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AI-Driven Decision-Making in Workplace Safety: Enhancing Risk Assessment and Compliance in Healthcare Settings

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Abstract

Artificial intelligence (AI) is significantly transforming healthcare by introducing advanced methodologies that enhance workplace safety, risk assessment, and regulatory compliance. This study argues that the integration of AI-driven risk assessment and compliance processes into healthcare quality management systems critically depends on adherence to fundamental ethical principles, including transparency, equity, and accountability. Focusing on the context of Aotearoa New Zealand, the research investigates how AI can optimise clinical workflows, reduce the workload of healthcare professionals, and support patient-centred care, while maintaining cultural safety and equity standards.

The analysis identifies governance challenges and highlights the need for adaptable, culturally inclusive frameworks that engage diverse stakeholders. Practical applications, such as the automation of routine tasks and integration within quality assurance systems, are examined, alongside important aspects of trustworthiness, data validity, ethical oversight, and continuous collaborative governance.

Guided by the research question, how can AI-enabled risk assessment and compliance systems be ethically and effectively integrated into healthcare quality management frameworks in Aotearoa New Zealand? This study employs a rapid review methodology that synthesises current literature and standards, such as ISO 7101:2023. The findings emphasise that embedding AI technologies requires a robust commitment to ethical governance and cultural responsiveness to achieve enhanced operational effectiveness and workforce confidence. The paper concludes by proposing governance models that foster innovation while ensuring equitable and culturally safe healthcare workplaces. Furthermore, recommendations such as implementing robust auditing, fostering Indigenous partnerships, and enhancing research investment have been proposed to improve New Zealand's healthcare and AI sectors.

Keywords: Artificial Intelligence, Healthcare Safety, Risk Management, Ethical Governance, AI-Driven Risk Assessment, Quality Management

1. Introduction

Since 2019, artificial intelligence (AI) has been rapidly transforming healthcare, offering new opportunities for enhanced workplace safety, risk management, and regulatory compliance in clinical settings (Faiyazuddin et al., 2025). As AI systems move from pilot projects to integral parts of clinical practice, they offer the potential to optimise decision-making, streamline routine processes, and support patient and workforce wellbeing (Pavuluri et al., 2024; Valtonen et al., 2025). However, adopting AI in healthcare remains challenging, as it faces issues with trust, transparency, and responsible governance (Kelly et al., 2019; Lekadir et al., 2025).

This study puts forward the central argument that the effective integration of AI-enabled risk assessment and compliance systems must be achieved within the framework of the ISO 7101:2023 healthcare quality management standard (ISO 7101, 2023). Achieving this integration requires explicit consideration of the principles of transparency, equity, and accountability. Moreover, the successful embedding of AI technologies into such standardised quality systems necessitates not only technical compatibility but also a resolute commitment to fairness, transparency, and ethical oversight (Lekadir et al., 2025). The analysis situates these requirements within both global consensus guidelines and the broader context of governance priorities relevant to the unique cultural and regulatory environment of Aotearoa New Zealand (Gerrard et al., 2023; Lekadir et al., 2025). Ultimately, this research demonstrates that prioritising ethical AI adoption facilitates robust clinical decision-making, advances cultural safety, and enhances operational performance in healthcare settings (Lekadir et al., 2025; Whittaker et al., 2023).

1.1 Opportunities and Benefits for Clinicians and Patients

One of the most exciting aspects of AI is its ability to reorganise daily workflows. For example, in radiology, AI can prioritise urgent scans, enabling clinicians to immediately focus on critical cases, facilitating faster decisions and more efficient resource allocation(Lee et al., 2022). AI technology is revolutionising healthcare processes by automating various routine and time-consuming activities, including clinical documentation, note-taking, and patient data summaries(Faiyazuddin et al., 2025). By relieving clinicians of these routine tasks, AI can reduce cognitive load and administrative burden, in turn decreasing burnout rates(Faiyazuddin et al., 2025; Lekadir et al., 2025; Pavuluri et al., 2024). Beyond documentation, AI-driven technology can expedite appointment scheduling, minimising no-shows through dynamic alerts, and help with patient follow-ups, thereby enhancing operational efficiency and clinician-patient interactions(Alowais et al., 2023; Maleki Varnosfaderani & Forouzanfar, 2024). Nevertheless, the quality and reliability of AI outputs are strongly related to the diversity and quality of training data, requiring validation to ensure their safety and efficacy in clinical decision-making(Faiyazuddin et al., 2025; Lekadir et al., 2025).

1.2 White Spaces and Unaddressed Challenges

Despite these promising advances, the literature continues to exist within “white spaces” (Cherry, 2010)- areas marked by uncertainties and unanswered questions, where new knowledge and governance strategies are clearly needed to implement AI in healthcare(Kelly et al., 2019). AI can be considered a form of “troubled knowledge,” as discussed by David Perkins (as cited in Cherry, 2010), which is complex and difficult to comprehend. In addition, AI’s disruptive nature poses serious challenges that demand higher levels of ethical, governance and analytical solutions to ensure responsible adoption of AI in healthcare(Kelly et al., 2019; Lekadir et al., 2025; Whittaker et al., 2023). The paper positions the debate concerning AI in healthcare within these white spaces, where there is no precise data, and ambiguous, system-level challenges arising in practice(Cherry, 2010).

The preprint by Opoku et al. (2025) indicates that healthcare workers are exposed to various occupational hazards, including infectious disease, chemical and biological exposures, manual handling leading to musculoskeletal strains, and psychological strains, such as burnout and workplace violence. These risks can significantly impact the physical, mental, and social well-being of healthcare professionals(Fiegler-Rudol et al., 2025). Traditional occupational health surveillance methods are predominantly reactive, relying on manual reporting and post-incident analysis, which often fail to provide timely workplace safety measures in fast-paced, dynamic clinical settings. Additionally, outdated safety systems are unable to handle real-time hazards or analyse complex, heterogeneous data, leading to key gaps in prevention and prompt reaction(Ozobu et al., 2025).

AI-based occupational health surveillance systems, including wearable sensors and automatic incident detection, allow hazard identification, prediction and prevention in real-time, thereby bridging the gap in workplace hazard management(El-Helaly, 2024; Patel et al., 2024).

Although AI technologies hold great promise for enhancing safety in healthcare workplaces, significant challenges and controversies remain that have not been fully addressed. A significant issue is the presence of algorithmic bias within AI systems, which may lead to inequitable safety outcomes for minority and indigenous healthcare workers. These biases often result from training data that do not adequately represent diverse populations and from AI decision processes that lack transparency. Such factors undermine fairness and trust in AI-based safety interventions, highlighting the need for robust measures to ensure equitable implementation and oversight(Gerrard et al., 2023; Hasanzadeh et al., 2025).

Deploying AI systems also raises new concerns regarding data privacy and security. As sensitive information is involved, breaches can compromise safety measures or expose incident reports, requiring strong governance systems and clear privacy policies(Chustecki, 2024; El-Helaly, 2024). Algorithmic bias, under-diverse training data, and lack of transparency threaten fairness and erode trust in AI systems. Ongoing audits and active stakeholder involvement are essential for maintaining trust and ensuring the responsible deployment of AI(Gerrard et al., 2023; Lekadir et al., 2025).

Operational challenges, such as integrating AI with existing healthcare IT systems, safeguarding patient data, and establishing robust governance structures, can impede the effective adoption of AI technologies within clinical environments(Almyranti et al., 2024). Addressing these multifaceted challenges is crucial to unlocking the full potential of AI and ensuring the health and safety of workers.

Although AI-driven surveillance has enhanced workplace safety, the absence of operationalised and empirically validated governance frameworks persists as a significant limitation. Insufficient empirical research on the practical application of ISO 7101 standards in AI risk assessment limits understanding of how these standards can be implemented in real-world contexts(ISO 7101, 2023; Lekadir et al., 2025). Future research should prioritise evaluating the auditability of AI systems, the effectiveness of compliance protocols, and how the ISO-governance framework aligns with improving workplace safety(Lekadir et al., 2025).

Māori data sovereignty in AI-powered risk monitoring presents distinct challenges. Regulatory uncertainties, limited integration of indigenous governance models in AI development, and inadequate opportunities for community participation hinder the culturally safe implementation of AI. The collaborative design of culturally responsive AI frameworks with Māori stakeholders is essential for integrating indigenous data rights and worldviews across all stages of AI development and deployment(Gerrard et al., 2023; Whittaker et al., 2023).

The identified gaps underscore vital priorities for enhancing AI governance in the healthcare workplace safety. Developing governance frameworks that are equitable, trustworthy, and sensitive to contextual factors is essential for effectively addressing challenges such as algorithmic bias and stakeholder mistrust. Ensuring culturally responsive approaches within these frameworks can facilitate the design and deployment of AI systems that uphold principles of fairness and accountability. Such efforts are critical to achieving sustained improvements in occupational health outcomes and fostering broader trust in AI-driven healthcare innovations(Gerrard et al., 2023; Lekadir et al., 2025; Whittaker et al., 2023).

1.3 Governance and International Frameworks

The ISO 7101:2023 standard represents the first international quality management system designed specifically to address healthcare organisations. It outlines a full range of requirements aimed at ensuring systematic, sustainable, and auditable quality management practices within the healthcare sector(ISO 7101, 2023).

Complementing the New Zealand model are the international FUTURE-AI guidelines designed by 117 experts representing 50 countries. These recommendations apply the notion of reliable AI to six principles, namely, fairness, universality, traceability, usability, robustness, and explainability. Furthermore, they provided thirty practical recommendations aimed at improving ethical, transparent, and auditable development and implementation of AI systems in healthcare environments(Lekadir et al., 2025).

While ISO 7101 forms a conceptual framework for quality management in healthcare, it does not directly regulate the output of AI nor does it require auditing of AI decision-making processes. Therefore, despite being a pillar in healthcare quality, the establishment of AI-oriented governance and auditing systems is required to meet the multi-layered problem of AI integration(ISO 7101, 2023).

For New Zealand, these frameworks would necessitate the incorporation of Te Tiriti o Waitangi principles to achieve culturally responsive governance. Ongoing stakeholder participation, particularly with Māori communities and frontline clinicians, is crucial to fostering trust, cultural safety, and effective governance beyond mere compliance(Gerrard et al., 2023; Whittaker et al., 2023).

1.4 Aotearoa New Zealand: Governance and Equity in Focus

New Zealand’s health system emphasises cultural safety, equity, and upholding the principles of Te Tiriti o Waitangi, including the data sovereignty of the indigenous population. An example of cross-disciplinary AI governance and equity is the Artificial Intelligence Governance Group (AIGG), operating under Te Whatu Ora (Health New Zealand). The AIGG oversees eight areas of governance: concept, strategy, stakeholder engagement, data stewardship, technical assessment, ethical review, monitoring, evaluation, and continuous improvement. This governance model ensures AI technologies comply with safety, ethical transparency, and inclusivity principles tailored to New Zealand’s socio-regulatory context. The proactive presence of Māori health perspectives and consumer views fosters trust and optimises community influence(Almyranti et al., 2024; Gerrard et al., 2023; Whittaker et al., 2023).

Additionally, the Te Whatu Ora National Artificial Intelligence and Algorithms Expert Advisory Group (NAIAEAG) provide technical guidance and oversight on AI initiatives in New Zealand’s public health sector. NAIAEAG evaluates AI applications in terms of safety, ethics, legal compliance, and cultural appropriateness, with a particular focus on data sovereignty (Mauri-whenua) and Te Tiriti o Waitangi

obligations. Holding statutory power, NAIAEAG supports the use of AI tools, thereby ensuring implementation aligning with legal, ethical and equity considerations, including Māori representation to uphold the principles of tino rangatiratanga and mana motuhake(Te Whatu Ora, 2025; Whittaker et al., 2023).

1.5 Operationalising AI Risk Models: Scope and Implications for New Zealand

The study explores how AI-informed triage and risk assessment accelerate the clinical response process, enhance psychosocial risk surveillance among workers, and integrate equity and cultural safety into analytic processes(Faiyazuddin et al., 2025; Pavuluri et al., 2024; Valtonen et al., 2025). It outlines approaches to convert AI-generated risk signals into tangible improvements through risk registers, controlled corrective actions, and ongoing governance reviews(Lekadir et al., 2025). The research addresses crucial gaps in operationalising AI outputs within ISO frameworks in New Zealand settings(Gerrard et al., 2023; Te Whatu Ora, 2025), and creating flexible and comprehensive evaluation methods to ensure safety consistently, build trust, and support well-being in a variety of healthcare settings(Kelly et al., 2019; Whittaker et al., 2023).

Despite progress in AI-driven workplace safety, critical gaps remain in governance systems that ensure transparency, fairness, and cultural responsiveness, especially in the New Zealand healthcare setting(Kelly et al., 2019; Lekadir et al., 2025; Whittaker et al., 2023). Existing literature has not fully explored how indigenous data sovereignty principles and equity-oriented governance could be incorporated into AI risk assessment models(Gerrard et al., 2023; Whittaker et al., 2023). This research aims to address these gaps by examining ethical implementation of AI-decision-making processes under ISO compliant quality management systems, upholding Te Tiriti o Waitangi obligations, and promoting culturally safe and equitable healthcare outcomes(ISO 7101, 2023; Lekadir et al., 2025; Te Whatu Ora, 2025).

2. Research Questions

How can AI-driven risk assessment and compliance frameworks be effectively aligned with both international standards like ISO 7101 and indigenous governance principles to ensure ethical, culturally responsive integration into healthcare workplace safety systems in Aotearoa New Zealand?

3. Materials and Methods

3.1 Study Design

The study uses a rapid review methodology to synthesise available evidence on the use of AI in workplace safety, risk assessment, and compliance within healthcare environments, with a specific interest in governance and equity in Aotearoa New Zealand(Featherstone et al., 2015). Rapid review techniques provide a streamlined yet rigorous evidence synthesis method, enabling the generation of timely knowledge without sacrificing transparency or methodological soundness(Garritty et al., 2021).

3.2 Data Sources and Search Strategy

A preliminary search in Google Scholar helped define themes and authors relevant to the topic's scope. The search was carried out in major electronic databases such as VUW Library, PubMed, Embase, Cochrane Library, Web of Science, and Scopus(Haby et al., 2016). Search terms were “artificial intelligence”, “workplace safety”, “risk assessment”, “healthcare compliance”, “ISO 7101”, “governance”, and “equity” in New Zealand, with Boolean operators (AND, OR) and truncation (e.g., AI*, safet* govern, complian*) being used to narrow the search outcomes. In addition to database searches, citation mining was employed as a complementary strategy, involving the examination of reference lists from relevant reviews and policy documents to identify additional relevant studies for inclusion. Citation mining increased the depth of this review by revealing sources of foundations and influence(Frost & Whakakitenga). Although the ISO 7101 was used in the search, no empirical research that examined the ISO 7101 and AI implementation together in the context of healthcare was found; however, ISO 7101 is presented as a direct description of the standard and corresponding policy documents(Gerrard et al., 2023; ISO 7101, 2023). To make the review relevant and contemporary, the scope was restricted to articles published between 2019 and 2025. This phase marks the increased pace of implementing AI technologies in healthcare, thereby offering access to the latest evidence, identifying new issues, and developing governance mechanisms, as highlighted by the publication of ISO 7101:2023(Almyranti et al., 2024).

3.3 Inclusion and Exclusion Criteria

Inclusion criteria were studies published in English within the specified period that reported any empirical result, systematic review, or policy frameworks regarding AI-assisted risk evaluation, adherence, or regulation of healthcare workplace safety. The priority was placed on studies that cover issues of equity or governance relevant to New Zealand or provide transferable insights into governance. Non-English articles, articles published prior to 2019, and those that were not related to the implementation of AI in healthcare were excluded.

3.4 Screening and Data Extraction

The screening was conducted in two phases: reviewers first analysed titles and abstracts to eliminate potential irrelevant literature; second, they conducted full-text analysis to ensure the included literature satisfied the eligibility criteria(Featherstone et al., 2015). The extracted data comprised information about the implementation of AI in healthcare workplace safety and clinical processes, focusing on particular governance frameworks, the value of equity, and the mention of international standards like FUTURE-AI (Lekadir et al., 2025) and ISO 7101(ISO 7101, 2023).

3.5 Quality Assessment and Risk of Bias

This research used validated assessment tools suitable for quick reviews to evaluate the quality and possible bias of the included studies. The methodological rigour and transparency of the systematic reviews identified during the search were assessed using the AMSTAR Measurement Tool to Evaluate Systematic Reviews. AMSTAR is especially appropriate in the quick synthesis of evidence in the sense that it offers a systematic and trustworthy evaluation model without adding uncertainty on constraints that could occur as a result of the fast-moving, rapid reviews(Haby et al., 2016). No other official quality appraisal instruments were used; however, the transparency of the scope was ensured.

3.6 Review Type

The study employs a rapid review methodology which adapts systematic review processes to provide evidence syntheses quickly while maintaining methodological rigour. The selection of this approach was suitable given the rapid transformation of AI in healthcare, as it enables the timely and relevant provision of information without compromising transparency or quality(Featherstone et al., 2015; Garritty et al., 2021). The methodology was inspired by the urgent need to understand AI's implications for workplace safety and governance in healthcare settings, aided by recent upgrades such as ISO 7101:2023(ISO 7101, 2023).

3.7 Data Synthesis

Thematic synthesis was employed to extract and integrate information, resulting in a holistic narrative that explores AI applications in healthcare, workplace safety, governance models, and culturally responsive, equity-based implementation within the New Zealand context.(Whittaker et al., 2023). Qualitative data were extracted and coded line by line, following the methodology of Thomas and Harden (2008). The process involved three stages- coding text line by line, descriptive identification of themes and then synthesising them into higher-order constructs. This results in a comprehensive narrative that emphasises gaps and convergences in the existing knowledge base, allowing for the production of new insights(Thomas & Harden, 2008).

3.8 Ethical Considerations

This review employed secondary data, and therefore, it did not require human ethics approval.

4. Literature Review and Results

The synthesis of literature presented in Table 1 reveals several interconnected themes surrounding the deployment of AI technologies for workplace safety and compliance in healthcare. These findings highlight both technological advancements and the complexities involved in their integration within clinical settings(El-Helaly, 2024; Lekadir et al., 2025). AI applications demonstrate the capability to proactively detect workplace hazards, improve administrative efficiency, and support clinical decision-making; however, persistent concerns about data quality, ethical oversight, and algorithmic fairness constrain their effective adoption(Hasanzadeh et al., 2025; Kelly et al., 2019).
Additionally, the importance of embedding culturally responsive frameworks, especially regarding data sovereignty and equitable outcomes for indigenous populations, is a recurring focus in current research(Gerrard et al., 2023; Whittaker et al., 2023). Collectively, these insights lay the groundwork for developing nuanced, evidence-based strategies to support healthcare organisations in advancing

AI integration while promoting governance, cultural safety, and fairness across diverse stakeholder groups(Fiegler-Rudol et al., 2025; Lekadir et al., 2025).

Table 1: Artificial Intelligence in Workplace Safety and Healthcare Compliance

Citation (Year)	Study Type	Setting/ Population	Focus/ Intervention	Key Findings	Governance/ Equity Focus
Almyranti, M., Sutherland, E., Ash, D. N., & Eiszele, S. (2024)	Perspective	Health Workforce, International	Medical association opinions on AI and health care.	Emphasised workforce attitudes towards AI integration; the focus on the necessity of upskilling and ethical principles that should be used to guide AI adoption.	Employee preparedness, skills and expertise training, ethical use of AI, and health policy consequences.
Alowais et al. (2023)	Review	Healthcare, International	AI in automating clinical activities and workflow management.	AI-enhanced documentation, appointments, and patient follow-ups, and made clinicians work more efficiently.	Encourages ethical systems to assist in fair adoption.
Chustecki (2024)	Narrative Review	Healthcare, International	AI in Healthcare - Reduce biases, enhance transparency, safeguard data privacy, and keep it safe.	Eliminate biases, ensure transparency, protect data privacy, and enhance safety.	Manage innovation and patient safety, ethical, regulatory, and safety concerns.
El-Helaly (2024)	Review	Healthcare, Global	AI-based wearables, sensors.	Real-time hazard detection, Preventive risk identification, Safety-related predictive analytics, Forecasting health trends.	Ethical issues, Data privacy concerns, Compliance with regulations.
Faiyazuddin et al. (2025)	Comprehensive Review	Healthcare System, International	Integration of AI technologies, including ML, DL, NLP, and Robotics, into healthcare practices.	AI enhances diagnosis, treatment planning, and workflow efficiency, identifying operational and safety issues.	Suggests strong governance and regulation systems to use ethically and fairly.
Fiegler-Rudol et al. (2025)	Narrative Review	Healthcare workers, Worldwide	Human-AI interactions improve workplace safety and health.	Identifies AI's role in improving safety culture, worker monitoring, and risk reduction.	Emphasises ethical AI use and inclusion.

Citation (Year)	Study Type	Setting/ Population	Focus/ Intervention	Key Findings	Governance/ Equity Focus
Gazquez-Garcia et al. (2025)	Systematic Review	Health Professionals, International	Prepare the health workforce by developing AI skills and competencies in data, ethics, and patient-centred care.	Basic AI, data management, ethics, human-centred care, and critical evaluation are some of the core AI competencies to ensure safe deployment.	Training needs to achieve fair access.
Gerrard et al. (2023)	Policy report	Aotearoa New Zealand national health	National strategy of AI governance and implementation.	Addressing health disparities requires Te Tiriti-based AI governance.	Māori Rights, and Governance, Cultural Competency: Equity
Hasanzadeh, F., Josephson, C. B., Waters, G., Adedinsewo, D., Azizi, Z., & White, J. A. (2025)	Review / Empirical	Healthcare Applications, International	Detection and Mitigation of Bias in AI-Driven Healthcare Systems.	Addresses bias sources in AI models deployed in healthcare, summarises best practices in mitigation, such as a diverse sample of data, algorithm audit, and multi-level stakeholder involvement to reduce harms caused by biased generated output.	Emphasis on transparency in governance, the use of unlimited auditing and multiple stakeholder models to manage equity and trust dilemmas in healthcare AI.
Kelly et al. (2019)	Perspective	Implementation of healthcare AI	Significant clinical AI adoption issues.	AI Trust - Evidence plays a central role in adoption, counteracting the problems of opaque decision-making and automation bias in AI systems.	Requirement of effective governance.
Lee et al. (2022)	Empirical Application	Korean radiology department	AI-CAD systems based on chest radiography.	Enhanced workflow efficiency and shorter diagnostic times.	Requirement to be constantly validated and audited.
Lekadir et al. (2025)	International agreement	International, 117 interdisciplinary specialists, 50 nations	FUTURE-AI to develop reliable and implementable AI in healthcare.	Six guiding principles: robustness, explainability, traceability, universality, usability, and fairness.	Extensive global AI ethical guidelines.

Citation (Year)	Study Type	Setting/ Population	Focus/ Intervention	Key Findings	Governance/ Equity Focus
Maleki Varnosfaderani & Forouzanfar (2024)	Review	Hospitals and Clinics, International	Patient flow, operational efficiency, and decision support by AI.	The application of AI in hospitals enhances patient care and workflow management, facilitating faster and safer decision-making, as well as more efficient resource allocation.	Insists on the necessity of flexible mechanisms and alignment with local organisational policies of safe deployment.
Opoku et al. (2025)	Empirical Study	Healthcare professionals, Ghana	Work Health and Safety Mapping.	Assesses OHS risk and AI potential for reducing hazards.	Focus on employee well-being, local government.
Ozobu et al. (2025)	Conceptual Framework and System Development	Workplaces, diversified industries	Creation of the AI-based occupational health surveillance system.	AI enables the identification and control of workplace health risks in real-time, predictive risk assessment, and pre-emptive intervention.	Focuses on compliance-enabling, scalable design for various working environments; governance structures are required to ensure the safe and fair incorporation of AI.
Pavuluri et al. (2024)	Review	Healthcare Workforce, International	AI to minimise the administrative and cognitive load.	AI minimised cognitive/administrative workload, decreasing staff burnout and improving workforce health.	Calls for equitable governance and human-AI partnership.
Shah & Mishra (2024)	Review	Occupational Health and Safety, International	Smart PPE and AI- empowered wearables.	Proactive approach to mitigating risks, Automatic risk notifications.	Governance and Ethical frameworks, Accountability, transparency.
Valtonen et al. (2025)	An Empirical Investigation	Healthcare Employees, International	The Impact of AI on Mental Health and Well-being.	Burnout reduction via workload management.	Concerns about algorithmic bias in risk assessment.
Whittaker et al. (2023)	Real-world case study	Waitematia District Health Board, NZ	AI governance framework with Māori knowledge and customs.	Eight domains of governance - Makes AI in the workplace safe, legal, ethical, transparent, and inclusive.	Acknowledgement of Māori data sovereignty and Te Tiriti obligations.

The literature review supports the key argument that AI offers substantial transformative potential in advancing workplace safety and compliance within healthcare by addressing technical, organisational, and human factors. Evidence from studies suggests that AI-enabled wearables and

sensor technologies facilitate early and proactive hazard detection, enabling timely risk mitigation and preventing adverse incidents(El-Helaly, 2024; Lee et al., 2022; Pavuluri et al., 2024; Shah & Mishra, 2024). Additionally, AI-driven automation platforms reorganise patient care workflows, reducing administrative burdens while improving resource allocation and prioritising critical clinical results, thereby enhancing both efficiency and safety culture in healthcare organisations. Human-AI collaboration has also been shown to strengthen safety monitoring and encourage ongoing workplace safety improvements(Fiegler-Rudol et al., 2025). Overall, these findings affirm that while AI adoption significantly improves workplace safety, its implementation must be carefully appraised through established frameworks of clinical governance and workforce engagement to realise sustainable benefits.

On the workforce level, AI technologies prove to decrease healthcare staff burnout through the automation of repetitive activities and optimising workload distribution, which enhances the well-being of the staff and operational efficiency(Pavuluri et al., 2024; Valtonen et al., 2025). These benefits are based on empirical research by Opoku et al. (2025), which focuses on the actual clinical environment, highlighting existing occupational health and safety issues affecting healthcare professionals and how AI technologies can potentially mitigate these issues.

On the governance front, culturally responsive structures are needed to address algorithmic bias, transparency, and equity, particularly in Aotearoa New Zealand, where the principles of Māori data sovereignty and Te Tiriti are at the forefront(Gerrard et al., 2023; Whittaker et al., 2023). Ozobu et al. (2025) propose an AI-based system to monitor occupational health. It identifies real-time risks and combines innovative technology and sustainable governance.

Together, AI is helping medical facilities make their workplaces safer, more efficient, and equitable by means of intelligent risk forecasting, workflow optimisation, and evidence-based decision support(El-Helaly, 2024; Pavuluri et al., 2024). However, achieving these benefits necessitates strong governance mechanisms that strike a balance between innovation and ethical accountability and cultural safety(Lekadir et al., 2025; Whittaker et al., 2023). These findings are further discussed in detail in the following discussion, which explores the potential of the international currency, such as FUTURE-AI, and the local initiative, such as the AIGG project in New Zealand, in directing responsible AI incorporation into the ISO-compliant healthcare quality systems(ISO 7101, 2023; Whittaker et al., 2023).

5. Discussion

The preceding analysis highlights the diverse opportunities and challenges presented by the integration of artificial intelligence within healthcare workplace safety and compliance systems(Gerrard et al., 2023; Lekadir et al., 2025). This discussion critically interprets these findings, situating them within the context of international technological progress, as well as the unique cultural, regulatory, and ethical landscape of Aotearoa New Zealand(Lekadir et al., 2025; Whittaker et al., 2023). It explores how emerging AI tools impact operational workflows, employee experience, and governance frameworks, while examining consequences for equitable and culturally attuned healthcare delivery(Gerrard et al., 2023). By weaving together global academic insights and local policy mandates, the discussion clarifies pathways for the ethical and practical implementation of AI innovations in healthcare organisations and identifies ongoing knowledge and practical gaps that warrant further investigation(Fiegler-Rudol et al., 2025; Whittaker et al., 2023).

5.1 Redefining Healthcare Workplace Safety using AI: The Global Innovation and the Imperatives of New Zealand.

Recent developments in AI have significantly enhanced workplace safety and compliance in healthcare globally. AI is now considered an essential tool for assessing risks, prioritising diagnoses, and checking compliance(Kelly et al., 2019; Lekadir et al., 2025). By automating routine tasks and filtering relevant information, AI reduces clinicians' mental workload, enabling them to focus more on patient care. This is achieved by prioritising emergencies supported by AI-guided radiology triage and decision support systems(Lee et al., 2022; Maleki Varnosfaderani & Forouzanfar, 2024). These technologies have not only streamlined staffing and decreased administrative burdens but also reduced the level of burnout, fostering healthier workplaces(Faiyazuddin et al., 2025; Pavuluri et al., 2024; Valtonen et al., 2025).

Empirical evidence from healthcare settings demonstrates tangible benefits of AI-enabled interventions. For example, AI-based wearable sensors and smart personal protective equipment have shown promise in early detection and prediction of occupational hazards, leading to proactive

preventive measures and enhanced safety compliance(El-Helaly, 2024; Shah & Mishra, 2024). In radiology and clinical workflow management, AI systems have significantly improved operational efficiency, reduced clinician burnout, and expedited critical decision-making(Lee et al., 2022; Pavuluri et al., 2024). However, the successful operationalisation of these systems depends heavily on continuous validation and adherence to ethical and technical governance frameworks to avoid risks of system failures or unintended harms.

Despite these evident advantages, significant gaps still exist, particularly in governance, trust, and equity, necessitating further academic research and the development of systems. Biased algorithms and structural injustices risk perpetuating inequalities and disadvantaging minority groups, underscoring the need for transparent, auditable governance and effective mitigation strategies(Chustecki, 2024; Hasanzadeh et al., 2025; Lekadir et al., 2025).

Additionally, the implementation of AI in occupational health raises serious concerns regarding data privacy, security, and fairness. To avoid breaches and biases, especially towards marginalised groups, AI systems must operate through detailed governance structures and clear privacy policies. Regular audits and continuous stakeholder involvement are necessary to maintain trust and uphold ethical standards(Gerrard et al., 2023; Lekadir et al., 2025). Operational issues of interoperability with existing health IT systems and adaptive governance structures also pose challenges that need to be addressed to unlock the full potential of AI(Almyranti et al., 2024).

5.2 Workforce Readiness and Ethical Governance: A New Zealand Approach

Aotearoa New Zealand is unique in the literature regarding its emphasis on culturally responsible leadership, Māori information sovereignty, and obligations under Te Tiriti o Waitangi, which impose ethical limits on the adoption of AI in healthcare. As a national pilot, the Artificial Intelligence Governance Group (AIGG) and its associated participatory models should prioritise stakeholder engagement, ethical assessment, and transparent tracking to foster trust and inclusiveness. These frameworks aim to ensure that equity, cultural safety, and Indigenous rights are at the forefront, thereby mitigating the risk that AI will perpetuate societal disparities when adopted without critical examination and reflection(Gerrard et al., 2023; Whittaker et al., 2023).

Global standards like FUTURE-AI complement the need for local data sovereignty and indigenous co-design(Lekadir et al., 2025). And ISO 7101:2023, which does not directly address the combination of the first three requirements, i.e., fairness, universality, and traceability and explainability(ISO 7101, 2023). In this manner, the New Zealand approach bridges an essential research gap, namely, operationalising ethical and auditable AI within the cultural, legal, and policy limitations specific to the local context.

Additionally, the literature confirms that the creation of workforce preparedness will determine the sustainability of the change: the training of healthcare specialists in the field of AI literacy, ethics, and patient-centred competencies is essential to provide a safe and accountable implementation(Almyranti et al., 2024; Gazquez-Garcia et al., 2025). Continuous capacity building and co-designed governance should remain a focus to achieve greater safety and mitigate the adverse effects of technological transitions.

5.3 Achieving Integrated, Equitable, and Safe AI-Driven Healthcare Systems

Based on international studies and regional policies, the discussion reveals that the full potential of AI in the healthcare workplace safety and compliance is not limited to technical deployment(Gerrard et al., 2023). It demands multi-dimensional leadership(Whittaker et al., 2023), participatory governance(Hasanzadeh et al., 2025), critical ethical care(Pavuluri et al., 2024), and a complete focus on equity, especially for indigenous and underrepresented populations within the rapidly changing New Zealand healthcare landscape(Whittaker et al., 2023).

The results highlight a pressing demand for governance frameworks that effectively address the notable gaps—often termed ‘white spaces’—in existing research, particularly where empirical data and actionable guidance remain insufficient. Progress in this field depends on the development and application of evidence-based, contextually tailored strategies that harmonise global standards with region-specific legal and cultural factors (Cherry, 2010; Lekadir et al., 2025). The New Zealand context exemplifies how the ethical deployment of AI can be aligned with culturally safe healthcare delivery practices, suggesting a model for balancing technological innovation with ethical stewardship. Future research should systematically investigate the effectiveness of these integrative frameworks, particularly their capacity to mitigate algorithmic bias, uphold indigenous data sovereignty, and

promote equitable health outcomes. Such investigations are crucial for informing the design of adaptable governance models that can support the responsible integration of AI in diverse healthcare environments(Gerrard et al., 2023; Whittaker et al., 2023).

Sustainable AI implementation requires continuous workforce education, flexible governance, and stakeholder participation, promoting safety, trust, and equity. These components are essential for developing systems that support, empower, and protect healthcare professionals and patients within a more AI-integrated healthcare setting(Almyranti et al., 2024; Pavuluri et al., 2024; Valtonen et al., 2025).

This study highlights that building AI-driven healthcare systems that are ethically sound, culturally sensitive, and safe requires combining global best practices with indigenous data sovereignty and equity principles(Lekadir et al., 2025). Effective governance must reconcile international standards with local ethical frameworks(Gerrard et al., 2023). Developing adaptable policies beyond mere regulatory compliance is essential to fostering culturally fair and sustainable workplace safety in healthcare(Lekadir et al., 2025). Future research should focus on empirical assessment of these governance approaches to ensure AI adoption reduces disparities and supports resilient, inclusive health systems(Fiegler-Rudol et al., 2025; Whittaker et al., 2023).

6. Conclusion

This investigation emphasises that successful AI integration in healthcare goes beyond technical innovation, requiring comprehensive governance infused with ethical rigour and cultural sensitivity. The creation of Indigenous-led AI oversight committees can empower local communities, ensuring AI aligns with their values and safeguards data sovereignty. Developing culturally tailored AI literacy and bias-awareness training for both developers and healthcare practitioners can help minimise unintentional harms. Incorporating dynamic, real-time audit systems that are accessible to frontline workers and community stakeholders enables the proactive detection and mitigation of AI-related risks.

Additionally, incentivising AI adoption through funding mechanisms tied to adherence to culturally inclusive governance frameworks can drive broader systemic change. Cross-sector collaborations between technology developers, policymakers, and Indigenous organisations can sustain governance that adapts fluidly to emerging challenges. Finally, investing in capacity-building initiatives, such as fellowships for Indigenous researchers in AI ethics and governance, will cultivate leadership critical for shaping future AI healthcare solutions. These context-specific strategies collectively foster safer and more equitable AI deployment, addressing gaps seldom explored in current scholarly discourse.

In summary, while AI presents significant transformative potential to improve workplace safety in healthcare, this promise can only be realised through governance that is ethically rigorous, culturally responsive, and inclusively co-designed with Indigenous communities. Policymakers, healthcare leaders, and AI developers must collaboratively prioritise transparency, equity, and accountability as foundational pillars. Integrating these core principles into the design and rollout of AI not only improves workplace safety in healthcare but also strengthens trust and adaptability within the workforce.

Reflecting on the findings of this study, the strategies and frameworks presented offer valuable insights that can inform international governance approaches. To further strengthen both the healthcare and AI sectors in New Zealand, this work recommends actions such as establishing thorough auditing mechanisms, fostering sustained collaboration with Māori and Indigenous communities, conducting regular evaluations of governance frameworks, and increasing investment in research. Implementing these recommendations will deliver practical solutions for existing and emerging challenges, ensuring that AI advancements promote fairness and positive transformation rather than contributing to inequities or new risks.

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7.2 Declarations of Interest

Declarations of interest: none.

8.0 References

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