In recent years, physician burnout has gained attention as a major barrier to caretaker productivity, efficacy, and satisfaction that can cause harm to patients. Burnout is also recognized in younger cohorts of medical students, hastening loss of empathy and increasing opportunities for patient harm. As many as 50% of medical students in the United States demonstrate signs of burnout. As such, medical schools have renewed efforts to support student wellness, largely by improving curricula and implementing programs specifically aimed at maintaining well-being. Unfortunately, these interventions have not been shown to improve medical student wellness significantly in the preclinical years; following the implementation of these curricula, the only marked decrease in burnout and dissatisfaction scores was shown in fourth year students. Importantly, medical students frequently enter school already in possession of the tools they need to combat burnout. In particular, both resilience and self-efficacy have been shown to act as defenses against burnout. Medical students show a higher capacity for both of these than their age-matched peers before matriculation; however, this capacity falls sharply throughout their years of education. In light of this negative impact of education on student wellness, administrators may do well to focus efforts on maintaining and supporting students who enter school already in possession of these tools. As such, medical schools have renewed efforts to support student wellness and reduce burnout. As such, survey participants reported high levels of self-efficacy (Table 2); however there was no statistically significant difference in self-efficacy scores among those who had received counseling in the last six months and those who had not (chi-square=0.28, p=0.886). Of average, students did not report high levels of burnout according to the Maslach Burnout Inventory, and students who received counseling in the last six months did not report statistically higher levels of burnout than those who did not receive counseling, on average (paired t-test, t(1,827)=0.09, p=0.923).

Survey participants with higher levels of burnout did report less frequent use of technology for wellness maintenance purposes (Table 3). Across all groups, the use of a smartphone was the most popular method to track wellness goals, with 76.5% (n=51) of respondents indicating that they use their phone to track wellness goals at least some of the time. The three most popular uses of technology were to track daily steps (61.1% of respondents, n=41), to track sleep patterns (57.4% n=36), and to reduce stress (47.6% n=30). While most students are aware of the programs within smartphone applications on wearable technology that promote mindfulness (76.12%, n=51), 88.06% (n=59) have never or do not routinely use these applications.

In the effort to promote wellbeing, educators may consider a turn toward wearable technology and digital interventions. Wearable technology (such as Fitbit or Jawbone) as well as smartphone applications that track physical activity, sleep, and stress levels are increasingly being used by both students and professionals who want to maintain their well-being. Unfortunately, these interventions have not always shown to be effective in improving student wellness. For example, a study of medical students found that two of the three elements of technological wellness maintenance that are most at-risk students may not in fact use them at a higher rate. In addition, the data collected from these surveys demonstrate that on average, preclinical students at SKMC are not experiencing severe burnout, and are maintaining relatively high levels of self efficacy and resilience; however, those that do experience burnout are no more likely to seek out counseling services.

This finding suggests that though schools may seek to support their students by implementing new curricula with improved access to mental health services, the most at-risk students may not in fact use them at a higher rate. In addition, the students who report lower rates of burnout also report more frequent use of technology to maintain their wellness. This finding is supported by the responses that two of the three elements of technological wellness maintenance that are most important to these students are sleep quality and stress reduction; these are, of course, intimately related to wellness and burnout. Due to the ongoing nature of this study, the data presented here are incomplete. As such, there is no clear demonstration of the effect of technology use on the wellness of these students. Additionally, this study only enrolled students at SKMC; therefore the results may not be generalizable to all medical students. Further research is needed to identify the true underlying patterns being used by medical students and professionals.

Even in light of its limitations, the results of this survey provide a way forward for medical schools seeking to improve student wellness: first, identify the ways in which the students already maintain their own wellness; then, support these measures at an institutional level. More data is needed from other institutions to understand the complete picture of student resilience and self efficacy, and how best to combat burnout before it begins. To this end, this study demonstrates the need for future research and highlights the potential for positive change. With better understanding of how students attain wellness, educational institutions may be able to form future physicians who avoid the burnout epidemic.

## Acknowledgements

We would like to thank Dr. Anna Marie Chang, Dr. Adam Dicker, Dr. Wayne Bond Lau, Dr. Jonathan Fenkel, the Sidney Kimmel Medical College Office of the Dean, Jeffrey Lu, Mariisa Ruggiero, Sabrina Lefcochilos, George Titomihelakis, and Christine Wamsley for their contributions to and support of this project.

## References


