



## Short Communication

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# Artificial Intelligence and the Standard of Care in Pharmacy Practice

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## Abstract

Artificial intelligence (AI) is increasingly deployed across clinical pharmacy practice, influencing drug discovery, pharmacokinetic modeling, and medication-related clinical decision support. As AI-enabled technologies become embedded in routine workflows, they raise important questions regarding professional liability, regulatory compliance, and the legal interpretation of the standard of care. This article examines the role of AI in contemporary pharmacy and pharmacology through a healthcare law and professional accountability lens. AI systems are positioned as adjunctive tools that may inform, but do not redefine, standards of care or shift responsibility away from licensed professionals. Emphasis is placed on clinician judgment, duty of care, foreseeability of harm, and the risks of automation bias. The article argues for adaptive standards of care that preserve pharmacist and pharmacologist accountability while accommodating the evolving role of AI in clinical environments.

**Keywords:** Artificial intelligence; standard of care; pharmacy law; professional liability; clinical decision support; pharmacology

## Introduction

The standard of care occupies a central role in pharmacy and pharmacology, serving as both a clinical benchmark and a legal construct used to assess professional conduct. Traditionally, standards of care are defined by accepted professional practice, clinical guidelines, and the exercise of reasonable judgment under similar circumstances [1]. The rapid integration of artificial intelligence (AI) into pharmacological practice and medication-related clinical decision-making challenges conventional interpretations of these standards. AI systems are now routinely applied in drug discovery, pharmacokinetic and pharmacodynamic (PK/PD) modeling, medication safety surveillance, and clinical decision support systems (CDSS). These tools offer demonstrable benefits in speed, pattern recognition, and data synthesis.

However, their increasing influence over professional workflows introduces new sources of risk related to overreliance, opacity, and misalignment with patient-specific contexts. Importantly, AI adoption does not alter the legal obligations of pharmacists, pharmacologists, or prescribing clinicians [2]. Standards of care remain grounded in professional accountability, not technological capability. This article examines the integration of AI into pharmacological practice with particular attention to pharmacy law, liability exposure, and the preservation of clinician judgment as the core determinant of appropriate care.

## AI as a Clinical Tool in Pharmacology

In clinical pharmacy practice, AI-enabled CDSS support medication selection, dosing recommendations, interaction

checking, and adverse event detection. Evidence suggests these systems can reduce medication errors under controlled conditions. However, real-world deployment highlights well-documented behavioral risks, including automation bias and reduced independent verification. When AI outputs are presented as confident or authoritative, clinicians may be less likely to question recommendations, even when clinical context warrants deviation [3]. From a legal standpoint, the presence of an AI recommendation does not modify the duty of care owed to patients. Courts and regulatory bodies consistently evaluate professional conduct based on what a reasonably competent practitioner would do under similar circumstances, not on whether an algorithm suggested a particular action. Failure to critically assess AI outputs may therefore increase, rather than mitigate, liability exposure.

### Standards of Care, Liability, and Professional Responsibility

Standards of care in pharmacy and pharmacology are inherently tied to professional judgment and licensure. AI systems, regardless of regulatory clearance or institutional endorsement, do not assume legal responsibility for clinical outcomes [4]. Pharmacists and pharmacologists remain accountable for evaluating medication appropriateness, dosing, interactions, and monitoring requirements based on patient-specific factors. From a malpractice perspective, AI tools are generally classified as clinical aids rather than decision-makers. Their use does not excuse deviation from accepted practice or justify failure to recognize foreseeable risk. Indeed, uncritical reliance on AI-generated recommendations may be construed as a breach of duty if harm results and clinical judgment was reasonably required. Regulatory frameworks governing medical software reinforce this position. While AI-enabled CDSS may be subject to oversight as clinical software, regulatory clearance does not equate to endorsement of autonomous use. Institutions retain responsibility for ensuring that systems are deployed within validated contexts and monitored for performance drift, bias, or misuse. Clinicians retain responsibility for interpreting outputs and integrating them appropriately into care decisions [5].

### Ethical and Legal Risk Considerations

The ethical principles underlying pharmacological practice, beneficence, nonmaleficence, justice, autonomy, and transparency, closely align with liability considerations. AI systems trained on biased or proxy-based data may systematically misestimate risk for certain populations, creating foreseeable disparities in care. When such risks are recognized or should reasonably be recognized, failure to account for them may raise ethical concerns and legal vulnerability [6]. Transparency also carries legal relevance. When AI tools materially influence medication decisions, clinicians must be able to explain the basis for those decisions in professional and, when necessary, legal contexts. Reliance on opaque algorithms that cannot be meaningfully interrogated complicates documentation, informed consent, and post hoc defense of clinical reasoning. Professional competency increasingly includes basic AI literacy

[7]. Pharmacists are not expected to understand machine learning algorithms at a technical level, but they are expected to recognize limitations, appropriate use cases, and situations in which algorithmic outputs warrant skepticism. Institutions share responsibility for training, governance, and escalation pathways, but they cannot transfer liability to technology vendors when professional judgment is required.

### Toward Adaptive Standards of Care

AI systems are dynamic, continuously updated, and context-sensitive. Static interpretations of standards of care are ill-suited to such technologies. Adaptive standards of care offer a legally and ethically appropriate framework, emphasizing core professional principles while allowing flexibility in implementation. Key elements of adaptive standards include explicit expectations for human oversight, ongoing performance monitoring, and clearly defined accountability [8]. Importantly, standards should focus not on whether AI is used, but on how it is used and how clinicians respond to its outputs. Documentation of rationale, clinician override, and patient-specific considerations becomes increasingly important as AI tools permeate practice. Education and governance are essential to sustaining adaptive standards. Without them, AI risks becoming a de facto authority, subtly shifting professional norms in ways that erode judgment and increase systemic risk.

### Conclusion

Artificial intelligence is reshaping pharmacy and pharmacology, offering substantial benefits while introducing new legal and ethical complexities. Its integration does not redefine the standard of care or displace professional responsibility. Rather, it reinforces the centrality of clinician judgment as the ultimate safeguard of patient safety. Adaptive standards of care that explicitly recognize human-AI collaboration provide a defensible path forward. By treating AI as a tool rather than an authority, pharmacy professionals can harness innovation while preserving accountability, minimizing liability, and maintaining public trust in pharmacological care.

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