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Harnessing Artificial Intelligence (AI) Tools in Primary Care:

The Promise of Being Smarter, Safer, and More Present

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Why Consider a Shift to Using AI Now?

Primary care clinicians (PCCs) are increasingly overwhelmed by the rising number of tasks, expanding patient rosters, and the ever-growing volume of new data and studies. Artificial Intelligence (AI) has captured the attention of many clinicians for both personal and professional use. The College of Family Physicians of Canada (CFPC) AI Working Group has highlighted the growing role of AI in family medicine.¹ These applications are emerging across prevention, decision support, and efficiency. However, most remain largely insufficiently tested in or validated for clinical practice, making careful implementation essential to maximize benefits and minimize harm.² In the U.S., AI is already helping to reduce clerical burdens by drafting letters, simplifying forms, or explaining results, yet clinicians are cautioned against its unsupervised use in direct clinical decision-making due to risks such as bias and hallucination.²

This article focuses on exploring the evolving AI options available to PCCs. We aim to provide a practical framework for evaluating these tools, highlight key features worth considering, and suggest strategies for effective and safer implementation.

Understanding the Basics of AI

AI differs from traditional technology because it does not follow fixed, pre-programmed rules. Instead, AI systems learn from data, allowing them to recognize patterns, make predictions, and generate responses.²

The foundation of today's most widely used AI tools are **Large Language Models (LLMs)**. These models, such as ChatGPT, are trained on vast amounts of text to learn the statistical relationships between words and concepts.³ When asked a question, an LLM does not "recall" facts. Instead, it constructs an answer by predicting the most likely sequence of words, essentially functioning as a sophisticated form of predictive text.³

Why understanding the basics of AI matters in clinical care:

- **Training data quality matters.**
 - Specialized AI tools (e.g., OpenEvidence) rely on vetted medical sources for their training, whereas general LLMs trained on broad internet data are more prone to errors and bias.
- **Responses can vary significantly.**
 - The same question may yield different outputs depending on the model or AI agent used. Even the same agent can generate different responses to similar questions because of the randomness in text prediction.
- **Hallucinations can occur.**
 - AI can produce plausible but factually incorrect statements. This may happen when training data is incomplete or biased, leading the agent to 'fill in the gaps' with confabulated associations. This poses a key safety concern in healthcare, where even small inaccuracies can have serious consequences.

To Use or Not to Use AI?

Clinicians should follow three key principles when considering the use of AI. They should only use AI as a tool to augment their work.

1. **Never first:** Clinicians should use AI only after applying their own clinical knowledge and experience.
2. **The assistant not the professor.** Think of AI as an assistant or student that produces a draft, rather than providing the final answer to a question.
3. **Always question and verify.** Always verify outputs against one's clinical judgment, knowledge of current guidelines, and evidence before applying them to patient care.

The Hidden Cost of AI in Healthcare: Is Clinical Thinking at Risk?

Some experts are concerned that over-reliance on AI could lead to cognitive atrophy. Early data from some exploratory projects suggest that using AI for cognitive offloading may hinder the development of problem-solving skills.⁴ Concerns regarding skill atrophy and over-reliance on AI are widespread.⁵

A second perspective is that AI, when applied thoughtfully, can help clinicians manage cognitive overload and improve care.⁶ Evidence indicates that tools such as scribes and AI-driven workflow automation can reduce clerical burdens, enhance efficiency, and allow clinicians to spend more time in direct patient care, potentially reducing burnout and improving the quality of care.^{6,7}

In summary, the long-term effect of AI on human cognition is unknown. Relying on AI to perform all cognitive tasks could potentially lead to atrophy of these skills. For clinicians, it is important to view AI as a tool to complement their knowledge and training.

Safe Use of AI for Clinicians – A Framework

Canadian regulatory and professional organizations have provided guidance on the safe use of AI in clinical practice. The Canadian Medical Protective Association (CMPA) highlights both the opportunities and medico-legal risks associated with AI, emphasizing that clinicians remain responsible for patient care decisions.⁸ Similarly, the College of Physicians and Surgeons

of British Columbia (CPSBC) has issued interim guidance stressing privacy, informed consent, transparency, and accountability when integrating AI tools into medical care.⁹ Collectively, these advisories underline that AI can complement, but never replace, clinical judgment. In addition, its use must align with professional, ethical, and legal standards.

When integrating AI into practice, clinicians should begin with two essential principles:

- **Protect patient privacy:** Never input identifiable patient information into general-purpose AI tools. Use only information that is de-identified, anonymized, or publicly available (e.g., guideline PDFs, published articles).
- **Apply a structured framework for queries:** Consider the following framework (Role, Risk) when deciding how to use AI in clinical settings (Table 1).⁴

AI Scribes Have Highlighted a Potential Role for AI

AI medical scribes are among the first AI tools being adopted by Canadian clinicians.¹⁰ These technologies are modernizing documentation workflows and have changed clinician-patient interactions.¹¹ These tools utilize ambient speech recognition and natural language processing to passively listen to visits, generate notes, and reduce the administrative burdens of documentation.¹² AI scribes provide cognitive support, enabling clinicians to shift their focus from documentation to actively listening and engaging with patients,¹² which, allows clinicians to focus on goal-directed therapy and/or planned, proactive preventative care whilst remaining more engaged during encounters. Patients may also benefit from AI-generated patient summaries and the potential enhanced face-to-face time with their clinician.¹² AI scribes are not without risks, including potential errors, bias, and privacy concerns. As frontline tools, AI scribes play a direct role in supporting clinician presence and performance.^{11,12}

AI as a Support Tool Across Primary Care Roles

PCCs often manage diverse roles beyond direct patient treatment, including clinical and administrative tasks, as well as educational duties.

Risk	• Each task performed by AI carries some risk. • There are three key risk categories for the use of AI: ◦ Low-stakes tasks: Where potential errors carry minimal risk, which includes tasks such as drafting emails or creating educational materials. ◦ Medium-stakes tasks: These require increased clinician oversight due to increasing ramifications, such as summarizing research for clinician review. ◦ High-stakes tasks: These carry significant consequences if AI makes mistakes. It is unsafe for AI to perform these tasks without direct clinician control. These include tasks such as diagnostic and prescribing decisions.
Role	• The perspective from which the question is asked depends on what role the clinician is playing in their multiple roles including: ◦ 1:1 clinical care ◦ Seeking evidence-based guidance ◦ Development of patient education material ◦ Clinic administration optimization workflows.

Table 1. Concepts of Risk and Role in the Clinical Use of AI; courtesy of Daniel Ngui, MD, FCFP and Michael Boivin, Rph, CDE, CBE.

The integration of AI can help to transform how these roles are managed, offering new ways to enhance efficiency, support professional development, and improve patient care. **Figure 1** illustrates how AI can support the many roles of clinicians.

Choosing the Correct AI Tool

Healthcare professionals should evaluate different AI tools based on their training context and original design intent, as these factors may influence the likelihood of bias or the risk of hallucinations (**Table 2**). Each tool has its own strengths and weaknesses, therefore, clinicians are encouraged to experiment with multiple AI agents to determine which works best for the task at hand.

Examples of Everyday AI Uses in Primary Care

The role for AI in clinical practice is evolving rapidly, extending beyond tools such as AI scribes. Clinicians can now consider a variety of use cases where AI adds value. The current roles for AI can be categorized into three main groups:

- Simplifying time consuming tasks such as drafting and revising letters for patients, or for clinic management tasks such as writing internal memos, formatting complex meeting minutes, or developing office manuals.
- Assisting PCCs in improving daily practices and workflows.
- Assisting with the synthesis and review of large volumes of data, such as from journal articles, clinical practice guidelines, or medical presentations.

Practice pearls for AI use in clinical care may include:

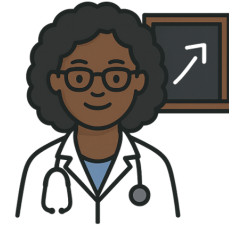
- **Use voice-to-text:** Dictate queries directly to speed up interactions.
- **Track projects and tasks:** Many AI tools can function as project trackers or maintain running to-do lists.
- **Upload or drag and drop context:** Share snippets of documents, full PDFs, URLs, or images (e.g., guidelines, patient handouts, research articles). Please ensure any patient information is fully redacted before uploading. The AI can then summarize, generate action items, or generate patient-friendly materials.
- **Work across multiple windows:** Keep separate AI windows open for different tasks or AI agents (e.g., one for clinical summaries, one for teaching preparations, and one for administrative work).



Clinician: Direct patient care tasks such as writing letters or reviewing and summarizing the latest clinical practice guidelines



Learner: AI can assist in continuing professional development and keep track of latest guidelines and trial data



Educator: Teaching residents, creating CME content, keeping track and sharing for your trainee



Consultant: Preparing for meetings by using AI for clinical trial summaries and gap analysis literature synthesis



Leader: Developing clinic policies, meeting summarization and creating team newsletters or communications

Figure 1. The Potential of AI to Support the Many Roles of Primary Care Clinicians; courtesy of Daniel Ngui, MD, FCFP and Michael Boivin, Rph, CDE, CBE.

- **Personalize the settings:** Provide the AI with context on who you are and what you value (e.g., "I am a Canadian primary care clinician who prefers evidence-based, guideline-relevant material"). This helps improve the consistency and relevance of its responses.

AI tools can also support interprofessional collaboration. Teams should first agree on the ways AI should be used. For example, tasks such as drafting summaries of guidelines, generating links to patient education materials, or sharing overviews of new clinical trials should be treated as starting points for team discussion and review, not as final authority. This approach strengthens teamwork while ensuring clinical efficiency. Additional examples of AI-supported tasks that clinicians can consider are listed in **Table 3**.

Improve Your AI Results by Improving Your Prompt

The quality of an AI-generated response largely depends on **asking the right question**. The more detailed and specific the prompt, the more relevant and applicable the output will be. One helpful method is the **Context, Task, Output and Requirements** framework, which guides users in structuring their AI questions based on the nature of the task. Applying this method can help improve the results. However, not every task

requires all four features.

For many **low-stakes** tasks, a simple prompt such as:

"Create an infographic for patients with type 2 diabetes that provides practical, culturally sensitive dietary recommendations during Ramadan fasting."

For **moderate** or **high-stakes** tasks, providing more detail and context to the prompt is often necessary. While the ideal prompt may be longer than a simple question, the added specificity and direction helps produce more reliable and useful results. To further enhance the quality of the response, clinicians can upload supporting resources (e.g., PDFs) to the LLM. Of course, these resources should not contain any confidential patient information. An example of this type of prompt with an uploaded guideline chapter:

"I am a family physician in New Brunswick. I would like you to summarize the Diabetes Canada Guidelines on hypoglycemia management. Can you return points that I can consider using when educating my patients. The guidelines are attached. Use only content from this source."

Table 4 provides some considerations when entering a prompt into an LLM such as ChatGPT, Gemini, or Claude.

Different AI Tools	Potential role	Cost
Specialized AI tools		
OpenEvidence (openevidence.com)	- Specifically designed for use by licensed clinicians - Trained on vetted medical literature - Partnered with journals such as the <i>New England Journal of Medicine</i> and <i>The Journal of the American Medical Association</i> for direct access Bottom line: - Best for clinical decision-making support, high-risk evidence retrieval, and compliance-required environments - Can only be used for queries on clinical information; not a multi-purpose tool	Currently available at no cost and with unlimited access exclusively for healthcare professionals with a medical licencing identifier
Perplexity (perplexity.ai)	- Designed as an AI-powered search engine with real-time web access and clearly cited sources - Unlike a 'typical' internet search, its goal is to provide the most accurate answer to your question Bottom line: - Excellent for rapid literature reviews, confirming facts, or finding up-to-date resources	Standard plan: free Pro plan: \$20 USD/month
General AI large language models		
ChatGPT (chatgpt.com)	- These AI platforms are built on generalized LLM models - They serve as a repository of everything stored on the internet, encompassing both correct and incorrect information	Standard plan: free Pro plan: \$20 USD/month
Gemini (gemini.google.com)	Bottom line: - These tools should be thought of as a "Swiss army knife/multi-tool" versus as a single instrument for a specific task - Most suitable for low-to-medium risk work	Standard plan: free Pro plan: \$20 USD/month
Claude (claude.ai)	One can keep track of projects. These tools can be customized and adapted for different roles, such as drafting referral letters, translating medical knowledge, summarizing research, or supporting complex communication needs	Standard plan: free Pro plan: \$20 USD/month

Table 2. Different AI Tools/Agents; courtesy of Daniel Ngui, MD, FCFP and Michael Boivin, Rph, CDE, CBE.

Category	Suggestions
Summarize and provide insight for clinicians	• Guideline Analysis: Rapidly generate concise summaries of guidelines (e.g., Diabetes Canada, Hypertension Canada) for quick reference. • Research appraisal: Produce structured summaries of recent journal articles that include methodology, results, and clinical implications.
Improving patient education or messaging	• Patient handouts: Create patient-friendly handouts for explaining conditions, test results, or medications, or to locate reliable links to existing materials online. • Tailored lifestyle handouts: Generate dietary, exercise, or sleep suggestions adapted to cultural or religious needs (e.g., managing diabetes during Ramadan). • Visual aids: Design simple infographics or icons for explaining common conditions (e.g., hypertension zones, insulin titration charts). • Shared decision-making tools: Produce lists of patient-centred questions to guide discussions. • Difficult conversations: Draft suggestions for patient centric and simplified messages when delivering difficult news, discussing adherence, or addressing vaccine hesitancy.
Clinical risk calculation tools	• Generate structured, guideline-based risk scores: Use patient-specific variables to calculate scores (e.g., FIB-4, ASCVD 10-year cardiovascular risk, or CKD staging with eGFR/ACR). • Provide concise outputs for clinicians: Include key elements such as risk category, referral thresholds, treatment triggers, and simplified summaries to support patient discussions.
Continuing education support	• Multiple choice or short answer quizzes: Develop brief case-based questions for self-assessment after reading an article or attending a webinar. • Clinical scenarios: Simulate short vignettes with multiple-choice management questions to reinforce guideline updates.
Practice management	• Referral letters: Accelerate the drafting of referral letters for specialists using redacted patient information. • Employer notes: Generate clear, professional documentation for medical absence or workplace accommodations, guided by specific prompts. • Clinic protocols workflow optimization: Analyze current clinic operations manuals such as triage procedures, refill requests, or job descriptions, and create communiques and suggest improvements. • Team role optimization: Analyze team-based care interactions to identify opportunities for role-specific support (e.g., pharmacists for titrations, nurses for patient education).

Table 3. Examples of Clinical Uses of AI in Primary Care; courtesy of Daniel Ngui, MD, FCFP and Michael Boivin, Rph, CDE, CBE.

Abbreviations: ACR: albumin-to-creatinine ratio; ASCVD: atherosclerotic cardiovascular disease; CKD: chronic kidney disease; eGFR: estimated glomerular filtration rate; FIB-4: Fibrosis-4 Index

Component	Reason and example
Context	- Include your role, the patient's condition, and care setting. For example: <i>"I am a nurse practitioner in Alberta preparing a handout for a newly diagnosed patient with type 2 diabetes."</i>
Task	- Specify the exact deliverable (e.g., guideline summary, patient letter, clinical research synthesis, clinic operating manual, or meeting agenda). For example: <i>"Summarize the 2025 Diabetes Canada chapter listing the A1C, BP and LDL-C targets and proven agents for adults with diabetes and CKD."</i>
Output	- Indicate the type of report or output and the desired length. For example: <i>"Return as a bullet-point summary under 200 words with citations."</i> <i>"Give me 5 action items for daily practice as a pharmacist."</i>
Requirements	- List the requirements that should be included in the response. For example: Sources and citations: Provide working full URLs only after verifying they open to the correct document. If a link cannot be confirmed, state 'No working link found.' Limit to specific sources: The references should come from only reputable organizations (e.g., Diabetes Canada, U.K. NICE guidelines, WHO, or major U.S. medical organizations).

Table 4. Components and Structure of a Well-Designed AI Prompt; *courtesy of Daniel Ngui, MD, FCFP and Michael Boivin, Rph, CDE, CBE.*

Abbreviations: **BP:** blood pressure; **CKD:** chronic kidney disease; **LDL-C:** low-density lipoprotein cholesterol; **NICE:** National Institute for Health and Care Excellence); **WHO:** World Health Organization

Using AI to Perform a Quality Check

Techniques to improve the quality of the AI response for moderate- to high-stakes tasks:

AI Audit and Quality Improvement Cycle

- Ask the AI to help refine your prompt by requesting suggestions. For example: ***"How can I improve my prompt"*** to improve the overall results.
- Ask AI to self-analyze the results. For example: ***"Show your analysis step by step including assumptions and citations. Keep it concise and show me the final reasoning steps and sources."***

When to Use the Advanced Research Button

This is a feature available for many AI tools that directs the search to include an extended, multi-step reasoning model that processes information for more sophisticated analysis. This is especially important for medium- and high-stakes queries. Consider using this feature when you need to:

- Gather information from multiple sources
- Cross-check claims
- Include citations and alternative perspectives
- Deliver a comprehensive, evidence-based response

Figure 2 provides some recommendations on when clinicians should consider using advanced research and when it is best avoided.

So... Truly Smarter... Safer, and More Present?

The evidence is emerging: AI tools ranging from specialized platforms such as OpenEvidence to general-purpose LLMs such as ChatGPT can enhance efficiency, support evidence-based decision-making, and preserve the precious commodity of clinical bandwidth. However, these benefits depend on using AI within an appropriate role and risk framework, crafting high-quality prompts, and directing the AI model to perform self-checks. Clinicians must be able to match the technique to each task. For low-stakes tasks such as locating patient education URLs, AI offers immediate value with minimal risk. For high-stakes

When to Use Deep Research

Definition: Extended, multi-step reasoning with layered source gathering to improve accuracy and quality of results

Use Deep Research When:	Avoid Deep Research For:
 High-stakes medical content (e.g., drug dosing in CKD; MASLD/CKD)	 Low-stakes tasks (e.g., appointment reminders, general wellness tips)
 Complex syntheses (multiple or conflicting guidelines)	 Single-source facts retrievable in one step
 Recent updates are critical	

Figure 2. When to Use and Not Use Deep Research; *courtesy of Daniel Ngui, MD, FCFP and Michael Boivin, Rph, CDE, CBE.*

Abbreviations: **CKD:** chronic kidney disease; **MASLD:** metabolic dysfunction-associated steatotic liver disease

tasks, such as clinical decisions, AI requires continued human oversight.

AI literacy has become a new professional competency in today's era of continuous professional development and growing clinical and administrative burdens. With the surge in data and tasks, clinicians must learn to use AI effectively and safely, always as an assistant, never as a replacement for clinical judgment.

When applied thoughtfully, AI can help us work smarter, by rapidly synthesizing evidence, generating insights, and supporting continuous

learning. It can help us be safer, by connecting clinicians to validated clinical tools and by helping with the creating and sharing of standardized operating procedures and visit templates based on new studies or clinical practice guidelines. Most importantly, AI can help us be more present, by reducing clerical burdens so that clinicians can focus on listening and engaging with patients, and to be better able to deliver goal-directed therapy at the point of care.

Suggested Next Steps for Clinicians Who Want to Start Using AI in Clinical Practice

- **Stay informed:** Keep current with professional guidelines and regulatory updates as standards for AI use continue to evolve.
- **Choose appropriate tools:** Align specialized AI platforms with clinical decision-making needs, and use general LLMs for administrative or educational tasks.
- **Patient consent:** Inform patients when AI tools are used, ensure they consent, and document appropriately.
- **Start small:** Begin with low-stakes applications, such as drafting patient education materials or summarizing guidelines.
- **Selecting the AI agent:** Every AI agent has strengths and limitations and can excel at different tasks. Clinicians are encouraged to try different agents to determine which is the most effective for the task at hand.
- **Establish verification workflows:** Always review AI outputs, especially for medium- and high-stakes clinical applications.
- **Experiment safely:** Build confidence and safe practices by first applying AI to non-patient-facing tasks.
- **Document AI use:** Document when AI contributes to patient care (e.g., copy and paste evidence from OpenEvidence into the patient's chart).

Bottom line: The question is not if clinicians will use AI, but when, and how safely and skillfully they integrate it into clinical practice to enhance patient care while preserving the human connection.

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