Practice Guidance

Using Artificial Intelligence in the Oral Healthcare Setting

College of Dental Technologists of Alberta

ACDH
Alberta College of Dental Hygienists

COLLEGE OF ALBERTA DENTURISTS

This guideline has been developed collaboratively by the College of Alberta Denturists, the Alberta College of Dental Hygienists, and the College of Dental Technologists of Alberta.

Acknowledgement

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Introduction

Artificial Intelligence (AI) has been an emerging technology that is increasingly being utilized in the oral health setting. For example, AI technology can be used to facilitate practice management, imaging and diagnostics, treatment planning, patient care, communication, recordkeeping, and clinical care. Although AI tools are increasingly being utilized in oral health services, their impacts on the quality of patient care remain insufficiently analyzed. Legislation does not yet specifically support (nor prevent) the use of AI in health care.

Currently, a federal strategy with respect to AI use in health care is being developed and Offices of Information and Privacy Commissioners of several provinces are investigating ChatGPT with respect to concerns. As regulations and frameworks around the use of AI continue to be developed, this practice guidance will be regularly updated to reflect new information.

General Expectations

Until more information is available about the accuracy and reliability of AI-supported documentation, diagnosis, treatment planning, and other clinical decision-making, this practice remains speculative. Although AI tools can imitate human cognitive capabilities, they are not a replacement for an oral healthcare provider's (OHCP) critical thinking or professional judgement. OHCPs are ultimately responsible for the care they provide to patients/clients and must comply with current legislation, standards, ethical principles, guidelines, and policies.

OHCPs using AI in their practice should ensure that:
- they have obtained the necessary training and education to competently incorporate AI into their practice safely, effectively, and ethically;
- they identify risks and adopt appropriate risk management strategies;
- any suggested diagnosis or treatment plan is verified for accuracy and evaluated before being provided to the patient or client;
- patient privacy and personal health information is protected according to current privacy legislation;
- they have obtained informed patient consent prior to the use of AI. The quality of the record keeping/documentation is verified for accuracy and evaluated for bias before being included in the patient's record; and
- appropriate follow-up advice is given to the patient and adequately documented.

OHCPs should **not** use AI for the following purposes:
- generating requirements related to their college's continuing competence program;

- writing essays, letters, or other documentation required in complaint resolution processes;
- creating content for malicious purposes;
- using conversational bots to obtain personal information; nor
- re-identifying any previously de-identified data.

OHCPs should exercise care to ensure that documentation is accurate and that patient care decisions are sound and supported by evidence. OHCPs utilizing AI in practice are advised to proceed judiciously.

Competencies for AI Use

When implementing AI in their practices, OHCPs ensure they acquire the necessary training, education, skills, and competencies related to the use of AI, including but not limited to:
- privacy and data handling such as removing sensitive health information and personal identifiers.
- AI risk management strategies and AI product risk assessments to evaluate and implement AI technologies.
- vendor risks (e.g., considerations for third-party modalities) when selecting AI technology.
- rights impact assessment to protect patients/clients' rights during the selection and use of AI applications.
- training and awareness related to AI use to ensure compliance with regulatory requirements. For example, potentially having an AI officer responsible for risk management, skills, and competency assessment for AI use.
- incident monitoring and creating organizational procedures for identifying, escalating, and responding to serious incidents and malfunctions.
- skill, capability, and competence assessments.

Ethical Considerations

Regulated healthcare professionals have an ethical and legal responsibility to cause no harm to their patients/clients. Careful ethical considerations should be made when implementing AI technology.

Beneficence and non-maleficence

When integrating AI into practice, OHCPs should ensure that the potential benefit of the technology outweighs the possible harm. Protocols and policies should be developed to mitigate these risks appropriately. Examples of risks associated with using AI in the oral healthcare settings include but are not limited to:

- adverse treatment outcomes resulting from AI generated errors.
- OHCPs' over-reliance on AI may compromise their clinical experience and expertise.
- potential increase of the cost of treatment.
- AI algorithms depend on the quantity and diversity of data. Certain populations may be under- or overrepresented. This inherent bias in an AI algorithm may place certain populations at a greater risk of negative treatment outcomes, which can further contribute to inequities in oral healthcare.
- patient privacy and confidentiality concerns.
- uncertainty in current literature regarding the potential risks and benefits of AI technology.
- the lack of legislative guidance on the use of AI on an oral healthcare setting.

Confidentiality and patient privacy

Privacy and data security are significant concerns as AI systems often require access to sensitive patient information. The ethical implications of data usage, storage, and sharing require proper safeguards to protect patient confidentiality and comply with legal and regulatory requirements.

OHCPs to refer to their College specific document for additional guidance:

Dental Hygienists – Standard of Practice: Privacy and Confidentiality
Dental Technologists/Technicians - Standards of Practice: General
Denturists – Standards of Practice
Denturists – Recordkeeping Guidelines

Patient-Centred Approach

When treatment planning, OHCPs must collaborate with the patient and prioritize the patient's needs, values, interests, and goals. OHCPs should consider whether their information management policy is respectful of data sovereignty for Indigenous peoples. The Canadian Institute for Health Information (CIHI) provides some guidance in this area. [1]

OHCPs to refer to their College specific document for additional guidance:

Dental Hygienists - Standard of Practice: Patient Centered Approach
Dental Technologists/Technicians - Standards of Practice: General
Dental Technologists/Technicians - Standards of Practice: Restricted Activities

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[1] Canadian Institute of Health Information's "A Path Forward: Toward Respectful Governance of First Nations, Inuit and Métis Data Housed at CIHI"

Denturists - Standards of Practice

Clinical Services

When providing clinical services, OHCPs are expected to use critical thinking and professional judgment to interpret assessment data, determine a diagnosis, treatment plan and prognosis, and inform the patient of the OHCP's professional opinion. The use of AI in oral healthcare should minimize potential data-related harm and promote the delivery of quality health programs and services.

OHCPs to refer to their College specific document for additional guidance:

Dental Hygienists – Standard of Practice: Clinical Therapy
Dental Technologists/Technicians - Standards of Practice: General
Dental Technologists/Technicians - Standards of Practice: Restricted Activities
Denturists – Standards of Practice
Denturists – Professionalism Practice Guidance

Evidence-Informed Practice

AI technologies are being integrated more frequently in oral health services, yet their effects on the quality of patient/client care have not been thoroughly researched or examined. Current research on the application of AI in oral healthcare is still in its early stages and remains limited in scope. OHCPs are expected to seek and assess new research, knowledge, and emerging trends to determine AI's applicability to practice. Additionally, OHCPs integrate evidence and best practices when developing or reviewing organizational policies.

OHCPs to refer to their College specific document for additional guidance:

Dental Hygienists – Standard of Practice: Evidence-Informed Practice
Dental Technologists/Technicians - Standards of Practice: General
Denturists – Standards of Practice

Privacy and Confidentiality

OHCPs take care not to expose a patient's personally identifiable information when using AI technologies in their practice. Even without names or personal health numbers, a patient's privacy may be exposed in an AI algorithm by the clinical uniqueness of a case.

OHCPs may need to update privacy policies to address potential vulnerabilities associated with AI systems. These include risks such as hacking, large-scale data breaches, and insufficient anonymization of patient data, which could lead to patient re-identification. It is critical to ensure that all AI-driven processes adhere to strict data protection protocols to maintain patient confidentiality.

OHCPs defined as custodians under the *Health Information Act* (HIA) who utilize AI-supported charting, and clinical decision-making, may be required to update a privacy impact assessment (PIA) and file it with the Office of the Information and Privacy Commissioner of Alberta (OIPC)[2]. If using commercial software, inquire whether the vendor has filed a PIA with OIPC.

OHCPs to refer to their College specific document for additional guidance:

Dental Hygienists – Standard of Practice: Privacy and Confidentiality
Dental Technologists/Technicians - Standards of Practice: General
Denturists – Standards of Practice

Informed Consent

Informed consent must be obtained from patients/clients when utilizing generative AI to record a clinical encounter. This may be further addressed in OHCP College's standards of practice. With a novel technology such as generative AI, it may be challenging to communicate the risks and benefits of the use of the technology to patients/clients. At a minimum, patients/clients should be asked to consent to record the clinical encounter (if applicable) and made aware of potential risks involving data integrity, bias and privacy.

OHCPs to refer to their College specific document for additional guidance:

Dental Hygienists – Standard of Practice: Informed Consent
Dental Technologists/Technicians - Standards of Practice: General
Denturists – Standards of Practice
Denturists – Patient/Client Consent Practice Guidance

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[2] OIPC: Privacy Impact Assessments

Documentation

OHCPs are responsible for ensuring that the patient record is accurate and complete. Inaccurate AI-generated information may pose risks to patient safety and lead to potential harm.

OHCPs are expected to comply with their College's Standards of Practice. Additional considerations of documentation for AI use include recording the context in which a note is generated. This might include the author's identity (e.g., OHCP, learner, scribe, allied healthcare provider) and any assistive technology used to generate the note (e.g., dictation software, template, generative AI model and version).

OHCPs to refer to their College specific document for additional guidance:

Dental Hygienists – Standard of Practice: Documentation
Dental Technologists/Technicians - Standards of Practice: General
Denturists – Standards of Practice
Denturists – Recordkeeping Guidelines

Legal Considerations

OHCPs ensure that AI systems and tools are integrated and used in compliance with applicable laws and legislation.

The legislative approach to health information technology, including the application of AI in oral healthcare, is largely silent concerning the rights of Albertans to information technology that promotes their health and well-being while also assuring access to their personal health information.

As stated by CPSA, and in alignment with the statement from the Office of the Information and Privacy Commissioner of Alberta, a reimagination of health information legislation that achieves a nuanced balance between the respective health data rights of Albertans and mitigates all forms of data-related harm is prudent.

Other Considerations

Computer-Aided Design and Computer-Aided Manufacturing (CAD/CAM)

AI-enhanced CAD/CAM systems incorporate generative design tools that produce a variety of design options, either fully or partially generated by AI. These tools allow OHCPs to input specific goals and requirements, with AI creating designs that are optimized for the intended clinical outcome. These designs are developed with consideration of the selected manufacturing methods and materials, ensuring a streamlined and efficient production process.

OHCPs using AI-enhanced CAD/CAM workflows and outcomes in their practice ensure that:
- they have obtained the necessary education and training to competently incorporate AI into their practice safely, effectively, and ethically;
- they identify risks and adopt appropriate risk management strategies;
- patient privacy and personal health information is protected; and
- any suggested digital design or CAD/CAM produced device, appliance or prosthesis is verified for accuracy and evaluated before being provided to the patient or client.

Summary

OHCPs utilizing AI are advised to proceed judiciously and ensure all *Standards of Practice* are followed.

If engaging in the use of AI, ensure that the patient/client consents to the use of the technology/recording and that their privacy is protected. Exercise care to review and confirm the accuracy of documentation before incorporating them into their health record. An AI-enhanced diagnosis is not a replacement for professional judgement. Any suggested diagnoses, treatment plans, or other professional services must be verified for accuracy and assessed for potential bias.

OHCPs ensure that all professional decisions are sound, based on evidence-informed best practices, and appropriately documented.

Be aware that the OHCP remains responsible for the quality and integrity of their own assessments, documentation, recommendations, and services with or without utilizing AI.

Additional factors to consider when using this form of information technology are as follows:
- Standards of Practice
- workflow efficiency
- access to care
- reduced system cost

Appendix A contains a fulsome breakdown of the potential harms associated with using large language model generative artificial intelligence such as ChatGPT.

Glossary

Artificial Intelligence (AI): the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings.[3]

Chatbots: software agents (may be based on LLMs) which converse in natural language with website visitors to determine their needs and address common requests.[4]

ChatGPT: proprietary software that allows a user to ask it questions using conversational or natural language. It was released on November 30, 2022, by the US company OpenAI. ChatGPT is a chatbot based on the GPT-3 and GPT-4 LLMs. [5,6]

Custom-made*:* means any prosthetic or orthodontic device, other than a mass-produced medical device, that
> (a) is manufactured in accordance with a health care professional's written direction giving its design characteristics;
> (b) is
>> (i) for the sole use of a particular patient of a professional, or
>> (ii) for use by that professional to meet special needs arising in the course of his or her practice.   (*instrument fait sur mesure*) [7]

Generative AI: a type of AI algorithm that uses deep learning techniques and massively large data sets to understand, summarize, generate and predict new content, including audio, code, images, text, simulations and videos.[8]

Large Language Models (LLM): a data set which can support generative AI software to produce text-based content.

Oral Health Care Professional (OHCP): for the purposes of this document, regulated members of the College of Alberta Denturists, the College of Dental Technologists of Alberta, and the Alberta College of Dental Hygienists.

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[3] Britannica.com
[4] Britannica.com
[5] Britannica.com
[6] National Cyber Security Centre: "ChatGPT and large language models: what's the risk?"
[7] https://laws-lois.justice.gc.ca/eng/regulations/sor-98-282/fulltext.html
[8] Tech Target: "What is large language model (LLM)?"

Appendix A

Table 1: Health Data-Related Harm and potential impact of using LLM-generative AI to support note taking and clinical decision making. Note that this has not yet been studied systematically and **definitive evidence** is required to fully assess impact.[9]

Policies concerning the use of AI/ChatGPT should consider these harms as well as any others arising from the use of such technology.

Individual Harm	Potential Impact of LLM-generative AI
Breach of personal health data privacy & security	HARM From privacy and security perspectives, potential location of servers outside of Canada is of concern. Lack of a Privacy Impact Assessment (PIA) filed with OIPC poses risk. Most LLM-generative AI is unregulated technology owned and operated by private companies that have a proprietary and financial interest in any data shared.
Damage to physical or emotional health and well-being	HARM Incorrect or erroneous encounter documentation and/or diagnostic advice. BENEFIT Anecdotal evidence suggests that LLM- generative AI can improve quality of chart notes, thus supporting high-quality clinical communication and care. Early studies suggest LLM-generative AI may support equivalent or improved diagnostic service.
Breach of cultural rights to personal health data	HARM The use of this technology without express consent could be in violation of the First Nations Principles of Ownership, Control, Access, and Possession. (OCAP)[10] Métis principles of ownership,

[9] *Used with consent from the College of Physicians and Surgeons of Alberta*
[10] First Nations Information Governance Centre: OCAP and Information Governance

	control, access and stewardship (OCAS)[11]; and Inuit principles of Qaujimajatuqangit data[12].
Breach of legal & ethical rights to personal health data	**HARM** Canadians are legally entitled to their health information. How this principle applies to health information that is being transferred to a private technology company with servers in the United States is unclear and untested in law. This raises red flags.
Population Harm	**Potential Impact of LLM-generative AI**
Failure to benefit from science and use health data for public good.	**BENEFIT** The potential for large volume natural language processing to provide powerful insights into population-based health questions is substantial. Curtailing use of this technology may obstruct the capacity to benefit from science and use health data for public good.
Use of data to promote population-based discrimination and/or inequities.	**UNKNOWN** Risk of this harm with this form of AI is not known. Further study is required.
Health System Harm	**Potential Impact of LLM-generative AI**
Cost overruns & system inefficiency arising from poor data design and use.	**BENEFIT** Early anecdotal evidence suggests that LLM-generative AI can improve the efficiency of health service, thus reducing system cost.
Damage to health workforce well-being from poor data design and use	**BENEFIT** Early anecdotal evidence suggests that LLM-generative AI can offload note-taking burden from healthcare providers and promote wellness at work.
Failure to support health innovation through health data use.	**BENEFIT** AI is a data-dependent health innovation. Innovation is an important means to improve health system function and render it sustainable. Further exploration of this technology supports health innovation.

[11] Canadian Institute for Health Information: Toward Respectful Governance of First Nations, Inuit and Métis Data Housed at CIHI
[12] Nunavut Impact Review Board: Inuit Qaujimajatuqangit data

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