



Less screen time, more operating time: electronic health record use, telepressure, and the general surgery resident

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The Health Information Technology for Economical and Clinical Health (HITECH) Act, a subset of the 2009 American Recovery and Reinvestment Act, has ushered in the era of the electronic health record (EHR). Since its passage, hospitals across the nation have transitioned from paper documentation to the EHR, a now ubiquitous feature of healthcare systems. While there is no denying the convenience of the EHR: readily available information, easily accessible charts for patient and providers, mobile compatible options—is this accessibility really an improvement? It depends on who you ask.

The intrusion of a constant connection to work is not unique to the healthcare setting. Workplace telepressure describes a psychological state consisting of the “preoccupation with and urge for responding quickly to work-related [information and communication technology] messages” [1]. This is found both during and after designated work hours and is made possible by the global presence of personal communication devices. When studied in the general population, university students, and professors, it has been demonstrated that round-the-clock access to one’s work via personal communication devices is detrimental to workers’ wellbeing [2–4]. Similarly, in a study of administrative assistants working from home during the height of the COVID-19 pandemic, high workplace telepressure led to a low sense

of control over the work environment and feelings of psychological detachment and exhaustion among employees [5]. Furthermore, a 2017 systematic review of the workplace and burnout symptoms showed that low control over work environment, high workload, and job insecurity increased the risk of developing emotional exhaustion, a known symptom of professional burnout [6]. With the continual evolution of technology and a perceived expectation for immediate responses, it has become increasingly difficult to leave work at the workplace. The introduction of the EHR connected the outside life of medical providers to their clinical duties on an entirely new level.

In 2003, major reforms implemented an 80-h cap on resident doctors’ work week. Prior to this restriction, residents regularly worked over 100 h weekly, including some shifts lasting more than 30 continuous hours. This limitation was borne out of concern for trainee fatigue and patient safety, and it moved to safeguard time outside of the workplace. Following this constraint, surgical residents have been successful in maintaining relative operative volume, while reporting an increase in motivation and time spent on reading and educational conferences with improvement in scores of in-service training exams [7, 8]. This time constraint also dictates that patient care is handed off to the on-call team, freeing residents to leave the hospital at the end of each shift. However, clinical work is now possible outside the hospital with the introduction of the EHR. Remote access and mobile friendly applications are pervasive and often set up during intern orientation. This easy access, and the resulting patient care telepressure, has allowed for an extension of resident duties into this protected time.

What then does workplace telepressure truly mean for the world of resident doctors? Although the impact of EHR usage and physician burnout has not been well-characterized in surgical specialties, several studies in primary care settings reveal an association between increased EHR usage

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and physician burnout. Adler-Milstein et al. demonstrate that afterhours EHR use correlated with higher odds of emotional exhaustion in primary care providers [9]. Likewise, a 2023 comparison of burnout symptoms and EHR login frequency between attendings and residents found that residents had more total logins (actual and perceived) and larger depersonalization scores than attendings [10]. These findings would suggest that residents are at higher risk of burnout symptoms associated from time spent on the EHR alone, regardless of other contributing workplace stressors. Comparably to findings related to workplace telepressure experienced in other industries, the extension of work-related activities beyond duty hours contributes to burnout in healthcare.

Moreover, patient care telepressure via the EHR has implications beyond wellness. In a 2013 national survey of 1515 residents and fellows across medical specialties, respondents reported less time spent on direct patient care than clinical documentation and less time for teaching with reduced education quality [11]. Several studies of EHR usage among residents across specialties and postgraduate years reveal an average of 20 to 45.6 min per patient chart with a range of 13 to 33% of that time completed afterhours [12–14]. Consequently, EHR use would appear to compromise both clinical training and protected resident time at some level, yet there appears to be an expectation for constant EHR engagement.

This commitment to the EHR, which interferes with practical, hands-on training remains true for surgical residents. A 2018 study by Cox et al. revealed that surgical residents spend at least 30% of reported weekly duty hours on the EHR, with a third of reported EHR use among interns occurring afterhours [13]. This staggering amount of time was further corroborated by Watson et al. in 2020 in which the authors found that surgical residents spend an average of 8 months out of their 5-year residency training on EHR tasks [14]. In fact, EHR audit logs alone have been shown to accurately reflect surgical residents' duty hours including afterhours violations [15]. This would indicate that the EHR is a constant throughout the typical resident workday. The resulting concern being that EHR use pulls residents away from learning in a sterile environment where hands-on training necessitates that residents are scrubbed. Also, as time spent on work outside of the 80-h constraint is often spent on the EHR, remote access enables surgical residents to engage beyond their duty hours.

However, not all EHR use contributes to an increase in workload for residents. A single-center evaluation of on-site versus remote access to the EHR among vascular surgery residents revealed lower average daily use than prior studies and that remote access use was associated with lower total EHR time [16]. While this study only audited EHR use during day-time duty hours, this substantiates that patient care telepressure can be facilitated through remote access,

albeit in a manner that decreases EHR burden on residents during duty hours. What is less clear are drivers of after-hours remote EHR engagement. Does this ease-of-access during the workday spill over into off duty time secondary to incomplete tasks or a pressure to respond?

Additionally, efforts to boost EHR efficiency have been successfully implemented in various settings and individuals who engage with an EHR regularly develop time saving processes. As one example, an EHR workflow to streamline inpatient surgery consultations significantly decreased time to note completion and operating room transportation [17]. And even without a specific workflow design, multiple studies have shown that residents increase their EHR efficiency intuitively over time [16, 18]. Overall, healthcare systems are invested in improving EHR workflow to increase workplace performance [19], which subsequently benefits all EHR users.

To our knowledge, there are no existing programs or dedicated time to help residents become efficient with an institution's EHR system. Mandatory sessions during resident orientation serve as an introduction to cover the basics needed for day one, but efficiency is not the priority. But EHR efficiency training among providers has been shown to increase satisfaction, work-life balance, and job satisfaction [20, 21]. Although the ideal timing and length of training is uncertain, efforts towards EHR efficiency training for residents could decrease time to proficiency. This may increase time for educational and training activities during duty hours and decrease EHR engagement afterhours.

Similarly, residents may benefit from policies and training to combat workplace telepressure. The implementation of a clear organizational policies directed toward work-related mobile device use when off duty is instrumental in empowering employees to disengage from work afterhours [2]. But policy alone is likely insufficient to promote workers to disconnect [22]. Therefore, consistent training and a change in the global culture may be necessary to lessen afterhours workplace telepressure for residents.

How then do we accommodate the requirement of the EHR within surgical training? It appears certain that the EHR will remain an important tool in healthcare delivery and team communication. Currently surgical residents are almost continuously connected to the EHR. It consumes a significant portion of their day and travels home with them afterhours. While workplace telepressure has not been studied in the healthcare setting, residents appear to engage with the EHR in a manner suggestive of this psychological state. The apparent association of telepressure and the increased risk of burnout symptoms and decreased wellness is not sustainable. Afterhours use of the EHR for clinical duties should be discouraged or restricted to educational tasks, which is in line with the original motive behind the 80-h work week restriction. Furthermore, and perhaps equally as

concerning, is the possibility that workplace telepressure during duty hours is taking time away from surgical education. EHR efficiency training may help but is unlikely to eliminate the feeling of urgency to respond. Further research efforts are needed to evaluate the impact of workplace telepressure and EHR usage on surgical resident education and burnout competency development.

Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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References:

- Semaan R, Nater UM, Heinzer R, et al. Does workplace telepressure get under the skin? Protocol for an ambulatory assessment study on wellbeing and health-related physiological, experiential, and behavioral concomitants of workplace telepressure. *BMC Psychol*. 2023;11(1):145. <https://doi.org/10.1186/s40359-023-01123-4>.
- Cambier R, Derks D, Vlerick P. Detachment from work: a diary study on telepressure, smartphone use and empathy. *Psychol Belg*. 2019;59(1):227–45. <https://doi.org/10.5334/pb.477>.
- Barber LK, Santuzzi AM. Telepressure and college student employment: the costs of staying connected across social contexts. *Stress Health*. 2017;33(1):14–23. <https://doi.org/10.1002/smi.2668>.
- Liu B, Zhang Z, Lu Q. Influence of leader mindfulness on the emotional exhaustion of university teachers: resources crossover effect. *Front Psychol*. 2021;12: 597208. <https://doi.org/10.3389/fpsyg.2021.597208>.
- Tedone AM. Keeping up with work email after hours and employee wellbeing: examining relationships during and prior to the COVID-19 pandemic. *Occup Health Sci*. 2022;6(1):51–72. <https://doi.org/10.1007/s41542-021-00107-3>.
- Aronsson G, Theorell T, Grape T, et al. A systematic review including meta-analysis of work environment and burnout symptoms. *BMC Public Health*. 2017;17(1):264. <https://doi.org/10.1186/s12889-017-4153-7>.
- Shin S, Britt R, Doviak M, Britt LD. The impact of the 80-hour work week on appropriate resident case coverage. *J Surg Res*. 2010;162(1):33–6. <https://doi.org/10.1016/j.jss.2009.12.003>.
- Hutter MM, Kellogg KC, Ferguson CM, Abbott WM, Warshaw AL. The impact of the 80-hour resident workweek on surgical residents and attending surgeons. *Ann Surg*. 2006;243(6):864–75. <https://doi.org/10.1097/01.sla.0000220042.48310.66>.
- Adler-Milstein J, Zhao W, Willard-Grace R, Knox M, Grumbach K. Electronic health records and burnout: time spent on the electronic health record after hours and message volume associated with exhaustion but not with cynicism among primary care clinicians. *J Am Med Inform Assoc*. 2020;27(4):531–8. <https://doi.org/10.1093/jamia/ocz220>.
- Khan MT, Mitchell N, Assifi MM, Chung M, Wright GP. Surgeon burnout and usage of personal communication devices: examining the technology “empowerment/enslavement paradox.” *J Surg Res*. 2023;285:205–10. <https://doi.org/10.1016/j.jss.2022.12.023>.
- Christino MA, Matson AP, Fischer SA, Reinert SE, Digiovanni CW, Fadale PD. Paperwork versus patient care: a nationwide survey of residents’ perceptions of clinical documentation requirements and patient care. *J Grad Med Educ*. 2013;5(4):600–4. <https://doi.org/10.4300/JGME-D-12-00377.1>.
- Holmgren AJ, Lindeman B, Ford EW. Resident physician experience and duration of electronic health record use. *Appl Clin Inform*. 2021;12(4):721–8. <https://doi.org/10.1055/s-0041-1732403>.
- Cox ML, Farjat AE, Risoli T, et al. Documenting or operating: where is time spent in general surgery residency? *J Surg Educ*. 2018;75(6):e97–106. <https://doi.org/10.1016/j.jsurg.2018.10.010>.
- Watson MD, Elhage SA, Green JM, Sachdev G. Surgery residents spend nearly 8 months of their 5-year training on the electronic health record (EHR). *J Surg Educ*. 2020;77(6):e237–44. <https://doi.org/10.1016/j.jsurg.2020.06.017>.
- Lin JA, Pierce L, Murray SG, et al. Estimation of surgical resident duty hours and workload in real time using electronic health record data. *J Surg Educ*. 2021;78(6):e232–8. <https://doi.org/10.1016/j.jsurg.2021.08.011>.
- Ho VT, Sgroi MD, Chandra V, Asch SM, Chen JH, Lee JT. Utilizing remote access for electronic medical records reduces overall electronic medical record time for vascular surgery residents. *J Vasc Surg*. 2023;77(6):1797–802. <https://doi.org/10.1016/j.jvs.2023.01.198>.
- Iguidbashian J, Lun Z, Bata K, et al. Novel electronic health records-based consultation workflow improves time to operating room for vascular surgery patients in an acute setting. *Ann Vasc Surg*. 2023;97:139–46. <https://doi.org/10.1016/j.avsg.2023.07.101>.
- Maloney SR, Peterson S, Kao AM, Sherrill WC, Green JM, Sachdev G. Surgery resident time consumed by the electronic health record. *J Surg Educ*. 2020;77(5):1056–62. <https://doi.org/10.1016/j.jsurg.2020.03.008>.
- Zheng K, Ratwani RM, Adler-Milstein J. Studying workflow and workarounds in EHR-supported work to improve health system performance. *Ann Intern Med*. 2020;172(11 Suppl):S116–22. <https://doi.org/10.7326/M19-0871>.
- Livingston K, Bovi J. Department-focused electronic health record thrive training. *JAMIA Open*. 2022;5(2):00ac025. <https://doi.org/10.1093/jamiaopen/ooac025>.
- Dastagir MT, Chin HL, McNamara M, Poteraj K, Battaglini S, Alstot L. Advanced proficiency EHR training: effect on physicians’ EHR efficiency, EHR satisfaction and job satisfaction. *AMIA Annu Symp Proc*. 2012;2012:136–43.
- Barber LK, Santuzzi AM, Hu X. Tackling the problem of workplace telepressure: are disconnection policies helpful. *Group Organ Manag*. 2023;5:5. <https://doi.org/10.1177/10596011231206206>. (Published online October 27, 2023;10596011231206206).