Review

AI-augmented rheumatologist? Reflections on AI-induced technostress, job insecurity and professional identity

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ABSTRACT

Objective. *To synthesise current evidence on artificial intelligence (AI) in rheumatology with a specific focus on AI-induced technostress, job insecurity and professional identity, and to propose a pragmatic framework for an 'AI-augmented' rheumatologist.*

Methods. *A narrative review was conducted using focused searches for articles published between January 2015 and March 2026. Search terms combined AI- and rheumatology-related concepts with terms related to technostress, burnout and professional identity. Reference lists of key rheumatology AI reviews and empirical studies were screened for additional publications. Eligible works included empirical studies, reviews and conceptual papers on AI in rheumatology or AI-related technostress and psychological or professional consequences for physicians.*

Results. *Current AI applications in rheumatology span imaging, risk prediction, data integration and large language model (LLM)-based tools, but routine use remains low despite largely positive expectations among rheumatologists and patients. Evidence from mixed-specialty cohorts indicates that AI-related self-esteem threat is a central driver of job insecurity and may contribute to burnout. Rheumatology's reliance on longitudinal pattern recognition, uncertainty management and relationship-centred care makes perceived threats to expertise particularly salient, although similar dynamics likely affect other specialties. Building on this evidence, a four-pillar framework for an 'AI-augmented' rheumatologist is proposed: clear role boundaries between humans and AI, rheumatology-specific AI literacy, clinician- and team-led implementation and governance, and routine monitoring of technostress and well-being.*

Conclusion. *AI can meaningfully support rheumatology care and, when well-designed and implemented, may even reduce certain forms of technostress by offloading administrative and repetitive tasks. At the same time, AI-related technostress, perceived self-esteem threat and job insecurity can undermine professional identity and well-being if introduced without attention to role boundaries, governance and multiprofessional collaboration. The proposed framework aims to help rheumatologists and institutions integrate AI in ways that preserve core professional values and clinician well-being.*

Introduction

Artificial intelligence (AI) has moved within a few years from a largely experimental concept to a set of tools increasingly visible in daily clinical work. In rheumatology, algorithms are being developed and evaluated to support image interpretation, risk prediction and data integration across electronic health records, registries and biobanks (1, 2). Large language models (LLMs) are beginning to assist with summarising clinical encounters, drafting letters, synthesising research findings and formulating preliminary responses to patient queries (2-5). These systems promise more accurate and timely diagnostics, more consistent documentation and less time spent on repetitive administrative tasks. Yet conversations among rheumatologists often convey a more ambivalent picture. Clinicians report feeling overwhelmed by successive waves of new digital tools, unsure whether their skills remain up to date and worried that core aspects of their expertise may be devalued or displaced. These concerns are particularly salient in rheumatology, where clinicians follow patients with complex, systemic diseases over many years, continuously updating diagnostic impressions and treatment strategies as both disease and life circumstances evolve. Rheumatology is best viewed as a specialty-specific illustration of broader AI-related identity and technostress dynamics that are likely to extend to other medical specialties. The suggestion that AI might outperform human clinicians at pattern recognition in imaging or longitudinal data is therefore experienced not only as a technical development, but also as a potential challenge to professional identity.

Discussions about AI in rheumatology have so far focused mainly on technical performance metrics and proof-of-concept applications (1-7). Less attention has been paid to how AI-related technostress, job insecurity and perceived self-esteem threat might contribute to burnout and to changing notions of what it means to be a rheumatologist (1, 2, 8-10). This narrative review synthesises evidence on AI-related technostress and professional identity in medicine, situates rheumatology within this broader landscape and outlines a pragmatic framework for an 'AI-augmented' rheumatologist. AI-augmented rheumatologist refers to a clinician whose judgment is supported, but not replaced, by AI tools that are transparently governed, specialty-informed and aligned with core professional values.

Methods

This article is a narrative review intended to integrate empirical and conceptual work from rheumatology, digital health and organisational psychology rather than to provide a formal systematic review. Literature was identified through focused searches in MEDLINE/PubMed, Scopus, Web of Science and DOAJ for articles published between January 2015 and March 2026.

Search terms combined concepts related to artificial intelligence and machine learning (*e.g.* "artificial intelligence", "machine learning", "deep learning", "large language model"), rheumatology (*e.g.* "rheumatology", "rheumatic diseases", "autoimmune") and psychological or professional outcomes (*e.g.* "technostress", "burnout", "job insecurity", "professional identity", "automation bias").

Search results were imported into a reference manager and screened in two stages. First, titles and abstracts were assessed for relevance to AI applications in rheumatology or to AI-related technostress, professional identity, autonomy or well-being in physicians. Clearly off-topic records (*e.g.* non-clinical computer science, veterinary applications, AI in unrelated specialties without transferable concepts) were excluded. Second, full texts of potentially relevant articles were examined to determine whether they provided empirical data or conceptual frameworks that could inform the questions of AI-induced technostress, job insecurity or professional identity in rheumatology. Reference lists of recent rheumatology AI reviews and key empirical studies were screened to identify additional studies.

Given the narrative nature of this review, no formal risk-of-bias tool was applied. Instead, the synthesis gives particular weight to study design, outcome measurement and external validity, especially in relation to the main empirical study by Liu *et al.* (9), which was cross-sectional, self-reported and not rheumatology-specific.

To account for the qualitative shift associated with the emergence of general-purpose LLMs, the synthesis distinguishes conceptually between an earlier phase of AI in rheumatology dominated by discriminative models on structured data and imaging, and a more recent phase characterised by generative models and retrieval-augmented systems. Rather than attempting a rigid temporal cut-off, the review uses this distinction to highlight how different AI tool types may be associated with different forms of technostress and perceived identity threat.

Current AI applications in rheumatology: promise and limited routine use

Several recent reviews have catalogued the breadth of AI applications in rheumatology (1, 2, 5). For the purpose of this review, it is useful to distinguish between discriminative or predictive AI systems, such as imaging and flare prediction models, and generative systems such as large language models; retrieval-augmented and certified medical AI products form a third, partly overlapping category. This distinction is useful because the professional implications of imaging-based predictive models differ from those of generative systems that draft text, summarise encounters or interact directly with patients. Overall, the clinical value of these systems depends on careful validation, transparent evaluation and context-specific implementation (2).

Machine learning and deep learning models have been developed for automated joint damage scoring on radiographs, ultrasound image interpretation, prediction of disease flares based on clinical and laboratory data, phenotype clustering in heterogeneous diseases and integration of data from registries, biobanks and electronic health records (1, 2). Generative AI, driven by LLMs, is increasingly explored for literature summarisation, drafting of clinical documents and decision support (2-5). At the same time, recent rheumatology literature has emphasised that the main challenge is no longer proof of technical feasibility, but translation into clinically trustworthy, workflow-compatible and well-governed use in routine care (11). More recent benchmarking work also suggests that the landscape is rapidly diversifying beyond general-purpose models. In a controlled comparison of ChatGPT-5 Thinking, OpenEvidence and the certified RAG-based tool Prof. Valmed, diagnostic performance differed only modestly overall, with numerical differences in top-ranked diagnoses and processing time, underscoring that regulatory design and retrieval augmentation do not automatically translate into large diagnostic gains in rheumatology (12).

For systemic autoimmune diseases such as systemic lupus erythematosus, AI has been investigated to support classification, organ involvement prediction and the construction of core datasets that harmonise data across centres (1, 2). In inflammatory arthritides, AI-based symptom checkers and triage tools have been proposed to prioritise referrals and reduce diagnostic delay, although concerns about sensitivity, specificity and transparency remain (2, 13). Early work has also explored AI in patient education, where LLMs can help translate complex rheumatology literature into more accessible language (4, 5). Importantly, AI may also reduce stress when it offloads repetitive documentation, supports literature management or improves task efficiency, thereby freeing cognitive resources for relational and interpretive work central to rheumatology.

Despite this technical activity, routine use of AI in rheumatology appears limited. In a national survey of German rheumatologists, Holzer *et al*. reported that 73% of respondents never used AI tools in daily practice, and 88% rated their AI literacy as low to intermediate (1). At the same time, rheumatologists expressed largely positive expectations regarding potential benefits, including improved diagnostics, more efficient report generation and reduction of administrative burden, and 84% indicated interest in structured AI training (1). Patients show a similarly ambivalent stance: they are interested in digital decision-support tools, but express concerns about diagnostic errors, data protection and potential erosion of the physician–patient relationship (13).

The combination of low day-to-day AI use and high expectations among rheumatologists is striking. It suggests that the main barriers for AI adoption in rheumatology may be structural rather than purely psychological: a lack of validated, specialty-specific tools; uncertainty about medico-legal responsibility; limited integration into existing workflows and documentation systems; and insufficient protected time for training and experimentation. Interpreting low adoption simply as resistance would therefore be misleading. From a technostress perspective, this gap points to a situation in which rheumatologists are asked to form attitudes, take responsibility and reassure patients about AI tools that are not yet meaningfully embedded in their own practice. Such a configuration is likely to amplify uncertainty and perceived self-esteem threat (14, 15) as well as technostress in rheumatology. Rheumatologists are increasingly expected to evaluate, interpret and, in some settings, adopt AI-enabled systems that they have not helped design, often with limited training and unclear lines of responsibility when algorithmic suggestions differ from clinical judgement (1, 2, 5, 8-10, 13).

AI-related technostress, job insecurity and burnout

Technostress describes the stress reactions that arise when individuals struggle to adapt to new information and communication technologies (10). In healthcare, digital documentation systems have been major drivers of technostress and have been linked to burnout, reduced job satisfaction and perceived loss of control over work (8, 10). Recent work has started to conceptualise AI-specific technostress in physicians.

In a multi-hospital survey of 400 physicians, Liu *et al*. extended classic technostress dimensions with AI-specific items and examined their relation to job insecurity and self-reported performance (9). The strongest association with AI-related job insecurity was not overload or complexity, but perceived self-esteem threat – the feeling that AI makes one's own skills comparatively less valuable (9). Job insecurity, in turn, was linked to lower job satisfaction and, somewhat paradoxically, to higher short-term performance, suggesting that some physicians may overcompensate in the face of perceived threat, potentially increasing the risk of later burnout (9). This survey provides the strongest current empirical signal, but its cross-sectional design, self-reported outcomes and non-rheumatology-specific sample limit causal inference and direct specialty-specific generalisability.

While much of the emerging literature and the present review focus on AI as a source of technostress and perceived threat, technostress theory also highlights the concept of 'techno-eustress' – situations in which digital tools are experienced as stimulating and performance-enhancing rather than draining (10). Delegating repetitive documentation to digital scribes, receiving timely decision-support for complex cases or using AI to navigate rapidly expanding literature can (under supportive conditions) reduce overload and free cognitive resources for precisely those relational and interpretive tasks that define rheumatology as a profession. Whether AI is experienced as techno-distress or techno-eustress therefore depends not only on the technology itself, but also on design choices, organisational support and the alignment between AI use cases and clinicians' professional values (10).

These findings resonate with broader literature on technostress and automation in healthcare (8, 10, 16). Clinicians often describe worries about loss of autonomy, de-skilling and erosion of the patient relationship as more salient than questions of model accuracy, particularly when AI tools are introduced as top-down mandates rather than co-designed interventions (8, 10). Automation bias – the tendency to over-rely on automated recommendations even when they are incorrect – has been documented in clinical decision-support scenarios, with clinicians sometimes overriding initially correct judgements in favour of erroneous algorithmic advice (16). In a randomised controlled trial among medical students using a diagnostic decision support system for three rheumatic disease vignettes, the system improved diagnostic accuracy compared to unassisted evaluation but also highlighted the risk of automation bias. Participants were more likely to accept the system's suggestion even when it conflicted with their own correct assessment (17). This mirrors broader evidence from radiology and other specialties, where clinicians, especially less experienced ones, show an increased tendency to follow erroneous AI suggestions when under time pressure or cognitive load. Rheumatology-specific empirical data are still sparse, but available surveys suggest that low AI literacy, high perceived uncertainty about AI's role and strong professional pride may create fertile ground for self-esteem threat and job insecurity (1, 2).

From a conceptual perspective, AI-related technostress in rheumatology can thus be seen as a sequence in which AI-specific stressors (opacity, perceived threat to expertise, automation bias) feed into self-esteem threat, job insecurity, reduced satisfaction and potentially burnout. This sequence is likely modulated by factors such as AI literacy, perceived organisational support and the degree of clinician involvement in AI implementation (1, 2, 8-10).

Figure 1 summarises the conceptual framework of AI-related technostress in rheumatology and highlights how stressors, professional identity threats, protective factors and governance interact in shaping an AI-augmented rheumatologist.

Fig. 1. Conceptual framework of AI-related technostress in rheumatology.
AI-related stressors may contribute to perceived threats to professional identity, job insecurity and burnout, whereas training, governance and clinician-led implementation may buffer distress and support constructive human-AI collaboration. The numbered boxes indicate key stressors, protective factors and governance elements relevant to an AI-augmented rheumatologist. The figure was created with the assistance of an AI-based illustration tool and depicts a conceptual framework rather than primary research data.

Professional identity and rheumatology practice in the AI era

Professional identity in medicine encompasses the values, roles and competencies that clinicians internalise as part of 'who they are' as professionals. For many rheumatologists, this identity centres on making sense of complex symptoms over time, integrating multisystem manifestations into coherent narratives, managing chronic relapsing disease in partnership with patients and tolerating uncertainty while avoiding both over- and undertreatment.

AI tools can support these tasks but can also be perceived as intruding on core professional territory. Discriminative AI models for imaging and pattern recognition directly target domains where rheumatologists have traditionally located their expertise (1, 2, 5-7). In diagnostic vignette studies, GPT-4 has achieved performance comparable to prior rheumatology board exam results, albeit under idealised conditions and with limitations in contextual nuance and justification (6, 7). LLMs have also shown promise in generating patient-facing educational materials, though their outputs still require careful clinician oversight to ensure accuracy and appropriate framing (4, 5). Recent benchmarking work in rheumatology illustrates that clinicians are increasingly confronted not with a single monolithic 'AI', but with tools that differ in retrieval architecture, reference transparency, regulatory status and usability, which further complicates how they make sense of AI in relation to their own expertise.

Beyond diagnostic support, AI-enabled tools such as digital scribes can reshape how clinicians document and reflect on clinical encounters. Ambient AI scribes have been associated with reductions in documentation time and improvements in measures of task load and burnout across specialties (18). In a rheumatology outpatient setting, an early evaluation reported reduced documentation burden and maintained or improved patient-perceived engagement when an ambient AI scribe was used during consultations (19). At the same time, heavy reliance on automatically generated notes could reduce opportunities for reflective practice, nuanced narrative documentation and bedside teaching if not implemented thoughtfully.

When AI systems influence triage, treatment pathways or documentation in ways linked to institutional performance metrics, they can also affect perceived

Table I. Four pillars of an 'AI-augmented' rheumatologist and selected implementation examples.

Pillar	Core idea	Examples in practice
1. Draw the lines between human and machine	AI supports, but does not replace, clinical judgement. Rheumatologists retain responsibility for contextualisation and final decisions.	AI performs pattern-intensive tasks (*e.g.* joint erosion scoring, ANA pattern classification, flare probability estimates). • Clinicians review and contextualise outputs, with clear override rights. • Local policies define accountability when human and AI recommendations diverge.
2. Build literacy that fits rheumatology	Rheumatologists need field-specific knowledge of how AI works, where it fails and how to appraise AI-relevant evidence.	Short modules in training on model basics, typical biases (*e.g.* under-representation, incomplete registries) and generalisability. • Journal-club-style critique of AI-rheumatology papers. • Case-based teaching on recognising hallucinations and context mismatch in LLM outputs.
3. Bring rheumatologists into the room early	Clinicians should help design, test and govern AI tools rather than receiving them as top-down mandates.	A local AI–rheumatology group defines use cases and override rules (*e.g.* ambient AI scribes for outpatient letters, AI support panels for imaging reads) • Tools are tested on local data before broader rollout. • Governance includes plain-language patient information and opt-out options.
4. Actually measure whether people are okay	Technostress, job insecurity and s burnout hould be monitored alongside efficiency metrics as AI use expands.	Short staff surveys monitor AI-technostress, stratified by AI literacy and daily use. • Results trigger tailored responses such as training, workflow adjustments or 'AI-light' clinics. • Evaluations include autonomy, communication and professional fulfilment.

Implementation examples are based on conceptual frameworks of AI-induced technostress and job insecurity in physicians (9, 10), as well as recent survey and pilot studies in rheumatology and related fields (1-8, 13).

autonomy and accountability, with repercussions for professional identity (1, 2, 8-10, 16). If rheumatologists feel that their longitudinal, relationship-centred expertise is being reduced to algorithmic outputs or protocol-driven workflows, resistance or disengagement is likely. Conversely, when AI tools are experienced as augmenting rather than replacing core professional skills, they may support identity and job satisfaction.

Why rheumatology is a suitable testbed for human-AI collaboration

Rheumatology combines several characteristics that make it a valuable testbed for studying and shaping human-AI collaboration. Diagnoses often involve overlapping, evolving symptom patterns, diseases can relapse unpredictably, and management decisions depend heavily on the individual patient's comorbidities, preferences and life circumstances. Similar constellations can be found in other cognitive specialties such as oncology, neurology, internal medicine and psychiatry. What distinguishes rheumatology is less the absolute uniqueness of these features than their combination with long-term, relationship-centred care and a tradition of integrating heterogeneous data sources in everyday decision-making. AI models that perform well on curated datasets may therefore encounter substantial challenges when deployed in this dynamic, multimorbid reality (1, 2, 13). When AI-enabled tools are carefully designed and evaluated, they can address real pain points in rheumatology care. Examples include more consistent and reproducible assessments of structural damage on radiographs or ultrasound, automated or semi-automated assessment of immunofluorescence patterns, risk prediction models to support flare prevention and decision-support tools to prioritise referrals based on AI-assisted symptom assessment (1, 2, 5-7). Digital scribes have the potential to reduce the documentation burden and free up time for direct patient interaction, including in complex chronic care consultations where the narrative matters as much as the numbers (6, 18, 19). The challenge is to realise these benefits without undermining professional identity or well-being. Rheumatology's inherently longitudinal, relationship-centred model of care – coupled with workforce shortages in many countries – makes it particularly important to avoid de-skilling and to ensure that trainees still acquire the nuanced clinical skills that AI cannot easily replicate. These same features, however, also make rheumatology well suited to pioneer models of AI integration that foreground collaboration, transparency and shared responsibility (1-7, 18, 19).

Towards an 'AI-augmented' rheumatologist: a four-pillar framework

To make AI a constructive partner rather than a source of erosion, four interrelated pillars are proposed: (1) clear role boundaries between human and machine, (2) rheumatology-specific AI literacy, (3) clinician-led implementation and governance and (4) routine monitoring of technostress and well-being. Implementation examples are summarised in Table I.

First, AI systems should be positioned as tools that support, but do not replace, clinical judgement. In rheumatology, this implies that AI performs pattern-intensive tasks such as joint erosion scoring, flare prediction or ANA pattern classification, while rheumatologists remain responsible for contextualisation, integration with patient preferences and final decisions. Explicit policies on override rights and responsibilities can help mitigate automation bias and clarify accountability when human and algorithmic recommendations diverge (1, 2, 5-10, 16).

Second, rheumatologists need AI literacy that is tailored to their field. Recent rheumatology benchmarking studies illustrate why this literacy must go beyond general familiarity with LLMs and include the ability to distinguish between general-purpose models, retrieval-augmented systems and certified medical products, each with different strengths, limitations and governance implications (12). This includes basic understanding of common model types, typical sources of bias and error, and skills for critically appraising AI-related research. Training should also cover concepts such as algorithmic drift and fairness, as well as practical skills such as recognising LLM hallucinations and context mismatch in clinical applications (2-5, 10, 16). Embedding AI-focused modules into rheumatology training and continuing medical education may help reduce self-esteem threat linked to unfamiliarity.

Third, AI tools are more likely to be accepted when rheumatologists are involved early in their design, selection and governance. Local AI-rheumatology groups, ideally including rheumatologists, nurses, allied health professionals, data scientists, AI engineers, IT specialists, ethicists and, where feasible, patient representatives, can help define use cases that align with clinical priorities. They can also specify conditions under which outputs can be overridden and oversee validation on local patient populations.

In European settings, the EU AI Act adds an additional regulatory layer to existing medical device and data protection frameworks (20, 21). High-risk AI systems, including AI-based software intended for medical purposes, must comply with requirements for risk mitigation, high-quality datasets, clear user information and human oversight. AI systems that are safety components of regulated medical products, or that themselves require third-party conformity assessment, can also fall under the high-risk regime; Annex III further extends this classification to selected use cases (20, 21). For rheumatologists, this means that local AI-rheumatology groups and institutional governance structures must address not only technical performance, but also conformity assessment, documentation, incident reporting and the practical meaning of appropriate human oversight in daily practice. Governance structures should also include transparent communication with patients, including plain-language explanations of AI use and options to opt out of AI-assisted components where feasible (1-5, 8, 13, 19). Explicitly incorporating technical AI expertise and multiprofessional perspectives into these groups can help bridge the gap between algorithm design and bedside realities and can distribute responsibility for AI governance beyond the individual rheumatologist.

Fourth, AI implementation should be accompanied by routine monitoring of technostress, job insecurity and burnout, not only of throughput and efficiency. Short staff surveys that include AI-specific technostress items can identify groups at higher risk of distress, such as clinicians with low AI literacy or those exposed to rapidly changing digital toolsets (1, 8-10). Evaluation of digital scribes and other AI tools should include measures of autonomy, patient-clinician communication and professional fulfilment, not only time-in-note or throughput (1, 2, 8-10, 13, 18, 19).

Future directions and conclusion

Most empirical work on AI-related technostress and job insecurity in medicine has been conducted in mixed-specialty samples or other disciplines (8-10, 16). Rheumatology needs its own evidence base to understand which AI-related stressors are most salient in its specific practice context. Priorities include field-specific surveys, mixed-methods evaluations of concrete tools such as flare predictors, imaging support and digital scribes, and studies of how AI affects training and the development of professional identity in early-career rheumatologists.

AI has the potential to improve rheumatology care by supporting more timely diagnosis, richer use of longitudinal data and more efficient documentation, thereby freeing time and cognitive resources for patient-centred work, but it can also generate new forms of technostress and perceived identity threat if implemented without attention to role boundaries, governance and team-based support (1-7, 13, 18, 19). At the same time, AI-related technostress, perceived self-esteem threat and job insecurity can pose real risks to professional identity and well-being, particularly in a field built on longitudinal relationships, nuanced clinical judgement and tolerance of uncertainty (1, 2, 8-10, 16). An 'AI-augmented' rheumatologist is therefore not a diminished figure overshadowed by algorithms, but a clinician whose expertise is complemented by AI-enabled tools that are transparent, well governed and aligned with core professional values.

Use of AI-assisted tools

The author used an AI-assisted tool (ChatGPT-based assistant, 2026) to help design the layout of Figure 1. The conceptual content, structure and all final text were developed, reviewed and approved by the author, who takes full responsibility for the figure.

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