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A Comparison of the Existing Wellness Programs in Neurosurgery and Institution Champion's Perspectives

Once the accepted norm during Harvey Cushing's time, the mantra of work to the exclusion of family and lifestyle is now recognized as deleterious to overall well-being. A number of neurosurgical residency training programs have implemented wellness programs to enhance the physical, mental, and emotional well-being of trainees and faculty. This manuscript highlights existing organized wellness education within neurosurgery residency programs in order to describe the motivations behind development, structure, and potential implementation strategies, cost of implementation, and identify successes and barriers in the integration process. This manuscript is designed to serve as a "how-to" guide for other programs who may identify a need in their own trainees and begins the discussion of how to develop wellness, leadership, grit, and resiliency within our future generation of neurosurgeons.

KEY WORDS: Burnout, Neurosurgery, Residency Training, Wellness

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Harvey Cushing, the father of modern neurosurgery, was reportedly so busy taking care of his patients that he missed his own graduation from medical school. In fact, the very name of our training position, residency, stems from a trainee being so invested to training and patient care that they became "residents" of the hospital. This level of dedication and fervor to medical training, while noble and admirable, can have measurable physical and psychosocial impact on resident trainees. Notably, the transition from student to resident is associated with a reduction in exercise, weight gain associated with poor dietary choices, poor sleep quality, and "burnout" in up to 47% to 70% during residency.¹ Burnout is associated with increased resident medical errors and suboptimal patient care and can lead to resident attrition, seen in 14% of all neurosurgical trainees in the 1990s² with improvement to 6.7% in this past decade.³

Even more startling is the high suicide rate amongst physicians. Male physicians are 1.41 times more likely and female physicians 2.27

times more likely to commit suicide than the general population.⁴ According to the American Foundation for Suicide Prevention, 300 to 400 physicians die by suicide each year. Suicide is the number one cause of death among male residents and 23% of interns report having suicidal thoughts.^{5,6} This is not restricted to trainees, as a survey of American surgeons revealed 1 in 16 experiencing suicidal ideation in the past 12 mo.⁷

The idea of treating the patient to the exclusion of physician well-being has changed. This does not diminish the ideals of dedication and excellence that are paramount to neurosurgery, but recognizes that physician wellness remains important in the equation. "Wellness" is defined as the state of being in good health especially as an actively sought goal. This incorporates physical, mental and emotional health and implies that this is not a passive process. The ACGME recognizes the importance of physician well-being and has now included a new section in its 2017 common program requirements on well-being. Similar to other endeavors such as a national intern boot-camp and pioneering the ACGME milestones, neurosurgery is leading the way in formalized wellness programs.^{1,8}

This manuscript highlights existing organized wellness education within neurosurgery

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TABLE. Wellness Program Components

Wellness program components	Medical University of South Carolina	Louisiana State University-New Orleans	University of Minnesota	Tufts Medical Center	University of Florida	Vanderbilt	Wake Forest
Team workout sessions	X	X					X
Gym memberships		X				X	X
Team workout clothes	X						X
Scheduled group events (5K run, etc)	X	X				X	X
Annual softball tournament		X		X	X	X	X
Nonfitness team building	X		X			X	X
Mind-body wellness (yoga, Tai-Chi, etc)	X	X			X		X
Healthy food at conferences					X		
Actigraphy (fitbit, etc)	X	X					
Regular lectures on wellness	X		X		X	X	X
Body composition testing	X						
Scheduled PCP appointments	X						
Blood work	X						
Other							
Spouse support initiative	X						
Leadership curriculum			X				
Museum tours, escape room events				X			
Rafting and camping						X	
Group pheasant hunt							X
Program annual cost	\$7500	\$3360	\$15 000	\$2000	\$1500	\$10 000	\$2940
How long have you had a wellness program?	>2 yr	>1 yr	>2 yr	>2 yr	1-2 yr	>2 yr	1-2 yr
Percent residents who regularly attend fitness sessions?	51%-75%	51%-75%	51%-75%	26%-50%	7%-100%	51%-75%	76%-100%
Percent faculty who regularly attend fitness sessions?	<25%	<25%	26%-50%	<25%	<25%	26%-50%	26%-50%

residency programs in order to describe the motivations behind development, structure and potential implementation strategies, and identify successes and barriers in the integration process. It can serve as a potential “how-to” guide for other programs that may identify a need in their own trainees, and begins the discussion of how to develop wellness, leadership, grit and resiliency within our future generation of neurosurgeons.

METHODS

Study Design

Neurosurgical residency training departments with established wellness programs were asked to voluntarily participate by completing a brief survey about their wellness program. Each program director was asked to provide 4 paragraphs of text describing why the program was initiated, challenges encountered in implementing the program, aspects that are most important to the program, and whether the department feels the program has been effective in promoting wellness.

RESULTS

Wellness Program Survey

The results of the questionnaire demonstrated the true diversity of the wellness programs (Table). All were initiated and overseen

by their respective program directors and the majority of programs were well established (4 of the 7 implemented for over two yr and 2 for 1-2 yr). The majority of programs, all but one, reported greater than 50% resident participation. However, only 3 of the 7 programs had more than a quarter of their faculty as regular participants. No programs reported serious participant injury or adverse patient outcomes as a result of participation in the wellness programs.

While all focused on wellness, these programs differed greatly. The most popular items seemed to be in participation in the annual neurosurgery softball tournament, scheduled fitness events, regular conference lectures, and purchasing gym memberships for residents and faculty; however, other activities varied widely from leadership to meditation to social activities to camping, hiking, museum tours, and even team building via participation in escape room-type events (Table). Below is a synopsis of each program submitted by the residency program director.

Medical University of South Carolina

Placing the needs of the patient above one's own needs is a time-honored part of our venerable profession. However, excessive self-sacrifice can lead to the promotion of habits leading to a

poor physical and mental condition, and personal health and wellbeing are paramount to leading long and productive careers. The goal of any postgraduate medical training program should not merely be to prepare its trainees with medical knowledge and skills to function as independent physicians, but also provide them with the necessary tools to maintain habits of lifelong learning and personal well-being. This is necessary so that they may lead long, satisfying, and productive careers. The aim of our wellness initiative ('Operation: La Sierra') was to increase awareness of the importance of a balanced lifestyle and provide support and resources to establish lifelong habits of personal health.^{1,8} Simply stated, the primary goal was to equip residents with the antidote to burnout; at present and for the remainder of their careers. In so doing, we also hoped to achieve improvements in teamwork, learning, professionalism, and patient care.

The biggest hurdle encountered was internal resistance to change from attendings. However, this was quickly overcome as the goals and benefits of our wellness initiative became evident. Make no mistake about it—a cultural change is necessary. Without the support provided by our department's Chairman and Program Director, the program would not have been possible. The other challenge which will be shared by all institutions wishing to implement such an initiative is the time commitment. Time management is critical and we have supported regular exercise by carving out time during the workweek. As with anything else in life that is important, it must be assigned priority and time must be set aside.

The cornerstone of our program is the weekly, team-based workout. I believe there is no greater degree of bonding than working hard and sweating alongside someone else for a common goal. It has been a real pleasure to witness the strengthening of the bonds between our residents; bonds which will translate into more efficient and higher quality patient care on our busy neurosurgery service. Most recently, we have fostered a very successful spouse support program and have encouraged spouses to get together in social settings regularly as well as participate in the weekly workouts. The response from our resident's spouses has been very enthusiastic.

Our program has been very well received by both residents and attendings. Improvements in mental health, teamwork, and camaraderie have all been reported. Anonymous surveys have further demonstrated no perceived impairments in clinical or academic/research work by participating in the program. We have demonstrated objective improvements in physical fitness, physiology, sleep quality, and psychological measures such as quality of life, anxiety, and depression.⁸ Residents report a sharpness and clarity of mind and preparedness for work that comes with leading a more physically active lifestyle. Lastly, it has made our program more competitive with top applicants who seek a training program that focuses not only on the training of a neurosurgeon, but the making of a more complete physician and person.

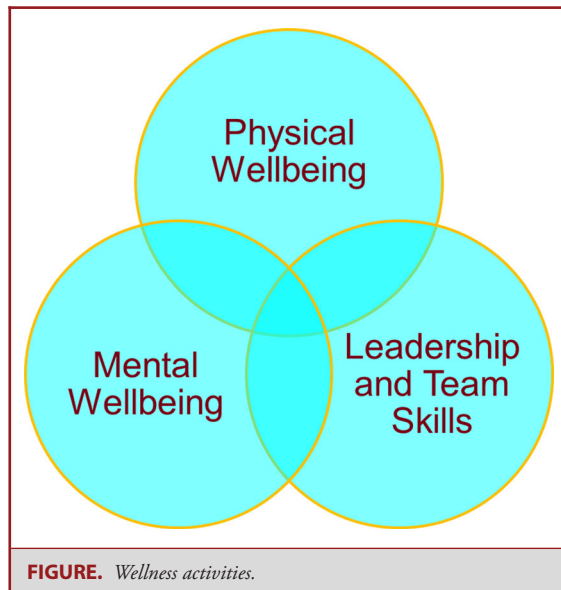
Louisiana State University

Resident well-being has come under scrutiny in recent literature. Research emphasis has been placed on the work hour restrictions implemented by the Accreditation Council for Graduate Medical Education (ACGME) in July 2003. Unfortunately, very little research has been focused on physician health through exercise, sleep, and nutrition. Several surveys have been published confirming psychological stress and burnout encountered during training.^{7,9} Our residents have identified the reduction in exercise activities and sleep as the major detractors from job satisfaction. Additionally, neurosurgical training call demands and nonclinical care responsibilities, compounded by increasing administrative burdens negatively impact our residents. Encouraged by results from Spiotta et al⁸ neurosurgery pilot nutrition and exercise program, we chose to implement a well-being curriculum at Louisiana State University Health Sciences Center in New Orleans. The University mandates residents' complete online education modules for burnout and fatigue management strategies. We felt this was insufficient and implemented leisure team building and social activities (bowling) to ensure resident cohesion and program stability.

Despite unanimous support of our wellness program, voluntary resident participation in fitness activities is inconsistent. Our training program is relatively small and consists of a diverse group of individuals (33% women, 55% married). Initial wellness program challenges have included coverage across various clinical sites during activities, finding activities suitable to athletic abilities, scheduling, and faculty participation. A strategy for the success of our program has been to involve residents' significant other in the activity. We schedule weekly low-impact spinning classes at the gym, following our blocked conference time. Conference is abbreviated on monthly Wellness Days to assure maximal resident participation in off-site activities such as kayaking and yoga. Additional weekly basketball games are scheduled each weekend. We also meet biannually for volleyball and compete annually in a softball tournament with surrounding programs during our state neurosurgical meeting. Many of these activities have a nominal fee; however, the real cost of not making resident wellness a program priority includes possible resident isolation, attrition, program instability, and compromised patient care.

Program cohesion and optimal resident health are the most important aspects of our wellness curriculum. Activities outside the sphere of neurosurgery encourage communication, co-resident work-life empathy, and camaraderie. Strategies to alleviate work stress are imperative to reduce resident burnout. This should include educational content (eg, nutrition, fatigue/stress management) combined with physical fitness and mindfulness to promote overall health.

An anonymous survey highlighted the benefits and effectiveness of our newly established program. 100% of our residents agree or strongly agree that resident wellness is important for



neurosurgical training and 89% (8/9) agree or strongly agree that physical fitness is important for neurosurgical training; 78% (7/9) of residents feel that the wellness program has had a beneficial effect on their neurosurgical training, while 66% (6/9) of residents report improved job satisfaction since initiation of the wellness curriculum. Clinical responsibilities and fatigue are cited most commonly as barriers to participation. These factors will be considered as we implement new techniques and strategies to enhance our program moving forward.

University of Minnesota

We started our program focused on leadership development 3 years ago. This effort grew out of a faculty leadership development effort we had started a few years before. In vocalizing our departmental vision, we perceived the need for leadership training for our residents in order to prepare them for the demands and stresses of neurosurgical practice. The introduction of the ACGME Neurosurgery Milestones also provided an impetus to create this program, as many of the milestones are directly relevant to leadership. Our program included quarterly meetings on topics including personal development planning, resilience, team leadership and conflict resolution, career planning, and the neuroscience of leadership. More recently, we are beginning the transition to include more physical well-being based on the experience of other programs. We also developed a leadership model that encompassed residency through mid-career neurosurgeons and helped to guide behaviors and goals through that period. We are currently in the process of introducing more physically based wellness activities into the program (Figure).

In introducing this program, we faced the most significant difficulties with time availability. We needed to transfer some time from other activities in our conference schedule. Since we

already had a financial commitment to much of this activity with the faculty, extending it to the residents has created a significant increase in the costs of the program. Lastly, engaging the residents in this work has been variable. Some are skeptical, some are neutral, and some are very engaged in improving and moving these efforts forward. By trying to make the program as broad as possible, we are striving to have components that are valuable to everyone in the department.

We have spent most of the time working on leadership development, and view these aspects as important, particularly personal resilience and team dynamics. In evaluating problems that neurosurgeons face on a day-to-day basis, we believe that these areas address the chaotic nature of our jobs as well as the hurdles that prevent us from being effective. We believe that adding physical wellness to our program will strengthen the effectiveness of our team as well by rounding out the efforts that we have made in other areas.

While we do not have objective evidence of the effectiveness of our program, we believe that the residents have benefitted from the department's efforts. The program seems to have been effective in helping residents manage conflict, his or her own personal development, and improving stress resilience. We have worked on team building, and these skills seem to have improved the cohesiveness of our resident team. We believe these efforts are worth it and continue to seek to improve our efforts.

Tufts Medical Center

From a program director's perspective, I believe it is particularly important for the program to encourage esprit de corps and camaraderie among residents and to provide residents with a supportive collegial departmental and hospital culture. The sense that residents get that they are supported by their peers, attendings, and hospital goes a long way in bolstering resident wellness, resilience, and in preventing burnout which I also believe will improve their work performance.

Our "wellness" program at Tufts started with the concept of having a venue outside of work that is fun for everyone in the department to participate. This started 20 years ago with our incoming intern/beginning of summer party (particularly welcomed after 6 mo of seemingly unending winter in Boston) which morphed into our softball tournament between the attendings and residents over the last 12 years. Holiday parties including Halloween dress-up party and Christmas party have sprung up over the last several years which have been a great hit for all.

More recently, with support from the Tufts Medical Center Graduate Medical Education (GME) Office we have offered other free wellness activities including Boston Museum of Fine Art's Art and Medicine program which provide opportunities after work for residents and attendings for reflection, dialogue, and relaxation. These sessions also help improve communication and observation skills. This year a new program was started

to encourage team-building which is also fun at an interactive game experience working together to escape a room. Interspersed during the year the hospital hosts BBQ and ice cream social events for all the hospital residents to encourage sense of community and interaction between residents outside of usual work activities. GME office also sponsors a lecture series on financial wellness geared towards residents and fellows. The GME office just finished a resident well-being survey to better understand the extent of “burnout” among residents as well as to help to improve and develop new wellness programs. Our senior resident is involved in the GME leadership subcommittee which is tasked also to improve resident wellness particularly among surgical specialties.

University of Florida

The University of Florida started a wellness program due to changes in trainee expectations and attitudes regarding what their residency experience should be, wider concerns regarding physician burnout and suicide, and because of similar programs that have been used successfully in other areas such as collegiate and professional athletics and business. It is also an area of significant interest to multiple members of our department, mainly in the areas of meditation, eastern religion/philosophy, and the neuroscience/neurophysiology of meditation techniques. Our program did not focus on physical fitness, but rather techniques and explanations of mindfulness and stress reduction.

The program has faced challenges in terms of acceptance and buy-in from residents. Faculty appeared much more interested in these ideas, possibly due to life stage and lack of worry about embarrassment. Sustained interest and modeling from the faculty have helped, but ongoing positive faculty support and discussion with upper level residents who act as models for the juniors is required. Continuing to identify dynamic speakers and organize interesting practical sessions is also a challenge. Residents appear more responsive to sessions with dynamic individuals regardless of the topic and in attempts to keep them involved and increase buy-in, we spend a significant amount of time brainstorming ideas to keep our wellness topics relevant and engaging.

The most important aspects of our program have been the scientific basis of mindfulness and meditation, which help with the understanding of the application of these techniques to our lives. The topic of mindfulness and wellness is very new in our specialty and in medicine in general. We believe that incorporating these concepts into our very stressful professional lives can help with performance and burnout issues. Resiliency is also a topic that is often discussed in graduate medical education; however, we do not do much to teach our trainees strategies to achieve this, or even talk about it much. A large part of our program is bringing these topics to the surface so residents and faculty feel comfortable talking about them.

The program has been effective, although there is a learning curve as mentioned above. We performed before and after surveys of our residents and faculty to quantify perceived value and

the majority saw benefits. Respondents noted less stress, better ability to deal with conflict, and more motivation, although 25% of respondents did not see value. We will continue to survey residents and faculty annually and use this data to adjust topics based on areas of interest and need. This year, we are continuing mindfulness education and in response to the survey, we plan to expand our program to include topics such as financial wellness, nutrition, and sports psychology techniques for peak performance. Of note, our residents almost unanimously support UF’s continued involvement in the annual Neurosurgery Softball Tournament and see this as a wellness initiative. There is a relatively high cost to our department to support this, but we believe it functions as a great teambuilding tool, bonding experience, and stress reliever for the residents (and also faculty who participate).

Vanderbilt University

Wellness is often thought to be synonymous with health, which is paramount to success in neurosurgical residency and thereafter. The World Health Organization defines wellness as “A state of complete physical, mental, social well-being, and not merely the absence of disease.” Furthermore, the common program requirements released by the ACGME July 1, 2017 state that emotional and physical wellness are important in trainees. Thus, at Vanderbilt we believe all neurosurgical residency programs should embrace a structured wellness curriculum.

The themes behind wellness and professionalism are similar and often interwoven. We therefore created the Wellness and Professionalism Program, which combines both of these aspects into a single initiative. Wellness-related activities provide an outlet for work-related stress, improve physical health, and should decrease overall burnout while leading to increased productivity. Activities centered around wellness in our department include whitewater river rafting, camping, hiking, and team sports—such as basketball, softball in New York City and fantasy football. These activities are spread evenly throughout the year and are supplemented with holiday parties and other group celebrations. Importantly, all of these activities intentionally take place outside of the hospital as we believe it is vital for residents and attendings to interact in a reduced stress environment. Professionalism-related activities focus on preparing residents for a successful career. These activities include leadership lectures and individualized mentoring sessions by people within medicine and other leaders within the Nashville community. For example, Tim Corbin, head baseball coach of the Vanderbilt Commodores, and Jon Meacham, a #1 New York Times bestselling author, lectured on *recruiting the best team players* and *how historical figures turned failures into success*, respectively. Additionally, we hold an annual Intern Professionalism Bootcamp and allow residents to choose specific career tracks based upon their surgical and research interests.

Currently, the breadth and features of wellness programs within neurosurgery are unknown. We sought to address this by creating

a wellness survey and sending it to program directors of all 116 MD and DO residency programs. Surprisingly, we discovered that the majority of neurosurgical residencies do not have a wellness program and that residencies located in the West have a higher incidence of wellness programs compared to residencies in other geographic regions. While this data is interesting, more research on wellness and how it impacts resident training should be completed. It is our hope that this article generates further discussion on wellness and motivates others to develop their own programs.

Wake Forest University

The ideas of “wellness” and “burnout” are rampant throughout current training literature, but these must be understood and addressed appropriately in the context of the unique specialty of neurosurgery. According to Merriam-Webster, “burnout” is 1; the cessation of operation usually of a jet or rocket engine, or 2. Exhaustion of physical or emotional strength or motivation is usually as a result of prolonged stress or frustration. The comparison of neurosurgery to a jet engine, especially during residency, may be quite appropriate and there is no debate on the fact that neurosurgery is a demanding specialty. The reality is that all neurosurgeons, at some point, have experienced periods of exhaustion, whether physical, mental, or emotional. The opportunity then exists to train residents to manage this appropriately so they don't allow brief periods of exhaustion to become hopelessness or depression, while maintaining the excellence demanded of a neurosurgeon that we owe our patients.

Wake Forest had two primary goals in the development of our wellness program: fostering excellence and empowering a team. Excellence occurs when there is a high level of mental toughness, personal accountability, and ownership. These attributes are fostered when there is a strong sense of team. We looked to the example of the military in developing these qualities, and employed a boot-camp style weekly work-out. The department paid for a gym membership for each faculty and resident, and pays for a former drill sergeant to run a 45 minute workout every Tuesday prior to our weekly conference. The military-style approach requires teamwork and accountability. If one person is late, everyone does pushups. But we also succeed as a team. It is much harder to fail when others around you are still going. In reports of resident attrition, co-resident support was one of the more common reasons cited for continuing.¹⁰

We started working out in October 2016 as a 3-mo experiment, which has been so well-received that it is now an indefinite hallmark of the program. Crucial to the success was leadership buy-in. The fact that the Chair, Vice Chair, Program Director, and Associate Program Director, business administrator, and research coordinator showed up to every work-out for the first 3 mo was crucial to demonstrating commitment and fostering the buy-in of the residents. This has spurred them to engage with each other

outside the gym, meeting for casual resident run social events, starting a weekly softball practice and participating in the neurosurgery charity softball tournament, running the heart/stroke 5K, adopting a family during the holidays, and coming together for departmental lunches. The faculty host at least 4 resident/faculty events in their homes every year, and in the spirit of North Carolina, we have an annual pheasant hunt. More emphasis is placed on including family in activities and there is renewed emphasis on academic activities such as the annual meeting and participation in the SANS challenge, which we follow with a Wake Forest dinner sponsored by faculty.

There is no question that an endeavor like this requires commitment, finances, and time on the part of the faculty and department, but it has created an unparalleled level of camaraderie, academic achievement, and research productivity. We have developed the idea of grit: perseverance when things are difficult, knowing that there is a team to encourage, support and refine.

DISCUSSION

The individual program director wellness program commentary and survey responses highlight the motivations behind wellness program development, structure and potential implementation strategies, and identify successes and barriers in the integration process. The wellness programs profiled share a number of core features. Each was created in response to the unique needs of the residency program. A majority of programs place emphasis on the inclusion of physical fitness activities as a major component of their wellness initiatives. Although all programs report a shared focus on team-building and team work, each program followed a slightly different path in order to achieve this goal—spanning mindfulness meditation to escape rooms to military-style workouts. Clearly, there is no “one-size-fits-all” solution to implementing a successful wellness initiative, rather a multitude of paths to achieve unique programmatic goals.

There are important potential obstacles that must be considered and addressed when creating a wellness program. The majority of the programs report a strong emphasis on faculty buy-in as a necessary pre-requisite for success. Active participation of faculty at its adoption is needed to model behavior and demonstrate program commitment. An additional obstacle to success is the potential for compromise of clinical duties or resident education, which was a major concern at time of program implementation for nearly all programs. None of the surveyed centers reported an instance of resident or patient injury secondary to the wellness program, suggesting that wellness programs may be adequately assimilated into residency program education and clinical responsibilities as long as this risk is considered during planning stages. Additionally, cost was identified as a major concern amongst centers. The average annual cost per center was not insurmountable at \$6000 per year (range \$1500-\$15 000). Choosing a cost-effective wellness program such as group fitness

or small group outings as the main activity is a potential option for cost containment in the early phases of instituting a wellness program. Then, as the program matures, adding healthy dietary choices or events like hiking, team-building, and guest speakers is a potential option for further enrichment.

For those programs considering implementing a residency wellness program, we recommend beginning with an introspective assessment of the goals of the program and the shared interests amongst residents and faculty that are unique to the program. A wellness initiative that channels the program ethos is more likely to thrive with a high rate of participation. Designing important metrics to track for each unique program is an important consideration. As institutional funds become increasingly harder to secure, justification of the effects of these programs would aid in their funding and widespread acceptance. Tracking changes in markers of the participants' physical health, emotional well-being or resilience adds a layer of objectivity to support subjective observations. Additionally, discussing the implementation of the wellness initiative during faculty meeting and creating buy-in amongst multiple members of the department is a key to the early and sustained success of the residency wellness program. Through thoughtful selection and early faculty support, a strong, effective wellness program can be crafted which enriches both residents and attendings alike.

CONCLUSION

Once the accepted norm during Cushing's time, the mantra of work to the exclusion of family and lifestyle is now recognized as deleterious to overall well-being. Wellness involves physical, mental, and emotional well-being, and can be addressed in a wide variety of ways, as evidenced by the described neurosurgical wellness programs.

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COMMENT

In an assessment of health and wellness programs from Neurosurgery residency programs across the country, the authors compiled commentary directly from program directors on the advantages, limitations, and future directions from each individual experience. As reported in the article, maintaining wellness within a residency program has been shown to improve resident satisfaction as well as patient safety. As such, neurosurgery residency programs have, over the years, attempted to combine resident wellness and educational reform.

This push for neurosurgery resident satisfaction and overall wellbeing comes almost paradoxically against the traditional educational models for neurosurgery. However, as this article alludes, there is a distinct separation between resident wellness and education. Both require significant participation, commitment on behalf of the individual resident as well as support from the department and faculty.

Creating a residency wellness program should be carried out to suit the individual goals of the residents and faculty, and can change with time and environment. Specific departmental philosophies should remain paramount. Again, resident education should remain paramount during training, but balance should be given to maintaining wellness during this time spent.

Overall, this commentary should serve to provoke further discussion on residency wellness programs. While the concept of "physician wellness programs" is briefly noted in the Neurological Surgery ACGME Milestones, there is currently no set standard of wellness during Neurosurgery training. Perhaps moving forward we, as a profession, can establish guidelines on this topic, and begin to change the paradigm of stigmatized neurosurgery training.

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