

# Electronic health record associated stress: A survey study of adult congenital heart disease specialists

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## Abstract

**Background:** Physician burnout has many undesirable consequences, including negative impact on patient care delivery and physician career satisfaction. Electronic health records (EHRs) may exacerbate burnout by increasing physician workload.

**Objective:** To determine burnout in adult congenital heart disease (ACHD) specialists by assessing stress associated with EHRs.

**Design:** Electronic survey study of ACHD providers.

**Setting:** Canada and United States.

**Participants:** Three hundred eighty-three ACHD specialists listed on the Adult Congenital Heart Association directory between February and April 2017.

**Outcome Measures:** Burnout was measured using the Maslach Burnout Inventory (MBI) to understand factors contributing to work life and EHR satisfaction. Chi-square and Wilcoxon Rank Sum tests were used for statistical analysis.

**Results:** Of the 383 invited participants, 110 (28.7%) completed surveys with the majority ( $n = 88$ , 80.7%) reporting from an academic medical center. Burnout was defined as high scores on the emotional exhaustion and/or depersonalization MBI subscales. When comparing the 40% ( $n = 44$ ) that met criteria for burnout with those that did not, there was strong disagreement that a reasonable amount of time is spent on clerical tasks related to direct ( $P = .0043$ ) or indirect ( $P = .0004$ ) patient care. There was strong disagreement that EHRs increased efficiency ( $P = .006$ ) or the patient portal improved patient care ( $P = .0215$ ). Finally, physicians who met criteria for burnout had lower personal accomplishment scores ( $P = .0355$ ).

**Conclusions:** Our results suggest time spent on EHRs creates clerical burden exacerbating ACHD physician burnout. The high levels of emotional exhaustion may decrease quality of ACHD care by directing focus away from physician-patient interaction. Health care systems must develop best practice for EHR design and implementation to optimize patient advocacy and care, and decrease physician burnout.

## KEYWORDS

adult congenital heart disease, electronic health record, patient care, physician burnout, stress, workload

## 1 | INTRODUCTION

In the United States, more than half of physicians are experiencing burnout, a syndrome of emotional exhaustion, loss of meaning in work, feelings of ineffectiveness, and a tendency to view people as objects rather than as human beings.<sup>1</sup> Burnout and dissatisfaction with work-life balance is more common in physicians than in any other profession.<sup>2,3</sup> The widespread implementation and use of electronic health records (EHRs) has increased the clerical burden on physicians by altering the physician-patient interaction, and distracts from the more meaningful aspects of medical practice.<sup>4-7</sup> Physician burnout is associated with a negative impact on patient care, physician workforce and turnover, and the overall quality of health care delivery.<sup>8</sup> Although the intent of EHRs is to improve physician efficiency and delivery of high-quality patient care through computerized physician order entry and electronic patient portals, the available evidence is inconclusive.<sup>4,6,7</sup> Among physicians experiencing burnout, there is a loss in opportunities to provide comprehensive, patient-centered care or reciprocal caring relationships, which inspired most physicians to pursue careers in medicine.<sup>9</sup>

In the current system, the EHR has been expanded and promoted as an integral aspect of clinical care. In recent years, the EHR is often described as “fragmented, rushed, dysfunctional, digitized, and corporatized,” a system that prizes efficiency over relationships, profits over common good, and volume over value.<sup>9</sup> Among US physicians, subspecialty providers at the front line of care access, such as general internal medicine and family medicine, are at the greatest risk for burnout compared to other professions.<sup>2,3</sup>

Accordingly, physicians that subspecialize in adult congenital heart disease (ACHD) may be one such discipline at increased risk for burnout. It is estimated that 2 million adults in the United States have congenital heart disease outnumbering children with the condition. The ACHD population also continues to grow at 5% each year,<sup>9,10</sup> yet there is a significant deficiency of ACHD providers.<sup>10</sup> ACHD trainees spend more than a decade in postsecondary education prior to becoming board-certified ACHD physicians. Moreover, as structured transition programs are implemented among ACHD centers, which benefit the ACHD patient by providing patient-centered uninterrupted care,<sup>11</sup> the supply and demand mismatch between ACHD providers and patients will increasingly worsen over the next decade. This will have a significant impact in the outpatient adult congenital clinic, particularly in the evaluation, management, and outcomes of patients with congenital heart disease of great complexity. The influx of patients requires time to review complex medical history, transcatheter and surgical procedures, clinical notes, laboratory and radiology results, and perform medication reconciliation. We conducted a national survey of ACHD physicians to understand the prevalence of professional burnout and provide recommendations to address this issue.

## 2 | METHODS

An electronic survey was administered to 383 physicians listed on the Adult Congenital Heart Association directory.<sup>12</sup> The study was reviewed by the Spectrum Health Institutional Review Board and

determined to meet the criteria for exempt status as described in 45 CFR Part 46.101(b). Data collection included the region and professional characteristics of the physician's employer, basic demographics, electronic environment, clerical tasks directly related to patient care including use of computerized physician order entry, reviewing laboratory results, and communicating with patients via an electronic portal; clerical tasks indirectly related to patient care such as correspondence, completion of forms, and answering telephone calls; and overall satisfaction with clerical tasks. Burnout was measured using the Maslach Burnout Inventory (MBI), a validated 22-item questionnaire considered to be the gold standard for measuring burnout, to understand factors that contribute to work life and EHR satisfaction.<sup>1</sup> The survey was administered between February and April 2017. Participation was voluntary, all responses were collected anonymously, and managed using REDCap electronic data capture tools<sup>13</sup> hosted at Spectrum Health. Chi-square and Wilcoxon rank-sum tests were used for statistical analysis.

Descriptive data were recorded as frequency (percent) for categorical data and median (25th, 75th percentile) for numerical data. To determine if there was association between demographics and outcomes data, a chi-square or Fisher's Exact test was used on the categorical data. The numeric *P* values were derived using Wilcoxon rank-sum tests. A *P* value of  $\leq .05$  was considered statistically significant. All statistical analyses were completed using SAS Enterprise Guide software, Version 7.1 of the SAS System for Windows, copyright 2014 (SAS Institute Inc, Cary, North Carolina).

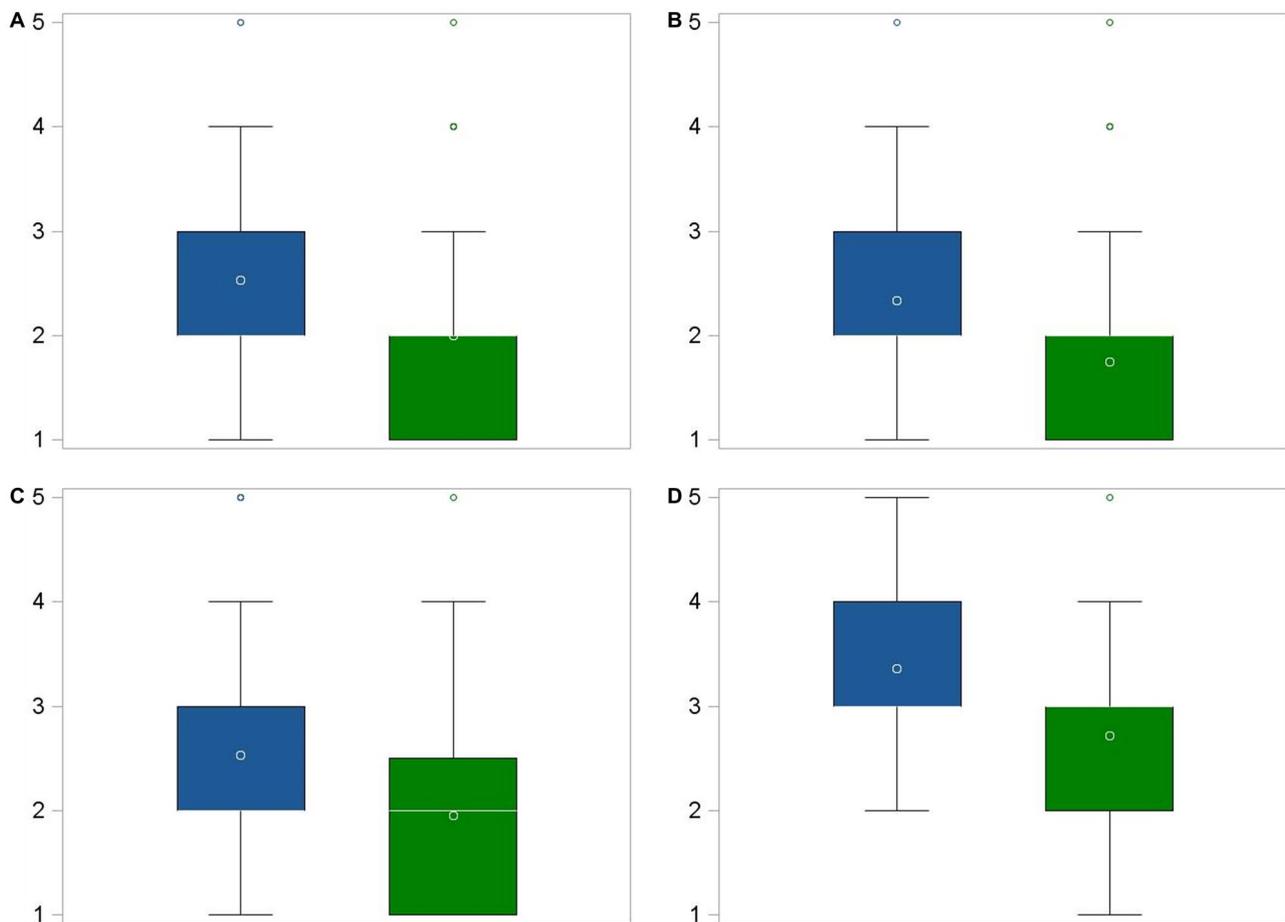
## 3 | RESULTS

Of the 383 ACHD physicians invited to participate, the 110 (28.7%) participants were in active clinical practice at the time of the survey. The majority of providers ( $n = 88$ , 80.7%) worked at an academic medical center (Table 1). Burnout was attributed to those who scored high on the emotional exhaustion and/or depersonalization MBI subscales. There was no statistically significant difference for age ( $P = .3512$ ), work hours ( $P = .7765$ ), or clinic size ( $P = .8966$ ) on emotional exhaustion. Female physicians were found to have higher incidence of emotional exhaustion than male physicians ( $P = .0033$ ). Age ( $P = .0976$ ), gender ( $P = .6672$ ), work hours ( $P = .6737$ ), and clinic size ( $P = 1.0000$ ) were not observed to impact depersonalization. When comparing the 40% ( $n = 44$ ) that met criteria for burnout with those that did not, there was strong disagreement that a

**TABLE 1** Demographics of survey participants

Age (<55 y)	77 (70.0)
Gender (male)	79 (71.8)
Marital status (married/living with partner)	99 (90.0)
Average work hours/week (<60 h)	56 (50.9)
Work setting (academic medical center)	88 (80.7)
Size of Adult Congenital Heart Program (1000+) <sup>a</sup>	59 (53.6)

<sup>a</sup>Size of program is measured as outpatient clinic visits per year.

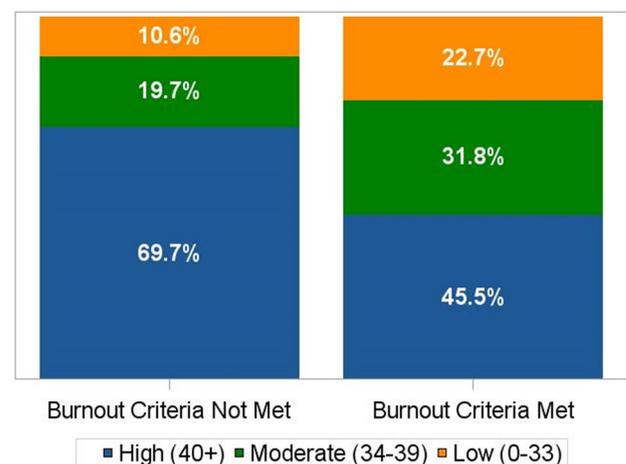


**FIGURE 1** A-D., Physicians who met criteria for burnout have a stronger dissatisfaction for clerical tasks and EHRs (blue = burnout criteria not met; green = burnout criteria met; 1 = Strongly disagree and 5 = Strongly agree). A, Reasonability of time spent on clerical tasks related to direct patient care. B, Reasonability of time spent on clerical tasks related to indirect patient care. C, Perception that EHRs have improved efficiency. D, Perception that the patient portal has improved efficiency

reasonable amount of time is spent on clerical tasks related to direct ( $P = .0043$ ; Figure 1A) or indirect ( $P = .0004$ ; Figure 1B) patient care. Furthermore, there was strong disagreement that EHRs improved efficiency ( $P = .006$ ; Figure 1C) or that the patient portal improved patient care ( $P = .0215$ ; Figure 1D). ACHD physicians who met the criteria for burnout had lower scores of personal accomplishment ( $P = .0355$ ; Figure 2). Gender ( $P = .4883$ ), work hours ( $P = .7819$ ), and clinic size ( $P = .0651$ ) were not observed to impact the perception of personal accomplishment. However, age ( $P = .0058$ ) was statistically significant specifically for physicians >55 years old who had a higher perception of personal accomplishment than their younger peers. Finally, ACHD physician burnout was found to be comparable across the United States ( $P = .3702$ ; Figure 3).

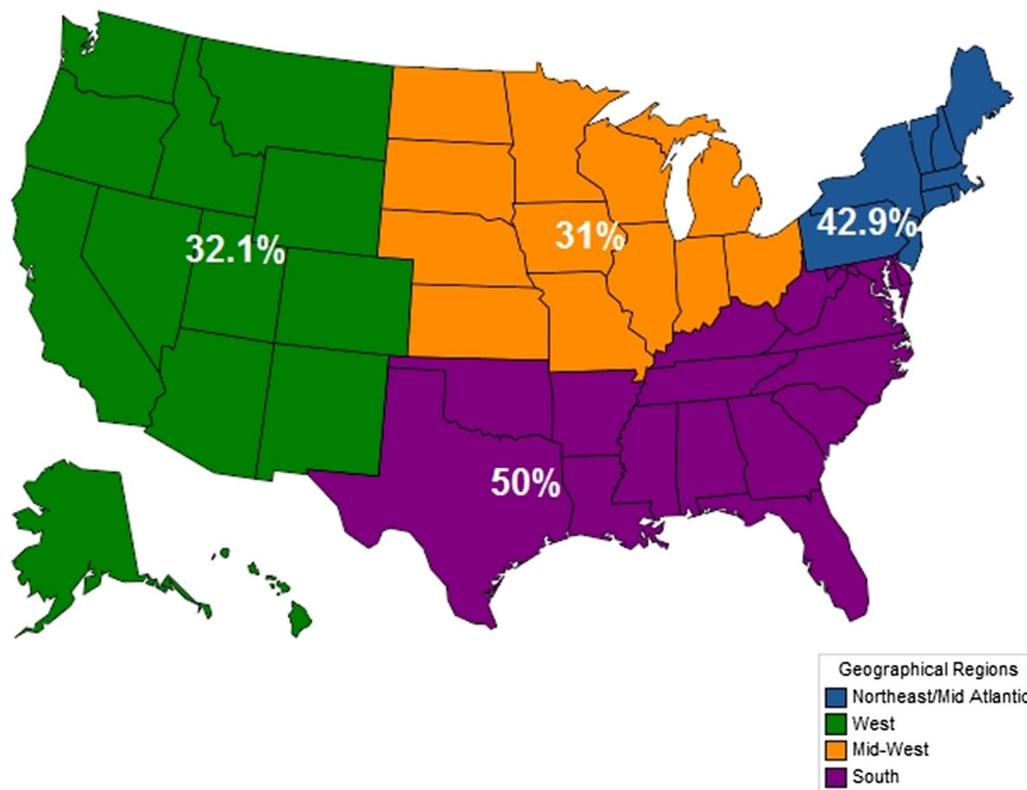
#### 4 | DISCUSSION

The high prevalence of burnout and intensity of reported burnout in health professionals has become a major concern for leaders in the health care field. Without appropriate steps to decrease or eliminate



**FIGURE 2** Physicians experiencing burnout had lower scores of personal accomplishment

burnout stress, health care systems will likely face early retirement of many professionals and might even risk severe depression that leads to suicide. In the United States, the rate of physician burnout is



**FIGURE 3** Percentage of ACHD physicians experiencing burnout across the geographical regions in the United States

twice as high as compared to other professions.<sup>14</sup> The contemporary structure of health care delivery has significantly altered the amount and quality of time of physician-patient interactions. A recent study concluded that providers spend almost two additional hours on EHR and other clerical tasks during work hours for every 1 hour of face-to-face interaction with a patient. In addition, providers were noted to spend 1-2 hours of personal time each day on electronic clerical tasks.<sup>15</sup> This ratio of time has jeopardized the deep sense of professional obligation and satisfaction leading to emotional exhaustion and/or depersonalization, and diminished level of personal accomplishment ultimately resulting in physician burnout.<sup>2,3,6,9</sup>

There are several key consequences to physician burnout, including low-quality patient care, increased risk of medical errors, poor patient outcomes and satisfaction, decreased productivity, job dissatisfaction, early retirement or turnover, severe depression/suicidal ideation, substance abuse, and poor self-care.<sup>16</sup> Given the increased complexity associated with the ACHD patient, this patient population cannot withstand low-quality care and adverse outcomes associated with physician burnout. The high rates of medical errors may also increase legal expenses and erode the trust of patients served by the health care entity. Physician burnout adds significant costs to health care organizations as physician turnover ranges between hundreds and thousands of dollars depending on specialty, practice location, and duration of the unfilled vacancy. The impact of physician burnout on physician health has alarming consequences

with 40% higher suicide rates in male physicians and 130% higher suicide rates in female physicians compared to the general working population.<sup>16,17</sup>

Our study suggests that ACHD physicians are at high risk for burnout. ACHD physicians that experienced burnout reported that a disproportionate amount of time was spent on clerical tasks related to direct (order entry, dictation, reviewing lab results, communicating with patients via an electronic portal) and indirect (completion of forms, telephone calls) patient care. Furthermore, the EHR did not improve clinical efficiency. In addition, these physicians also felt that the patient portal did not improve patient care. These results suggest the time spent with EHRs creates clerical burden and exacerbates ACHD physician burnout. Female ACHD physicians were found to have a higher incidence of emotional exhaustion than male ACHD physicians commensurate with the current literature.<sup>18</sup> Although ACHD providers >55 years old had a higher perception of personal accomplishment than their younger peers regardless of burnout, the ACHD providers experiencing burnout had lower scores of personal accomplishment. ACHD providers who spend a greater amount of time consumed by inefficient work processes and environments (performing tasks not maximizing their ACHD skills) are less likely to report a sense of personal accomplishment. Interestingly, ACHD physician burnout was found to be comparable across the United States suggesting that burnout is not center-dependent or unique to one state, but rather a national crisis. Factors that may contribute

to burnout in ACHD include: (1) a relative deficiency in providers, (2) limited number of fellowship training programs, and (3) exponential growth of the patient population. The high levels of emotional exhaustion and depersonalization experienced by ACHD physicians may lead to a decrease in the overall quality of patient care by directing focus away from the physician-patient interaction.

This study is subject to limitations. Most physicians who were sent emails to inform them of the study may not have received the invitation to participate or never opened the message. Although similar to other national survey studies of physicians, the response rate of 28.7% among physicians who received an invitation to participate in this study is lower than that of physician surveys in general.<sup>19</sup> We did not use monetary or any additional incentives to improve participation. Those who voluntarily responded to the survey might have had stronger opinions about physician burnout and thus have been overrepresented. However, several cross-sectional investigations have failed to identify significant differences between responding and nonresponding physicians.<sup>20</sup> The limited number of responses from ACHD providers ( $n = 5$ ) in Canada may not be representative of nationwide physician burnout.

This study has important strengths. The physician sample was obtained from the Adult Congenital Heart Association directory, a complete registry of all ACHD physicians from a variety of practice settings and environments throughout the United States and Canada. Our work highlights that physician burnout is present among ACHD physicians throughout the US efforts are now required to incorporate the EHR into clinical practice without affecting physician efficiency or compromising professional satisfaction.

Unfortunately, there is little evidence regarding how to address physician burnout. Both individual-focused and structural or organizational solutions are required to address physician burnout. Evidence-based strategies targeted toward reducing physician burnout include mindfulness, stress management training, communication skills training, and self-care efforts.<sup>21</sup> Yet none of these interventions mitigate the clerical or cognitive burden associated with the EHR, but rather focus on the individual to decrease burnout. Thus far, organizational strategies targeted toward reducing physician burnout include only restriction on resident duty hours.

Our results suggest the time spent with EHRs creates clerical burden that exacerbates ACHD physician burnout. The high levels of emotional exhaustion and depersonalization experienced by physicians may result in decreased overall quality of patient care by directing focus away from the physician-patient interaction. Given the exponential growth of the ACHD population, further studies are now required to understand the level of burnout caused directly by EHR, its relation to patient outcomes and safety, and how this may affect the overall work-life balance of the ACHD physician. To overcome this national crisis, understanding which EHR features contribute to stress and burnout, and implementation of novel approaches that incorporate an EHR that simultaneously improve physician efficiency and professional satisfaction is required.

## CONFLICT OF INTEREST

The authors declare that they do not have a conflict of interest.

## AUTHOR CONTRIBUTIONS

*Concept/design, data analysis/interpretation, drafting article, data collection, and approval of article:* Marckini and Samuel

*Data analysis/interpretation, statistics, critical revision of article, and approval of article:* Parker

*Concept/design, data analysis/interpretation, drafting article, critical revision of article, and approval of article:* Cook

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