

Evaluating the Ethical and Financial Impact of AI-Based Prior Authorization Systems on Patient Care Access

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Abstract

The implementation of artificial intelligence (AI) in prior authorization (PA) systems represents a growing trend in healthcare utilization management, promising administrative streamlining but introducing substantial ethical, clinical, and financial complexities with direct implications for patient care access. AI-based PA platforms use machine learning algorithms, natural language processing, and rule-based automation to evaluate coverage eligibility by comparing clinical documentation against payer-specific criteria. While intended to reduce administrative burden and accelerate decision timelines, such systems increasingly operate within proprietary frameworks that diminish transparency, constrain physician autonomy, and marginalize patient-specific nuance. The substitution of algorithmic adjudication for clinician-guided review raises fundamental ethical concerns, particularly when the logic of automated denials remains inaccessible to providers and patients, undermining informed appeals and due process. Early analyses indicate that AI-driven denials (often predicated on rigid, pattern-based criteria) are disproportionately applied to individuals with complex, rare, or multimorbid conditions, where deviation from normative care pathways is medically necessary but poorly codified. Financially, delays or denials in care authorization can impose substantial indirect costs through deferred treatment, exacerbation of disease states, increased emergency utilization, and heightened out-of-pocket spending, especially for vulnerable populations. Algorithmic opacity further impedes accountability, while biases embedded in training datasets risk amplifying structural inequities in healthcare access and coverage approval. In the absence of oversight mechanisms, the adoption of AI in prior authorization threatens to reshape the clinician-patient-payer relationship in ways that prioritize administrative throughput over ethical obligation, clinical appropriateness, and distributive justice. Rigorous interdisciplinary evaluation encompassing algorithmic transparency, ethical safeguards, and health equity impact is required to ensure that technological innovation in utilization management enhances, rather than erodes, equitable access to medically necessary care.

1. INTRODUCTION

1.1. Rise of AI in Healthcare Administration

Artificial Intelligence (AI) is advancing at a remarkable speed, with its reach extending across multiple fields and settings. In healthcare, AI is being used to transform patient care and improve efficacy through its capability to act as a diagnostic tool and create patient-specific treatment plans. AI has the potential to revolutionize healthcare administration by

fundamentally altering how healthcare operates, particularly in the areas of administrative processes, clinical decision-making, and patient engagement [1].

Currently, AI utilization streamlines care by organizing and updating patient records, analyzing and interpreting large amounts of patient data, and addressing patient scheduling concerns. Due to its ability to enhance patient care and outcomes, AI is being integrated into an

increasing number of healthcare systems [2]. As a result, AI is becoming a frequently used tool in modern healthcare. Despite its benefits, numerous challenges still exist such as biases, issues with generalizability, and ethical and safety concerns [3].

A challenge arises with the use of AI in prior authorization, an integral element of modern healthcare in the U.S. that functions as a protective measure for both patients and insurers. Many physicians fear that AI may disproportionately increase prior authorization denials, thereby exacerbating preventable patient harm [4]. Although AI has been used to increase accessibility regarding scheduling and updating patient records, it poses a threat to accessing life-saving care.

1.2. Evolution + Purpose of Prior Authorization

Initially developed as a means to contain costs and minimize unnecessary healthcare utilization, prior authorization was intended to verify the medical necessity and cost-effectiveness of certain high-cost procedures, diagnostics, and prescriptions before insurance coverage would be approved [5]. While originally conceptualized as a safeguard for both patients and payers, aimed at promoting evidence-based care, PA has gradually shifted into a more burdensome administrative barrier, particularly as healthcare systems have become more complex and insurers have expanded utilization management strategies [6]. Recent data from the American Medical Association indicate that 93% of physicians report care delays linked to PA, with more than one-fourth attributing serious patient harm to these delays [7].

This growing disconnect between the intended purpose of PA and its operational impact underscores a broader tension between clinical decision-making and bureaucratic control. As artificial intelligence tools are increasingly introduced to streamline prior authorization workflows, they are entering a system already marked by inefficiencies and provider frustration. Although these technologies promise faster determinations and reduced manual labor, they also introduce new concerns around algorithmic transparency, fairness, and clinical nuance [8].

A thorough understanding of PA's evolution is, therefore, critical to assessing whether AI-driven reforms will genuinely enhance healthcare delivery or simply reinforce the existing flaws in a more opaque and impersonal manner.

1.3. Aim and Scope of this Review

This review aims to critically examine the integration of artificial intelligence into prior authorization processes within the U.S. healthcare system, with a focus on the ethical, clinical, and systemic implications for patient care access. It aims to analyze whether AI-driven tools in PA achieve their goal of reducing administrative burden or if they risk exacerbating existing barriers by introducing algorithmic opacity and biases. By contextualizing recent developments in AI within broader debates on healthcare automation, this review aims to inform policy, clinical practice, and future research on the responsible integration of AI into utilization management systems.

2. REVIEW

2.1. Technical Foundations of Ai-Based Pa

Artificial intelligence (AI) enabled prior authorization systems rely on a combination of machine learning (ML) and natural language processing (NLP) to evaluate clinical documentation against payer-specific coverage criteria. Each technology contributes unique capabilities: ML detects patterns in clinical data, NLP converts free-text notes into structured inputs, and rules engines enforce policy thresholds. Together, these components power tiered decision-making models that can auto-approve straightforward cases while escalating more complex ones for further review. This shift from static rule-based systems to adaptive AI solutions reflects a growing demand for efficient approaches to utilization management in modern healthcare.

Machine learning distinguishes itself from traditional rule-based systems by learning from example data rather than operating solely on preprogrammed instructions [9]. In healthcare, ML models have demonstrated the ability to analyze large volumes of heterogeneous clinical information including imaging, provider notes, and diagnostic codes with greater consistency and efficiency than manual reviewers [9-10]. These models are typically developed using supervised learning techniques, trained on datasets of prior PA cases labeled by outcome. Over time, they learn to associate specific clinical features with approval or denial decisions, effectively replicating the judgment of experienced reviewers while reducing reliance on rigid, manually constructed rule sets [8]. This ability to generalize from previous choices has the potential to minimize human bias, ensure

greater consistency, and support equitable access to necessary treatments. Moreover, ML-driven systems can continuously improve with new data, allowing for dynamic adaptation to evolving payer policies.

Natural language processing plays a vital role in parsing the unstructured content of electronic health records. Clinical documentation, such as narrative notes, radiology impressions, and discharge summaries, often contains essential information that cannot be captured through structured fields alone. NLP models convert these narratives into standardized representations that reflect clinical intent, enabling downstream AI systems to evaluate coverage criteria more holistically [9, 11]. These capabilities support a range of administrative tasks beyond PA, including automated clinical coding, patient risk stratification, and extraction of diagnosis-specific elements across provider notes [11]. By transforming free-text documentation into structured, analyzable data, NLP bridges the gap between how clinicians communicate and how automated systems process information. Its ability to surface clinically relevant details enhances the accuracy of AI-driven prior authorization decisions and underscores the broader value of language-based models in scalable, data-driven healthcare.

These AI tools are increasingly applied to adjudicate PA requests by automating a traditionally manual and labor-intensive process. Leveraging comprehensive datasets that combine eligibility, claims, clinical history, prior authorizations, appeals, and outcomes, AI models, primarily trained via supervised learning, classify requests by complexity [9]. This classification allows for automatic approval of many low- and medium-complexity cases, thereby reducing manual review, accelerating turnaround times, and improving consistency for clinicians and patients. These systems typically use a tiered decision-making approach, auto-approving straightforward requests while escalating more complex or uncertain cases for human review based on confidence thresholds or flagged concerns [9]. By streamlining routine decisions, AI has the potential to significantly enhance administrative efficiency and free up clinical resources for cases requiring more nuanced judgment. Despite these operational gains, concerns about transparency and accountability remain. Some worry that opaque AI systems may issue even complex denials algorithmically without clinician oversight. The limited explainability of many ML-driven

decisions, especially within proprietary models, restricts providers' ability to understand or appeal denials. As AI's role in utilization management expands, understanding these technical mechanisms is essential to balancing administrative efficiency with the preservation of clinical nuance. While these technologies transform prior authorization from a burdensome manual process into a more scalable and responsive system, the ethical, legal, and systemic implications of delegating decisions to automated algorithms remain subjects for ongoing examination. These broader implications are addressed in subsequent sections.

2.2. Clinical Implications

Artificial Intelligence (AI)-based PA systems have introduced significant challenges to physician autonomy and clinical judgment, raising concerns about decision-making authority and patient care quality. According to a nationwide survey of 1,000 practicing physicians conducted in 2024 by the American Medical Association (AMA), 61% of physicians believe the implementation of AI has resulted in higher rates of PA denials because of inadequate human oversight [4]. Automated decision-making without physician review has created greater potential for barriers to be constructed between patients and the delivery of necessary treatment. AI tools cannot consider the full context of a patient's condition and can be difficult to represent in rule-based formats, leading to outcomes that do not reflect the nuances of individual patient cases [8]. This underscores the need for human regulation of AI in PA processes to ensure that patient-specific nuances are explored and considered, preserving patient's access to necessary medical treatment. As the use of automated systems has been deemed to override clinical decisions and physician judgment, patient care has been significantly compromised. Taking a closer look at the 2024 AMA survey, 93% of physicians have reported a delay in treatment access, and 29% have reported a serious adverse outcome for a patient in their care [7]. These findings suggest that the implementation of AI does not support timely and nuanced medical decisions, delaying care and potentially worsening symptoms and the progression of a patient's condition. The substantial burdens associated with the rise of PA denials have also significantly impacted physicians' workload, contributing to increased administrative burdens and physician burnout. In a 2024 AMA survey, 89% of physicians have

reported that the automated system of PAs has increased physician burnout, and 20% have reported they always appeal an adverse PA decision [7]. When appealing a PA decision, physicians are often required to do a peer-to-peer review with a healthcare representative, which significantly consumes physician time and disrupts the patient's appointment schedule. The administrative challenges posed by AI-based PA systems have substantially increased the costs of healthcare providers due to the hiring of dedicated staff to manage PA tasks [12]. This highlights a crucial inefficiency in healthcare costs as resources and financial capital are diverted away from patient-centered care and towards administrative personnel. According to a report from the Council for Affordable Quality Healthcare (CAQH), the U.S. healthcare industry spent \$1.3 billion on administrative costs related to PAs in 2023, representing a 30% increase from the previous year [13]. The growing financial strain of automated systems on healthcare organizations underscores the need to streamline the PA process and reallocate resources toward enhancing patient care and improving healthcare delivery.

2.3. Ethical Concerns, Transparency, Accountability

The automation of high-stakes medical decisions is not without its ethical concerns. In the past, automated systems have indicated that Black patients at a given risk score were considerably sicker than White patients [14]. This means that the algorithm has biases that underestimate the health needs of Black patients compared to White patients with similar health statuses. Rectifying this would lead to a reduction in inequality between groups. In addition, the use of stigmatizing language has been found to perpetuate these biases. When stigmatizing terms such as "belligerent," "argumentative," and "difficult," among others, were removed from models, the discrepancy between Black and White patients was found to be reduced from 2.97% to 0.05% [15]. This example highlights one of many precautions that should be applied to AI before it is responsible for authorizations in healthcare. Due to the significance of these algorithms, there must be transparency regarding the decision-making process. Concerningly, many of these algorithms cannot explain their decisions, prompting the rise of Explainable Artificial Intelligence (XAI) to bridge this gap. XAI, however, has been found to incorrectly attribute responsibility, creating scapegoats [16]. This highlights a key weakness in these models,

as they are trained to recognize patterns rather than comprehend them. In addition, Savulescu et al. discuss the critical importance of shared decision-making in the medical process, which algorithms do not allow for [17]. Erosion of this integral process would result in the reduction of patient trust and a compromise of fundamental values of patient autonomy. It is due to this that safeguards must be put in place before unjustified denials occur.

The question of who is accountable when AI is at fault isn't entirely clear. Some have placed the blame on developers, while others, have posited the need for organizational accountability [18]. Similarly, Smith argues that clinicians should maintain responsibility for outcomes when using AI systems and that technologists should share responsibility with the clinician [19]. This shared responsibility allows for the clinician-patient relationship to remain intact, rather than handing over the reins to an external and opaque AI system. To foster accountability, Wang et al. have introduced a framework to cultivate a sense of accountability among healthcare professionals using AI [20]. This framework has two critical conditions at its core: AI ethics enactment and trusting belief in AI. Regarding AI ethics, this would require that an ethical framework be created and actively adhered to. In terms of trusting belief in AI, this would mean having a calibrated amount of trust in AI systems enough to trust the efficacy of AI systems while still critically reviewing their output.

These two concepts are important when answering the question of how these systems can be made more accountable.

2.4. Health Equity, Social Determinants of Health & Algorithmic Bias

As Artificial Intelligence and machine learning become increasingly integrated into healthcare delivery, concerns about equity have grown more urgent. In light of these concerns, the development, validation, and implementation of equitable AI are critical to preventing the exacerbation of existing systemic inequalities. The success of machine learning models is contingent on the datasets from which they are trained; regular development of validated datasets can help further enhance their accuracy [21]. Unfortunately, however, issues with a lack of diversity in training sets and small sample sizes in early validation studies persist [22-23]. Addressing the problem of limited representation is not only essential for model accuracy, but equitable AI integration in this space.

For example, one AI tool designed to identify individuals with Alzheimer's disease based on short speech samples was found to accurately identify speech patterns only in native English speakers of a particular Canadian dialect [21]. Unfortunately, it incorrectly identified common mispronunciations or pauses from non-native speakers as indicators of cognitive decline [21]. Another study demonstrated that existing algorithms systematically underestimate African Americans' risk of kidney stones and death from heart failure, among other medical conditions, by inaccurately attempting to adjust for race [24]. Apart from race-based discrimination, AI has also previously demonstrated gender bias [25]. Such algorithmic discrimination in medicine can be considered a violation of civil rights laws, such as Section 1557 of the Affordable Care Act, which prohibits discrimination based on race, color, national origin, sex, age, or disability in health programs and activities [26]. In response, the U.S. Department of Health and Human Services Office for Civil Rights (OCR) issued a final rule in May 2024 clarifying that Section 1557 applies to AI-enabled decision-making tools and, starting in May 2025, will require healthcare organizations to be legally responsible for managing the risk of discrimination when using such tools [27]. This regulatory shift marks a critical step toward accountability, reinforcing that AI systems must protect patient rights.

Finally, considering insurers' financial incentive to minimize risk, the use of AI-powered data-intensive underwriting and behavior-based insurance can perpetuate and even exacerbate discriminatory practices under the guise of precision and/or personalization [28]. A widely used U.S. algorithm for identifying candidates for high-risk care management systematically underestimated the needs of racial minorities by using past healthcare spending as a proxy for medical risk, effectively failing to account for structural barriers that lead to lower healthcare expenditures among Black patients in the United States.

Interestingly, despite issues with training set diversity, patient perceptions of AI algorithms for diagnostics remain positive. Studies have shown that individuals from underrepresented and disadvantaged groups often prefer AI algorithms over human physicians, as widespread inequalities in medical outcomes increase their preference for algorithmic decision-making, particularly in triage situations [29]. Unfortunately, this preference may not only reflect optimism about emerging technologies,

but also deeper mistrust in the healthcare system itself, further emphasizing the need to address longstanding disparities in medicine.

2.5. Financial & Systemic Implications/Effects

Artificial intelligence is a groundbreaking force in the health and health insurance sectors, offering innovative solutions to enhance efficiency, reduce costs, and optimize patient care [30]. However, implementation of AI-based PA systems has significant financial implications beyond simple administrative efficiency. Health insurers have increased the use of AI tools to automate prior authorization decisions, often with minimal human oversight [31]. These AI-driven decisions have been criticized for generating high rates of care denials, causing concerns about the impact on patient outcomes. Physicians have reported that delaying and disrupting care has impeded patient care and "at least sometimes" has shifted the cost to the patients making them pay out of pocket for medications [4]. Without transparent oversight and patient-centered protection, the financial efficiencies gained through AI-driven prior authorization risk come at the expense of equitable access, clinical appropriateness, and the overall integrity of patient care.

Beyond the direct financial cost, the systemic impact of AI-based prior authorization (PA) systems in coverage determinations has amplified existing issues in the medical field. The data used to train these algorithms are often embedded with social biases, including structural racism, and frequently omit critical contextual factors such as social determinants of health [32]. Unlike physicians, who can integrate insights into their patients' social environments and support systems, AI algorithms operate without this nuance, resulting in clinical decisions that diverge from human judgment and may lead to inappropriate care pathways. These algorithmic errors disproportionately affect marginalized populations, who already contend with structural barriers to healthcare access, thereby deepening existing inequities and perpetuating systemic harm [33].

The opacity of these systems compounds the issue that patients and providers are often unaware of the rationale behind denials, making it difficult to challenge or appeal flawed decisions. This lack of transparency erodes trust in the healthcare system and raises profound ethical questions about fairness, accountability, and informed consent. Without rigorous oversight, transparent auditing processes, and

inclusive data design, AI-driven PA systems risk operational failure as well as moral failure, undermining the fundamental principles of justice and equity in healthcare delivery.

2.6. Policy, Oversight, Governance

The integration of AI into the prior authorization process lacks the regulatory framework needed to ensure ethical, transparent, and equitable use. Insurance companies are operating with minimal regulatory oversight from state regulators, with no standardized requirements for algorithmic transparency, external audits, or accountability when automated systems issue flawed or unjustified care denials [8]. This allows AI algorithms the power to make critical decisions, such as denying care or withholding coverage for treatment and procedures, with little to no external scrutiny. Without regulatory control and transparency regarding how these tools are being used, there are no federal regulations in place to ensure that AI systems used to assess claims have undergone rigorous external validation, much less any assurance that they are clinically sensitive and specific or unbiased [34]. The absence of regulation delays care and disproportionately affects vulnerable patients. The lack of a regulatory framework leaves patients and providers unable to challenge and appeal these decisions effectively [35]. As AI-based prior authorization systems lack oversight poses a serious threat to health equity, ethics, and accountability creating an urgent need for comprehensive governance.

To address concerns regarding AI-based prior authorization, policies must be established and mandated to ensure transparency, accountability, and patient protection. Overcoming prejudices in claim approvals will require continuous monitoring, real-time data integration, and regular assessments of algorithmic performance. Ethical implementations also call for explainable AI and deep learning models that can be audited and understood by all particularly by providers and patients [36]. Placing the PA process under a dynamic, learning-enabled, and stochastic decision-making structure can help enhance operational quality as well as accountability.

Transparent, measurable, and optimizable decision policies bring an extra level of openness previously absent in PA systems. Integrating unstructured data from physicians' notes and using sophisticated NLP models can also make AI decisions more personalized and explainable [37]. Successful reform will depend on intersectoral collaboration among government

agencies, payers, and healthcare organizations to ensure ethical applications of AI and safeguard patient access and equity as the technology develops.

3. CONCLUSION

Integrating Artificial intelligence (AI) into prior authorization (PA) systems requires a nuanced and thoughtful approach to carefully balance the many risks and benefits. Though AI offers administrative efficiency, among other benefits, it raises profound ethical, clinical, and systemic concerns. Curating a balance between operational efficiency and maintaining clinical integrity, patient autonomy, and equitable care must not only guide the future integration of AI applications but also be codified through strict governance and policy. As demonstrated in the review above, if implemented without the appropriate oversight, AI-driven systems can risk undermining clinical judgment, exacerbating disparities, and eroding trust, as explainability is central to PA systems.

To ensure the long-term sustainable use of AI in PA, future policy and practice must adopt and uphold clear guidelines grounded in continuous validation and strict accountability standards [38]. Governance standards must require transparent auditing and credible avenues for patients and providers to appeal. Furthermore, continual high-quality research is needed to iteratively guide and refine AI models using diverse and representative datasets. The future of AI in medicine, though daunting, is also hopeful. Through thoughtful, interdisciplinary efforts, its potential can be harnessed to reduce administrative burden and restore focus to what matters most when practicing the art of medicine: human connection and compassionate patient care.

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