Assessing the state of LGBTQ+ diversity and inclusion in neurosurgery

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OBJECTIVE The aim of this study was to assess the diversity of neurosurgeons in terms of lesbian, gay, bisexual, transgender, and/or queer (LGBTQ+) gender and sexual minority status using the Graduation Questionnaire (GQ) as the single nationalized source of LGBTQ+ identification. Additionally, inclusivity was assessed through interviews by residents and attendings in the field.

METHODS First, a PRISMA literature review was conducted and independently reviewed by two authors on studies involving LGBTQ+ representation in neurosurgery from PubMed, Web of Science, and Google Scholar. Then, aggregate responses of 16,901 participants' sexual and gender identities from the GQ administered between 2016 and 2022 were compiled. To statistically analyze the response frequencies, the authors performed a chi-square analysis. Finally, interviews were conducted with individuals who identify as LGBTQ+ and are currently neurosurgical residents or attendings. Direct invitations were extended to participate in interviews, and all participants gave informed consent prior to the interview. Interviews were conducted using standardized questions and were video recorded.

RESULTS Two studies were identified by literature review that referenced the LGBTQ+ community in neurosurgery. A GQ chi-square analysis comparing neurosurgical with nonneurosurgical LGBTQ+ identification proved statistically insignificant (p = 0.65). More broad analysis of majority sexual and gender identification (heterosexual and cisgendered) compared with the total gender and sexual minority group also proved statistically insignificant (p = 0.32) in response frequency. Five interviews, including 4 residents and 1 attending, provided several overarching themes including self-identification as an invisible minority, self-limiting behavior to ensure inclusion, and LGBTQ+ status as a direct departure from the stereotypical neurosurgeon.

CONCLUSIONS Results from the GQ analysis indicate that neurosurgery is achieving LGBTQ+ diversity of its incoming members comparable to that of other fields in medicine. However, qualitative data from the interviews and a lack of specific literature indicate that despite obtaining diversity, inclusion of LGBTQ+ neurosurgeons and trainees is lacking.

https://thejns.org/doi/abs/10.3171/2023.8.FOCUS23285

KEYWORDS diversity; inclusion; LGBTQ+; neurosurgery; minority; gender

Neurosurgery is a field that has always been on the leading edge of technology and innovation but has not always been the most diverse. A 2021 letter from the Supreme Court of the United States made this fact much more salient as it singled out neurosurgery for its lack of diversity and inclusion. This Supreme Court objective review made recommendations for how the field could improve its inclusivity in three key demographic areas: women, African Americans and Hispanics as underrepresented racial minorities, and those who identify as lesbian, gay, bisexual, transgender, and/or queer (LGBTQ+).1 A stark statistic in this report indicated that the field of neurosurgery did not have a single publication to date referencing LGBTQ+ inclusion. Although progress has been made in quantifying inequality for women and ethnic minorities, as evidenced by the increasing number of publications and discussions at national conferences, the LGBTQ+ demographic in neurosurgery is absent from publication initiatives and national discussions. The goal of this study was to address this gap in LGBTQ+ diversity...
TABLE 1. Standard interview questions

<table>
<thead>
<tr>
<th>Question</th>
</tr>
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<tbody>
<tr>
<td>Has your LGBTQ+ status uniquely contributed to your career in medicine? How so?</td>
</tr>
<tr>
<td>Was there a source of representation of neurosurgery LGBTQ+ trainees and/or practitioners in your career? Where was that representation experienced or where was it lacking?</td>
</tr>
<tr>
<td>What would be the effects of increased LGBTQ+ representation in the neurosurgery community?</td>
</tr>
<tr>
<td>Have you experienced any hardships or negative interactions in the healthcare environment due to your LGBTQ+ status? If so, could you expand on this experience and how it impacted your career?</td>
</tr>
<tr>
<td>How can the neurosurgery community promote a more diverse and inclusive environment for LGBTQ+ practitioners and trainees?</td>
</tr>
</tbody>
</table>

and inclusion literature by assessing the current state of LGBTQ+ inclusion through quantitative and qualitative methodology.

**Methods**

**Literature Review**

A systematic review adhering to PRISMA guidelines was conducted to investigate the intersection between sexual and gender minorities and neurosurgery. A comprehensive literature search was performed in May 2023, retrieving articles from PubMed, Web of Science, and Google Scholar, without date restrictions. The search included terms related to sexual and gender minorities, LGBTQ+, neurosurgery, neurosurgeons, and neurosurgical trainees as follows: (Sexual and Gender Minorities [MeSH] OR Gender Identity [MeSH] OR “LGBTQ+” OR “Gender Expression” OR “nonbinary” OR “transgender nonbinary” OR “TGNB”) AND (Neurosurgery [MeSH] OR Neurosurgeons [MeSH] OR “brain surgeon” OR “brain surgery” OR “neurosurgical” OR “spine surgeon” OR “spine surgery” OR “neurosurgery residency” OR “neurosurgical resident” OR “neurosurgery resident” OR “neurosurgical training” OR “neurosurgical trainee” OR “neurosurgery training” OR “neurosurgery trainee”). Title and abstract screening, duplicate removal, and content analysis were carried out, following specific inclusion and exclusion criteria. Additionally, a separate search was conducted to compare literature across all surgical specialties using broader terms for surgeons.

**Data Acquisition**

Data were acquired from the Association of American Medical Colleges (AAMC) through an individualized report that was derived from the yearly Graduation Questionnaire (GQ) provided to graduating medical students. The report included an indication of the chosen specialty along with two questions indicating sexual and gender identity. Data was collected from the GQs administered from 2016 to 2022, and an aggregate percentage of LGBTQ+ status of entering neurosurgery trainees was determined. The minimal number of LGBTQ+ applicants to neurosurgery each year limits GQ data acquisition to 6-year aggregate data sets in accordance with AAMC guidelines to ensure confidentiality, thereby preventing specific descriptions of participant distribution over time.

**Interviews**

Interview subjects were identified via social media self-identification or direct connection to reflect a diverse representation of career stages within the field of neurosurgery. A participant had to be a board-certified or board-eligible neurosurgeon or a current neurosurgical resident in a US-accredited residency program. They must have self-identified as gay, lesbian, bisexual, transgender, or of an unspecified gender or sexual minority and voluntarily agreed to the interview. The interviews were conducted using video chat and were recorded.

To develop the interview questions, the team first went through the questions to ensure that they were understandable, user-friendly, and the right length. During the interview, open-ended questions predominated. However, there was also a chance for respondents to offer more details about their opinions, experiences, and perceptions.

**Standard Interview Questions**

We used the Sexual Orientation and Gender Identity (SOGI) framework to carefully formulate interview questions. Our approach recognized the diversity within the SOGI spectrum, accommodating individuals who may identify with various sexual orientations and gender identities. We maintained inclusive language throughout the interview process to foster an open and unbiased environment. We carefully developed our questions to avoid assumptions or biases regarding SOGI. We prioritized sensitivity and respect, allowing participants to guide the conversation, address sensitive topics, and seek clarification on any aspects of the interview process. Standardized questions asked of all interviewees can be seen in Table 1.

**Results**

**Literature Review**

Two articles were identified that discussed sexual and gender minorities in the context of neurological training and practice (Table 2). A breakdown of the content that resulted from the literature search is provided in Fig. 1. A parallel search of sexual and gender minorities in the context of surgical training and practice was conducted, identifying 2580 articles.

**AAMC GQ**

The data presented in the 2016–2022 GQ aggregate data set provide valuable insights into the sexual orientation and gender identification of respondents in the neurological surgery specialty (Table 3). Of the 179 neurosurgery respondents, the majority, 160 (89.4%), identified as heterosexual or straight. The nonheterosexual proportion...
for neurological surgery was 8.9%. However, there was no representation from asexual and pansexual respondents in this specialty. Regarding gender, 125 (69.8%) identified as male and 54 respondents identified as female (30.2%).

The large GQ data set allowed for additional analysis of other intended specialties. Of the 15,884 respondents in this category, the majority, 13,746 (86.5%), identified as heterosexual or straight. However, a significant number of respondents identified as nonheterosexual, with 798 (5.0%) identifying as bisexual, 567 (3.6%) identifying as gay or lesbian, and 212 (1.3%) identifying as queer. Furthermore, 321 (2.0%) respondents did not provide their sexual orientation. The nonheterosexual proportion was 10.9% for this category. Regarding gender, the data showed that 8568 (53.9%) of the respondents identified as female and 7308 (46.0%) identified as male.

A graphical representation of gender and sexual minority responses as a percentage of total responses can be seen in Fig. 2. Neurological surgery respondents reported the highest percentage of individuals identifying as bisexual compared with other groups. On the other hand, the other intended specialties category had the highest

**TABLE 2. Literature review**

<table>
<thead>
<tr>
<th>Authors &amp; Year</th>
<th>Type of Study</th>
<th>Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarpong et al., 2022&lt;sup&gt;11&lt;/sup&gt;</td>
<td>Cross-sectional study</td>
<td>0.5% of surveyed global medical students, neurosurgery residents, &amp; recent neurosurgery graduates identified as nonbinary</td>
</tr>
<tr>
<td>Bahji &amp; Altomare, 2020&lt;sup&gt;12&lt;/sup&gt;</td>
<td>Systematic review &amp; meta-analysis</td>
<td>28/52 studies identified sexual harassment in resident physicians, discussing sexual orientation as a risk factor &amp; neurosurgery as a specialty with high rates of IHD</td>
</tr>
</tbody>
</table>

<sup>1</sup>IHD = intimidation, harassment, and discrimination.

![PRISMA flow diagram demonstrating search results and article yield.](image-url)
percentage of individuals identifying as gay or lesbian compared with other groups. Interestingly, the highest percentage of nonresponses for sexual orientation, with 6.7% of respondents not providing a response, was among all GQ respondents.

The expected value formula used to perform the chi-square analysis is as follows: expected value = (identity group total × specialty group total)/total respondents. A p value of 0.65 was obtained from the chi-square analysis conducted to compare the actual versus expected distributions across sexual and gender minority respondents in the neurosurgery and nonneurosurgery groups (Fig. 2). This value indicates that there is no statistically significant difference between the observed and expected distributions.

In the neurological surgery category, 89.4% of respondents identified as heterosexual, cisgender, while 8.9% identified as sexual or gender minority (Fig. 3). In the other intended specialties category, 86.5% of respondents identified as heterosexual, cisgender, and 10.9% identified as sexual or gender minority. These results were used to calculate the expected values for each group, which were then compared to the actual values. In our analysis, we found that the p value for the minority compared with the majority chi-square test was p = 0.32.

**Interview Quantitative Results**

The data presented in Fig. 4 offer a glimpse into the perspectives of five interviewees from four different institutions regarding the impact of their LGBTQ+ status on their careers in medicine. Among the questions asked, three respondents answered affirmatively when asked if

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**TABLE 3. 2016–2022 responses to the GQ regarding gender and sexual orientation**

<table>
<thead>
<tr>
<th></th>
<th>2022 GQ</th>
<th>Neurological Surgery</th>
<th>Other Intended Specialties</th>
<th>All GQ Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sexual orientation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asexual</td>
<td>0 (0.0)</td>
<td>74 (0.5)</td>
<td>74 (0.4)</td>
<td></td>
</tr>
<tr>
<td>Bisexual</td>
<td>11 (6.1)</td>
<td>798 (5.0)</td>
<td>810 (4.8)</td>
<td></td>
</tr>
<tr>
<td>Gay or lesbian</td>
<td>4 (2.2)</td>
<td>567 (3.6)</td>
<td>573 (3.4)</td>
<td></td>
</tr>
<tr>
<td>Heterosexual or straight</td>
<td>160 (89.4)</td>
<td>13,746 (86.5)</td>
<td>13,938 (82.5)</td>
<td></td>
</tr>
<tr>
<td>Pansexual</td>
<td>0 (0.0)</td>
<td>85 (0.5)</td>
<td>85 (0.5)</td>
<td></td>
</tr>
<tr>
<td>Queer</td>
<td>1 (0.6)</td>
<td>212 (1.3)</td>
<td>214 (1.3)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>0 (0.0)</td>
<td>81 (0.5)</td>
<td>81 (0.5)</td>
<td></td>
</tr>
<tr>
<td>No sexual orientation response</td>
<td>3 (1.7)</td>
<td>321 (2.0)</td>
<td>1,126 (6.7)</td>
<td></td>
</tr>
<tr>
<td>Nonheterosexual summation</td>
<td>16 (8.9)</td>
<td>1,736 (10.9)</td>
<td>1,837 (10.7)</td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>125 (69.8)</td>
<td>7,308 (46.0)</td>
<td>7,829 (46.3)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>54 (30.2)</td>
<td>8,568 (53.9)</td>
<td>9,063 (53.6)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>179 (100.0)</td>
<td>15,884 (100.0)</td>
<td>16,901 (100.0)</td>
<td></td>
</tr>
</tbody>
</table>

**FIG. 2.** Bar graphs showing a representation of the percentages of GQ respondents per group, subdivided by sexual/gender minority identification. The bars represent the percentage of respondents calculated based on group total.
their LGBTQ+ status uniquely contributed to their career in medicine, while four interviewees had negative views on the representation of LGBTQ+ trainees and practitioners in neurosurgery. The third question inquired about negative experiences in the healthcare environment due to their LGBTQ+ status, with three interviewees answering that they had negative experiences and two answering that they did not.

Discussion

LGBTQ+ in Neurosurgery

As literature is lacking in the promotion of LGBTQ+ practitioners in neurosurgery, referencing surgery as a whole can provide a glimpse into the state of diversity and inclusion. In the field of surgery, it is evident that the fight for LGBTQ+ inclusion and recognition has been particularly challenging, given the profession’s long history of gender and sexual orientation discrimination. However, in recent years, significant progress has been made in the effort to promote LGBTQ+ diversity and inclusion.

The neurosurgery community faces specific considerations when it comes to the advancement of diversity and inclusion. One challenge is the traditional characterization of a neurosurgeon as a White, cisgender, straight male which remains pervasive. A conversation among the field is the value of overcoming this rigid stereotype, particularly when the content of the surgical specialty is relatively removed from LGBTQ+-specific healthcare. An argument to this claim proposed by interviewed neurosurgical trainees and physicians indicated improvements in training when they are integrated into an accepting environment. Hypermasculine attitudes have also been noted to negatively influence diversity in the field by promoting a culture that values aggression over compassionate care, characteristics exhibited more often by women and members of the LGBTQ+ community. However, groups like Women in Neurosurgery are fighting against these stereotypes and working to increase representation. Interestingly, the results from the GQ assessment indicate similar numbers of self-identifying LGBTQ+ members in the field, but the lack of indication of mentorship suggests that some individuals may be hiding their status. Despite these challenges, the grit and determination of neurosurgeons may indicate a willingness to become a silent minority to obtain residency positions and training. Recognizing these challenges and striving to foster a more inclusive and diverse neurosurgery community is crucial, as greater diversity has the potential to enhance patient outcomes.
individuals (5%–5.8%) among board-certified neurosurgeons. While specific data on neurosurgeons who identify as both racial minorities and members of the LGBTQ+ community are lacking, intersectionality should be addressed in holistic conversation of minority inclusion.

Literature Review

The literature on LGBTQ+ representation in neurosurgeons is limited, with only two relevant articles available. However, no specific investigation of these issues within neurosurgical trainees was conducted. These articles were published within the past 3 years, indicating a growing interest in LGBTQ+ topics within neurosurgery. It is worth noting that similar analyses on LGBTQ+ identities within surgeons and surgical trainees have also emerged in the past 3 years, highlighting the relative lack of emphasis on LGBTQ+ topics in the neurosurgery literature compared with other surgical specialties.

GQ Data Assessment

Utilization of the GQ data set offers a notable advantage as it serves as the sole nationally distributed source for comparison between LGBTQ+ individuals and their neurosurgery specialty status. However, it is important to acknowledge certain limitations associated with the GQ data. First, participants in the data set are not necessarily guaranteed to be engaged in neurosurgical training. Nonetheless, the survey is conducted after the national Match Day, thereby minimizing the risk of participants misrepresenting their specialty choice.

The findings from the GQ data set are remarkable as they indicate a comparable level of LGBTQ+ representation in the field of neurosurgery when compared with other specialties (as shown in Figs. 2 and 3). This rate of LGBTQ+ identification deviates from the national average, which was reported to be 7.1% of the adult American population in 2022. This trend seems to combat the idea that well-established anti-LGBTQ+ environments in neurosurgery are preventing trainees who identify as such from entering the field. However, when considering the results from the interviews, it appears that despite a similarly diversified LGBTQ+ class compared with all other specialties, neurosurgery fails to include this group. Further discussion will represent the contextualization of the GQ results by describing neurosurgeons who facilitate the diversity of the field, a majority of whom have experienced suppression of their LGBTQ+ status.

Recurring Interview Themes

Interviewing neurosurgical attendings and residents provided valuable insights into the experience of LGBTQ+ neurosurgeons. There were a few common themes throughout the interviews. The first of these trends involved the “invisible minority,” which was referenced verbatim in several interviews. Numerous interviewees shared their perspectives on being sexual and gender minorities, highlighting the often-invisible nature of this characteristic. This aspect particularly distinguishes LGBTQ+ neurosurgeons from other minority groups, such as gender and racial minority neurosurgeons. Particularly when being mentored, these individuals tended to hide any signs of LGBTQ+ affiliation. Lessons learned from historical parallels include the “Don’t Ask, Don’t Tell” legislative failure, which similarly forced invisibility of LGBTQ+ members. The highly problematic nature of these trends is the result of individuals withholding an intrinsic part of themselves, which becomes more challenging to accomplish during rigorous neurosurgical training and practice.

Challenges Faced as LGBTQ+ in Neurosurgery

Neurosurgical trainees and practitioners who identify as LGBTQ+ face numerous challenges that are unique to their situation. One of the major obstacles is the decision to conceal their LGBTQ+ status, which can be particularly difficult. Many LGBTQ+ neurosurgeons have been advised by their mentors to eliminate any indicators of their gender or sexual minority status from their résumés, followed by pressure to conform to heterosexual and cisgendered norms within the neurosurgical practice. This pressure to maintain a false facade, distinct from their true LGBTQ+ identity, is known to be exceedingly stressful during demanding neurosurgical practices. One resident stated that during his application season he would, “present myself as just straight and didn’t talk about my private life.” He went on to reflect how managing this false representation was especially challenging during his neurosurgery intern year, a burden that his cisgender, Caucasian, male neurosurgeon, providing a sense of unity among the underrepresented in the field.

Sources of LGBTQ+ Representation in Neurosurgery

Interview data highlight the significant absence of
LGBTQ+ mentorship in the experiences of neurosurgical residents and attendings during their interview processes. Mentorship is recognized as a crucial pathway for entering the field and navigating the specialty effectively. The lack of mentorship for LGBTQ+ trainees perpetuates heteronormativity in the field, leaving applicants uncertain about integrating their demanding careers with a fulfilling personal life outside of work. Furthermore, interviewees were counseled to hide their LGBTQ+ status to conform to the majority. Nearly all interviewees used the phrase “the invisible minority” to describe their suppressed LGBTQ+ neurosurgical experience. This near unanimous, unprompted description was used to express the feeling of being a minority, similar to women and Black neurosurgeons’ groups, but different in the fact that LGBTQ+ members actively suppress their minority status, so as to make the group unrecognizable in a heterosexual, cisgendered environment. This active suppression was clearly described in one resident interview. “One thing that definitely stood out to me was when I was applying, my advisor in medical school told me to leave out any sort of LGBTQ mention from my application, which you know most of the people are trying to put in some type of diversity anywhere they can on the application. I was specifically told to not put that there, which is interesting in hindsight.” The overt visibility of other minority groups in neurosurgery speaks to the value of combating the identified trend of suppression.

Perceived Value of Improved LGBTQ+ Representation

Currently, many interviewees reflect on minimal differences in LGBTQ+ inclusion in the field of neurosurgery. Most referenced women and Black neurosurgeons’ groups and the measurable improvement they have achieved in terms of advancing diversity and inclusion. The value these groups have brought to the field by improving its diversity have been highly published, but similar activity has not been seen in relation to LGBTQ+ membership. Additionally, with the rise in literature promoting LGBTQ+ inclusion in other surgical fields, many interviewees discussed the benefits of improved representation of sexual and gender minority practitioners within the field of neurosurgery. During the interviews, the value of inclusion was emphasized, particularly in terms of promoting efficiency within neurosurgical practice. The interviewees noted that a more connected practice could be achieved through inclusion. One resident elaborated on this point, saying:

The big thing is going to a place where you feel that the department really has your welfare at the forefront of what they’re doing. And really getting a gauge as to how the residents feel supported or not within that program. And I think once you have that, everything else falls to the wayside.

Additionally, interviewees identified strengthened communities of practitioners and the facilitation of more open exchange of practice methodology as potential benefits of improved representation. During the interviews, the topic of promoting a more diverse environment in the neurosurgery community was raised, and one interviewee encapsulated the interview consensus with the succinct statement, “be visible.” Overall, the interviews indicated a widespread recognition of the value of LGBTQ+ representation, which could have a positive impact on both LGBTQ+ trainees and the neurosurgery field as a whole.

LGBTQ+ Status Contributing to Medical Practice

A central argument to the value of promoting LGBTQ+ diversity and inclusion within neurosurgery is that specific LGBTQ+-related healthcare is not within the field’s scope of practice. Counterpoints to this argument include the unanimous description that being part of a minority group, such as LGBTQ+ practitioners, directly correlates with a more empathetic practice. Neurosurgery often carries some of the worst outcomes and highest acuity care. Interviewees described how LGBTQ+ surgeons promoting an inclusive environment for sexual and gender minorities can facilitate a more comfortable situation for patients in this life-altering time. One resident reflected on this concept when discussing that “being a part of any minority group makes you more empathetic and open to people’s experiences, especially when interacting with patients. You have a tendency to think about how to make your patients more comfortable.” It was additionally noted by an interviewee that LGBTQ+ status is almost always a passive form of diversity. Similar to women and racial minorities in neurosurgery, LGBTQ+ practitioners do not need to assert their minority status into every patient interaction to achieve measurable improvements by diversifying the field. This passive diversity was exemplified by one attending who stated:

I have a picture of my family on my phone … And in that sense, in a roundabout way, they learn about me being gay, and that can sometimes influence the bond that you develop with families. I don’t bring up my sexual orientation as a talking point.

Overall, it is clear that being an LGBTQ+ neurosurgeon brings specific benefits in practice and silencing this aspect of the neurosurgeon’s life can be detrimental to patients and practitioners alike.

Neurosurgery Prompting LGBTQ+ Inclusion

When asked about how neurosurgery could support LGBTQ+ diversity and inclusion, the majority response included community building. Social media has been a tool used by other minority groups in their efforts to facilitate diversity and inclusion initiatives. LGBTQ+-identifying neurosurgeons have no organized social media platform, which was indicated in several interviews as a place to start. Additional conversation focused on the lack of LGBTQ+-specific presentations or meetings at national conferences. An interviewee suggested, “there’s such a drive towards DEI [diversity, equity, and inclusion] efforts for underrepresented minorities … but there are a number of groups like the LGBTQ community that don’t [benefit from these efforts because they aren’t considered underrepresented].” Both Women in Neurosurgery and the American Society of Black Neurosurgeons have played instrumental roles in promoting discussions on DEI at the national level. These efforts were specifically mentioned by several interviewees who are part of these groups as strategies for advancing LGBTQ+ neurosurgeons in the future. By actively supporting these initiatives to foster
inclusion of LGBTQ+ individuals, patient care can be improved through enhanced communication, better decision-making, and increased medical adherence, as research suggests that shared characteristics between patients and healthcare providers contribute to these positive outcomes.

Limitations of this study are most specific to the study design. For one, utilization of the AAMC database offers advantages in terms of national coverage, but it has limitations as it is a more generalized model. The retrospective nature of this study provides strengths, such as the utilization of a national data set with recent data collection, although it may introduce a source of reporting bias due to limited control over the methods of data collection. For the qualitative assessment, the sensitivity of LGBTQ+ status disclosure, and concerns regarding confidentiality, interviewees were carefully chosen based on specific inclusion criteria, which may introduce selection and response bias. Additionally, we recognize that a small sample of LGBTQ+ neurosurgeons and residents was interviewed, which does not reflect the experiences of the entire cohort of LGBTQ+ individuals in neurosurgery in the US or abroad. To address these limitations, we recommend conducting national polling within the neurosurgery community to gather qualitative responses on LGBTQ+ diversity and inclusion while also comparing the responses with those of a straight, cisgender majority group.

Recommended areas for further research based on this study should address equivalent neurosurgery diversity to other subspecialties despite a lack of formal outreach programs, national polling for a more accurate LGBTQ+ response, and intersectionality as it pertains to inclusion in neurosurgery.

**Conclusions**

Despite notable progress in diversity and inclusion efforts in neurosurgery, the LGBTQ+ community has been conspicuously overlooked. While other surgical fields have acknowledged the importance of LGBTQ+ inclusion, neurosurgery has fallen behind, as evidenced by recent publications from the Supreme Court. This study identifies that incoming neurosurgical residents represent diverse LGBTQ+ identification similar to that of other specialties. However, interviews with current LGBTQ+ residents and attendings corroborate wider surgical literature that suggest a lack of inclusivity. It is apparent that LGBTQ+ members in neurosurgery have been suppressed in their gender and sexual minority status so as to form a silent minority. Representation without inclusion causes strain on the LGBTQ+ neurosurgeon that could be ameliorated with the promotion of LGBTQ+ inclusion. Referencing literature from related fields indicates that facilitating LGBTQ+ inclusion will not only benefit gender and sexual minorities, but has wider benefits, including improved patient outcomes, that uplift the field of neurosurgery more generally.

**Acknowledgments**

We thank all interviewed physicians who made this study possible, including, but not limited to, Miguel Quintero-Consuegra, MD; Michael Rothbaum, MD; and Garret Zoeller, MD. We additionally acknowledge Rupesh Raina, MD, for his mentorship and assistance in the IRB process.

**References**


**Disclosures**

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

**Author Contributions**

Conception and design: Foresi. Acquisition of data: Foresi, Pellot, Quadri, Muzyka. Analysis and interpretation of data: Foresi, Pellot, Muzyka. Drafting the article: Foresi, Pellot, Muzyka, Uzoukwu. Critically revising the article: all authors. Reviewed
submitted version of manuscript: Foresi, Pellot, Quadri, Muzyka, Uzoukwu, Pannullo. Approved the final version of the manuscript on behalf of all authors: Foresi. Statistical analysis: Foresi. Administrative/technical/material support: Foresi, White. Study supervision: Foresi, Pannullo.

Supplemental Information

Previous Presentations

The abstract of this paper was presented as a digital poster at the 2023 Congress of Neurological Surgeons Annual Meeting, September 9–13, Washington, DC.

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