

Importance of the Faculty Interview During the Resident Application Process

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OBJECTIVES: Selection of surgical residents is accomplished by processes unique to each institution based on anecdotal observations, self-evident truisms, and programmatic objectives. By closely examining how surgical residents are selected, we sought to determine whether this process accurately predicted exceptional clinical performance of matriculated residents.

DESIGN: Retrospective correlation of applicant composite scoring system with the core competency-based clinical rotation performance ratings as well as the final match rank list.

SETTING: University-based surgery residency program.

PARTICIPANTS: Residency applicants, residents, and faculty.

RESULTS: Applicant personal characteristics (PCs) and reference letter quality (RL) assessed during faculty interviews correlated most strongly with subsequent clinical performance, whereas medical school academic records (GPA) and USMLE scores correlated negatively. Faculty concern for resident performance also correlated negatively with PC (-0.55) and RL (-0.44) but positively with USMLE ($r = 0.47$) and GPA ($r = 0.39$). Residents who required remediation during training actually carried higher USMLE (236 vs 224, $p < 0.05$) and GPA (4.5 vs 4.0, $p < 0.05$). Both USMLE and GPA correlated positively with ABSITE (0.44 and 0.35) and ABS Qualifying Exam (0.82 and 0.64) performance. The final match list correlated highly with PC ($r = -0.74$) and RL ($r = -0.71$), much more so than with GPA ($r = -0.27$) or USMLE scores ($r = -0.22$). Use of PC and RL, alone, correlated better with final ranking ($r = -0.76$) than did our previous 10-component composite score (-0.60). Modification of interview invitation criteria was predicted to reduce by 80% the number of interviews for applicants ultimately not ranked.

CONCLUSIONS: Compared with a previous 10-point composite scoring system, faculty evaluations of personal characteristics and letters of reference were likely to predict subsequent resident clinical performance. USMLE scores and academic

grade performance were predictive of subsequent formalized testing such as ABSITE, but they were poorly predictive of resident clinical performance. The resident selection process can be streamlined. (J Surg 64:378-385. © 2007 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: surgery, personnel selection, clinical competence, internship and residency, educational measurement

COMPETENCY: Patient Care, Medical Knowledge, Professionalism, Interpersonal and Communication Skills, Practice Based Learning and Improvement, Systems Based Practice

INTRODUCTION

The selection process for surgical residents represents a difficult process unique to each institution that is often based largely on medical school grades, test scores, and election to the Alpha Omega Alpha (AOA) honorary society, which are parameters that exhibit certain historical biases and limitations.¹ The ultimate goal of the entire process is to identify those resident applicants who are likely to succeed in becoming competent or even exceptional surgeons. Secondary goals include optimizing the potential for satisfaction of the resident with the residency program as well as of the residency program with the residents.

Demographic information, cognitive knowledge, personality testing, manual dexterity, and visual-spatial ability have all been investigated for their power to predict the clinical performance of the general surgical resident.² Conflicting and sometimes controversial data have been proffered while attempting to support specific associations between the criteria used for resident selection and subsequent clinical performance. For example, residents who are older, left-handed, or female have been accused of exhibiting lesser skills on visual-motor tasks, whereas female residents have been suggested to be cognitively superior.³ Although little to no correlation between formal written examinations and clinical performance has uniformly been observed, significant correlations between previous medical school honors or election to AOA, high class rank, and number of research publications have been linked to the

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faculty assessment of resident knowledge, whereas others have failed to find any of these to be useful predictors of subsequent success.⁴⁻⁸ Interestingly, assessment of personality traits such as “stress tolerance” has even been suggested to predict technical operative skill.⁹ By closely examining the resident selection process for our general surgical program, we sought to determine whether this process was at all predictive of the quality of residents selected.

METHODS

Resident Selection

The Electronic Residency Application Service (ERAS; Association of American Medical Colleges, Philadelphia, Pennsylvania) allows registration for potential applicants beginning on August 15 and for residency programs beginning on September 1 each year. Although partial applications are available for program review much earlier, release of the completed applications occurs on November 1. Like most surgical residency programs, the Medical University of South Carolina (MUSC) carefully screens all applications and then invites the most favorable candidates to a formal interview on one of a specified number of interview dates. During these interviews, the resident candidates are provided with pertinent information about the program, given tours of the facility, and meet with current surgical residents of all levels. Each resident then sits for 3 extended 1-one-1 interviews with 3 surgical faculty members as well as shorter interviews with the Chairman of Surgery, the Chief of General Surgery, and the Program Director in Surgery. Although also intended to provide the applicants with important information and the faculty, the interviews provide the opportunity to evaluate the applicants on the basis of their personal characteristics and their letters of reference using a scoring system with specific anchors. The first tool titled “Personal Characteristics” (PC) displayed in Fig. 1 describes the impression of the faculty interviewer of the candidate’s attitude, motivation, integrity, interpersonal relationships, and response to specific life challenges that the candidate may have faced to date. Not all of these metrics are observed or tested by each interviewer, but examination by the interviewer of where most of the items marked line up on the page are intended to help the interviewer decide on the final PC summary score. For example, a candidate who appears interested, voices altruistic intentions, and appears to clearly recognize problems may be given an above average (Top 20) rating, even if his/her personal relationships seemed limited to others in medicine. The second tool entitled “Reference Letters” (RLs) displayed in Fig. 2 records the assessment of the interviewer of the letters of reference submitted on behalf of the candidate, specifically whether the author is known to the interviewer; the candidate’s school; any description of the candidate’s technical skill, work ethic, or honesty; use of key descriptors; and the overall quality of the letters. As for the PC tool, these initial ratings are used to help the interviewer decide on a final RL score ranging from 0 to 5. These PC and RL faculty evaluations are combined with other information to generate a preliminary match ranking score (Table 1). During a desig-

TABLE 1. Ten Factors Included in Preliminary Scoring System

Personal characteristics (PC score)
Reference letters (RL score)
Academic record
Academic honors
USMLE performance
Research experience
Research publications
MUSC student
Surgical externship at MUSC
Diversity enhancement

USMLE denotes United States Medical Licensure Examination ©. MUSC denotes Medical University of South Carolina. *Diversity enhancement includes underserved population (includes native, Hispanic, and African-American), gender, work/life experience, and other unique and valued characteristics to enrich the educational experience of the program.

nated meeting, all surgical faculty members are given equal input, with individual members providing insight into the applicants whom they interviewed. A final match list is agreed upon by the entire department in time for the February deadline to finalize the ERAS match list.

Improving Resident Selection

To study how successful our selection process is in identifying promising residents, 10 individual components of the resident selection preliminary scoring system as well as the overall preliminary score from all 152 applicants interviewed over the previous 2 years were obtained and correlated with each applicant’s position on our final ERAS match list using the Pearson correlation coefficient.

Resident Performance

Since 2003 the clinical performance ratings of residents at our institution have been submitted by the surgical faculty at the end of each clinical rotation using a computerized program (E-value; Advanced Informatics, Minneapolis, Minnesota) according to the 6 core competencies of the Accreditation Council for Graduate Medical Education: patient care, knowledge, practice-based learning, communication, professionalism, and system-based practice. The 10 individual components of the resident selection preliminary scoring system as well as the summary preliminary scores for all 26 residents in the MUSC surgical residency program from 2003 to 2006 were then compared with their clinical performance ratings according to core competency. Additional comparisons were also made with residents’ scores on the American Board of Surgery In-training Exam (ABSITE) and the American Board of Surgery Qualifying Exam (ABS QE). In addition, residents in the program were identified as “cause for concern,” which was defined by issues of professionalism and/or academic challenges faced, and the preliminary ranking score and individual components of the 2 groups were compared by ANOVA.

Applicant Name: _____ Medical School: _____

Interviewer: _____ Date: _____

USMLE: Part 1 _____ Part 2 _____ AOA: _____ Class Rank: _____

PERSONAL CHARACTERISTICS

Attitude

slovenly, disinterested	shy, retiring, poor eye contact, diffident	interested, attentive, good eye contact, seems genuine	actively engaged, upbeat, positive attitude, clearly genuine	overly enthusiastic, arrogant, haughty
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Motivation

limited other options	interest in surgery only from family expectation or tradition	longstanding interest in surgery, comments are altruistic; states desire to help others	has demonstrated personal sacrifice and altruism well beyond expected	financially or lifestyle driven
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Professional Integrity

unable to give example	uses example of others as a role model	demonstrates personal examples from own experience	recognizes and describes challenges from own and others' experience	always feels justified or correct; judgmental
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Interpersonal Relationships

unable to interact well, rude	limited family contact, relationships limited to others in medicine; dependent	well-rounded relationships, may be uneasy- in new situations; independent	interacts with new contacts easily, networks with others well; interdependent	overachiever, pushy, egocentric; dominates conversation
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Challenges / Problem-solving

avoids or unable to identify issue, uncomfortable with question	identifies issue and attempts to answer; halting response	clearly recognizes problem, cogently delivers organized option assessment	unusual insight, answers confidently after careful reflection	resents being asked a scenario, inappropriate
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Summary

Less than average Hire as last resort Rank above 40	average candidate, acceptable Top 40	above average, like this resident Top 20	excellent, excited to train Top 5	unacceptable, disruptive Do not rank
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	5	0

FIGURE 1. Interview evaluation form for personal characteristics.

REFERENCE LETTERS

Reference Writers

references unknown non-surgeons	references unknown surgeons	reference famous or well-known in surgical circles	reference close friend of interviewer, known to be honest and sparing in praise	reference notorious for bad judgment
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

School

lower third school	middle third school	upper third school	top ten school	non-US
<input type="checkbox"/>				

Technical Skill Description

none	average	above average	rave reviews	warning signs
<input type="checkbox"/>				

Work Ethic Description

none	average	above average	rave reviews	warning signs
<input type="checkbox"/>				

Honesty / Integrity Description

none	average	above average	rave reviews	warning signs
<input type="checkbox"/>				

Key Descriptors

“Good”	“Excellent”	“Superior”	“Outstanding”	Other
<input type="checkbox"/>				

Overall Quality of Letters

below average	average	above average	rave reviews	warning signs
<input type="checkbox"/>				

Summary

Less than average Hire as last resort Rank above 40	average candidate, acceptable Top 40	above average, like this resident Top 20	excellent, excited to train Top 5	unacceptable, disruptive Do not rank
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	5	0

Non-academic special accomplishments (e.g. World Cup Soccer, Mutual Fund Director, etc.)

Additional comments:

Signature

FIGURE 2. Interview evaluation form for reference letters.

TABLE 2. Correlation of Resident Core Competency Evaluations with Applicant Selection Criteria

	Patient Care (r)	Knowledge (r)	Professionalism (r)	Communication (r)	Practice-Based Learning (r)	System-Based Practice (r)
PC	0.43	0.35	0.21	0.36	0.30	0.46
RL	0.35	0.30	0.15	0.26	0.22	0.31
GPA	-0.19	-0.05	-0.19	-0.26	-0.12	-0.07
USMLE	-0.37	-0.32	-0.13	-0.35	-0.24	-0.44
Res	-0.08	-0.10	-0.21	-0.14	-0.15	0.10
Pub	-0.13	-0.10	-0.31	-0.24	-0.20	-0.16
Current	0.17	0.16	0.16	0.11	0.22	0.17
Modified	0.43	0.36	0.20	0.34	0.28	0.43
Final	-0.22	-0.24	-0.31	-0.44	-0.21	-0.05

PC = personal characteristics; RL = reference letters; GPA = academic record; USMLE = United States Medical Licensing Examination Part I scores; Res = research experience; Pub = research publications; Current = existing preliminary ten component ranking score; Modified = modified preliminary two component ranking score; Final = final rank list ordinal position.

Results

Assessment of the ability of the interview process to actually predict the quality of residents matriculating into the surgical program revealed that faculty PC and RL evaluations correlated most favorably with resident clinical performance, whereas academic record and United States Medical Licensing Examination (USMLE) scores actually correlated negatively with these evaluations (Table 2). No parameter of the scoring sheets (eg, "Motivation" or "Attitude") was particularly predictive. Because of the observation of the extremely high correlation between the resident clinical performance and faculty PC and RL evaluations at the time of initial interview, a 2-point preliminary score based solely on the sum of these 2 scores was created. This 2-point score was significantly more predictive of core competency ratings than the existing 10-point preliminary score. The final rank ordinal position also correlated quite well with subsequent clinical performance. Regarding written test-taking skills, both USMLE and academic record scores did correlate well with ABSITE and ABS QE scores, as did the final rank ordinal (Table 3).

As noted, certain residents had received evaluations that indicated "cause for concern," which was defined by issues of professionalism and/or academic challenges faced. The frequency with which residents received evaluations indicating "cause for concern" correlated negatively (desirable) with PC (-0.55) and RL (-0.44) evaluations and positively (undesirable) with USMLE scores ($r = 0.47$) and medical school academic record ($r = 0.39$). When comparing preliminary scores, a combined PC/RL 2-point preliminary score correlated much better (-0.55) than did the existing 10-point score (-0.20). In fact, the final rank list ordinal correlated weakly positively (undesirable) with the frequency of "cause for concern" reports (0.10). Interestingly, the USMLE scores (236 vs 224, $p < 0.05$) and academic records (4.5 vs 4.0, $p < 0.05$) were higher in the 8 residents identified most commonly as "cause for concern."

The role that the preliminary composite rank score and its 10 individual components contributed to creating the final rank list was investigated. This revealed that the final match list correlated most highly with the applicant PC ($r = -0.74$) and

RL ($r = -0.71$) evaluations (Table 4). Use of the combined PC/RL 2-point score preliminary, alone, correlated better with final ranking ($r = -0.76$) than did the overall 10-point preliminary rank composite score (-0.60). Clearly, the rank meeting has a large role in the final ranking. The observation that the preliminary rank score only correlated with the final rank order at an r value of -0.60 ($r^2 = 0.36$) indicates that the preliminary rank order only contributes about one third to the final rank order, which is substantially less than the contribution demonstrated by r^2 values of 0.55 for PC, 0.50 for RL scores, and 0.58 for the PC/RL combined rank scoring system. Although the mean 10-point preliminary score was higher for residents finally included on the rank list, there was considerable overlap (Fig. 3). Attention was then directed to determine whether it might be possible to reduce the number of ultimately unranked applicants interviewed. Such an analysis could obviously not include the 2 faculty interview PC and RL components. The preliminary score derived from the remaining 8 components of the current system correlated moderately well with the final ordinal rank list (-0.42) (Fig. 4). Removal of 3 components

TABLE 3. Correlation of American Board of Surgery In-Training Examination (ABSITE) and Qualifying Examination (ABS QE) with Applicant Selection Criteria

	ABSITE	ABS QE
Personal characteristics (PC score)	-0.01	-0.13
Reference letters (RL score)	0.13	0.69
Academic record	0.35	0.64
Academic honors	0.01	-0.13
USMLE performance	0.44	0.82
Research experience	-0.38	-0.41
Research publications	-0.19	0.21
MUSC student	0.09	0.38
Surgical externship	0.30	0.49
Diversity enhancement	-0.07	-0.05
Overall preliminary score	0.18	0.61
Modified preliminary score	0.08	0.42
Final rank list ordinal position	-0.56	-0.85

Favorable correlations are negative with greater selection points correlated with lower ordinal rank number. USMLE = United States Medical Licensing Examination Part I scores.

TABLE 4. Correlation of Final Rank List Ordinal Position with Applicant Selection Criteria

	Correlation (r)
Personal characteristics (PC score)	-0.74
Reference letters (RL score)	-0.71
Academic record	-0.27
Academic honors	-0.41
USMLE performance	-0.22
Research experience	0.05
Research publications	-0.15
MUSC student	-0.22
Surgical externship at MUSC	0.15
Diversity enhancement	-0.01
Overall preliminary score	-0.60

Favorable correlations are negative with greater selection points correlated with lower ordinal rank number. USMLE = United States Medical Licensing Examination Part I scores.

that displayed poor correlation with the final ordinal rank slightly improved the correlation (-0.46), with the remaining components consisting of USMLE scores, academic performance, election to AOA, research experience, and publications. Using a cutoff for this 5-component score of 6 as the minimum threshold for invitation to interview would be predicted to eliminate 80% of ultimately unranked applicants from interviewing compared with our previous interview protocol. However, use of this modified system would also be predicted to restrict the interview of potentially rankable applicants by 24%, although this would represent only 12% of the top 20 and 5% of the potential top 10 applicants.

DISCUSSION

We found that two components of the faculty interview with the applicants, assessment of personal characteristics (PC) and letters of reference (RL), were surprisingly predictive of subsequent clinical performance ratings covering the 6 core competencies later in their residency training. Our observation differs from the reports of others who have found no correlations.¹⁰ It is acknowledged that some of this correlation may be related to the fact that, despite our best efforts at objectivity and the use of

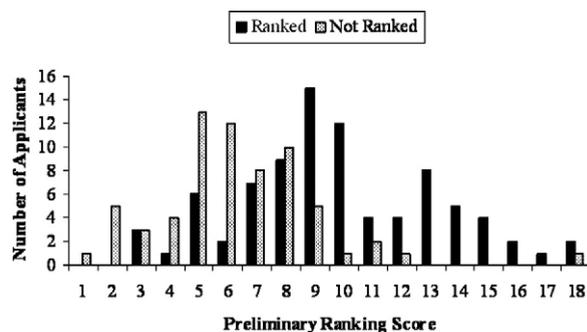


FIGURE 4. Comparison of number of ranked and unranked applicants according to preliminary ranking score without use of interview information.

sophisticated Internet-based evaluation acquisition and management systems, the clinical performance ratings by the faculty supervisors can still be quite subjective and influenced by personal characteristics of the residents that may have little to do with surgical performance. Masterful interview skills aside, surgical faculty who like whom they have chosen to instruct may be more apt to be satisfied with their performance, whereas the opposite also seems likely to be true. On the other hand, it is possible that faculty could pick up on certain personality characteristics such as Myers-Briggs “intuitive” and “thinking” preferences thought to be associated with later success in a surgical career.¹¹ Although applicants have ample time to converse with our residents, the formal interviews only include faculty and are 1-on-1. Use of residents for interviewing applicants has not been shown to affect the initial or final rank positions of the applicants, even though resident interviewers seem to consistently give more favorable scores than faculty interviewers.¹² With regard to faculty RL assessment, it is likely that academic performance, honors, and even USMLE scores are influential to these evaluations, as such records are included in the packets provided for faculty review. On the other hand, this may introduce bias, because interviews with the faculty blinded to USMLE scores and grades might give a better opportunity to display communication skills, emotional stability, and fitness for our program.¹³ That the final ordinal rank number, the final result of our resident selection process, was also predictive of clinical and formalized testing outcomes appears to validate our current interview practice to some degree.

Other medical and surgical specialties have similarly investigated the traits deemed desirable among intern applicants. In 1 program, the number of honors grades during clinical rotations was the strongest predictor of performance, whereas election to AOA was second.¹⁴ For emergency medicine, the medical school attending, dean’s letter of recommendation, and “distinctive factors” such as championship athlete or medical school officer were the most predictive of performance in a residency.¹⁵ Work ethic, interpersonal qualities, prior surgical experience, and enthusiasm seem to correlate most highly with final candidate rank order in orthopedic surgery.¹⁶ These factors would likely come out in faculty interview sessions such as our own.

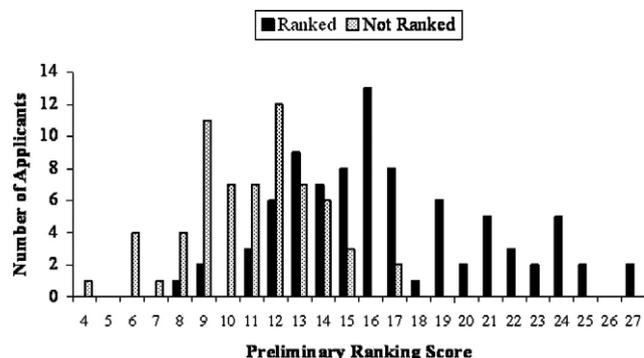


FIGURE 3. Comparison of number of ranked and unranked applicants according to preliminary ranking score.

The observation in our surgical training program that prior academic performance and USMLE scores were predictive of subsequent poor clinical performance was unexpected and conflicts with other reports.^{17,18} Clearly, not every surgical residency program is attractive to the same applicant, and perhaps applicants who might have scored well during the faculty interview and had achieved excellent USMLE scores and academic achievement in medical school may have been more likely to choose another program. Conversely, our program may have been more likely to list applicants with excellent academic credentials who did not impress the faculty interviewers, yet ended up higher on the final match list because of those academic credentials. The argument that academic performance and clinical skills might be completely unrelated is countered by the negative (not zero) correlation. Similar to other reports, we did observe that USMLE scores and academic grade performance were predictive of subsequent formalized testing such as ABSITE.^{6,10} Our program has not resorted to tests of either manual dexterity or visual-spatial ability to predict subsequent technical surgical skill.^{14,19} It seems that any correlation of visual-spatial ability with surgical skill on spatially complex surgical procedures is confined to novices and is not observed in advanced trainees or experts, which suggests that practice and surgical experience may supplant the influence of visual-spatial ability over time.²⁰ Nonetheless, none of the described outcomes (clinical performance rating by faculty or formalized testing) in isolation should be considered anything but intermediate outcomes compared with the ultimate goal to produce the best surgeon, which we unfortunately still do not know how to measure.²

We were intrigued to ponder that our resident selection process might be streamlined to reduce the numbers of unranked applicants interviewed, allowing exposure to more applicants that would be ultimately ranked on our final ERAS match list. Compared with our previous 10-point composite scoring system, PC and RL evaluations were more likely to predict final resident rank status. In addition, more liberal use of a screening system might be anticipated to reduce by as much as 80% the number of unranked applicants interviewed. In fact, on the basis of these analyses, for the 2007 intern applicant class, the modified applicant interview and scoring system was first employed. This system reduced the number of applicants interviewed from an average of 90 each of the 4 previous years to 50, which allowed us to focus more personal attention on this smaller number of interviewees. Forty-four of these 50 applicants were included on our final ERAS match list, which was similar to the average of 51 ranked applicants the previous 4 years. An impact of this change in selection protocol on subsequent resident clinical performance remains anxiously anticipated.

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