notes, there are additional text boxes at the bottom of the each section.

## 2. Best Practice: Support a Patient-Centred Approach

### 2.1 Support Therapeutic Relationship

A key facet of patient-centred pain care is developing a positive, supportive, and respectful therapeutic relationship, or ‘therapeutic alliance’.<sup>10</sup> Each patient’s experience and response to chronic pain can vary, and respecting and validating the individual’s experience is a key component of care. Involving persons with lived and living experience during the tool development process can help ensure that their experience informs the content of the CDSS and the way the tool is used during a clinical encounter.

Acknowledging the patient’s experience early in the stages of pain management can encourage compliance with a proposed treatment plan and help a patient to achieve their therapeutic goals.<sup>11</sup> This validation of a patient’s narrative and unique experience is an important part of the process, and those with chronic pain have expressed the need to have their experiences acknowledged, believed, and supported.<sup>11</sup> When developing a CDSS it is important to remember that effective communication between patients and healthcare providers is crucial, and use of the tool should not detract from this relationship. The tool should incorporate elements that support the therapeutic relationship and patient-provider communication, such as tips for engaging with patients regarding their experience, and for framing options for management.

#### Application in Practice

To help support appropriate, respectful communication, we identified the need for information and tools to facilitate conversations between providers and patients. The CDSS includes elements to help support communication with patients by encouraging conversations that are engaging, supportive, and collaborative. This includes embedded talking tips that can be clicked on and viewed as needed. Feedback from the advisory council stressed the importance of using person-centred language during an encounter, and identified the need to include additional support for clinicians regarding motivational interviewing techniques.

### 2.2 Provide Opportunities to Identify, Record, and Track Patient Goals and Preferences

A useful CDSS for CNCP should support and enable shared decision-making between clinicians and patients; this can be achieved through thoughtful design choices that help place the patient at the centre of their care and incorporate supports for patient self-management.<sup>7</sup> To help drive a patient-centred approach to chronic pain management, patient preferences, priorities, and specific circumstances should be easy to document, and simple to refer to at subsequent visits.

Providers should work with patients to set specific, measurable, achievable, relevant, and time-limited (SMART) goals for pain management, and regularly review these goals together. A

useful CNCP CDSS can help providers identify and prioritize patient treatment goals and preferences and encourage the user to clearly document this in the patient's medical record.<sup>12</sup>

A tailored approach to managing CNCP should be based on the needs and goals of the individual living with pain. A CDSS should allow for customization to document and track the measures and outcomes that are important to both the patient and the clinician, such as functional improvements, pain intensity as well as pain scores.<sup>8</sup>

The CDSS should also help empower patients with CNCP to actively participate in their care by providing opportunities for the PCP to document a treatment plan customized to each patient's individual needs and goals. To ensure that everyone has a shared understanding of a patient's goals, the CDSS should include an export feature to share information directly with patients and others who are supporting their care. Patient-centred care should be strengthened by incorporating prompts and tips for effective communication, and tools to report, record and share results.

### **Application In Practice**

To support shared decision making, the 'management: general' tab in the tool encourages providers to easily document and refer to SMART treatment goals (Appendix 3b). This feature encourages discussion with patients and can help with supporting more effective patient-provider collaboration. The tool also includes relevant guidance, prompts, and tips for facilitating patient self-management.

## **2.3 Include Shareable Patient Educational Materials, Tools, and Resources**

People with lived experience require tools and resources to support the management of their chronic pain.<sup>13</sup> An effective CNCP tool should equip clinicians with self-management resources that they can preview and review together with their patients, and then share if desired.<sup>4</sup>

To enable that sharing of educational and self-management resources with patients, the CNCP tool should allow the user to easily review relevant material with their patient, and then share selected materials via print or email. Providing educational materials and information about their care plan and goals can support and empower patients to take an active role in their care.

### **Application In Practice**

Feedback from usability testing highlighted the need for patient resources that could be emailed and/or printed for patients. The 'patient resources' tab curates relevant patient material for consideration and allows the provider to easily check off the resources they would like to print and/or email patients (Appendix 3c). Users also have the ability to see and review previously selected resources. Print functionality has also been built into other aspects of a visit, such as when a clinician completes a form and wants to share that documentation with the patient for their reference, or to share with other members of their care team.

## 3. Best Practice: Engage Target End Users Throughout Development Process

### 3.1 Conduct Usability and Pilot Testing

It is important to work collaboratively with target end users throughout the tool development process. Engaging in a user-centered model of tool development improves the suitability, objectivity, and functionality of the tool in practice.<sup>12</sup> Usability and pilot testing are important opportunities for users to provide feedback on the general layout and design of the tool, the relevancy and appropriateness of the content, potential enablers and barriers of implementing the tool in practice, and to share ideas to improve uptake of the tool.

Engaging a representative sample of primary care clinicians who potentially see patients with chronic pain in their practice through usability and pilot testing can help ensure that the CNCP tool:<sup>7,12,14,15</sup>

1. Meets their specific information needs and addresses gaps in care
2. Supports clinicians seamlessly in practice
3. Is useful across a variety of patient encounters
4. Reflects the appropriate clinical context and needs of patients
5. Can be smoothly integrated into their workflow

Multiple rounds of usability testing should be completed prior to implementing a CDSS.<sup>15</sup> Failing to conduct rigorous testing can result in poor uptake of the CDSS and can be a missed opportunity to highlight the benefits of the CDSS in supporting patient care and improving patient outcomes.<sup>16</sup>

Pilot testing a version of the tool that is nearly ready to launch allows the development team to gain insight into how the tool would be used in regular practice, and make additional refinements to improve user experience.

#### Application in Practice

Two rounds of usability testing were conducted with primary care clinicians from different practice models to elicit feedback on early iterations of the tool. A variety of perspectives were solicited, with some participants representing those who have broad primary care practices and may see patients with CNCP, while others approached their review from a more focused interest in CNCP.

After reviewing the tool, participants were asked questions related to the tool functionality and usability, items they found helpful, and suggested areas for improvement. The feedback was reviewed by the internal project team and discussed with the clinical leads and Advisory Committee, and incorporated, as appropriate, into the next iteration of the tool.

The first round of usability testing focused primarily on the content and functionality of the tool, and involved 2 family physicians and 1 primary care nurse practitioner. During the first round of usability testing, the clinicians generally found the information in the tool to be helpful in guiding assessment, diagnosis, treatment, and management, however the extensiveness and length of the tool were consistently noted as areas for improvement.

The second round of usability testing involved 2 family physicians, 2 primary care nurse practitioners, and 1 respiriologist. Input in this round focused on the layout and format of the tool to ensure ease of navigation and fit within workflow, as well as ensuring appropriate, accurate, and relevant language was used throughout. Feedback supported the use of prompts and tool tips, the embedding of accessory forms, as well as the inclusion of textboxes, links and linking features. Additional feedback was provided regarding the amount and context of 'stamp text'; blocks of pre-formatted text that can be inserted in the record.

Following the usability testing, the tool was updated in preparation for pilot testing in a live environment with 3 clinics and 6 providers. To engage a representative sample of users, potential pilot sites and users were selected based on factors such as their region or location, number of available providers, schedules for participation, patient population, and CNCP familiarity and practice. Each participant received training on the tool, completed a pre-intervention survey, and were expected to use the tool with a minimum of 5 patients during the testing period. At the end of each pilot testing day, participants completed a brief survey to identify any issues or enhancements opportunities to improve the tool's ease of use and functionality, and additional feedback was obtained through post-intervention surveys and interviews.

Overall, feedback on the tool has been very positive, with providers reporting that the tool helps them to be more confident in their care of patients with CNCP, and that their patients said that they feel more engaged participating in their care.

Throughout the usability and pilot testing stages, the clinical leads and National Advisory Committee were presented with the results of the usability and pilot testing, and was asked to provide insight into how suggested changes to the tool could potentially impact care, and best meet the needs of target end-users. This additional level of engagement helped ensure that a wide range of perspectives were considered during the development of the CDSS.

## Conclusion

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Evidence-based clinical decision support systems have the potential to support clinicians in their practice, and help build primary care capacity to deliver high-quality, compassionate care for patients with chronic non-cancer pain.

The best practices described herein outline practical and actionable principles to apply when developing or adapting CDSS tools for CNCP management in primary care. These best practices were developed in an evidence-based manner through an appraisal of existing tools, targeted literature reviews, and the expertise of clinical leads and the National Advisory Committee. They were then applied in practice to the adaptation of a point-of-care EMR CDSS for CNCP using an iterative clinical co-design process that incorporated key design features and information elements to support CNCP management in primary care.

Best practices include engaging end users throughout the development process, addressing PCP's point-of-care information needs, and including key elements that support a patient-centred approach to care. These principles will aid in the development of future CDSS tools, to support for appropriate, effective, efficient, and compassionate CNCP management

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# Appendix 1: Search Strategy for Existing CNCP CDSS

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## Overview

A targeted literature search was conducted in July 2022 and updated in February 2024 to identify existing clinical decision support systems (CDSSs) to help primary care clinicians manage patients with chronic non-cancer pain (CNCP).

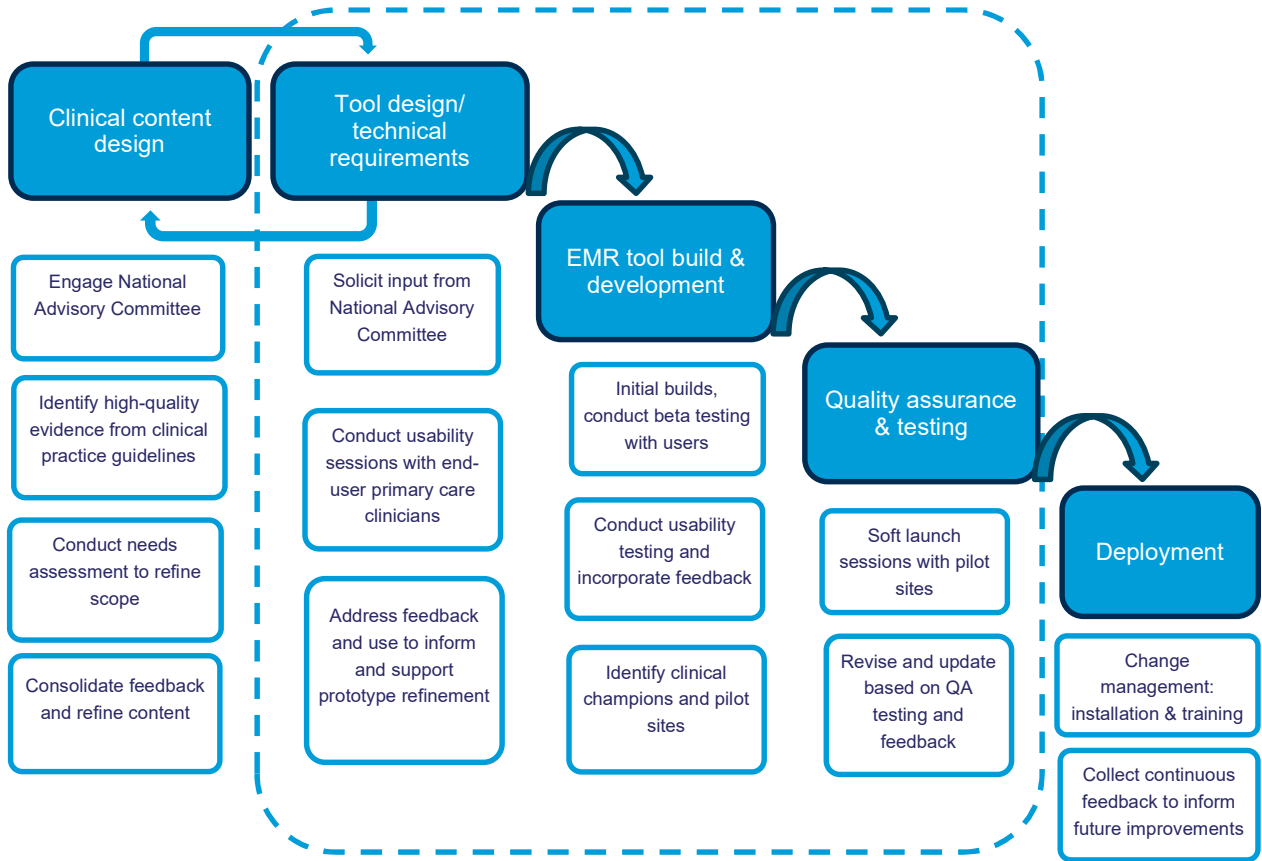
The search was designed to identify English language point-of-care tools for primary care clinicians that were incorporated into an electronic medical/health record, and which were developed, launched, or evaluated between 2017-present. The search strategy was designed to capture tools that addressed chronic non-cancer pain broadly rather than those that targeted specific aspects of care or pain.

## Summary of Search Strategy

A multi-faceted approach was used to identify relevant CDSS, which included:

- 1) Reviewing high-quality CNCP clinical practice guidelines for any tools referenced or discussed therein.
- 2) Conducting a search of the indexed literature using Ovid MEDLINE to identify studies of validated tools, or publications describing the process of developing/implementing the tools. The search strategy used was: (Chronic Pain/ or non\$ancer pain.m\_titl or chronic pain.m\_titl) and (Decision Support Techniques/ or Decision Support Systems, Clinical/ or ("decision support" or "management tool" or "assessment tool" or "point of care tool" or "clinical tool" or "decision aid" or algorithm or pathway or "decision rule" or "prediction rule" or "EMR tool" OR "EHR tool" or "CDSS").mp.
- 3) Conducting a grey literature search of the internet using Google. The first 3 pages of results were examined for each combination of the following search terms: (Chronic pain OR pain OR chronic non-cancer pain) AND (Clinical decision support OR OR CDSS OR clinical decision support system OR electronic clinical decision support OR eCDS OR EMR OR Custom form OR Dashboard OR point of care tool OR tool)
- 4) Conducting a focused search of specific pain- or implementation- focused online resources such as the RUIS McGill Centre of Expertise in Chronic Pain, AHRQ Clinical Decision Support, Think Research, Applied Clinical Informatics Journal, Implementation Science, Canadian Journal of Pain, Healthcare Information and Management Systems Society, etc.


# Appendix 2: Tool Design Process



# Appendix 3: Application in Practice


## Appendix 3a: Tool Dashboard

Mar 12, 2024 Chronic Non-Cancer Pain Tool MG



Centre for Effective Practice

### Chronic Non-Cancer Pain Tool



Last visit: Mar 12, 2024
First visit: Jan 12, 2024
Print form

**Management of CNCP Form**

The CEP CNCP tool is based on synthesized high-quality guidelines. [For the list of evidence sources used click here.](#)

Work with your patients to identify and understand the complex bio-psycho-social elements involved in their pain and emphasize the value of a multi-modal approach to manage their pain. Management is often a process of repeated trials to determine the effects of specific treatments and can take a few months or years to optimize. Once a treatment plan is identified, initiate, adapt and evaluate how it improves daily function, pain, mood and quality of life, while assessing the risks/benefits for long-term use. It is also important to optimally manage any active underlying health issues related to a patient's pain (e.g., diabetes, inflammatory arthritis).

**Dashboard**

Pain Summary
Relevant Past Medical History
Pain Related Investigations / Consults

<input type="checkbox"/> Headaches <input type="checkbox"/> Osteoarthritis (OA) <input type="checkbox"/> Low Back Pain (LBP) <input type="checkbox"/> Myofascial Pain		<input type="checkbox"/> Fibromyalgia (FM) <input type="checkbox"/> Neuropathic Pain <input type="checkbox"/> Other	
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Metrics	Latest value	Date	Frequency (months)	Update:
Pain Severity Score		due	12	Open BPI Tool
Pain Interference Score		due	12	Open BPI Tool
PHQ-9		due	12	Open PHQ-9 Tool
GAD-7		due	12	Open GAD-7 Tool
UDS		due	12	Open Lab Req

Assessment
Management: General
Management: Non-Pharmacological
Management: Pharmacological
Patient Resources

## Appendix 3b: Tracking Patient Goals

Assessment
Management: General
Management: Non-Pharmacological
Management: Pharmacological
Patient Resources


Pharmacotherapy is not the sole treatment option for pain. A treatment plan should be a multi-modal strategy. Consider using the PEER Decision Aid to support patients in their decision-making. [Open PEER Decision Aid site](#)

**First line treatment**

First line treatment includes the use of non-pharmacological therapy and non-opioid medications to manage pain. Medication should be adjusted as needed, minimizing polypharmacy as required. Consider using the BPI to evaluate treatment on pain, function and mood.

**Treatment goals**

Work with the patient to identify goals towards which the patient would like to work to.

Use the SMART framework to help define goals. [For more SMART goals guidance click here.](#)  [Copy from prior visit](#)

- 1.
- 2.
- 3.

## Appendix 3c: Shareable Patient Educational Materials, Tools, and Resources

Assessment	Management: General	Management: Non-Pharmacological	Management: Pharmacological	Patient Resources
<p>Select the resources below that you would like to share with the patient. You can also click the links below to open the resource to print or share via email.</p>				
<input type="checkbox"/>	Introduction to Mindfulness for Chronic Pain	<a href="#">Visit webpage</a>		
<input type="checkbox"/>	Power over pain	<a href="#">Visit webpage</a>		
<input type="checkbox"/>	Understanding and rethinking chronic pain for patients	<a href="#">Visit webpage</a>		
<input type="checkbox"/>	Exercise videos (Pain BC)	<a href="#">Visit webpage</a>		
<input type="checkbox"/>	Exercise videos (Dr Andrea Furlan)	<a href="#">Visit webpage</a>		
<input type="checkbox"/>	Understanding low back pain (Dr. Mike Evans)	<a href="#">Visit webpage</a>		
<input type="checkbox"/>	RAC LBP Exercise videos	<a href="#">Visit webpage</a>		<a href="#">Copy section from prior visit</a>
<input type="checkbox"/>	Ecouch	<a href="#">Visit webpage</a>		<a href="#">Print or Email</a>
<input type="checkbox"/>	Fact Sheet: Chronic Pain (PDF)	<a href="#">Visit webpage</a>		
<input type="checkbox"/>	The Arthritis Society of Canada: managing Chronic Pain	<a href="#">Visit webpage</a>		
<input type="checkbox"/>	RNAO Fact Sheet: Helping people manage their pain	<a href="#">Visit webpage</a>		
<input type="checkbox"/>	Canadian Pain Coalitions- Pain Resource Centre	<a href="#">Visit webpage</a>		
<input type="checkbox"/>	Prescription opioids: What you need to know (CDC)	<a href="#">Visit webpage</a>		
<input type="checkbox"/>	Messages for patients taking opioids (McMaster University)	<a href="#">Visit webpage</a>		
<input type="checkbox"/>	Best Advice for people taking opioid medications (Mike Evans)	<a href="#">Visit webpage</a>		
<input type="checkbox"/>	Opioid Pain Medicines Information for Patients and Families (ISMP Canada Opioid Stewardship)	<a href="#">Visit webpage</a>		