RESEARCH LETTER

PHYSICIAN WORK ENVIRONMENT AND WELL-BEING

Trends in Physician Electronic Health Record Time and Message Volume

Physician work is increasingly centered around the electronic health record (EHR), which consumes nearly 50% of scheduled clinic time.[1] Time spent in the EHR and inbox has been associated with burnout.[2,3] Patient-initiated medical advice request messages increased substantially at the onset of the COVID-19 pandemic as other forms of care access were limited.[4] However, it is unclear how durable the post-COVID-19 increase in patient medical advice request volume has been, whether the rise in messages represents a substitution from other communication modalities (eg, telephone calls), the distribution of this increase across specialties, and the resulting impact on total EHR time. To address these questions and guide health system and policymaker efforts to address inbox burden, we used national EHR metadata to assess how patient medical advice request inbox work and EHR time changed from 2019 to 2022.

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Methods | We used national Epic Signal measures, which are monthly aggregations of granular, physician-level EHR use metadata, including EHR time and number of messages received.[5] This dataset includes deidentified measures for all ambulatory physicians (280 712 unique physicians) using an

Figure 1. Trends in Patient Medical Advice Request and Telephone Call Volume

Epic EHR in the US from June 2019 through March 2022. Measures were normalized to weekly averages.

We measured weekly patient medical advice request message volume, including messages sent or forwarded to the physician's inbox and messages sent to shared inboxes that were then completed by the physician. We also measured the volume of patient telephone calls forwarded to physician inboxes. We then measured active EHR time, defined in Signal as time performing tasks, including mouse movement, clicks, or keystrokes, excluding time following 5 seconds of inactivity. EHR time was categorized as during clinic hours, beginning 30 minutes prior to the first appointment through 30 minutes following the last appointment, and time outside scheduled patient hours on days with appointments and time on unscheduled days.[6]

We used descriptive statistics to measure mean patient medical advice request volume and patient telephone call volume over time, stratified by physician specialty groupings.[5] We compared mean EHR time between the pre-COVID-19 period (June 2019-February 2020) to the post-COVID-19 onset period (March 2020-April 2022). We also performed sensitivity tests, including only physicians with greater than 40 visits per week to assess trends among physicians with substantial clinical volume.

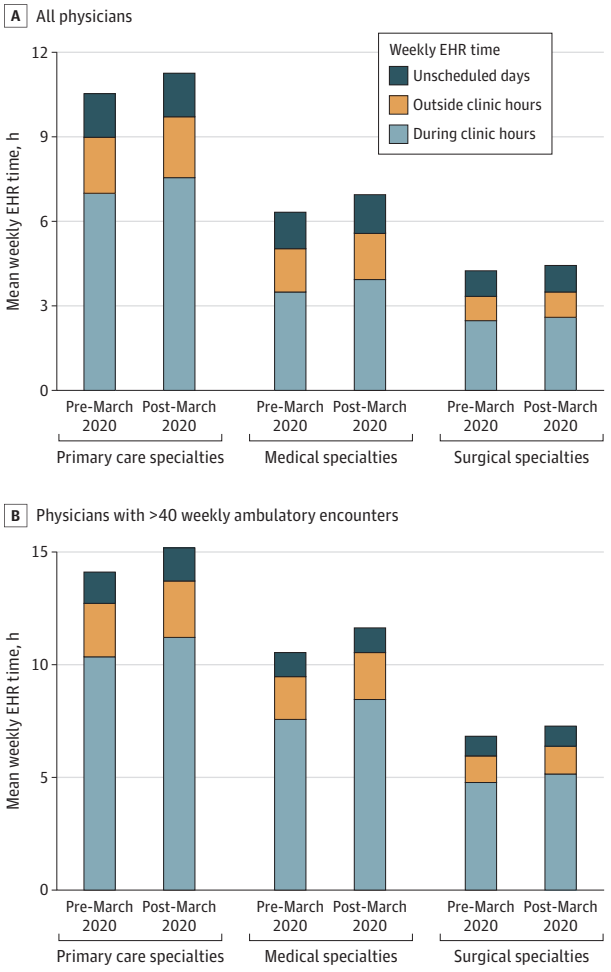
This study was deemed nonhuman participant research by the University of California, San Francisco institutional review board self-certification process. This study followed STROBE reporting guidelines.

Results | Patient medical advice request messages and patient telephone calls rose in March 2020 across specialty groups. Primary care physicians (PCPs) received the most, with a mean of 24 patient calls and 16 patient medical advice request messages per week (**Figure 1**A), with similar trends between the full sample and the subset of physicians with at least 40 visits per week (Figure 1B).

Mean time actively working in the EHR per week increased for all specialty groups following the onset of the COVID-19 pandemic (**Figure 2**A). PCP EHR time increased 6.5%, from a mean of 10.6 to 11.3 hours per week, medical subspecialists' time increased 9.9%, and surgeons' time increased 5.2%. Physicians with greater than 40 visits per week saw similar trends, with PCPs having the highest EHR time before and after the start of the pandemic (7.8% increase from 14.1 to 15.2 hours per week; Figure 2B).

Discussion | The volume of EHR messages received by physicians increased at the onset of the COVID-19 pandemic in March 2020 and remained elevated. Patient medical advice request messages meaningfully increased, and we found no evidence that patients were substituting other communication, such as telephone calls, which stabilized at prepandemic levels. Study limitations include data from a single EHR vendor and inability to evaluate message content or burnout. Nonetheless, these results suggest that the increase in message volume is likely a sustained, ongoing source of physician work. Health systems and policymakers should prioritize strategies to reduce inbox burden for physicians, especially PCPs, while maintaining patient access to care.

Figure 2. Electronic Health Record (EHR) Time During and Outside of Physician Work Hours Before and After the Start of the COVID-19 Pandemic



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Editor's Note

Patient Portals—Balancing Workload and Opportunity

Soon after the earliest email systems were developed in the late 1960s, electronic messages began to pile up. The onslaught of messages surprised early adopters and spurred the development of message management systems from which modern email applications descended.[1] Sixty years later, health care email has arrived in earnest with the development of patient portal messaging systems. And despite the history, the recent growth of patient portal messaging has caught clinicians and health systems by surprise. As health care systems struggle to adapt, understanding the scale of portal messaging and its potential impacts on clinicians and patients is crucial for designing and implementing effective solutions.

In this issue of *JAMA Internal Medicine*, Holmgren and colleagues[2] quantified patient-initiated messages to US physicians using Epic before and after onset of the COVID-19 pandemic. Consistent with studies in smaller populations,[3] they found that message volumes increased markedly in early 2020 and have persisted at these levels since.[2] The rise in patient portal messages was coincident with a rise in telephone calls and a substantial increase in time spent in the electronic health record, suggesting that portal messages are additive, rather than replacements for other forms of communication.

While the study by Holmgren and colleagues[2] frames portal messaging primarily as a challenge, we would emphasize that it is also an opportunity. Through portal messages, patients can report symptoms and adverse effects, ask questions, seek clarification about care plans, and accomplish straightforward tasks like scheduling or requesting refills. Many concerns or questions can be resolved efficiently, particularly when the clinical team knows the patient well. Features like read receipts can ensure closed-loop communication between patients and clinicians. Ultimately, lowering the bar for contacting the health care team could improve patient safety, adherence, and health. Given these benefits, measuring the positive impacts of patient portal messaging on health outcomes is as important as documenting its burden.

This opportunity should also be reflected in efforts to optimize portal messaging. As medicine catches up to other workplaces in adapting to the new reality of patient messaging, proposed solutions tend to focus on reducing message volume for clinicians. This makes some sense given the sheer number of messages, the typical lack of compensation for the work, and the association between message volume and burnout. To this end, clinical leaders have trialed solutions like asking patients to send fewer messages, charging patients for messages, and using artificial intelligence–generated responses.

At the same time, solutions cannot solely be oriented around reducing patient message volume. Instead, we must reimagine patient messaging as a central part of patient care, rather than an add-on task squeezed into the interstices. As such, we should build and equip teams to handle the volume and variety of messages, many of which do not need a physician's input, and use artificial intelligence and other technology to triage messages appropriately. Payment models should adapt to the reality of patient messaging by considering messaging part of direct patient care and compensate physicians and practices accordingly—ideally through hybrid payment models. Only then can patients benefit from the promise of portal messaging while also ensuring that rising message volumes do not overwhelm clinicians and contribute to burnout.

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Heterogeneity of Primary Outcomes in Large Atherosclerotic Cardiovascular Disease Trials Published in Prominent Medical Journals

The extent of heterogeneity in end points reported by randomized clinical trials (RCTs) of atherosclerotic cardiovascular disease (ASCVD) is unknown. We aimed to describe the heterogeneity of primary end points reported in contemporary ASCVD RCT publications and to compare them with the original end points at RCT initiation.

Supplemental content

Methods | This cohort study was considered nonhuman participants research by the Columbia University institutional review board and did not require informed consent. The study followed the STROBE reporting guideline.

All ASCVD RCTs published between January 1, 2019, and December 31, 2023, in the *New England Journal of Medicine*, *The Lancet*, *JAMA*, the *European Heart Journal*, *Circulation*, and the *Journal of the American College of Cardiology* were reviewed. RCTs of revascularizations and acute care, which often include different end points, were excluded. Secondary analyses, extended follow-up publications, and reports of surrogate end points were also excluded. Published end points were compared with the original end points at RCT initiation, extracted from ClinicalTrials.gov, and the effect of end point modifications on published results was assessed. Because most RCTs used time-to-event analysis and the original data were generally unavailable, an accurate comparison of trial results using different composite end points was not feasible. Rather, the Fisher exact test was used to compare the cumulative incidence of different composite end points reported in both study groups. Statistical significance was defined as 2-sided $P < .05$. Analysis was performed with SPSS, version 28 (IBM SPSS).

Table. Characteristics of Included Randomized Clinical Trials[a]

Characteristic	Value (N = 50)
Study type	
Primary prevention	6 (12)
Secondary prevention	20 (40)
Both primary and secondary prevention	18 (36)
Postmarketing CVD safety studies	6 (12)
Intervention	
Lipid-lowering agent	9 (18)
Antidiabetic agent	9 (18)
Nutritional supplements	6 (12)
Antihypertensive agent	4 (8)
Polypill	4 (8)
Anti-inflammatory agent	4 (8)
Educational or organizational interventions	4 (8)
Influenza vaccination	2 (4)
Antihyperuricemic agent	2 (4)
Antiplatelet agent	2 (4)
Other[b]	4 (8)
Sample size, median (IQR), No.	5877 (3589-12 078)
Age, median (IQR), y	65 (63-68)
Gender, median (IQR), %	
Male	67 (53-72)
Female	33 (28-47)
Follow-up, median (IQR), mo	37 (26-54)
Funding	
Industry	24 (48)
Nonindustry	26 (52)
Positive studies	32 (64)
Journal	
NEJM	23 (46)
JAMA	10 (20)
The Lancet	7 (14)
European Heart Journal	5 (10)
Circulation	4 (8)
JACC	1 (2)

Abbreviations: CVD, cardiovascular disease; *JACC*, *Journal of the American College of Cardiology*; *NEJM*, *New England Journal of Medicine*.

[a] Unless indicated otherwise, data are presented as No. (%) of randomized clinical trials.

[b] Includes yoga, long-acting muscarinic antagonist inhaler, mineralocorticoid receptor antagonist, and inhibitor of epigenetic gene regulation.

Results | This study included 50 RCTs (**Table**). Nearly all RCTs (49 [98%]) used composite end points, the most common (14