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DIGITAL OVERLOAD AMONG PRIMARY CARE PHYSICIANS AS AN EMERGING THREAT TO WORKFORCE SUSTAINABILITY

Abstract. The digital transformation of healthcare has substantially changed the everyday practice of primary care physicians by expanding opportunities for clinical documentation, care coordination, remote consultations, and long-term patient follow-up. At the same time, digitalisation has created a new spectrum of professional risks, among which digital overload is becoming increasingly significant. This phenomenon involves not only increased time spent working with electronic health records but also the accumulation of indirect clinical work, administrative digital tasks, large volumes of electronic communications, and the transfer of part of the professional workload into after-hours time. The issue is particularly relevant for primary care physicians because of their central role in care coordination, chronic disease management, and asynchronous patient communication.

The aim of this article was to systematise current scientific evidence on digital overload among primary care physicians, analyse its main components and mechanisms of development, and assess its impact on professional well-being and workforce sustainability in primary care. A narrative review of contemporary literature was conducted, focusing on electronic health records, indirect clinical work, administrative burden, asynchronous digital work, professional burnout, and workforce retention in family medicine.

The literature analysis demonstrated that digital overload is a multidimensional phenomenon arising at the intersection of technological, organisational, and communication-related factors. Its principal components include excessive electronic documentation, high volumes of electronic messages, duplication of digital tasks, poor usability of electronic systems, inadequate team-based distribution of digital responsibilities, and a lack of protected time for managing digital work. Current studies demonstrate that high message volumes and increased after-hours work in electronic systems are associated with greater emotional exhaustion and professional burnout. At the same time, international studies suggest that the critical issue is not digitalisation itself, but whether digital processes reduce physicians' actual workload or instead create new forms of organisationally invisible work. Digital overload reduces time available for direct patient interaction, decreases job satisfaction, and increases the likelihood of reducing clinical activity or leaving practice.

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Digital overload should therefore be regarded as a systemic challenge for the organisation of primary care rather than merely a side effect of digitalisation. Promising response strategies include recognising asynchronous digital work as part of physicians' actual workload, optimising electronic systems, implementing team-based redistribution of digital tasks, allocating protected time for electronic communications, and further research into the impact of digital overload on quality of care, patient safety, and workforce sustainability in primary care.

Keywords: primary care, family medicine, digital overload, electronic health records, asynchronous work, administrative burden, professional burnout, workforce sustainability, workforce retention, healthcare digitalisation.

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ЦИФРОВЕ ПЕРЕВАНТАЖЕННЯ ЛІКАРІВ ПМД ЯК НОВА ЗАГРОЗА КАДРОВІЙ СТІЙКОСТІ ПЕРВИННОЇ ЛАНКИ

Анотація. Цифрова трансформація охорони здоров'я суттєво змінила повсякденну практику лікарів первинної медичної допомоги, розширивши можливості документування, координації допомоги, дистанційного консультування та довготривалого спостереження за пацієнтами. Водночас цифровізація сформувала новий спектр професійних ризиків, серед яких дедалі більшого значення набуває цифрове перевантаження. Воно охоплює не лише зростання часу роботи з електронною медичною документацією, а й накопичення непрямої клінічної праці, адміністративних цифрових дій, великого потоку електронних звернень і перенесення частини професійного навантаження на позаробочий час. Для лікарів ПМД ця проблема є особливо актуальною через їхню ключову роль у координації допомоги, супроводі пацієнтів із хронічними захворюваннями та асинхронній комунікації з пацієнтами.

Метою статті є систематизація сучасних наукових даних щодо цифрового перевантаження лікарів ПМД, аналіз його основних складових, механізмів формування та впливу на професійне благополуччя і кадрову стійкість первинної ланки. У роботі здійснено наративний огляд сучасної літератури, присвяченої електронній медичній документації, непрямій клінічній праці, адміністративному навантаженню, асинхронній цифровій роботі, професійному вигоранню та утриманню кадрів у сімейній медицині.

Аналіз літератури показав, що цифрове перевантаження є багатовимірним явищем, яке формується на перетині технологічних, організаційних і комунікаційних чинників. Його провідними компонентами є надмірний обсяг електронної документації, велика кількість електронних повідомлень, дублювання цифрових

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дій, низька зручність електронних систем, відсутність належного командного розподілу цифрових завдань і брак захищеного часу для їх виконання. Сучасні дослідження демонструють зв'язок значного обсягу електронних повідомлень і позаробочого часу в електронних системах із вищими показниками емоційного виснаження та професійного вигорання. Водночас міжнародні дослідження свідчать, що вирішальне значення має не сам факт цифровізації, а те, чи зменшують цифрові процеси реальне навантаження лікаря, чи створюють нову організаційно невидиму працю. Цифрове перевантаження зменшує час безпосередньої взаємодії з пацієнтом, послаблює задоволеність працею та підвищує ризик скорочення клінічної активності або залишення практики.

Обґрунтовано, що цифрове перевантаження слід розглядати як системний виклик для організації первинної медичної допомоги. Перспективними напрямами реагування є визнання асинхронної цифрової праці частиною реального робочого навантаження, оптимізація електронних систем, командний розподіл цифрових завдань, виділення захищеного часу для роботи з електронними зверненнями та подальші дослідження впливу цифрового перевантаження на якість допомоги, безпеку пацієнтів і кадрову стійкість первинної ланки.

Ключові слова: первинна медична допомога, сімейна медицина, цифрове перевантаження, електронна медична документація, асинхронна робота, адміністративне навантаження, професійне вигорання, кадрова стійкість, утримання кадрів, цифровізація охорони здоров'я.

Problem Statement and Its Relationship to Important Scientific and Practical Tasks. In modern primary care, an increasing proportion of physicians' work is being transferred into the digital environment. Whereas clinical consultations previously constituted the main focus of professional workload, substantial amounts of time are now devoted to electronic health records, reviewing investigation results, issuing electronic prescriptions and referrals, responding to patients' electronic messages, coordinating care with other specialists, and other forms of indirect clinical work. In the scientific literature, this shift is increasingly described as a transition from a model in which digital tools merely support clinical practice to one in which they shape the rhythm and structure of physicians' working day [1–4].

For primary care physicians, this issue is of particular importance. Family physicians represent the most accessible entry point to the healthcare system, coordinate patient pathways, and serve as the link between prevention, diagnosis, treatment, and long-term follow-up. Consequently, any increase in indirect digital work not only adds new technical tasks but also directly competes with the time required for clinical reasoning, patient communication, and team-based collaboration within primary care [5–7].

The problem ceases to be purely technological when digital processes begin to affect professional well-being and workforce retention. According to estimates by the World Health Organization, healthcare systems are already facing challenges related

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to maintaining adequate staffing levels, workforce retention, and stable functioning, while the projected global shortage by 2030 is expected to reach 11 million healthcare workers [16]. Under these conditions, digital overload among primary care physicians should be regarded as an emerging threat to workforce sustainability in primary care and, consequently, as an important scientific, organisational, and managerial challenge.

Analysis of Recent Research and Publications Addressing the Problem and Identification of Previously Unresolved Aspects of the General Issue Addressed in This Article. To prepare this review, contemporary publications focusing on electronic health records, indirect patient care, administrative burden, asynchronous digital work, professional burnout, and workforce retention in primary care were analysed. Particular attention was paid to systematic reviews, meta-analyses, multicentre studies, and recent publications that provide insight into both the scale of the problem and potential organisational solutions [1–16]. Literature searches were conducted in PubMed, Scopus, and Google Scholar using combinations of keywords including “electronic health records”, “digital overload”, “primary care”, “burnout”, and “asynchronous work”. Priority was given to systematic reviews, meta-analyses, multicentre studies, and recent publications from 2019–2025.

One major area of contemporary research concerns the relationship between electronic health record use and professional burnout. A systematic review by Yan et al. demonstrated that the factors most consistently associated with burnout included time spent working with electronic health records, documentation burden, and the characteristics of interaction with digital systems [1]. A later systematic review and meta-analysis by Wu et al. confirmed that electronic health record use is a significant contributor to burnout among healthcare professionals, with one of the principal practical implications being the need to improve digital systems and develop strategies to reduce the associated workload [3]. A review by Budd focusing specifically on primary care further identified the most problematic components, including documentation burden, poor system usability, high cognitive workload, large volumes of electronic messages, and time spent working within electronic systems during and after the clinical day [2].

Another important aspect of the problem concerns administrative burden and indirect work in primary care. A critical review by Storseth et al., which included 136 publications, demonstrated that administrative burden in primary care encompasses not only formal requirements and paperwork but also the time required for training, navigating complex digital processes, and psychological costs in the form of stress and burnout [4]. A qualitative study by Brown et al. showed that family physicians primarily associate administrative burden with the coexistence of paper-based and electronic work, management of incoming communications, and the lack of compensation for administrative time [5].

A third group of publications focuses on electronic inbox management and asynchronous work. In a systematic mixed-studies review, Scholes et al. demonstrated that family physicians spend approximately half of their professional time on indirect

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patient care activities, a substantial proportion of which consists of prescription renewals, reviewing test results, handling messages and administrative requests, and coordinating care [6]. As early as 2019, Murphy et al. emphasised that practising clinicians regarded improvements in electronic inbox structure, better message routing, reduction of irrelevant notifications, and clearer workflows as key measures for reducing workload associated with electronic systems [7].

The most compelling recent empirical evidence linking digital workload with exhaustion in primary care has been provided by studies conducted by Adler-Milstein and colleagues. Their findings demonstrated that, among primary care clinicians, high message volumes and increased after-hours work within electronic health record systems were associated with greater odds of emotional exhaustion [8]. Baxter et al. also demonstrated an association between characteristics of electronic inbox messaging and physician burnout [9]. Following the onset of the COVID-19 pandemic, the volume of patients' electronic communications increased sharply, with primary care physicians receiving the largest proportion of such requests [11]. In a national study within the United States Veterans Health Administration, Apaydin et al. demonstrated that an increase in secure electronic messaging, unlike video consultations, was associated with a higher likelihood of burnout, suggesting that unstructured asynchronous digital communication may represent one of the key drivers of physician exhaustion [12].

At the same time, the contemporary literature has become more nuanced. An international study by Jendly et al. involving primary care physicians from ten countries of the Organisation for Economic Co-operation and Development demonstrated that more intensive use of digital tools was associated with dissatisfaction with workload but was not directly linked to burnout, stress, or work–life balance [13]. These findings suggest that the critical issue is not digitalisation itself, but rather the way digital technologies are integrated into clinical workflows. A similar perspective was supported by the study of Rotenstein et al., which demonstrated that not only electronic system characteristics but also team-based practice features may either amplify or mitigate digital workload [10].

A separate line of research has already moved beyond merely identifying the problem towards evaluating potential solutions. Kanaparthy et al. demonstrated that reserving one appointment slot per half-day session for work related to electronic documentation reduced after-hours time spent in electronic systems and was associated with lower levels of burnout [14]. Doolan et al. showed that integrating protected time for asynchronous work into clinic schedules improved physician satisfaction and strengthened intentions to remain in practice, although this was accompanied by a modest reduction in the number of patient visits [15]. A review by Han et al. further emphasised that administrative burden is among the most significant factors undermining retention of family physicians in comprehensive primary care practice [16].

Thus, the existing literature provides a convincing description of individual components of digital overload; however, several issues remain insufficiently

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explored. First, there is still no widely accepted comprehensive definition of digital overload specifically applicable to primary care physicians. Second, no unified system of indicators has yet been developed to simultaneously account for documentation burden, electronic communications, cognitive workload, and after-hours digital work. Third, evidence regarding the effectiveness of specific organisational interventions and the impact of digital overload on workforce turnover across different primary care models remains relatively limited. These unresolved issues determine the relevance of the present article.

The aim of this article is to systematise current scientific evidence regarding digital overload among primary care physicians, analyse its principal components and mechanisms affecting professional well-being and workforce sustainability in primary care, and identify promising directions for prevention and organisational response.

Presentation of the Main Research Findings with Full Substantiation of the Scientific Results Obtained. Based on the analysed literature, digital overload among primary care physicians may be defined as a state of work organisation in which the cumulative volume of electronic clinical, documentation-related, communication, and administrative tasks exceeds physicians' temporal, cognitive, and emotional resources and reduces their control over the work process. Two aspects of this definition are particularly important. First, digital overload should not be regarded as an isolated technological problem but rather as a multidimensional condition emerging at the intersection of electronic system design, workflow organisation, team structure, and institutional expectations. Second, digital overload extends beyond work with electronic health records alone and encompasses the broader spectrum of asynchronous digital work, which often remains organisationally invisible [1–4, 6].

Within the structure of digital overload, at least four interrelated components may be distinguished. The first is the documentation-related component, in which electronic systems require numerous repetitive actions, duplication of data, technical confirmation of already established clinical decisions, and extensive use of templates that do not always support clinical reasoning. The second is the communication-related component, associated with large volumes of electronic messages, clarifications, prescription requests, notifications regarding investigation results, and administrative communications. The third is the coordination-related component, in which physicians perform digital tasks related to patient routing, approvals, interdisciplinary communication, referrals, and post-visit follow-up.

The fourth is the cognitive–temporal component, characterised by constant switching between clinical and technical tasks combined with the transfer of digital work into evenings, breaks, or weekends [4, 6–8].

Comparison of contemporary studies makes it possible to identify several mechanisms through which digital overload becomes a workforce-related risk. The first mechanism involves the displacement of direct clinical time by indirect digital work. When a substantial proportion of the working day is devoted to electronic communications, prescription renewals, review of results, clarifications, and

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documentation, physicians are forced either to reduce the time available for face-to-face patient interaction or to complete digital tasks after the official end of the clinical day [6, 8, 11]. The second mechanism is the reduction in perceived control over work. Asynchronous digital communications occur outside the logic of the traditional schedule and create the effect of an endless working day in which physicians lack a clear endpoint to their work [7, 12]. The third mechanism involves the accumulation of cognitive workload resulting from constant switching between clinical reasoning, administrative activities, and technical work within electronic systems [1, 2]. The fourth is a moral-professional mechanism, whereby physicians increasingly perceive themselves as spending time not on direct patient care but on the digital maintenance of the care process, thereby diminishing their sense of professional meaning and fulfilment [5, 16].

To summarise the key dimensions of digital overload and their impact on workforce sustainability in primary care, the following components may be distinguished.

Table 1

Key Dimensions of Digital Overload in Primary Care and Their Potential Impact on Workforce Sustainability

Dimension of Digital Overload	**Typical Manifestations in Primary Care**	**Potential Consequences**
Documentation-related	Excessive volume of records, duplication of data, repeated confirmation of actions, template-driven documentation	Reduced time for clinical consultations, routine-related fatigue, decreased job satisfaction
Communication-related	Large volumes of electronic messages, prescription requests, notifications of investigation results, administrative correspondence	“Endless working day” effect, increased emotional exhaustion, greater after-hours workload
Coordination-related	Referrals, approvals, patient routing, communication between specialists, post-visit follow-up	Fragmentation of attention, increased indirect work, reduced sense of control over work
Cognitive–temporal	Constant switching between clinical and technical tasks, excessive notifications, evening and weekend work	Burnout, intentions to reduce clinical activity or leave practice

Current evidence rather convincingly links digital overload with professional burnout. In the study by Adler-Milstein et al., high message volumes and prolonged after-hours work within electronic systems were associated with greater odds of emotional exhaustion [8]. Baxter et al. demonstrated that characteristics of electronic inbox messaging correlate with physician burnout [9]. In a longitudinal analysis of the United States Veterans Health Administration, primary care physicians consistently

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demonstrated the highest levels of burnout across professional groups, further highlighting the particular vulnerability of primary care to digital workload [12].

At the same time, the review literature does not support the overly simplistic assumption that any form of digitalisation inevitably leads to exhaustion. The international study by Jendly et al. demonstrated that more intensive use of digital tools does not necessarily result in higher levels of burnout [13]. Therefore, decisive importance lies in workflow organisation, the boundaries of physicians' electronic availability, the quality of message routing, team support, and the distribution of responsibilities among members of the primary care team. In other words, the problem does not lie in the existence of digital tools themselves, but in whether these tools are designed to support physicians rather than continuously expand their responsibilities [10, 13].

For workforce sustainability in primary care, it is particularly important that digital overload affects not only physicians' immediate well-being but also their long-term professional trajectory. The review by Han et al., focusing on retention of family physicians, explicitly emphasised that administrative burden is one of the factors fuelling the burnout epidemic and driving clinicians to reduce their clinical activity or leave practice altogether [16, 17, 18]. In this context, digital overload becomes not merely a source of everyday professional discomfort, but a factor undermining the workforce capacity of primary care.

Based on the analysed evidence, several practical response strategies may be identified. First, asynchronous digital work should be formally recognised as part of the actual workload of primary care physicians. Second, protected time within clinical schedules should be allocated for work related to electronic documentation and electronic communications. The study by Kanaparthy et al. demonstrated that reserving dedicated time for such work reduced after-hours use of electronic systems and was associated with improvements in burnout indicators [14]. Similarly, Doolan et al. showed that integrating time for asynchronous work into clinic schedules improved clinician satisfaction and strengthened intentions to remain in practice [15].

Third, redistribution of digital tasks within the healthcare team is necessary. Not all electronic communications should reach physicians directly; some requests may be managed by nurses, administrators, or other team members according to clearly defined protocols. Fourth, digital systems themselves should be designed according to workload-reduction principles, including minimising duplication, improving message filtering, reducing excessive notifications, simplifying system interaction, and prioritising clinically relevant information [7]. Fifth, approaches to remuneration and performance evaluation require reconsideration so that indirect digital work does not remain organisationally invisible and effectively unpaid [5, 15].

Thus, the body of contemporary scientific evidence supports considering digital overload as a systemic threat to workforce sustainability in primary care. It reduces physicians' available time resources, worsens professional well-being, intensifies emotional exhaustion, reshapes the working day in favour of indirect digital work, and

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decreases the attractiveness of family medicine as a long-term professional career pathway. If digital transformation is not accompanied by revision of workflows, team-based support, and adaptation of organisational models, it may ultimately exacerbate the workforce crisis it was intended to help address.

Conclusions and Prospects for Further Research

1. Digital overload among primary care physicians is a multidimensional problem encompassing documentation-related, communication-related, coordination-related, and cognitive–temporal components.

2. The most significant manifestations of digital overload in primary care include the growth of indirect clinical work, high volumes of electronic communications, after-hours work within digital systems, and the organisational invisibility of asynchronous work.

3. Contemporary studies confirm the association between digital overload and emotional exhaustion, professional burnout, dissatisfaction with workload, and weakened workforce retention in primary care.

4. Digitalisation itself is not inherently harmful; the decisive factors are workflow organisation, team structure, routing of electronic communications, and the availability of protected time for asynchronous digital work.

5. The most promising strategies for preventing digital overload in primary care include recognising asynchronous digital work as part of physicians' actual workload, optimisation of electronic systems, team-based redistribution of digital tasks, and allocation of dedicated time for managing electronic communications.

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