

AIHQSP Study Guide

Artificial Intelligence in Healthcare Quality & Safety Professional (AIHQSP)

Date	Version	Review Cycle	Contact
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01 Introduction

This study guide provides a structured overview of the knowledge domains assessed in the AIHQSP certification examination. It is designed to support candidates preparing for the examination by summarizing the key principles, terminology, and competencies assessed across the twelve certification domains.

Artificial intelligence technologies are increasingly integrated into clinical decision support systems, diagnostic tools, patient monitoring platforms, and operational healthcare processes. These technologies introduce significant opportunities for improving healthcare delivery, while also introducing potential safety, ethical, regulatory, and operational risks that require active, competent governance.

The AIHQSP certification focuses on the competencies required to manage these risks and support the responsible, effective, and patient-centered use of artificial intelligence in healthcare systems.

Candidates should review each domain and ensure familiarity with the learning objectives, key concepts, and summary principles presented. The AIHQSP examination is aligned with these twelve domains. Candidates are encouraged to supplement this guide with professional experience, current healthcare quality and patient safety literature, and practical understanding of artificial intelligence technologies used in healthcare environments.

Domain 1 Clinical AI Safety Science

Learning Objectives

- Identify common failure modes in clinical AI systems
- Evaluate risks associated with model drift and performance degradation
- Recognize indicators of silent AI errors in clinical environments
- Recommend monitoring strategies for deployed AI systems

Key Concepts

— AI model failure modes	— Concept drift and model degradation
— Silent errors in AI-enabled clinical tools	— Edge cases and rare clinical conditions
— AI system reliability monitoring	— Safety signal detection

Summary

Healthcare AI systems may degrade over time as clinical populations and data patterns change. Safety science approaches focus on identifying failure modes, detecting drift early, and implementing robust monitoring mechanisms to maintain safe, reliable system performance.

Domain 2 Algorithmic Accountability & Clinical Governance

Learning Objectives

- Evaluate governance frameworks for clinical AI oversight
- Assess validation and approval processes for AI systems
- Identify accountability structures for AI-enabled decision-making
- Recommend governance mechanisms that support safe AI deployment

Key Concepts

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|----------------------------|-------------------------------------|
| — AI governance frameworks | — Validation and approval processes |
| — Oversight committees | — Accountability structures |
| — Escalation pathways | — Clinical validation standards |

Summary

Healthcare organizations must establish structured governance frameworks to oversee AI systems, ensure rigorous clinical validation, and provide clear lines of accountability for algorithmic decisions affecting patient care and safety.

Domain 3 Human–AI Teaming & Cognitive Safety

Learning Objectives

- Identify risks associated with automation bias in clinical practice
- Evaluate trust calibration between clinicians and AI systems
- Recognize causes of alert fatigue in AI-supported workflows
- Recommend strategies to support safe and effective human-AI collaboration

Key Concepts

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|---------------------------------|----------------------------------|
| — Automation bias | — Trust calibration |
| — Alert fatigue | — Cognitive load management |
| — Human-AI collaboration design | — Clinician oversight mechanisms |

Summary

Effective collaboration between clinicians and AI systems requires deliberate design to prevent automation bias, manage cognitive load, and ensure that human judgment remains central to clinical decision-making.

Domain 4 Data Integrity, Bias & Representational Fairness

Learning Objectives

- Assess dataset quality and representativeness for clinical AI development
- Identify potential sources of bias in AI model training and outputs
- Evaluate fairness impacts across diverse patient populations
- Recommend strategies to detect and mitigate algorithmic bias

Key Concepts

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|------------------------------------|-------------------------------|
| — Dataset quality and completeness | — Representational bias |
| — Equity impact assessment | — Fairness evaluation methods |
| — Demographic performance analysis | — Bias mitigation strategies |

Summary

Bias in training data can produce systematically unequal outcomes across patient populations. Evaluating dataset composition and assessing model performance across demographic groups is essential to ensure equitable, safe AI deployment.

Domain 5 Real-World Validation & Post-Deployment Surveillance

Learning Objectives

- Evaluate monitoring approaches for deployed AI systems in clinical environments
- Identify early signals of performance drift in real-world conditions
- Recognize safety signals emerging from clinical use of AI systems
- Recommend validation strategies for ongoing AI performance assurance

Key Concepts

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| — Performance monitoring frameworks | — Drift detection methods |
| — Safety signal identification | — Real-world validation design |
| — Post-deployment surveillance | — Clinical outcome tracking |

Summary

AI systems must be continuously monitored following deployment to detect performance degradation, identify unexpected safety risks, and ensure sustained alignment with clinical and patient safety standards.

Domain 6 AI-Enabled Diagnostic & Therapeutic Risk Management

Learning Objectives

- Identify risks associated with AI-supported clinical decision tools
- Evaluate safeguards for diagnostic and treatment recommendation algorithms
- Assess potential unintended clinical consequences of AI use
- Recommend risk mitigation strategies for clinical AI integration

Key Concepts

- Clinical decision support safety
- Triage algorithm risk
- Diagnostic AI risk factors
- Unintended clinical consequences
- Safeguard design
- Risk mitigation strategies

Summary

AI-enabled clinical tools may significantly influence diagnosis and treatment decisions. Risk management strategies must ensure safe, appropriate integration with clinician decision-making and protect against unintended patient harm.

Domain 7 Regulatory, Legal & Ethical Risk in AI-Driven Care

Learning Objectives

- Evaluate regulatory requirements governing healthcare AI systems
- Identify legal risks associated with AI-assisted clinical decisions
- Assess ethical principles relevant to AI governance in healthcare
- Recommend compliance frameworks and transparency mechanisms

Key Concepts

- Regulatory compliance frameworks
- Legal liability considerations
- Informed consent for AI use
- Transparency and explainability
- Ethical principles in AI governance
- Accountability and documentation

Summary

Healthcare AI systems must comply with applicable regulatory frameworks and uphold ethical standards. Transparency regarding the role of AI in clinical decisions is essential to maintain legal compliance, patient trust, and institutional accountability.

Domain 8 Patient-Centered Transparency & Trust Design

Learning Objectives

- Assess transparency mechanisms used in AI-enabled clinical systems
- Evaluate patient communication strategies regarding AI involvement in care
- Recommend approaches to support patient trust in AI-enabled healthcare
- Support shared decision-making in AI-supported clinical environments

Key Concepts

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|--------------------------------|-----------------------------|
| — Explainable AI principles | — Patient autonomy |
| — Disclosure of AI involvement | — Shared decision-making |
| — Patient communication design | — Trust-building mechanisms |

Summary

Maintaining patient trust requires clear, honest communication about the role of AI systems in diagnosis, treatment recommendations, and care planning, while ensuring patients retain meaningful autonomy in clinical decisions.

Domain 9 Incident Investigation & Learning Systems

Learning Objectives

- Investigate AI-related patient safety events using structured methodologies
- Conduct root cause analysis for AI system failures and near-misses
- Recommend corrective and preventive actions following safety incidents
- Support organizational learning and improvement from AI-related events

Key Concepts

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|---|----------------------------------|
| — AI-related safety event investigation | — Root cause analysis methods |
| — Corrective action planning | — Preventive action frameworks |
| — Organizational learning systems | — Safety event reporting culture |

Summary

Healthcare organizations must investigate AI-related safety events using rigorous methodologies, apply findings to improve system design and governance, and foster a reporting culture that supports organizational learning and harm prevention.

Domain 10 Workflow Integration & Clinical Process Safety

Learning Objectives

- Evaluate how AI systems integrate into existing clinical workflows
- Identify workflow-related safety risks associated with AI implementation
- Recommend safeguards to protect clinical process integrity with AI
- Assess process safety implications of AI integration across care settings

Key Concepts

- Clinical workflow mapping
- Human-AI orchestration
- EHR and systems integration
- Process safety assessment
- Workflow disruption risks
- Interoperability considerations

Summary

Safe AI deployment requires careful alignment with clinical workflows to prevent disruption, reduce process errors, and ensure that AI tools enhance — rather than compromise — the safety and efficiency of care delivery.

Domain 11 Continuous Quality Improvement for AI Systems

Learning Objectives

- Apply quality improvement methods to evaluate and enhance AI system performance
- Assess outcome data from AI-enabled healthcare processes
- Recommend improvement cycles to support AI optimization and retraining
- Evaluate feedback loops that support ongoing AI system learning

Key Concepts

- Quality improvement cycles (PDSA/PDCA)
- Outcome measurement frameworks
- Performance optimization strategies
- Feedback loop design
- Model retraining protocols
- Continuous monitoring indicators

Summary

AI system performance should be evaluated regularly using outcome data and quality improvement methodologies to guide iterative improvements, model retraining, and sustained alignment with patient safety and quality standards.

Domain 12 Organizational AI Readiness & Safety Culture

Learning Objectives

- Assess organizational readiness for AI system implementation
- Evaluate workforce competency requirements for safe AI adoption

- Promote psychological safety and a reporting culture in AI-enabled environments
- Recommend leadership governance structures that support safe, responsible AI use

Key Concepts

- Leadership commitment to AI governance
- Workforce training and competency
- Psychological safety
- Organizational readiness assessment
- Change management for AI adoption
- Safety culture development

Summary

Successful AI adoption depends on visible leadership commitment, targeted workforce competency development, and an organizational culture that encourages transparent reporting, learning from errors, and shared accountability for patient safety.

02 Using This Study Guide

Candidates preparing for the AIHQSP certification examination should review each domain and ensure familiarity with the learning objectives, key concepts, and summary statements presented throughout this guide. The AIHQSP practice questions and certification examination are aligned with these twelve domains. Examination questions are designed to assess applied knowledge and professional decision-making — not simply recall of definitions.

Candidates are strongly encouraged to:

- Review all twelve domains and their associated learning objectives
- Supplement this guide with current healthcare quality, patient safety, and AI governance literature
- Draw on professional experience with healthcare AI implementation and governance
- Practice applying key concepts to realistic clinical and organizational scenarios
- Complete available AIHQSP practice questions to assess readiness

A thorough understanding of the principles covered in this guide, combined with practical professional experience, will provide the strongest foundation for AIHQSP examination success.