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Neurosurgical Education TODAY

Maintaining excellence in training and continuing education

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CNS

EDITOR'S NOTE

Ellen L. Air
Co-Editor

Clemens M. Schirmer
Co-Editor

Welcome to the Fall 2024 edition of Congress Quarterly. As we enter the latter half of 2024, the field of neurosurgery continues to evolve rapidly, driven by technological advancements, innovative research, and a commitment to improving patient care. This issue explores the vital areas shaping the future of our neurosurgery, with a particular focus on education and training.

The theme, "Neurosurgical Education Today," reflects the critical importance of maintaining excellence in training the next generation of neurosurgeons. As our field grows in complexity, and techniques and technologies advance at an accelerating pace, we must ensure our educational paradigms keep pace. This issue examines various aspects of neurosurgical education, from residency training to continuing medical education for practicing surgeons.

Akash Patel, Tiffany Hodges, and I provide an overview of recent advancements and initiatives from the CNS Education Division. We highlight the division's strategic vision, accreditation efforts, and innovative educational programs for all career stages, underscoring CNS's commitment to providing cutting-edge, accessible educational resources to neurosurgeons worldwide.

As more neurosurgeons transition to private or hybrid practice settings, Rupa Juthani provides practical advice on navigating continuing medical education, including practical tips for optimizing CME credits and leveraging educational opportunities to grow one's practice.

Douglas Kondziolka explores the evolving landscape of scientific communication, reflecting on the historical importance of documentation, while examining the impact of modern technology on our consumption and utilization of scientific literature. His insights are particularly relevant as we grapple with information overload and the need for efficient knowledge dissemination in our fast-paced field.

As editors, we are acutely aware of the pressures to publish and their potential impact on research quality. Michael Covell, Michael Kogan, and Christian Bowers thoughtfully tackle the importance of responsible stewardship in neurosurgical publishing, and offer potential solutions for prioritizing impactful, high-quality research.

Debraj Mukherjee and A. Karim Ahmed discuss the critical issue of equity in residency selection and training, exploring strategies to mitigate bias in the application process and ensuring fair, comprehensive evaluation of candidates. As our field strives to become more diverse and inclusive, these considerations are paramount.

Other highlights in this issue include George Koutsouras' examination of healthcare unionization and Mara Hoffert and Andrea Williams' insightful piece on supporting struggling learners in neurosurgical training. We're also pleased to include updates from the CNS Foundation and the Washington Committee, covering philanthropic initiatives and essential policy developments.

Neurosurgical education and training are at an inflection point. The challenges we face require innovative solutions and a willingness to adapt our traditional approaches. At the same time, we must remain true to the principles that have long guided our specialty: a commitment to excellence, a drive for innovation, and an unwavering focus on improving patient outcomes.

We hope you'll engage deeply with this issue to reflect on how these ideas might impact your practice or training program and invite you to join the ongoing dialogue about the future of neurosurgical education. Together, we can ensure our specialty remains at the forefront of innovation, attracting and nurturing the brightest minds in medicine.

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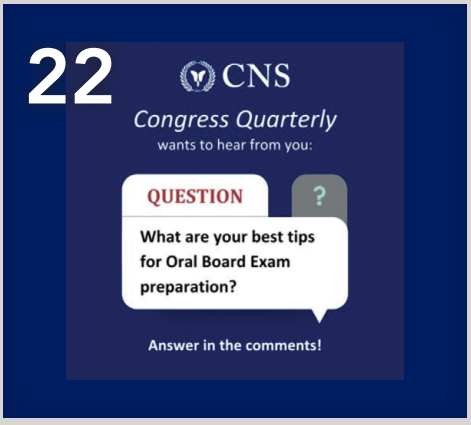


PRESIDENT'S MESSAGE

Alexander A. Khalessi, MD, MBA
President, Congress of Neurological Surgeons

Dear Colleagues,

Throughout our history, the Congress of Neurological Surgeons has maintained a commitment to education and innovation, driving the future of specialty. That has never been more true or more apparent than right now.

Over the past few years, members of the CNS Executive Committee and the Education Division have expanded our educational portfolio with a host of new live and virtual offerings that address today's practice issues, while working to make this content more accessible to members across the practice spectrum. From best-in-class board exam preparation courses, webinars and SANS modules to the hundreds of podcasts and YouTube videos covering critical topics across subspecialties, the CNS has exactly the educational program you need at each stage of your career. Clemens Schirmer, Akash Patel and Tiffany Hodges discuss these offerings and more in their article on page 4.

Neurosurgery Editor-in-Chief, Doug Kondziolka, reflects on the value of publishing in his article on page 8. Of course, there can be no doubt about the value of **Neurosurgery Publications**, which members frequently cite among the most essential educational resources. We are grateful to Doug for his contributions to the portfolio and his efforts to continue building value.

Being a leader in neurosurgical education also means training up the next generation of innovators and leaders in the field. Over the past year, we have worked to launch an entire educational curriculum around neurosurgical innovation. The innovation track at the 2024 CNS Annual Meeting in Houston was specifically designed for the

"FROM BEST-IN-CLASS BOARD EXAM PREPARATION COURSES, WEBINARS AND SANS MODULES TO THE HUNDREDS OF PODCASTS AND YOUTUBE VIDEOS COVERING CRITICAL TOPICS ACROSS SUBSPECIALTIES, THE CNS HAS EXACTLY THE EDUCATIONAL PROGRAM YOU NEED AT EACH STAGE OF YOUR CAREER."

"AS THE LEADER IN NEUROSURGICAL EDUCATION, THE CNS IS UNIQUELY POSITIONED TO EXPLORE THE TOPIC OF NEUROSURGICAL EDUCATION TODAY"

entrepreneurially minded surgeon, with symposia like "Transforming Neurosurgery through Technology," a pre-meeting Data Science Symposium and "CNS Data Science and AI for Neurosurgeons: A Hands On Experience," where attendees tackle a project together with our stellar faculty. Congratulations to Annual Meeting Chair Garni Barkhoudarian, Scientific Program Chair, Edjah Nduom and Vice-SPC Khoi Than for putting together this outstanding program.

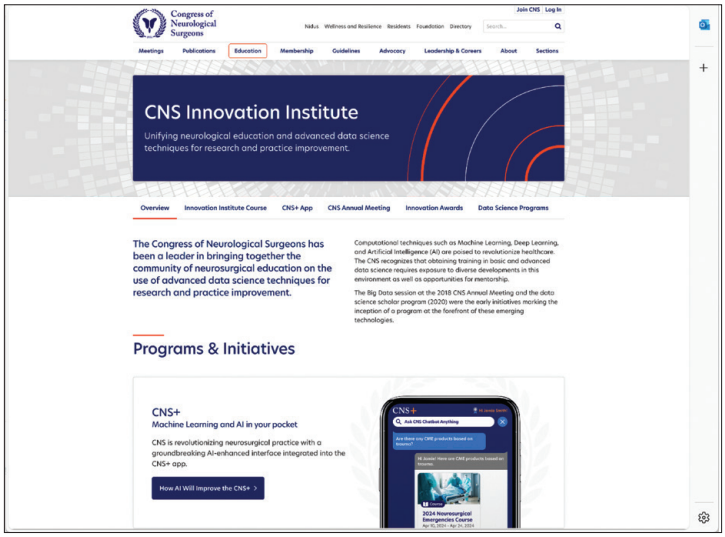
The CNS Data Science and Technology Committee has similarly worked to curate an online curriculum that will allow neurosurgical innovators to further explore technological advances in the field, understand the impact of digital health on our specialty, and to develop the skills needed to bring new solutions to market. Now available at cns.org, the Innovation Institute web microsite features CNS products nurturing innovation and demonstrating the CNS as an innovator. Congratulations to Mohamad Bydon and his committee on this great accomplishment.

As the leader in neurosurgical education, the CNS is uniquely positioned to explore the topic of Neurosurgical Education Today in this issue of *Congress Quarterly*. Editors Clemens Schirmer and Ellen Air explore important issues related to Resident education and training, continuing medical education, and neurosurgical publishing. Thank you to all the members who contributed to this issue.

It has been a great honor to serve the CNS as President this year. I am proud of all we have accomplished and the contributions my colleagues on the Executive Committee have made to CNS' rich educational legacy this year. I am confident that this team will continue to use their expertise and insight to build on the work we've done and continue to offer bold new courses and programs in the years to come.

Sincerely,

Alexander A. Khalessi, MD, MBA
President, Congress of Neurological Surgeons



The CNS Innovation Institute launching this fall features CNS online content for innovators in the field.

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EDUCATION TODAY

Akash J. Patel, MD

Tiffany R. Hodges, MD

Clemens M. Schirmer, MD, PhD

Neurosurgical Education Today:

ADVANCEMENTS AND INITIATIVES OF THE CNS EDUCATION DIVISION

In the rapidly evolving field of neurosurgery, continuous education and professional development are paramount to maintaining high standards of patient care and advancing clinical practices. The Congress of Neurological Surgeons Education Division has been at the forefront of this mission, relentlessly working to disseminate innovative neurosurgical education. This article provides an overview of the Division's current priorities, initiatives, and achievements, reflecting its commitment to enhancing neurosurgical education and practice.

The CNS Education Division's strategic vision is to enhance health and improve lives by advancing neurosurgical education, clinical practice, and scientific exchange. This vision drives every initiative, ensuring that neurosurgeons have access to the most current and comprehensive educational resources. The Division's efforts are guided by closing professional practice gaps, addressing educational needs, and fostering continuous professional development. We recently evaluated the entire educational portfolio to ensure mission-centric alignment with your needs and focus on bringing you the most relevant neurosurgical education.

The Accreditation Council for Continuing Medical Education (ACCME) accreditation is a cornerstone of the CNS's educational offerings. In 2023, CNS accredited 247 live courses and meetings, a testament to its extensive reach and impact. The Division has also implemented robust mechanisms to track and analyze professional practice gaps, educational needs, learning objectives, and evaluation data. These efforts ensure that every educational activity is meticulously planned and continuously improved based on feedback and outcomes. Our accreditation with commendation reflects the consistently high quality of the academic programs that the CNS provides. Tiffany Hodges oversees this pivotal effort.

One of the Division's significant projects for 2024 is the Outcomes Reporting Project, which aims to gather data on changes in clinical practice and improved patient outcomes resulting from CNS-accredited courses. This initiative not only aids in ACCME reaccreditation efforts but also helps refine educational content to better meet neurosurgeons' needs.

The CNS offers various joint and directly accredited live courses and meetings. Notable courses include the Neurosurgical Emergencies Virtual Course, Translating Data Science to Neurosurgical Practice: From Computer Screen to Bedside, and the Skull Base Fellows Course. These courses are designed to provide neurosurgeons with cutting-edge knowledge and practical skills, ensuring they are well-equipped to handle complex clinical scenarios. As the optimal learning environment evolves and adapts in a post-COVID world, we match the best delivery format and setting to the audience's needs.

Online education has become a pivotal component of the CNS's educational strategy. The Online Education Committee, led by Theresa Williamson and Sharona Ben-Haim, has made significant strides in enhancing the accessibility and quality of neurosurgical education through webinars and podcasts. Key achievements include successfully integrating the Journal Club Podcast with YouTube and developing a webinar series focused on finding a job after training. The committee also combines and optimizes various podcast series to streamline content delivery and increase engagement.

CNS was a first mover in neurosurgery to embrace the promise and opportunity of data science. It has offered multiple educational activities

that help interested neurosurgeons become familiarized regardless of their neurosurgical career stage. The Data Science Committee, chaired by Eric Karl Oermann, has incorporated data science and AI into neurosurgical education. The Committee has developed several AI tools, including the CNS Chatbot, which allow neurosurgeons to interact with educational content in novel ways. These tools will be rolled out at the 2024 CNS Annual Meeting in Houston and integrated into the all new CNS+ app, providing members with advanced resources for research and clinical practice.

The Committee also offers a Virtual AI Course to translate data science models into clinical practice. This course is designed to help neurosurgeons understand and apply data science techniques, enhancing their ability to make data-driven clinical decisions.

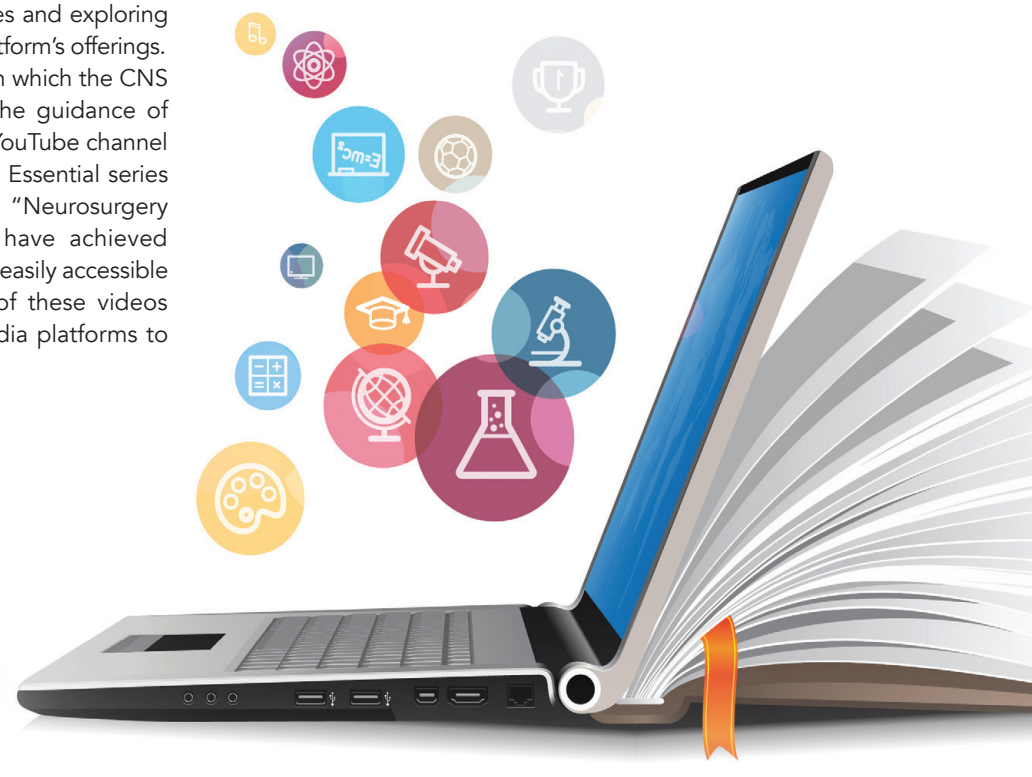
The Neurosurgery Survival Guide (NSG) app, overseen by Kunal Vakharia and Nicole Bentley, has undergone significant enhancements to improve its structure and functionality. The app now features enriched content in emerging areas such as radiosurgery, integrated pathology, and enhanced connectivity across sections. These updates ensure that the app remains a valuable resource for neurosurgeons, particularly those in training.

The NEXUS platform, overseen by Jeff Mullin and Kunal Vakharia, continues to be a vital resource for neurosurgical education. Since 2022, the platform has attracted over 40,000 visits from 5,000 unique viewers. Recent initiatives include developing oral board cases and exploring monetization strategies to sustain and expand the platform's offerings.

YouTube has become a powerful medium through which the CNS can disseminate neurosurgical education. Under the guidance of Garni Barkhoudarian and Kristin Huntoon, the CNS YouTube channel has grown significantly, with over 5,659 subscribers. Essential series such as "Neurosurgery 100," "Journal Highlights," "Neurosurgery On the Go," and CNS Neurosurgery Podcasts have achieved impressive viewership, providing neurosurgeons with easily accessible and engaging educational content. The success of these videos underscores the importance of leveraging multimedia platforms to reach a broader audience and enhance learning.

The Self-Assessment in Neurological Surgery (SANS) program, chaired by Laura Snyder and Theresa Williamson, remains a critical component of the CNS's educational offerings. The SANS Committee has developed new questions to update the current CNS SANS modules and submitted these questions for the American Board of Neurological Surgery (ABNS) primary exam update, which has become an essential resource for Residents preparing to take the primary board exam.. The Committee is also expanding the development of AI-related questions while ensuring that real neurosurgeons are involved. Monitoring the engagement in SANS flashcards and other products helps determine future production needs, ensuring that these resources remain relevant and valuable for neurosurgeons preparing for board examinations and recertification.

The CNS Education Division remains dedicated to advancing neurosurgical education through innovative programs, robust accreditation processes, and the integration of cutting-edge technologies. By continuously evaluating and improving its educational offerings, the Division ensures that neurosurgeons are well-prepared to meet the challenges of modern clinical practice and contribute to advancing the field. The Division's unwavering commitment to education enhances professional development and ultimately improves patient care and outcomes, fulfilling its mission to enhance health and improve lives.



EDUCATION TODAY

Rupa Juthani, MD, FCNS

Navigating Continuing Medical Education in Practice-Based Neurosurgery

Continuing medical education (CME) is a necessary and valuable requirement that ensures providers remain up-to-date in the rapidly changing field of medicine. This is particularly critical for surgical specialties, where exposure to new data and techniques is critical to driving innovation and excellence in surgical outcomes. The landscape of neurosurgery has shifted considerably in the last decade, with an increase in private, "privademic", and employed practice settings relative to pure academic practices. This, in turn, has necessitated an increase in access to innovative, complex neurosurgical care outside of traditional academic settings, further emphasizing the pivotal role of CME credits in furthering neurosurgical practice post-training.

When I was in a purely academic practice setting, I never gave significant thought to earning CME credits. They seemed to passively accumulate, through the plethora of Grand Rounds, subspecialty conferences, M&Ms, and resident educational opportunities. The neurosurgical and subspecialty conferences offered tremendous CME opportunity but were generally not "necessary" to meet CME quota. The tracking was also largely registered by administrators, requiring little effort on my part to ensure compliance. Thus, it came as something of a shock when I joined a privademic practice and had to proactively acquire and track CME credits to remain compliant. I have come to appreciate the value of CME activities and the opportunity they present for practice growth. Here, we discuss two perspectives on optimizing CME opportunities and leveraging the community need for CME to grow your practice.

Optimizing CME credits

1. Know your CME requirements

Not all CME credits are equal. Make sure you reference your hospital's and state requirements to determine how many credits, and what level (e.g. Category 1) are required. The American College of Surgeons (ACS) maintains a list of CME requirements by state, which serve as a benchmark for ongoing hospital accreditation. They typically vary from 50-100 credits, reviewed on an annual or biennial basis. While many states offered waivers or reductions during the pandemic, most requirements were reinstated after 2021. Visit https://www.facs.org/ to view the educational requirements by state.

2.Virtual opportunities

In a private or mixed practice setting, time spent outside of clinical work and program development must be high-yield, for both personal and professional reasons. During the COVID pandemic, many conferences quickly shifted to virtual and hybrid formats, offering an incredible new resource for neurosurgeons around the world. Some of the most valuable CME opportunities can be found virtually, which minimizes the opportunity cost of lost time in travel, and, if selected appropriately, provides a targeted activity that is tailored to your practice needs. The pitfall of virtual CME activities is the tendency to multitask during them, in which case you will get your credits, but likely not maximize absorption of the material. I have found that treating these virtual CME credits as non-negotiable protected time is critical; put a sign on your office door, and limit interruptions, or opt to complete them remotely to emphasize that you are "out of office" during this time. Offered biannually in the spring and fall, the CNS Oral Board Review course is an excellent example of how a CME activity can be successful and effective in a virtual format; given the remarkable shift towards virtual Oral Boards, the virtual training is in many ways more beneficial than a more traditional setting, and most closely replicates some of the nuances of the real examination. Furthermore, many in-person conferences offer virtual options at discounted rates, so be sure to inquire about virtual content when you are unable to travel to a CME activity.

3. National Meetings

National meetings, on the other hand, provide a critical opportunity not only to gain knowledge, but also network with colleagues and experience hands-on learning, from new technologies and simulations to interactive sessions and dialogues. While virtual conferences offer access to a broad audience with high convenience, there is no replacement for the dynamic learning that happens during national and international meetings, where a

TABLE 1

Saturday, September 28	
Special Symposium 02	Spinal Deformity Primer for All Neurosurgeons: A CNS Collaboration with Scoliosis Research Society
Dinner Seminar 1	Disruptive Technology in Spine Surgery
Sunday, September 29	
Special Symposium 05	360 Degrees Around the Greatest Surgical Challenges in the Cerebellopontine Angle, Petrous Apex, and Petroclival Fissure – A High Yield CNS/NASBS Symposum
Special Symposium 06	Transforming Neurosurgery through Technology: The Innovation Symposium
SYM 12	Navigating Neurosurgery Beyond Academia
SYM 18B	Harnessing the Power of Media to Cultivate a Parallel Career and Augment Your Practice

diverse range of voices in the neurosurgical community are represented, and heard.

The CNS is dedicated to reflecting the changing face of neurosurgery in the incredible array of speakers, leaders, and educators that form the backbone of the CNS. At the CNS Annual Meetings, the Guidelines Sessions in particular afford a high yield way to stay up-to-date on subspecialty topics, complemented by an array of luncheons and dinner seminars. While weekday attendance can be challenging for practice-based providers, this year's program offers several weekend seminars that may be of interest **Table 1**.

4. Recurring CME credits

Most hospitals and affiliated institutions offer access to weekly or monthly conferences that offer CME opportunities. Setting up a system to track these events may obviate the need for other events that require more time for a similar yield and offer the best opportunity for regular, interactive meetings to supplement your practice. If your practice or hospital is affiliated with a larger academic center, inquire about getting on a listserv for relevant M&M, tumor boards, case conferences, etc. Even sporadic attendance can offer valuable insight, keep you up-to-date on the latest science.

5. Low-lying fruit

You may have earned CME credit without even realizing it. According to the AMA, if you are listed as first author in a MEDLINE-indexed journal, you can earn a maximum of 10 *AMA PRA Category 1* Credits™ per article, and up to 5 credits per poster presentation. Masters in a medical area (ie. a Masters in Public Health) can earn you up to 25 *AMA Category 1* Credits™. Submit your documentation directly to the AMA to claim credit for these activities.[1]

In a pinch, look for CME credits acquired by reading articles in select medical journals. Even sites such as Doximity, will offer credit for reading interesting and educational articles in your area of interest. These are likely reflective of material you are already engaging with and can be an excellent way to round out your CME credits.

Leveraging CME credits

In recognizing challenges in acquiring CME credits, you may also realize that this presents a unique avenue to draw in providers for your own CME based activities. Hosting a CME-based event—be it a short course, dinner lecture, or other event—can be an excellent way to get your name out into the community and ensure referring providers are aware of the outstanding care you can provide. When designing your CME, use the same principles that attract you to a CME activity: accessibility, applicability, and high-yield content. Design your CME credits with a specific target audience in mind, to make them attractive for attendees effectively deliver your message to the right providers. Aim to offer such events regularly, each with a unique audience covering targeted topics relevant to their practices. While the primary goal is to educate the community, is also an excellent way to meet new providers and expand your own knowledge and practice. Partner with hospitals, practices, and sponsors that will offer your attendees useful contact or information.

Also consider whether leading or starting a multi-disciplinary case conference, tumor board, etc on an ongoing basis would be beneficial to your practice or hospital system. This allows you to collaborate on treatment decisions and leverage the benefit of the knowledge of all attendees. If you live in an area with a less dense neurosurgeon population, being part of a virtual aggregated case conference may be an excellent way to interact with other neurosurgeons.

Summary

While tracking CME credits can be an administrative nuisance, CME activities also allow us to dedicate meaningful time to improving our knowledge base. With thought and effort, neurosurgeons in the practice-based setting can optimize a regular system for maintaining CME credits that ensures you meet your quota and achieve the true goals of continuing your medical education. For more information regarding CNS based CME opportunities, visit www.cns.org.

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EDUCATION TODAY

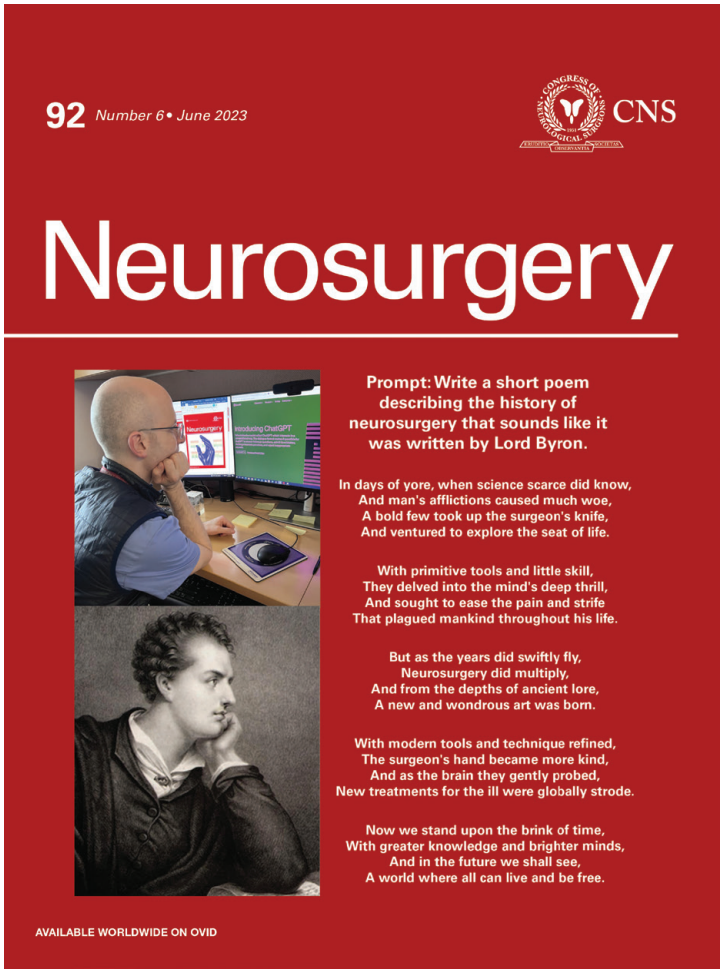
Douglas Kondziolka, MD, MSc, FRCSC, FACS

The Value of Publishing

"Since ancient times, long before the dawn of history," is a line from the tremendous music spoof documentary, "This is Spinal Tap." Thinking of this topic related to "value," I immediately thought of the ancient cave paintings done by early man to document important elements of their life or livelihood. Early human intelligence understood the need to educate others through documentation. Through the centuries, "reading, writing, and arithmetic" have been the basics of education. Is there a reason why reading is listed first?

Of course, the value of publishing is clear. Publication is a formal way of sharing information that is combined with an archive. It is hoped that the information is available for long periods of time, stored in a format that remains useful over time, and contains a message that is of some intrinsic value over that time period. Indeed, print remains one of the very best archives and has been an effective solution for centuries. Things stored on a 5-inch floppy disc only, as one example, would be difficult to access for most people, given that few have a 5-inch disc drive, or then the next iteration of digital data storage, the 3.5-inch drive. Do you still own a DVD player?

Thus, the four active elements of publishing: documentation, sharing, reading, and using, within an accessible archive are well understood. But recently, have readers and writers changed how these active processes are manifest? Do they document like they have in the past? Is information shared in the same way? How do



people read and on what tools or devices? Do they read the whole document? Parts of it? Increasingly, information is used in different ways because of the different formats available.

It is likely that reading techniques have evolved for scientific articles. Search techniques typically bring one to an article, but on a journal's website, when the article is opened, the reader can go directly into elements of an article. In print this would be like flipping the pages until attention is focused on what you actually want to read. This is certainly unlike reading a novel, where there would be no point to jump to the middle or end without a sense of the overall story. Nevertheless, it has been clear for the last century that many readers of a scientific article, start with the abstract and then jump into elements of the paper that may interest them. Do people still read an article from start to finish? Certainly, that can happen. But most likely readers are interested in specific elements of a work, with a focus on methodology, results and then a specific discussion of those results. A reader well-versed in the topic at hand would have less interest in the introduction section as one example, whereas a student, resident, or anyone else that is relatively new to a topic, would be highly interested in that material.

In order to empower a scientific article, the author must include that information of most value to readers. Otherwise what is the point? In one of my Editors Messages published last year, I listed the elements of an article that authors should strive to address.[1] Using these features, one can search within an article to find the necessary information. Search across multiple articles or abstracts for example, focusing on key words like "complications" related to a specific form of therapy, would enable any investigator to find authors with similar interests in those complications. This would be done without reading the entire article or abstract, because with this initiative one is only looking for certain terms that show the different investigators areas of interest. They then could be contacted via their publication metadata to pull the desired information fields and create a multicenter study. I used this exact technique in a paper I directed back in 2013.[2] This is a powerful value of publication – to find other writers that care about the same things that you do!

Modern archival materials seem to come and go, and some like print last for centuries. But perhaps those early cave paintings that are still preserved and found throughout the world, those early "publications," have best stood the test of time.

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EDUCATION TODAY

Michael Covell, BA

Michael Kogan, MD, PhD

Christian Bowers, MD

Conserving the Neurosurgical Publication Environment: How Neurosurgeons Can Maintain a Healthy Research Ecosystem Through Responsible Stewardship

The publication of original scientific research is the foundation of modern medicine, driving innovative breakthroughs that have maximized our life spans and revolutionized public health. Lister's seminal manuscript, "On the Antiseptic Principle of the Practice of Surgery," published in 1867, transformed the surgical field forever, setting the stage for the discovery and publication of modern surgical techniques.

While publications serve as a mark of academic expertise, ability, and prowess, the academic pursuit of publishing has been under increasing scrutiny. Over the past decade, the number of authors publishing more than sixty papers per year has quadrupled.[1] Within the last year, the Presidents of Harvard University and Stanford University resigned after claims that they participated in fraudulent research and plagiarism. The scientific publishing industry exceeded $25 billion last year, while more than 50 journals were delisted from Web of Science for failing to meet quality metrics. It is evident that scientific publications serve as a new universal currency across science and medicine, straying from the medium of scientific exchange that had previously defined the publishing landscape.

Since the USMLE Step 1 changed to a binary, "pass/fail" score in 2020, program directors have increasingly relied on applicant scholarly activity to aid in resident selection, and research experiences have become a leading predictor of "Match" success for neurosurgery applicants.[2] Unsurprisingly, residency applicants seeking acceptance to highly competitive specialties frequently pursue a strategy of maximizing scholarly publications to set themselves apart. Dr. Christian Bowers applied to neurosurgery residency in 2009 with zero publications, while the average applicant at the time had one PubMed-indexed publication and less than ten research items.[2] Fifteen-years later, neurosurgery leads the residency publications "arms race" with an average 25 research "items" per applicant, trailing only plastic surgery (28) while outpacing other competitive specialties including dermatology (20) and otolaryngology (17). These research "items" among neurosurgery applicants largely represent non-indexed publications, book chapters, and conference abstracts, while the average number of PubMed-indexed publications exceeded eight for successfully matched neurosurgery applicants in 2021.[3]

A significant cultural shift needs to occur in academic medicine. Neurosurgery can provide. critical leadership by setting the standard for conserving the sacred neurosurgical publication ecosystem. Responsible publication stewardship may be achieved in neurosurgery by changing how we evaluate publications, shifting the reward away from total publication number as this incentivizes a publishing ecosystem of quantity over quality, with peer-reviewed acceptance—regardless of journal quality—serving as our only quasi-threshold of quality. Two emerging metrics provide pathways for objectively evaluating individual neurosurgical research productivity: the mean Relative Citation Ratio for attendings and the Arms Race Control Score for medical students and residents.

Relative Citation Ratio

The Relative Citation Ratio (RCR) was introduced by the National Institutes of Health (NIH) to address the limitations of previous productivity metrics, including the h-index and overall citation count. RCR is calculated by the number of citations per year for each paper, normalized to the number of citations per year for NIH-funded papers published by neurosurgeons (or other respective specialties) each year. A paper with an RCR of 1.0 has the same number of citations per year as other papers in its field, while an RCR of 3.0 has three times the number of citations as

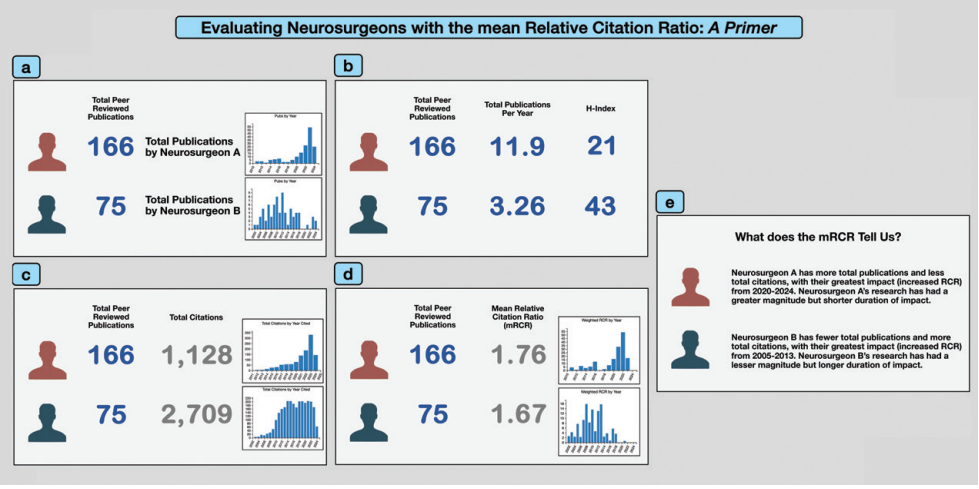

Figure 1: *Mean Relative Citation Ratio provides Comparative Data to Evaluate a Neurosurgeon's Relative Impact and Contributions to the Literature.*

the median NIH-funded paper in one's field. The mean Relative Citation Ratio (mRCR) is the average RCR across a researcher's entire PubMed-indexed publication portfolio. RCR is a time-independent metric, differing from total citation count and h-index which significantly benefit neurosurgeons with more established careers.

RCR's normalized design allows appropriate comparisons of research impact to similar publications and authors. RCR has demonstrated utility in assessing neurosurgery academic productivity based on surgeon gender, academic rank, and career duration.[4] Bhalla *et al.* demonstrated that the mean Relative Citation Ratio (mRCR) of attending neurosurgeons had the weakest correlation with career duration, suggesting that the scale may address the career duration disadvantage accompanying other traditional metrics.[5] mRCR may elucidate meaningful comparison of a neurosurgeon's contributions to the greater literature, providing an objective, previously unavailable metric to juxtapose with researchers in larger surgical specialties who benefit from larger readership. For example, while two neurosurgeons may have significant variance in total publication counts and h-indices, mRCR provides a normalized value of the relative impact of a researcher's publication portfolio (**Figure 1**).

Critically, mRCR incentivizes conservation through publication stewardship as every single publication's impact affects an author's mRCR. This may promote thoughtful consideration of a project's relative impact before immediately pursuing publication of a research idea, thus decreasing research emissions that have clouded the neurosurgical literature through appropriate stewardship. A neurosurgeon's mRCR may be calculated automatically here: https://icite.od.nih.gov

Arms Race Control Score

The Arms Race Control Score (ARCS) is an objective, quantitative metric that captures the amount of authorship effort invested in a publication. For each publication authored by a medical student, a corresponding Publication Effort Score (PES) is awarded (**Figure 2**). The PES is divided by a student's authorship position to compute a Publication Value Unit (PVU) for each publication. Each individual PVU is summated into a cumulative Publication Value Unit (cPVU) across all publications in a student's portfolio.

Publication Type	Point(s)
Editorial / Historical / Commentary/ Letter / Reply to Letter	1
Case Report / Operative Video / Technical Note	2
#Case Series / Review / Systematic Review	3
*Clinical or Basic Science Paper / Meta-Analysis / Cadaver	4 (+1)*

Case series > 30 patients, then it is counted as a standard clinical paper (4-points)
* If a 4-point publication is in a Top-500 Journal (Journal Impact Factor >10.2):
= add 1 point to 4-point score

Figure 2: *Publication Effort Score (PES) Based on Publication Type.*

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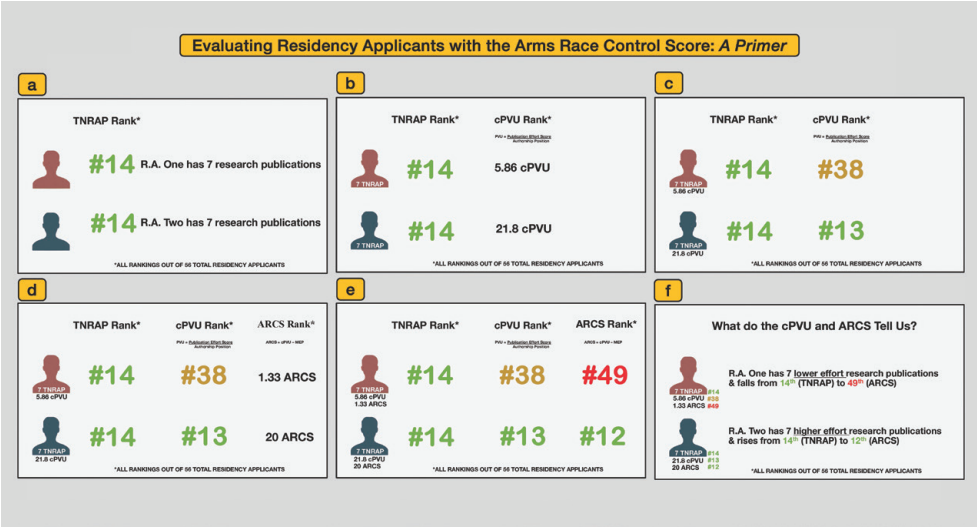

Figure 3: *Arms Race Control Score offers Comparative Metric to Evaluate Residency Applicants based on the Effort Required to Produce Publications. (R.A. = Residency Applicant, TNRAP = Total Number of Residency Applicant Publication, cPVU = cumulative Publication Value Unit, ARCS = Arms Race Control Score).*

Minimal effort publications are those with a PVU≤1. ARCS is a researcher's cPVU minus any minimal effort publications, resulting in a score that reflects higher effort research produced by a medical student.

ARCS may provide objective data to make equitable comparisons of applicants in the neurosurgery "Match." For example, while two students may have seven publications each in their "Match" application, the relative effort required to publish these seven studies may have vastly differed. Computing ARCS for each applicant and identifying relative rankings reveals a stark comparison in an applicant's perceived effort to create these seven publications (**Figure 3**).

The Stop the Arms Race (STAR) study is a consortium of over 25 institutions and nearly a dozen highly competitive specialties that are driving the medical student publications "arms race" (i.e. neurosurgery, plastic surgery, orthopedic surgery, otolaryngology, radiation oncology, dermatology). The STAR study seeks to establish baseline ARCS values to allow meaningful comparison between applicants based on demographics, educational background, and access to research opportunities. A student's ARCS may be calculated automatically here: https://arcscalculator.com

The uncontrolled, exponential increase in neurosurgical publications, with heterogenous regard for impact or quality, has resulted in excessive publications of questionable quality. Conservation of the neurosurgical research ecosystem requires a cultural shift, from the top-down, on metrics that incentivize quality and impact over sheer quantity. Implementing novel metrics like the mRCR and ARCS may promote publication stewardship as researchers adjudicate whether an article is truly worthy of publication, overriding the quantity-driven reflex response fueled by academic incentives. This new sentiment may be fortified by scores that prioritize high-quality research while disincentivizing publications that required low effort or may be of little impact to the field.

The time is right for a revolutionary shift in our collective focus from a culture of rampant publishing to one of mindful authorship, providing the mental and professional clarity to address critical issues in economics, innovation, and access to care that characterize the modern neurosurgical healthcare system. As a result, we may reduce the unhealthy publication emissions that clutter the otherwise beautiful neurosurgical literature, while making meaningful and impactful strides to improve the lives of our patients.

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George W. Koutsouras, DO, MPH, MS

Unionization of Healthcare: Does it favor Resident Education?

Fair wages, better working conditions, and improved benefits are the requests of all workers, including residents and fellow trainees. The average first-year resident salary is approximately $60,000, as reported by the AAMC, with many working 60-80 hours per week. Trainees may have profound student loan debts averaging over $200,000 per resident. Salaries and benefits are low and do not grow in parallel with inflation. These factors can have a significant impact on career choices and quality of life while in residency. Additionally, residents and fellows work under the purview of large institutions and may feel that they do not have the voice to advocate for certain benefits. While unionization has historically not been a consideration for many, these factors make collective bargaining and labor union organizations potentially attractive to trainees.

In 1999, the American Medical Association (AMA) created a national labor organization called Physicians for Responsible Negotiation with the aim of supporting physician negotiation structures. A lack of interest from physicians—as many at the time were private sector employees—led to the AMA no longer sponsoring the endeavor, but today, interest in unionization is growing among physicians and graduate medical education trainees. Most physicians are now employees and, as a result, feel a lack of control over their careers and personal finances. Since 1999, approximately 5.7% of the physicians have participated in union-related organizations. In 2022, it was reported that just under 1 in 10 physicians are now union members. Studies have demonstrated that union membership is associated with better wages, benefits, and equitable compensation across races.

The largest medical house staff union, the Committee of Interns and Residents (CIR), currently supports approximately 15% of unionized house staff across the country. Additional options include joining local unions or those that support health care professionals in general. Dues are often paid to unions with the potential for various levels of involvement and advocacy within a union. In 1999, the National Labor Relations Board stated that medical residents were employees, as well as students. If a hospital denies the vote of union involvement, it comes to a formal vote from the GME's trainee body. If interest is great among trainees, efforts must be respected. Collective efforts to improve the workforce and create unified fronts are ultimately the objectives of union organizations. Providing alternative benefits, such as insurance options, student loan consolidation options, licensing and certification support, work contact review, and improving leave options, are additional benefits of joining union labor organizations.

Over the last several years, collective groups of trainees have sought action to advocate for improved pay and benefits, such as an increase in vacation time or holiday pay. According to a study published in 2021, unionized surgical residents have improved vacation benefits Other physician-resident unions have fought for certain benefits and have won. For example, pregnant residents of the University of Washington fought to refuse 24-hour shifts and won. In 2023, in NYC, an almost weeklong strike occurred, as residents demanded equal pay. Another instance in two neighboring hospital centers, over 300 physicians, demanded improved pay and additional pay for extra shifts. A strike was averted as a deal was reached between the union, supporting these physicians and hospital centers.

These organized events have spread across news circuits nationwide and exemplify what collective labor organizations can achieve. However, resident unionization is not without the potential risks to those involved. Some fear that joining a union may hinder the relationship between the trainees and those that employ them, creating a divide in their work relationship. Others fear the possibility of strike, which could have major ramifications for the hospital's trainee staff. In 2023, the threat of a strike in Los Angeles County hospitals was averted by an agreement of contracts.

The potential of collective bargaining is high, as exemplified by many negotiating for more equitable and fair salaries and benefits, but ultimately improving work conditions should be a strong consideration for those interested in joining unions. Residents interested in joining unions should strive for an improved educational environment that supports their professional growth. The CIR has advocated for the support of their membership for safe and sustainable resident workloads, encouraging the ACGME to redesign the clinical training environment as it relates to enhancing work hours, instead of limiting duty hours.

Over time, physicians have transitioned from being primarily independent business owners to employees of larger organizations. With this, the outright conditions of work become less at the hands of physicians, and more in the control of those elsewhere in the organization. Residents and other trainees are seeing this dynamic and desperate loss of autonomy in the workplace. As the NRLA states, residents, although labeled as students, are still employees of the organization they work within. With rising costs of living and a non-competing growth of fair wages and benefits, trainees may start to see the benefit of collective organizing.

As physicians, it is important that we feel satisfied and accomplished in our work, and part of that is feeling appreciated by our place of employment. Trainees dedicate a significant amount of time to learning their craft and make many sacrifices along the way to learn their specialty of choice. Feeling adequately compensated has positive ramifications that include stronger work performance.

Union points of view aim to benefit the most but may not benefit the whole. Most graduate medical institution staff are non-surgical residents. Neurosurgical residents must be aware of the collective efforts around them and be willing to advocate their interests. Physician trainee organizing groups must be mindful of the possibilities that exist to create an optimal work environment that honors education and physician well-being. Collectivism must strengthen the educational environment while balancing work life and well-being.

There is likely to be a growth of unionization among residency programs given the points described, but resident members should always be mindful of their efforts to optimize work conditions that support their well-being and foster an environment that strengthens their education and training. It is crucial that at a given institution, the resident is aware of the institutional policies on union membership, the benefits of their nearby union, and union leadership. These components may have substantial implications for their work-life circumstances.

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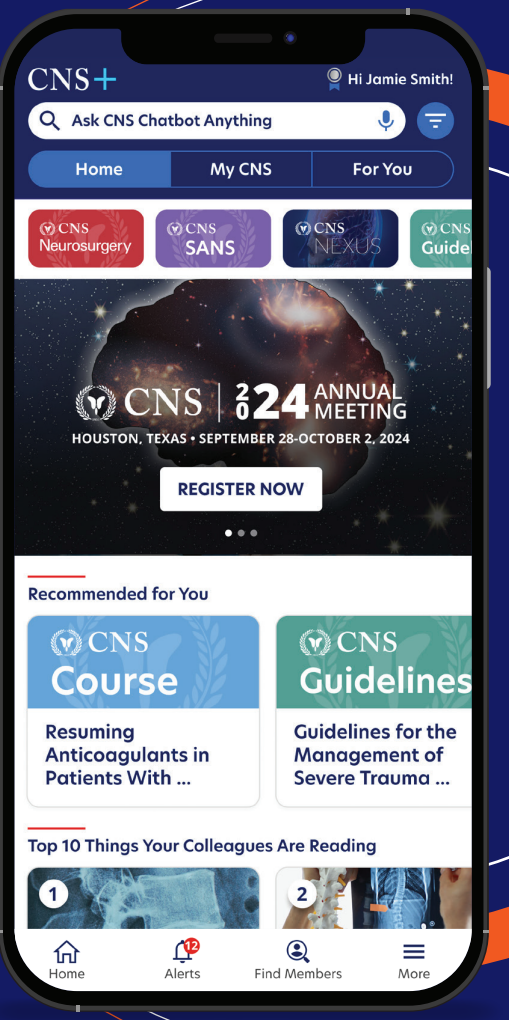

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A. Karim Ahmed, MD Debraj Mukherjee, MD

Striving for an Equitable Outcome: Avoiding Bias in the Residency Match and Training

The equitable, proficient, and rigorous training of medical students and resident trainees is of paramount importance to any academic neurosurgical program. As a field, neurosurgery prides itself on selecting the very best applicants with a heavy focus on research, technical training, anatomic mastery, nuanced decision-making, and caring for some of the most critical patients. However, particularly with recent changes to medical education and standardized testing, an unbiased assessment of applicants has become an onerous challenge. Additionally, the application and interview process may bring a significant financial burden upon certain applicants. Finally, once in residency, trainees may receive feedback in various forms and timepoints, setting the stage for standardized mechanisms and concrete milestones. This review aims to shed light on modern aspects of neurosurgical selection and training, with an emphasis on equitable, unbiased selection and the support of content and technical mastery.

Neurosurgical residents ranging from PGY1-7 receiving hands-on training in the operating room.

Standardizing The Application

Interestingly, neurosurgical residency selection is among the few competitive industries where blinded interviews do not routinely occur. Although complete blinding of applicants by faculty members and selection committees may obviate a holistic understanding of an applicant's unique personal background and skillset, partial blinding has been preliminarily attempted in other medical specialty selections with success. In a recent study of urology residency applicants where faculty members had semi-blinded access to a standardized limited portion of application materials, an impressive 80% of the faculty responded in the post-interview questionnaire that the blinded interview ensured they focus more on the applicant during the interview than they would have otherwise.[1] In a national survey of plastic surgery program directors, letters of recommendations, clerkship and medical school grades, and chosen letter writers were determined to be the most important academic factors in choosing residents.[2] However, sub-internship performance, maturity level, and performance during the interview were the three most important non-academic factors in residency selection. With an emphasis on an unbiased review, the standardization of residency interview questions ensures an objective assessment of each applicant's unique thought process, interpersonal skills, and critical decision making. Questions during an interview may be further characterized and classified into the domains of maturity, conflict resolution, social skills, and critical thinking in order to improve further interobserver reliability among different interviewers and applicants with vastly different backgrounds.

Traditionally, the interview process for applicants has come at an exorbitant personal cost, disadvantaging and deterring many potential trainees. A study of 121 neurosurgery applicants from the 2019-2020 Texas STAR Dashboard database determined a mean total cost of the application process to be $11,882; including mean application costs of $1,711, away rotation costs of $3,840, and interview costs of $6,400.[3] Applicants may now signal up to 25 neurosurgery programs of interest, likely functioning as a "soft cap" on number of applications while aiming to level the playing field and minimize unfair advantage based upon personal means. To address the inordinate costs of classic Electronic Residency Application Service® (ERAS) applications and to promote equity among plastic surgery applicants, the Central Application portal was designed by program directors, residents, and medical students. This application portal costs $100 per applicant regardless of the number of programs applied to, with similar signaling options to those in ERAS. Such an approach appears to be a viable alternative in neurosurgery, with success via this portal already demonstrated in a similarly competitive specialty, where applicants are often required to apply to several programs in order to secure a successful match.

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Mastery of Content

Neurosurgical trainees are charged with caring for medically and surgically complex patients, many of whom are critically ill and require a detailed understanding of pathophysiology and anatomy. Several required educational programs exist for neurosurgical trainees, including the Society of Neurological Surgeons (SNS) Intern Bootcamp, the American Board of Neurological Surgeons (ABNS) Primary Written Exam, and the ABNS Neuroanatomy Exam. Newest among them, the ABNS Neuroanatomy Exam highlights the essential need for mastery in the anatomic knowledge of the brain, spine, and peripheral nerves. Divided into five sections of 100 questions, the ABNS Neuroanatomy Exam requires a minimum passing score of 90% with immediate feedback after each question, up to four attempts to pass the exam, and with Program Directors notified of trainees failing to master this exam. This paradigm shift, from simply passing a required exam prior to chief residency toward true mastery of content, is imperative in the adequate training of neurosurgical residents. The ABNS Primary Exam may similarly shift in focus from a passing requirement to true content mastery with a stricter passing score and greater emphasis on required preparatory courses and content. Containing 375 questions across basic science, critical care, clinical skills, neuroimaging, anatomy, neurobiology, neurology, pharmacology, neurosurgery, and pathology, the Primary Exam consists of key fundamental knowledge required for proficient clinical performance of any neurosurgical trainee. Furthermore, stricter passing requirements and fewer allowed attempts would ensure greater attention to studying and preparation early in training, hopefully with a positive impact on clinical performance, particularly for junior trainees.

Throughout their seven years of training, neurosurgical residents are required to only pass the two ABNS examinations, with the remainder of responsibility placed on the home institution for guiding educational experiences. In an effort to standardize essential education, a program for continuing medical education throughout a resident's training would be of great value. Neurosurgical trainees are a self-motivated group, though with vastly differing institutional practice patterns and subspecialties represented throughout the country. A trainee in the modern era should have proficiency in understanding recent technological advances, core neurosurgical concepts, complex surgical approaches, novel therapeutics, and the wide breadth of treatment and surgical options afforded to our patients regardless of their home institution or geographic region of training.

Clear Milestones and Transparent Feedback

In an interesting prospective cohort study of teaching quality among 41 neurosurgical faculty, the System for Evaluation of Teaching Qualities (SETQ) instrument was employed at a single institution and given to residents every six months to complete.[4] Notably, when comparing three years prior to and three years following SETQ implementation, the authors found a significant improvement in not only ACGME program survey results, but also ABNS Primary Exam scores. Implementation of this program served to guide curricular changes, resulting in improved educational experiences for neurosurgical trainees, with regular feedback representing the strongest correlation to academic performance. This seminal work underscores the incredible value of transparent, standardized, and regular feedback during neurosurgical training. Transparent feedback and iterative curricular changes also open the door for clear and standardized milestones for residents. This may include guided milestones across surgical technique, academic productivity, and educational knowledge at regular intervals throughout training to facilitate holistic guidance to trainees and ensure the ongoing development of high quality neurosurgeons.

Neurosurgery sub-intern boot camp with sawbone models.

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Mara M. Hoffert, PhD Andrea Williams

Navigating the Neurosurgery Journey: From Struggling Learner to Leader

Last year, a graduating neurosurgeon shared a profound story about his time as an intern. He recalled being advised that if he felt the urge to quit at least once a week, it meant he was on the right track. There is no doubt that neurosurgical residency is demanding, akin to drinking from a fire hose, and trainees face immense pressure to excel in both the academic and surgical spheres. While it is natural for residents to struggle to some extent, the real concern arises when a learner struggles significantly. Neurosurgical residents are among the brightest, most determined, and competitive trainees in the medical field. However, despite their exceptional abilities, programs occasionally face the challenge of guiding struggling learners to successful graduation.

The intricate nature of neurosurgical procedures demands unwavering precision and confidence, making it challenging for residents to bounce back from setbacks. Supporting struggling neurosurgery trainees is critical to cultivate a competent and compassionate surgical workforce. When aspiring neurosurgeons face challenges, it is crucial to offer tailored support that addresses their specific needs. To effectively support struggling neurosurgical residents, medical educators can incorporate the following key components: Identify specific challenges and develop personalized action plans; Establish robust mentorship and guidance; provide support for emotional well-being; and follow-up and follow-through with the trainee. Sustaining a balance of these elements while upholding the rigorous standards of neurosurgical training enables struggling residents to surmount challenges and achieve success in their careers.

Identify specific challenges and develop personalized action plans

When a trainee is struggling, it can be particularly challenging to identify the underlying factors. However, it is crucial as it allows for targeted interventions and personalized support. When specific issues are pinpointed, medical educators can effectively address root causes, leading to more tailored solutions and enhanced learning and performance outcomes. This process begins by engaging in open dialogue with the struggling learner, which fosters a supportive and nonjudgmental environment. It is beneficial to identify a trusted faculty member—preferably someone who already has a relationship with the trainee—to facilitate these conversations. Once specific challenges are identified, a personalized action plan for improvement can include resources, such as guiding trainees through targeted learning activities, mentorship opportunities, and support networks. The plan should outline clear goals, timelines, actionable steps to enhance performance, and metrics for measuring growth. It should further incorporate effective study habits, such as a study schedule, active learning techniques, and other resources. A personalized action plan with clear, achievable goals enhances learning effectiveness and boosts confidence and motivation. Investing time upfront to work one-on-one with a struggling learner allows for timely identification and resolution of challenges and saves significant time down the line.

Establish robust mentorship and guidance

Ongoing mentorship and expert guidance is foundational to supporting struggling neurosurgical residents. Effective mentors bring knowledge, technical expertise, and the wisdom gained from personal experiences. In the case of a struggling learner, mentorship should begin with collaboratively crafting a personalized action plan, drawing from insights gleaned through shared medical education journeys. For residents concerned with medical knowledge, mentors provide actionable strategies, effective study methods, time management, and exam strategies tailored to individual needs. Mentorship continues through regular meetings to monitor progress and uphold a collaborative approach, reinforcing the mentor's belief in the resident's potential and the resident's accountability for their success. Consistent meetings provide a less-threatening forum for feedback and conversations that foster reflection on successes and setbacks that can guide future goals for the trainee. Mentors may direct residents to valuable resources such as textbooks, online courses, and specialized training programs within their institution, enriching both academic understanding and surgical proficiency.

Peers also play a pivotal role by offering diverse perspectives and practical advice. Mentors may encourage a struggling learner to connect with a peer for additional support, which promotes a collaborative environment for trainees. Resident colleagues may share study materials, exchange surgical tips, provide coping

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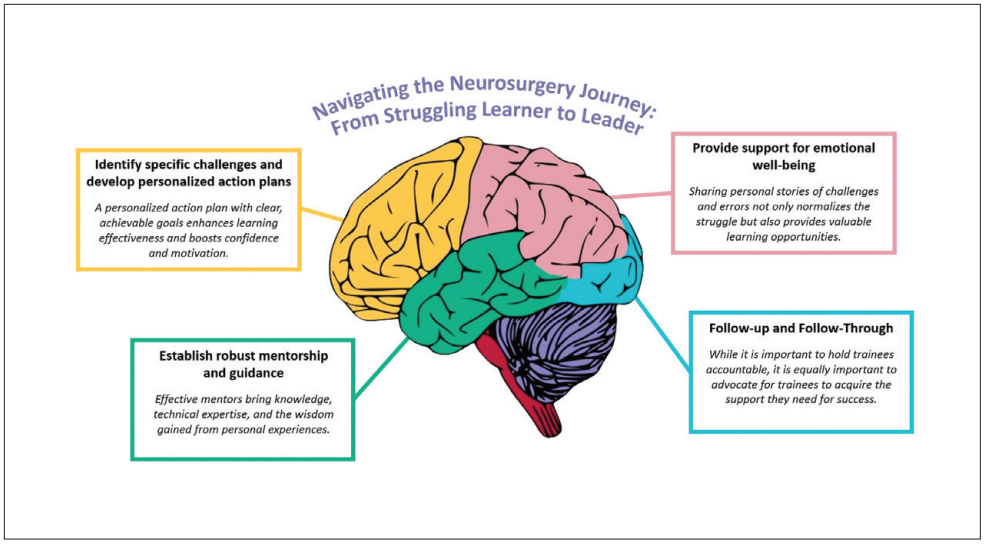

strategies for managing stress, and serve as accountability partners. This culture of mutual support and encouragement enhances learning and supports emotional well-being, creating a resilient community of shared success and growth.

Provide support for emotional well-being

Neurosurgeons endure one of the most rigorous and prolonged residencies in medicine, accompanied by considerable stress throughout their training. Faculty who acknowledge and validate the intense pressures inherent in neurosurgery, help alleviate trainees' feelings of isolation. Sharing personal stories of challenges and errors not only normalizes the struggle but also provides valuable learning opportunities. Faculty can further support residents by showing genuine empathy and promoting self-care practices, including strategies for nutrition, managing fatigue, and optimizing time efficiency. Program leadership must be well-informed about local and national resources to effectively guide trainees to services such as counseling and peer support groups.

Acknowledging and celebrating achievements is another powerful way to nurture emotional well-being. Not only does recognition boost morale, it also reinforces positive behaviors, validates hard work, and fosters a sense of belonging and motivation. For Millennials and Gen Zers, who often seek purpose and fulfillment in their work, meaningful recognition can contribute significantly to their engagement and overall well-being. Even small successes provide positive reinforcement and enhance motivation and confidence. Celebrating these accomplishments affirms progress and demonstrates the tangible results of dedication and hard work. Fostering a culture of recognition and encouragement significantly increases a struggling learner's ability to overcome challenges and achieve their full potential.

Follow-up and Follow-through

While it is important to hold trainees accountable, it is equally important to advocate for trainees to acquire the support they need for success. Programs can help learners gain access to necessary academic support services, skill enhancement workshops, and counseling as appropriate. Advocacy demonstrates a belief in learners' abilities and potential, thus validating efforts and empowering trainees to seek assistance without stigma. This aids trainees academically and underscores a program's commitment to their residents.

During this journey, it is key to connect with others. Reach out to your local GME, neighboring hospital systems, and colleagues nationally. Creating a collaborative network greatly bolsters perseverance in support of struggling learners and provides a platform for sharing best practices and innovative ideas, while also creating a robust support system for your work with struggling learners. Leveraging this network can help you gain valuable insights and perspectives to inspire new strategies and interventions to help residents move from struggling learner to successful graduate.

Developing the Neurosurgeons of the Future

Neurosurgery is a demanding field that requires a diverse set of skills beyond technical proficiency. Neurosurgeons must master critical thinking, effective communication, emotional resilience, ethical integrity, and leadership skills. Medical educators play a pivotal role in guiding future neurosurgeons, especially those who are struggling. By identifying specific challenges, creating personalized action plans, establishing robust mentorship, supporting emotional well-being, and following-up with trainees, today's neurosurgeons can ensure that every resident receives the support and guidance they need to succeed. As our graduate stated, neurosurgery trainees may still "face weekly challenges that make them think about quitting," but with unwavering support and perseverance, they will triumph and reach graduation.

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"Go over your own cases with as many (senior) people as possible. That way, you'll be ready for any question that might be asked of you." – Khoi Than, MD

"Nothing beats practice 1-on-1 sessions with colleagues. Those who know you well are not afraid to grill you hard and the feeling the pressure in practice is the best preparation for the real thing. Thanks to all those who grilled me!" #ABNS #oralboards @MonteNeurosg – Neil Haranhalli, MD MSc

"For me, the best things were practicing mock oral boards with other neurosurgeons and taking the Goodman course." – Richard Rammo, MD

"What I found most beneficial was, after reviewing my potential cases, consulting with multiple neurosurgeons to gather their insights and questions, particularly those outside my subspecialty." – Sanjeet S. Grewal, MD

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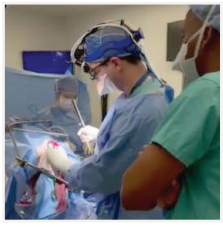

International Philanthropy: Fostering Global Connections Under the leadership of committee Chair Sarah Woodrow, international philanthropy plays a crucial role in the work of the CNS Foundation. Through Observerships and Visitorships ranging from a few weeks to six months, the Foundation invites international neurosurgeons to attend intensive, mentored learning opportunities at renowned American medical institutions. With these awards the recipients have a unique opportunity to gain new knowledge and skills that they will then share with their colleagues when they return home, enhancing patient care in their communities. These Observerships and Visitorships foster a global connection and lifelong mentorship with their neurosurgery counterparts in the US. In addition to the many opportunities within the areas of spine, tumor, trauma, CV and general neurosurgery that have been offered the past few years, the CNS Foundation has three new International Observerships in Endovascular through Beth Israel Deaconess / Harvard Medical School, University of California, Davis, and University of Utah Health that will be offered as part of the 2025 program.

"I believe that this initiative has immense value for young neurosurgeons from low-middle income countries where it is very hard to find funding for education and research purposes abroad. Personally, it was a privilege for me to be able to observe first-hand how the brain tumor division of the University of Miami manages to combine efficiency and excellence in medical care. I am certain this experience will have a significant impact in my future practice as a neurosurgeon and hope it will do the same for many others in the future."

– Guido Caffaratti, Argentina
International Tumor Observership (2023 Winner)
Mentored by Ricardo Komotar, University of Miami

"Having a spine observership at Duke University is exceptional to neurosurgeons of Indonesia. The barriers, e.g. access and cost, make it challenging. With the help from the CNS Foundation, I could get the opportunity to join the observership. As an aspiring spine surgeon, this program will surely enhance my knowledge and skills. Not only will it be beneficial for my career, this observership will also bring goodness to Indonesian people at large. I am a proud awardee and very thankful for CNS Foundation"

– Yunus Kuntawi Aji, Indonesia
International Spine Observership (2023 Winner)
Mentored by Khoi Than, Duke University

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The CNS Foundation appreciates and recognizes our donors for their donations that go toward supporting programs that make a positive impact on the specialty. As part of their contributions, CNS Foundation donors are recognized through both the CNS Foundation's Lifetime Giving Circle as well as our Annual Donor Levels. Join your peers as part of this philanthropic cohort by donating today!

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INSIDE THE CNS

Washington Committee Report

Russell R. Lonser, MD
Chair, Washington Committee

Charlotte Pineda, MPP
Vice President of Health Policy and Advocacy

Charlotte Pineda Named CNS/AANS Vice President of Health Policy and Advocacy

On July 1, the Congress of Neurological Surgeons (CNS) and the American Association of Neurological Surgeons (AANS) issued a press release announcing the appointment of **Charlotte Pineda** as CNS/AANS VP of health policy and advocacy. Following the press release, *The Hill*, *Politico* and *Becker's Spine* announced Ms. Pineda's new position. Ms. Pineda previously worked as health policy director for Sen. **Roger Marshall**, MD, (R-Kan.) and is succeeding **Katie O. Orrico**, JD. in her new role. With a track record of bipartisan collaboration, Ms. Pineda has helped advance legislation critical to neurosurgery, including streamlining prior authorization, improving the Medicare physician payment system, expanding value-based care, medical liability reform, promoting health care competition and increasing the physician workforce.

"The AANS and CNS have been at the forefront in advancing legislative and regulatory policies not only for neurosurgeons but also alongside their partners and coalitions across the health care stakeholder community," said Ms. Pineda. "Medicine is at a unique crossroads at this point in time, facing myriad challenges. I am incredibly honored to lead this talented team in developing and advancing durable policy solutions that help improve patient care."

Prior Authorization Reform Legislation Introduced in Congress

On June 12, Sens. **Roger Marshall**, MD, (R-Kan.); **Kyrsten Sinema** (I-Ariz.); **John Thune** (R-S.D.) and **Sherrod Brown** (D-Ohio) and Reps. **Mike Kelly** (R-Pa.), **Suzan DelBene** (D-Wash.), **Ami Bera**, MD, (D-Calif.) and **Larry Bucshon**, MD, (R-Ind.) introduced the Improving Seniors' Timely Access to Care Act (S.4532/H.R. 8702). This bipartisan bill would codify and enhance elements of the Advancing Interoperability and Improving Prior Authorization processes rule that was finalized by the Centers for Medicare & Medicaid Services (CMS) earlier this year. Specifically, the legislation would:

- Establish an electronic prior authorization (e-PA) process for Medicare Advantage (MA) plans;
- Increase transparency around MA prior authorization requirements and their use;
- Provide a pathway for CMS to institute real-time decisions for routinely approved medical services;
- Clarify CMS' authority to establish timeframes for e-PA requests; and
- Require several reports to Congress on program integrity efforts and other ways to improve the e-PA process.

In announcing the introduction of the legislation, Sen. Marshall issued a press release featuring the Regulatory Relief Coalition's (RRC) support. The CNS and the AANS issued a press release lauding the legislation. Subsequently, *Becker's Spine Review* published an article quoting **Russell R. Lonser**, MD, chair of the department of neurosurgery at The Ohio State University and chair of the Washington Committee. *Policy & Medicine* also published an article on the topic, quoting Dr. Lonser, "The widespread overuse of prior authorization, especially in Medicare Advantage, has led to unacceptable delays and denials of essential medical treatments. We are optimistic that this will be the year Congress acts to safeguard timely care for our seniors."

The legislation is supported by nearly 450 national and state organizations representing patients, physicians, MA plans, hospitals, and other key stakeholders in the health care industry. Support continues to grow.

Neurosurgery Supports Gun Violence Prevention Research Funding

On June 3, the CNS, the AANS, the Section on Neurotrauma & Critical Care and the Section on Pediatric Neurological Surgery joined over 430 organizations on a letter to the House and Senate Appropriations Committees urging the inclusion of increased funding for public health research into firearm morbidity and mortality prevention. Specifically, the letter requested $35 million for the Centers for Disease Control and Prevention (CDC), $25 million for the National Institutes of Health (NIH), and $1 million for the National Institute of Justice (NIJ) to conduct this crucial funding. Congress provided $12.5 million for the CDC and $12.5 million for NIH in Fiscal Year (FY) 2024 and the letter hoped to encourage the Appropriations Committees to sustain and build on this funding for FY 2025. Unfortunately, the House Appropriations Committee did not provide any FY 2025 funding.

CNS and AANS Continue to Advocate for Medicare Payment Reforms

On May 17, Senate Finance Committee Chair **Ron Wyden** (D-Ore.) and Ranking

Member **Mike Crapo** (R-Idaho) released the "Bolstering Chronic Care through Physician Payment: Current Challenges and Policy Options in Medicare Part B" white paper. On June 14, the CNS and the AANS joined the Alliance of Specialty Medicine in sending a comment letter with recommendations for stabilizing and improving Medicare physician reimbursement and performance programs through legislative reforms. The CNS and the AANS also join the Surgical Coalition in sending a comment letter expressing enthusiastic support for the committee's efforts and offering principles for consideration.

Click here to read the Alliance of Specialty Medicine letter and here to read the Surgical Coalition letter.

Neurosurgery Supports Increased Funding for BRAIN Initiative in FY 2025

On June 17, the CNS and the AANS sent letters were sent to both the House and Senate Appropriations Committees urging the members to provide a significant increase in FY 2025 funding for The Brain Research Through Advancing Innovative Neurotechnologies® (BRAIN) Initiative. The FY 2024 appropriations legislation slashed the funding for the BRAIN Initiative by 41 percent, from $680 million in FY 2023 to $402 million in FY 2024. This amount represents a massive blow to dedicated neurosurgeons.

While the House Appropriations Committee approved report acknowledges that the "BRAIN initiative is an ambitious program to develop and apply new tools and technologies to answer fundamental questions about the brain and ultimately to inspire new treatments for brain diseases," it does not provide a specific FY 2025 funding amount within the proposed new National Institute on Neuroscience and Brain Research.

CMS Releases 2025 Medicare Physician Fee Schedule Proposed Rule

On July 10, CMS released the calendar year (CY) 2025 Medicare Physician Fee Schedule (MPFS) proposed rule. CMS proposes **a CY 2025 conversion factor of $32.3562**, down approximately 2.8% from the CY 2024 conversion factor of $33.2875. This is due to the expiration of the 2024 2.93% bump provided by Congress, plus a *positive* budget neutrality adjustment of 0.05% triggered by CY 2025 policies. As part of the proposals, CMS is addressing its global surgical payment policy by emphasizing the use of transfer of care modifiers and requiring modifiers for follow-up care provided by a practitioner other than the operating surgeon. Overall, CMS estimates that the policy recommendations in the proposed rule will not have a significant financial impact on the specialty of neurosurgery.

For additional details, see:

- CY 2025 MPFS Proposed Rule
- CMS Press Release
- CMS CY 2025 MPFS Fact Sheet
- CMS Rx Drug Inflation Rebate Program Fact Sheet

A few initial highlights of payment issues of interest to neurosurgeons are below:

- **Global Surgical Modifiers**. CMS is proposing to broaden the use of the transfer of care modifiers for global packages and require the use of the existing modifiers (-54, -55, and -56) for all 90-day global surgical packages in any case when a practitioner (or another practitioner from the same group practice) expects to furnish only a portion of a global package (including but not limited to when there is a formal, documented transfer of care as under current policy, or an informal, non-documented but expected, transfer of care.) CMS also proposes a new E/M add-on code for use by practitioners who did not perform the procedure (i.e., did not bill the global code) but did provide post-procedure care.
- **Updated Code Values for New/Revised Services**. CMS did not accept the RUC-passed work relative value (RVW) of 18.95 for the new Cat. I code for MRI-guided focused ultrasound (MRgFUS) and have proposed a lower RVW of 16.60. The CNS and the AANS will object to this reduction in our comments, in comments from the RUC and other partners and a meeting with CMS.
- **Practice Expense (PE).** CMS acknowledges the ongoing American Medical Association Physician Practice Information Survey and has contracted with the RAND Corporation to develop other methods for measuring and updating PE.
- **Quality Payment Program (QPP)**
  - CMS continues to expand upon the Merit-Based Incentive Payment System (MIPS) Value Pathway (MVP) framework by proposing new MVPs—including a problematic Surgical Care MVP that combines measures related to spine surgery, thoracic surgery, and general surgery—and seeks feedback on potentially sunsetting traditional MIPS and fully transitioning to MVPs in 2029.
  - CMS proposes to revise MIPS scoring methodologies to allow for more successful participation among clinicians reporting specific high-performing quality measures subject to a scoring cap and to enhance cost measure scores, which have traditionally been lower than quality measures scores.
  - CMS proposes to maintain the 75-point MIPS performance threshold, which is the minimum number of points needed to avoid a penalty, recognizing the need for consistency and additional time for more recent data not impacted by the COVID-19 pandemic to become available.

- Qualifying Participants (QPs) in Advanced Alternative Payment Models (APMs) will continue to be exempt from MIPS. While QPs will receive a 1.88% APM incentive payment in 2026 (based on eligibility in 2024), QPs will no longer be eligible for an APM incentive payment starting next year. Per statute, starting in 2026, CMS will apply two separate PFS conversion factor updates—one for QPs (0.75%) and one for all non-QP eligible clinicians, including MIPS participants (0.25%). Also, beginning next year, the Medicare payment and patient count thresholds to qualify as a QP will increase under statute, making it more challenging for clinicians to qualify for this track of the QPP. The CNS and AANS are working with Congress to extend the APM incentive and freeze eligibility thresholds at their current level.

CMS Releases CY 2025 Medicare Hospital OPPS and ASC Proposed Rule

On July 10, CMS released the proposed rule for the calendar year (CY) 2025 Hospital Outpatient and Prospective Payment System (OPPS) and Ambulatory Surgery Center (ACS) Payment System. CMS proposes to update hospital outpatient payments by 2.6%.

- A link to the proposed rule is available here.
- A CMS OPPS/ASC press release is available here.
- A CMS OPPS/ASC CMS fact sheet is available here.

Washington Office staff will be preparing a list of issues of interest to neurosurgeons and helping to draft letters for review by leadership. Initial issues of interest include:

- **Separate Payment for Non-opioid Pain Treatment**. CMS is proposing to implement a provision of the Consolidated Appropriations Act (CAA) of 2023, which provides temporary additional payments for certain non-opioid treatments for pain relief in the hospital outpatient department (HOPD) and ASC settings from January 1, 2025, through December 31, 2027. They have identified seven drugs and one device (the Elastomeric infusion pump, non-opioid pain management delivery system, including catheter and other system components) as qualifying non-opioid treatments to be paid separately in both the HOPD and ASC settings. The CNS and the AANS have supported separate payments for non-opioid products, especially for devices.
- **Hospital Outpatient Quality Reporting (OQR) Program**. CMS proposes to remove the following two measures from the program beginning with the CY 2025 reporting period/CY 2027 payment determination due to a determination that performance on the measures is not tied to better patient outcomes:
  - MRI Lumbar Spine for Low Back Pain measure
  - Cardiac Imaging for Preoperative Risk Assessment for Non-Cardiac, Low-Risk Surgery measure

HHS Finalizes Information Blocking Disincentives

In late June, CMS, along with the Office of the National Coordinator for Health Information Technology (ONC), finalized regulations that establish disincentives for certain health care providers that have committed information blocking. Information blocking, as defined earlier through the 21st Century Cures Act (Cures Act) and subsequent regulation, is a practice that is likely to interfere with the access, exchange, or use of electronic health information (EHI), except as required by law or specified in an information blocking exception. The Cures Act authorizes two separate enforcement mechanisms, depending on the "actor." Health IT developers and health information exchanges/networks (HIEs/HINs) determined to have committed information blocking are subject to civil money penalties (CMPs) of up to $1 million per violation. Health care providers, on the other hand, will be subject to appropriate disincentives, which were finalized in this lates regulation.

The final regulation ties provider disincentives to three CMS programs:

- The Medicare Promoting Interoperability Program, which impacts Medicare payments to hospitals;
- The Merit-Based Incentive Payment System (MIPS), which impacts Medicare payments to clinicians; and
- The Medicare Shared Savings Program, which impacts Medicare payments earned through Accountable Care Organizations (ACOs).

CMS acknowledges that these disincentives would not cover all health care providers that might commit information blocking and expects to propose additional disincentives in the future.

Although the information blocking prohibition has been in effect since 2021, the government will not begin investigating health care providers or making determinations about their conduct until after July 31.

More information about information blocking and provider disincentives can be found here.

Neurosurgeons Featured in Wall Street Journal Op-Ed on Insurer-Driven Diagnoses in Medicare Advantage

On July 17, the *Wall Street Journal* published an op-ed tilted, "The Games Insurers Play With Your Diagnosis." Neurosurgeons **Luis M. Tumialán**, MD and **Mark A. Pacult**, MD comment on the rise of spurious insurer-driven diagnoses in Medicare Advantage. "The exploitation of patients and their diagnoses by insurers goes largely unchecked. Practices to undermine care to boost insurer profits at the expense of patients and physicians are widespread," state Drs. Tumialán and Pacult. "As independently practicing neurosurgeons, we have documented similar abuses by insurance companies."

IMAGES IN NEUROSURGERY

Connectomics Imaging in Neurosurgery: Visualizing Structural and Functional Connectivity

In a recent case, we utilized advanced connectomics imaging to enhance the surgical approach to a glioblastoma (GBM) located in Broca's region of the left frontal lobe. Connectomics imaging (Quicktome, Omniscient Neurotechnologies, Sydney Australia), which maps the brain's structural connectivity, was used to identify a safe entry zone for tumor resection. Preoperative structural connectivity analyses demonstrated that area 45 was immediately anterior to the tumor's location and had intact fiber tracts extending medially and around the inner enhancing capsule to the posterior inferior parietal and posterior temporal language areas (**Figure 1**). This detailed visualization allowed us to plan a surgical pathway that minimized the risk of damaging vital language pathways.

In addition to structural mapping, we employed resting-state functional MRI (rs-fMRI) to assess the functional connectivity of brain areas adjacent to the tumor. Functional connectivity imaging demonstrated that when a seed was placed in area 44, there was limited connectivity to regions primarily adjacent to 44, including areas 6r, 43, and FOP4 (**Figure 2**). However, when the seed was placed in area 45, there was significantly more connectivity, with the highest correlations to area 9a, area 55b, area Pf, STSdp, and TE1p (**Figure 3**). This suggested that the patient was left-dominant and that area 45 was primarily contributing to language function.

The integration of connectomics imaging into the preoperative planning phase may offer important insights into preserving critical language functions. By identifying and preserving key areas of functional connectivity, we ensured that the patient's language abilities remained intact postoperatively. This imaging helped identify area 45 and its visualized white matter tracts deep to the tumor boundary as critical to preserving the patient's language function. This case demonstrates the potential of connectomics imaging in neurosurgery to offer additional sophisticated methods to improve the precision and safety of procedures within eloquent regions.

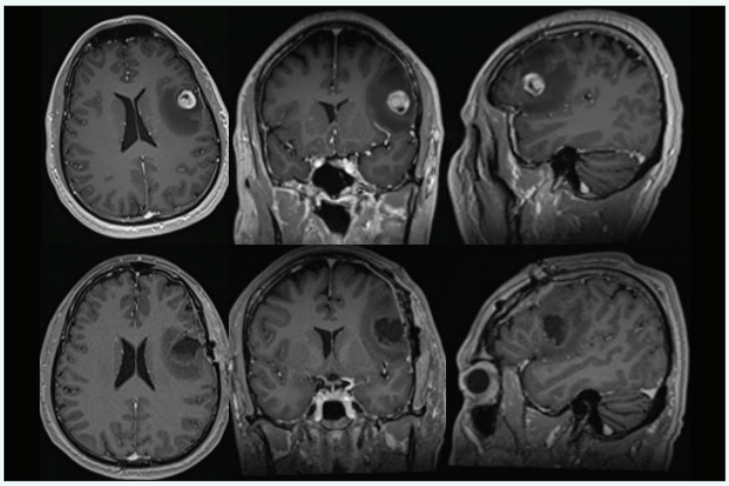

Figure 1: Pre and post-operative contrast-enhanced MRI demonstrating an enhancing lesion within the left frontal lobe with surrounding edema.

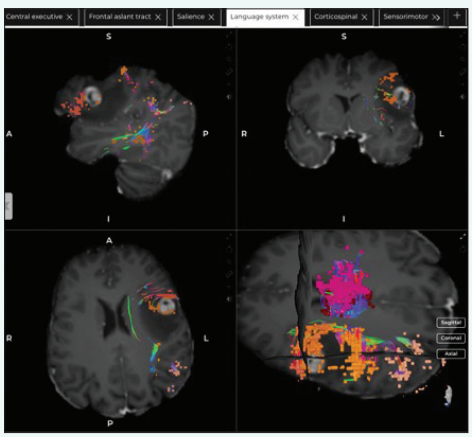

Figure 2: Preoperative structural connectivity map demonstrating the language system's fiber tracts around the tumor in the left frontal lobe. Intact fiber tracts extend medially and around the inner enhancing capsule to the posterior inferior parietal and posterior temporal language areas.

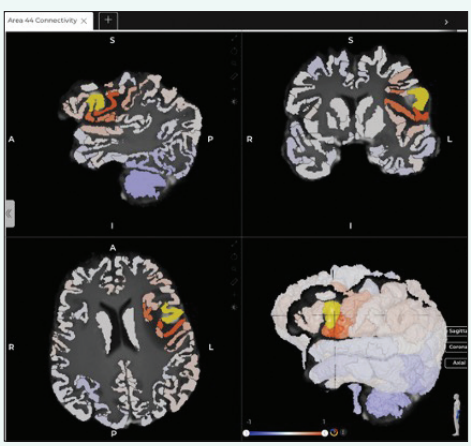

Figure 3: Functional connectivity map with a seed placed in area 44, showing limited connectivity primarily to adjacent regions, including areas 6r, 43, and FOP4. Correlation coefficients range from -1 to 1, with more orange areas indicating higher correlation.

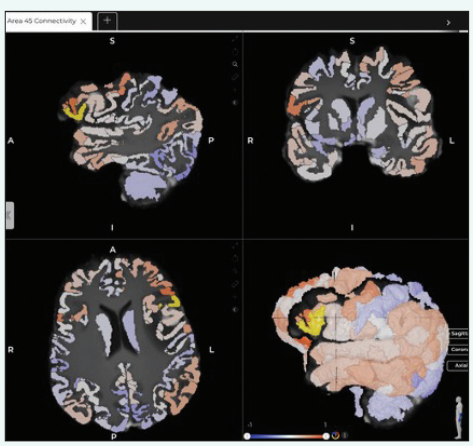

Figure 4: Functional connectivity map with a seed placed in area 45, demonstrating extensive connectivity with the language system. Highest correlations are observed with areas 9a, 55b, Pf, STSdp, and TE1p, indicating intact network connectivity crucial for language function preservation.

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