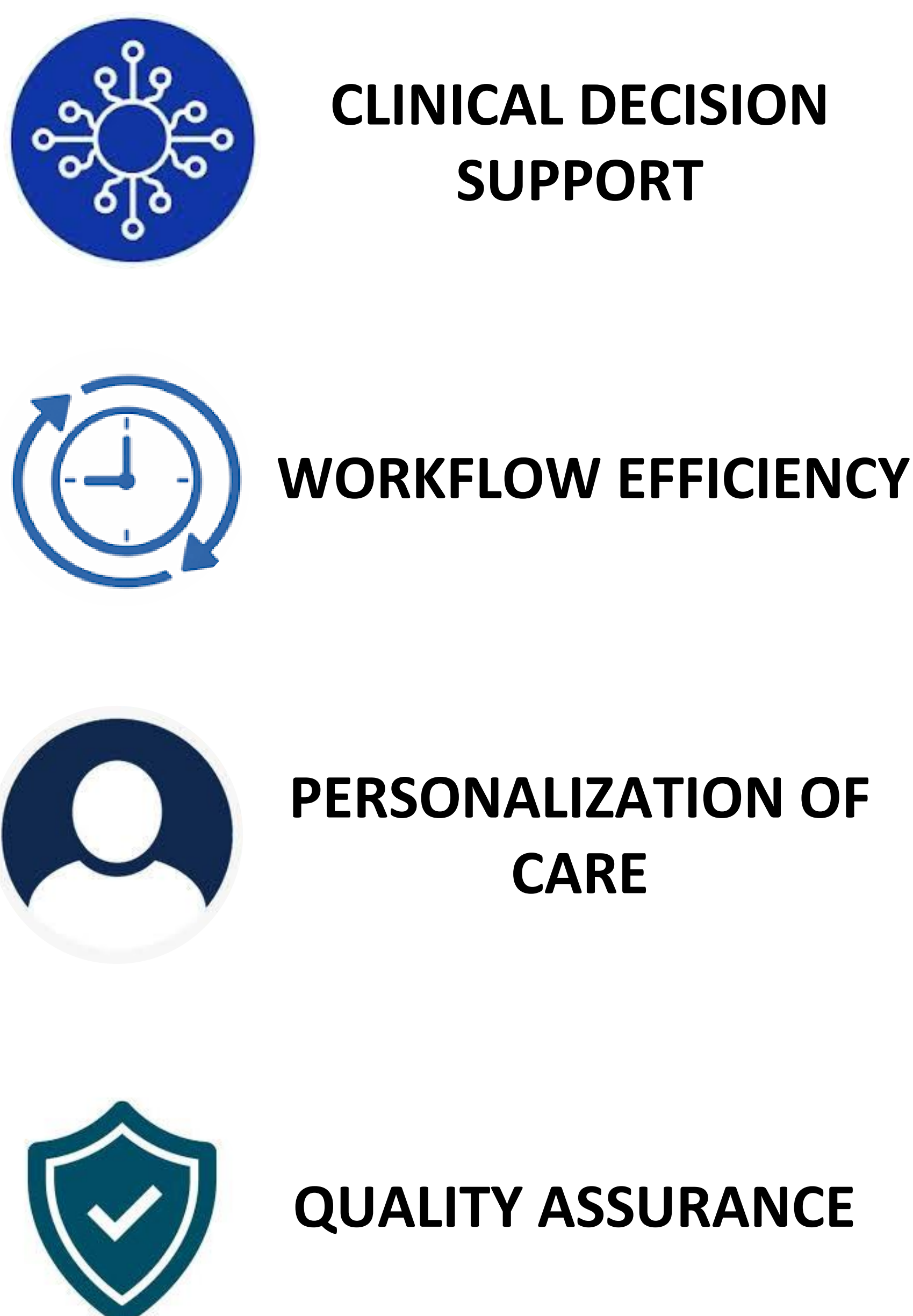


Responsible Integration of Artificial Intelligence Radiation Medicine: A Pan-Canadian Framework for Oversight, Education, and Collaboration Medicine

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Aligning technological innovation with rigorous governance, education, collaboration, and patient-centred values



INTRODUCTION

Artificial Intelligence (AI) is increasingly embedded across radiation medicine, with applications in clinical decision support, workflow efficacy, personalization of care and quality assurance.

Despite rapid technical advancement, there remains **a critical gap in guidance** on how AI should be responsibly integrated into clinical practice.

This work presents a pan-Canadian, interprofessional framework for preparing radiation medicine for an AI-enabled future, emphasizing **of governance, education, collaboration, and patient-centered values** as essential enablers safe effective implantation.



METHODS

This work synthesizes current literature, professional guidance, and the Canadian healthcare system context to examine emerging AI applications alongside ethical, professional, and operational considerations relevant to radiation medicine.

Using a consensus-based framework, it evaluates system-level requirements for AI integration, including:

- Oversight structures
- Data governance
- Workforce preparation
- Interprofessional collaboration implantation models

with particular attention to the role of medical physicists in commissioning, validation, and quality assurance.



RESULTS

Three interconnected domains were identified as essential for responsible AI implementation.

1. Governance & Oversight

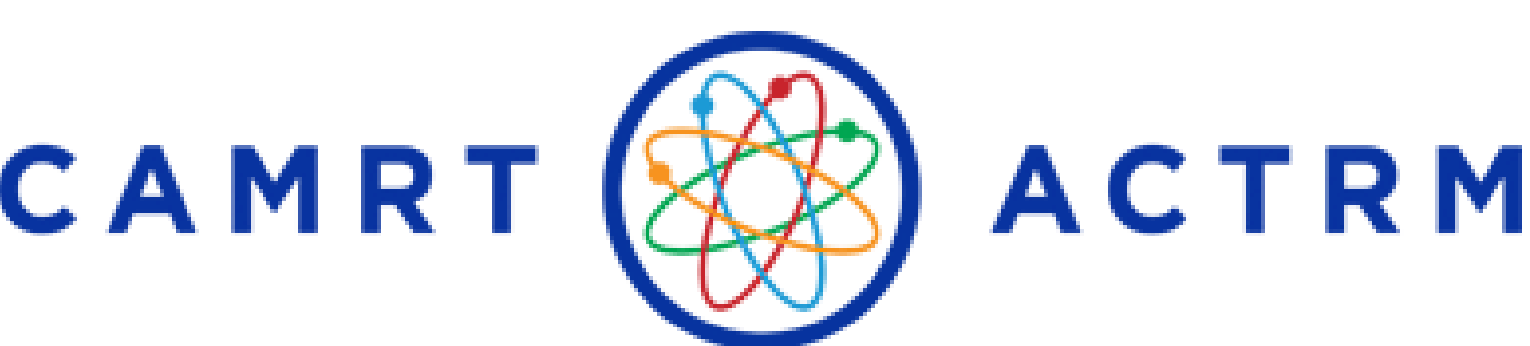
AI must be implemented with in robust governance and oversight frameworks, supported by human supervision and AI-ready data standards, to ensure transparency, reproducibility, and clinical reliability.

2. Education & Workforce Preparation

Comprehensive AI literacy across entry-to-practice education and continuing professional development is required to support evolving professional roles, including physics leadership in AI evaluation, commissioning, workflow integration, and ongoing performance monitoring.

3. Collaboration & Alignment

Coordinated collaboration across institutions, professions, and jurisdictions enables shared validation efforts, early adoption, and alignment with national and international informatics standards.



1

GOVERNANCE & OVERSIGHT

AI must be implemented within robust governance and oversight frameworks to ensure transparency, responsibility, and clinical reliability.



Robust governance structures and accountability



Human supervision and meaningful clinical oversight



AI-ready data standards, data quality, and privacy



Transparency, reproducibility, and model documentation



Monitoring, audit and risk management throughout the AI lifecycle

3

COLLABORATION & ALIGNMENT

Coordinated collaboration across institutions, professions and jurisdictions enables shared validation efforts, early adoption, and alignment with national and international informatics standards



2

EDUCATION & WORKFORCE PREPARATION

Comprehensive AI literacy across entry-to-practice education and continuing professional development is required to support evolving professional roles



AI literacy integrated across entry-to-practice education and CPD



Evolving roles and competencies for all professionals



Physics leadership in AI evaluation, commissioning & QA



Workflow integration, change management, and performance monitoring



Lifelong learning to keep pace with rapid innovation



CONCLUSIONS

AI must be implemented within robust governance and oversight frameworks to ensure transparency, responsibility, and clinical reliability

Robust governance structures and accountability. Human supervision and meaningful clinical oversight AI-ready data standards, data quality, and privacy transparency, reproducibility, and model documentation monitoring,, audit and risk management throughout the AI lifecycle.

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