Orthopedic surgery fellowships are a common aspect of the current training paradigm. Studies have shown that more than 90% of orthopedic surgery residents will pursue a fellowship. Choosing to pursue a fellowship has a profound impact on young orthopedic surgeons and will influence practice characteristics for the remainder of their career. The decision to invest another year of training into becoming a subspecialist is one of great import.

There are many reasons, including market pressure, pursuit of academic goals, refinement of surgical and clinical skill, desire for higher recompense, lifestyle considerations, and employer requirements, for the rise in the percentage of orthopedic surgeons completing fellowships. Overall, fellowships are a means to an end for trainees in search of employment and a fruitful career.

Although much information exists on the increasing trend of undertaking fellowships, little information exists about the factors that influence residents' career choices. The aim of this study was to determine what drives residents, after 5 years of training, to pursue subspecialization through a fellowship and why a particular fellowship is selected. Surgical and clinical practice vary greatly between.
the subspecialties. The career of an adult reconstruction surgeon can be drastically different from that of a pediatric orthopedic surgeon. Given that the range of subspecialties open to orthopedic residents through fellowship is broad, the authors hypothesized that there would be distinct considerations specific to each subspecialty. Their secondary hypothesis was that specific demographic factors, such as relationship status and debt, would affect the level of influence of these considerations on choice of specialty.

In the setting of increasing student debt, a rapidly changing health care system, and growing transparency in the age of outcome reporting and the Internet, residents have many factors to consider when determining their career path. The purpose of this investigation was to rate influences on residents’ career choices, with a focus on how level of debt, relationship status, and level of training affect the importance of these influences. Ultimately, the authors sought to elucidate which factors are the most significant to residents when considering their career. Factors were compared across the subspecialties, and influences were assessed in light of various demographic characteristics.

**Materials and Methods**

SurveyMonkey software was used to create the survey for data collection. This website was employed because it has a developer-friendly interface, is widely recognized, and permits easy survey distribution and data collection. The authors followed the website’s recommendations regarding timing of dissemination of the survey, formatting, and improving response rate. They developed the survey using Likert’s method of appraising individual attitudes, which has been validated and is trusted for assessing level of influence. The survey was compiled after similar articles about assessing level of influence.

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To ensure that only current trainees completed the survey, the email was the only portal for access to the website; the link was not provided through other means. To encourage responses, there were random drawings for three $100 credits on Amazon.com. Trainees had to complete the entire survey to be eligible for the drawings. This ensured that all questions had been answered. Because the final dataset did not contain links to respondents’ emails, specific responses could not be associated with specific individuals.

The SurveyMonkey website collected and compiled the data, which were exported and formatted in Excel (Microsoft, Redmond, Washington) prior to analysis via JMP Pro version 12.2 statistical analysis software (SAS Institute Inc, Cary, North Carolina). Models were run using the chi-square test or, when appropriate, Fisher’s exact test looking for statistical relationships between level of debt, relationship status, number of children, or having non-student debt and choice of fellowship.

**Results**

The survey was sent to approximately 1000 orthopedic surgery trainees. It was completed by 360, for a response rate of 36%. Of the respondents, 85.5% (n=308) were male and 14.5% (n=52) were female. Responses were received from every region of the United States and from every postgraduate year (PGY)—interns (n=65), PGY-2 (n=65), PGY-3 (n=57), PGY-4 (n=70), PGY-5 (n=69), PGY-6 (n=1), and fellows (n=33). Respondents represented the gamut of relationship status and indebtedness. Most of the respondents, 64.2% (n=231), were married, 15.8% (n=57) were single, 10.8% (n=39) defined themselves as being “in a long-term relationship,” 8.3% (n=30) were engaged, and 0.8% (n=3) were divorced.

Most of the respondents, 69.4% (n=250), did not have children, 15.6% (n=56) had 1 child, 9.7% (n=35) had 2 children, and 5.3% (n=19) had 3 or more children. All residents who reported having children also reported being married.

Various aspects of debt were recorded for the residents. Levels of student debt were reported as 41.94% greater than $200,000; 13.06% between $150,000 and $200,000; 9.72% between $100,000 and $150,000; 8.06% between $50,000 and $100,000; 4.44% between $20,000 and $50,000; 4.17% between $1 and $20,000; and 18.61% no debt. Almost 1 of every 4 residents (81 of 360; 22.50%) reported having “other personal debt (other than a mortgage).” Only 14.9% (10 of 67) of those reporting no student debt claimed another form of debt.

Responses were received from individuals interested in all of the current major subspecialties. Only 5 respondents (1.4%) reported no plans of pursuing a fellowship (Figure). The average Likert score was compiled for each influence (Table 1). Pursuit of an intellectually stimulating subspecialty had the highest average score (3.38), whereas potential to conduct research in that subspecialty and residency program with a strong tradition of placing into a particular subspecialty had the lowest average scores (2.09 and 2.08, respectively). After controlling for residents who reported being “undecided,” the authors found that the average Likert scores remained remarkably stable; the only change was that practice location and marketability switched ranks.

The overall rankings did not remain consistent on subgroup analysis. After the overall top 3 factors for pursuing a fellowship were excluded, so-called subspecialty-specific factors were identified (Table 2). Outpatient surgery was remarkable for being a significant or an insignificant factor, depending on fellowship association. Al-
though joining an academic practice was important for oncology, it ranked consistently low for many other subspecialties.

**DISCUSSION**

This is the most recent of several reports documenting the growing trend, since the 1990s, of pursuing a fellowship prior to taking an attending surgeon position.\(^1\)\(^2\)\(^15\) Thus, it can be inferred that fellowships are an essentially ubiquitous component of orthopedic education. In the current study, no orthopedic resident reported plans to leave the practice of medicine for an alternative career after residency. In contrast, in internal medicine, a small but significant percentage of residency graduates have been reported to have gone onto careers not centered on direct patient care.\(^18\)

This shift to subspecialization during the past several decades is likely due to multiple factors. Sarmiento\(^4\) posited that the emergence of specialty societies and changes to training paradigms fomented trainees’ impression of the necessity of fellowships. Lifestyle factors, reimbursement, and increased experience to avoid perceived shortcomings have also been reported to influence resident fellowship choice.\(^13\) The current study supports these ideas, as a strong mentor, marketability, and practice location were common factors considered by residents. This suggests that training under subspecialists, lifestyle, and procuring employment are influential factors.

In the current study, the high Likert scores related to marketability and practice location suggest that residents understand the practice environment that they will inherit as the next generation of orthopedic surgeons. The argument that increased case exposure and volume leads to better outcomes for specific procedures has been widely accepted. This trend has been observed to be relevant for both surgeon and facility volume.\(^19\)\(^-\)\(^21\) The logical evolution of these findings is that both patients and payers have shown a preference for higher-volume surgeons. There is a consistent dose-response relationship of higher volume equaling decreased complications for procedures.\(^22\) Furthermore, with the shift from fee for service to value-based reimbursement, residents must be prepared to meet metrics requiring competitive outcomes and high patient satisfaction ratings.\(^23\)

However, the high rating of variety of operative cases may be at odds with the trend toward high-volume surgeons. Variety of cases had an average Likert score of at least 3.11 for each subspecialty except adult reconstruction. These results

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**Figure:** Postresidency career plans reported by the orthopedic surgery trainees.

**Table 1**

<table>
<thead>
<tr>
<th>Influence</th>
<th>Score (SD)</th>
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<tbody>
<tr>
<td>Intellectually stimulating subspecialty</td>
<td>3.38 (0.74)</td>
</tr>
<tr>
<td>Variety of cases</td>
<td>3.26 (0.82)</td>
</tr>
<tr>
<td>Impact of a mentor</td>
<td>3.01 (0.93)</td>
</tr>
<tr>
<td>Practice location (ie, choosing a city, state, or region to work)</td>
<td>2.96 (0.95)</td>
</tr>
<tr>
<td>Marketability</td>
<td>2.87 (0.92)</td>
</tr>
<tr>
<td>Potential to join a private or hospital-employed practice model</td>
<td>2.71 (0.91)</td>
</tr>
<tr>
<td>Financial compensation</td>
<td>2.67 (0.93)</td>
</tr>
<tr>
<td>Altruism</td>
<td>2.58 (0.95)</td>
</tr>
<tr>
<td>Call responsibilities</td>
<td>2.54 (0.84)</td>
</tr>
<tr>
<td>Subspecialty primarily involves outpatient surgery</td>
<td>2.35 (1.00)</td>
</tr>
<tr>
<td>Interaction with physicians in other specialities</td>
<td>2.31 (0.92)</td>
</tr>
<tr>
<td>Potential to join an academic practice</td>
<td>2.28 (1.00)</td>
</tr>
<tr>
<td>Potential to conduct research in that subspecialty</td>
<td>2.09 (0.97)</td>
</tr>
<tr>
<td>Residency program with a strong tradition of placing into a particular subspecialty</td>
<td>2.08 (0.99)</td>
</tr>
</tbody>
</table>

\(^1\)Likert scale of 0 to 4 (1=no importance; 2=little importance; 3=moderate importance; and 4=greatest importance).
may, however, offer a counterargument to concerns outlined by Sarmiento\(^3\) relating to the growing subspecialization of new orthopedic surgeons. The current findings may also offer insight into why graduates, although interested in case variety in their area of fellowship, are reluctant to tackle cases outside of their subspecialty. This is a notable difference from the prior generation of general orthopedic surgeons, who willingly took on a number of cases from a broad range of the current fellowships. Regardless, with new legislation increasing the transparency of outcome reporting (which is in patients’ best interests) and tying certain outcome metrics to reimbursement (potentially flawed in their current iteration), it behooves the nascent surgeon and the trainee to plan for this practice environment and to exercise caution in taking on cases.

In a recent survey of 3076 residents from all fields, which included 167 orthopedic surgery residents, 63.5% of all residents and 61.2% of the orthopedic surgery residents responded that debt influenced their choice of specialty.\(^{24}\) Also, 49.1% of the orthopedic surgery residents reported that their debt burden influenced the next step of their career, which is not surprising given that more than 50% of the residents reported greater than $150,000 and 12% reported greater than $300,000 of debt. The current study revealed similar levels of debt, with 55% of the residents reporting more than $150,000 and approximately 42% reporting more than $200,000 of debt. Despite this considerable debt, remuneration ranked in the middle of all influencing factors. No subspecialty was noted to correlate statistically with debt level.

Given the aforementioned considerations and the ever-looming threat of decreased compensation, the current study suggests that the practice of medicine remains what primarily drives orthopedic residents. This was exemplified as intellectual stimulation, case variety, and mentors ranking the highest regarding fellowship choice. When these most common considerations were controlled for, a resident’s planned fellowship choice did influence the importance of other factors. It was not surprising that those areas suited to outpatient practices (sports medicine, shoulder and elbow, and hand surgery) had that factor ranked highly on the Likert scale. Conversely, those areas that largely deal with inpatients (trauma, spine, pediatrics, oncology, and adult reconstruction) often had that factor ranked low on the Likert scale. Oncology was unique in that it was the only subspecialty in which joining an academic practice and conducting research were highly ranked. This is somewhat of a contradiction in that intellectual stimulation was ranked highest overall, which suggests that orthopedic residents find intellectual fulfillment outside of purely academic pursuits such as research.

The low average Likert scores for research and for joining an academic practice were ostensibly consistent. This further supports the view that residents consider fellowship an opportunity to refine surgical skills and expertise in an increasingly competitive marketplace. In the 2016 American Academy of Orthopaedic Surgeons census, only 19% of responding surgeons reported being based at an academic practice.\(^{25}\) The fact that there are fewer academic posts with resources for research and education may further explain why many trainees do not hold these high among consideration for their career.

The authors found it telling that among residents undecided about their subspecialty, practice location was the most significant factor (average Likert score, 3.32), followed by a subspecialty being...
intellectually stimulating (average Likert score, 3.16). This is consistent with the assertion that the next generation of orthopedic surgeons is demanding more work–life balance. This also explains why these 2 factors were removed from the overall analysis, marketability ranked more highly than practice location. This may indicate that once trainees have decided on a fellowship, they perceive their ability to practice in a certain location to be dependent on how they are able to market themselves.

The limitations of this study primarily relate to just a sample of the total population of residents being investigated. However, the percentage of females and the number for each PGY were proportional to national data regarding orthopedic surgery residents. Because little information exists in the orthopedic literature, the authors relied on the input of various senior-level surgeons, a survey test run, and a review of other medical specialty literature to create the survey. They ensured that responses were recorded only once for each individual.

**Conclusion**

The goals of this study included elucidating the impetus for subspecialty training among orthopedic residents and understanding what specifically may attract candidates to various fellowships. Knowledge of these cultural and market influences may better prepare educators to meet the future needs of the field of orthopedics. Intellectual stimulation and a strong mentor were most influential in the decision to pursue a given fellowship. Specialty choice did result in differences in the importance of several factors. Because fellowship is now the norm, it is important to understand the motives behind young orthopedic surgeons’ career aspirations.

**References**