

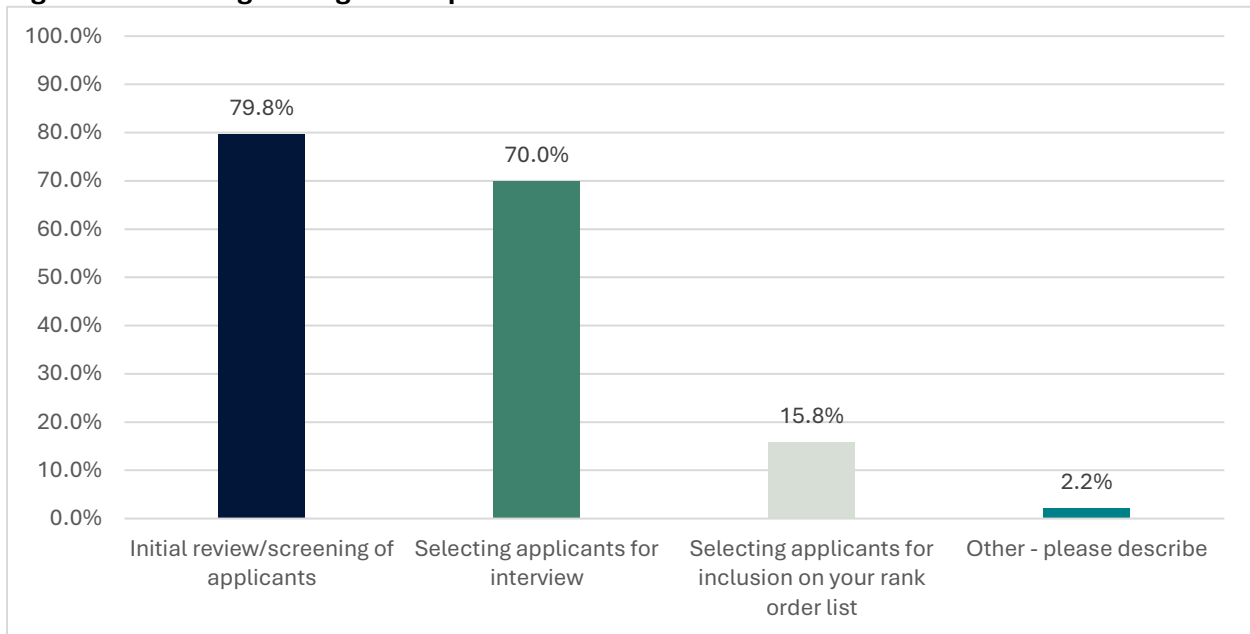
half (nine specialties) had rates of affirmative endorsement over 70 percent. Two specialties (Internal Medicine/Pediatrics and Vascular Surgery) had no affirmative endorsement, which is in line with these two specialties not participating in program signaling in 2024. For the remaining specialties (in which programs had the option of participating in program signaling), PDs were split between affirmative endorsement and negative endorsement. While rates of affirmative endorsement in the following specialties are higher than negative endorsement, specialties with highest negative endorsement include Child Neurology, Family Medicine, Neurology, Pathology, and General Surgery.

Table 2. Respondent Reporting of Whether Receipt of Program Signals Changed Review and Selection Process by Specialty

Specialty	Yes		No		Not Applicable		Total N
	N	%	N	%	N	%	
Anesthesiology	36	92.3%	2	5.1%	1	2.6%	39
Child Neurology	7	50.0%	6	42.9%	1	7.1%	14
Dermatology	9	81.8%	2	18.2%	0	0.0%	11
Emergency Medicine	47	78.3%	12	20.0%	1	1.7%	60
Family Medicine	72	59.5%	37	30.6%	12	9.9%	121
Internal Medicine	66	63.5%	27	26.0%	11	10.6%	104
Internal Medicine/Pediatrics	0	0.0%	2	12.5%	14	87.5%	16
Neurological Surgery	10	71.4%	3	21.4%	1	7.1%	14
Neurology	18	58.1%	12	38.7%	1	3.2%	31
Obstetrics and Gynecology	55	82.1%	11	16.4%	1	1.5%	67
Orthopedic Surgery	23	69.7%	8	24.2%	2	6.1%	33
Otolaryngology	18	90.0%	2	10.0%	0	0.0%	20
Pathology-Anatomic and Clinical	15	60.0%	8	32.0%	2	8.0%	25
Pediatrics	35	74.5%	11	23.4%	1	2.1%	47
Physical Medicine and Rehabilitation	16	80.0%	3	15.0%	1	5.0%	20
Psychiatry	37	66.1%	14	25.0%	5	8.9%	56
Radiology-Diagnostic	32	100.0%	0	0.0%	0	0.0%	32
Surgery-General	34	56.7%	20	33.3%	6	10.0%	60
Transitional Year	2	10.5%	4	21.1%	13	68.4%	19
Vascular Surgery	0	0.0%	4	40.0%	6	60.0%	10
All Others*	19	46.3%	10	24.4%	12	29.3%	41
Total	551	65.5%	199	23.7%	91	10.8%	841

Below, in **Figure 3**, PDs were asked about what phases of their review and selection process changed with the receipt of program signals. PDs were given the opportunity to select all phases that applied to them. Roughly 80 percent of PDs indicated that it impacted their initial review/screening of applicants, followed by selecting applicants for interviews (70.0 percent), with selection for inclusion on their rank order list being the least frequently endorsed option (15.8 percent).

Figure 3. How Program Signals Impacted Review and Selection Processes

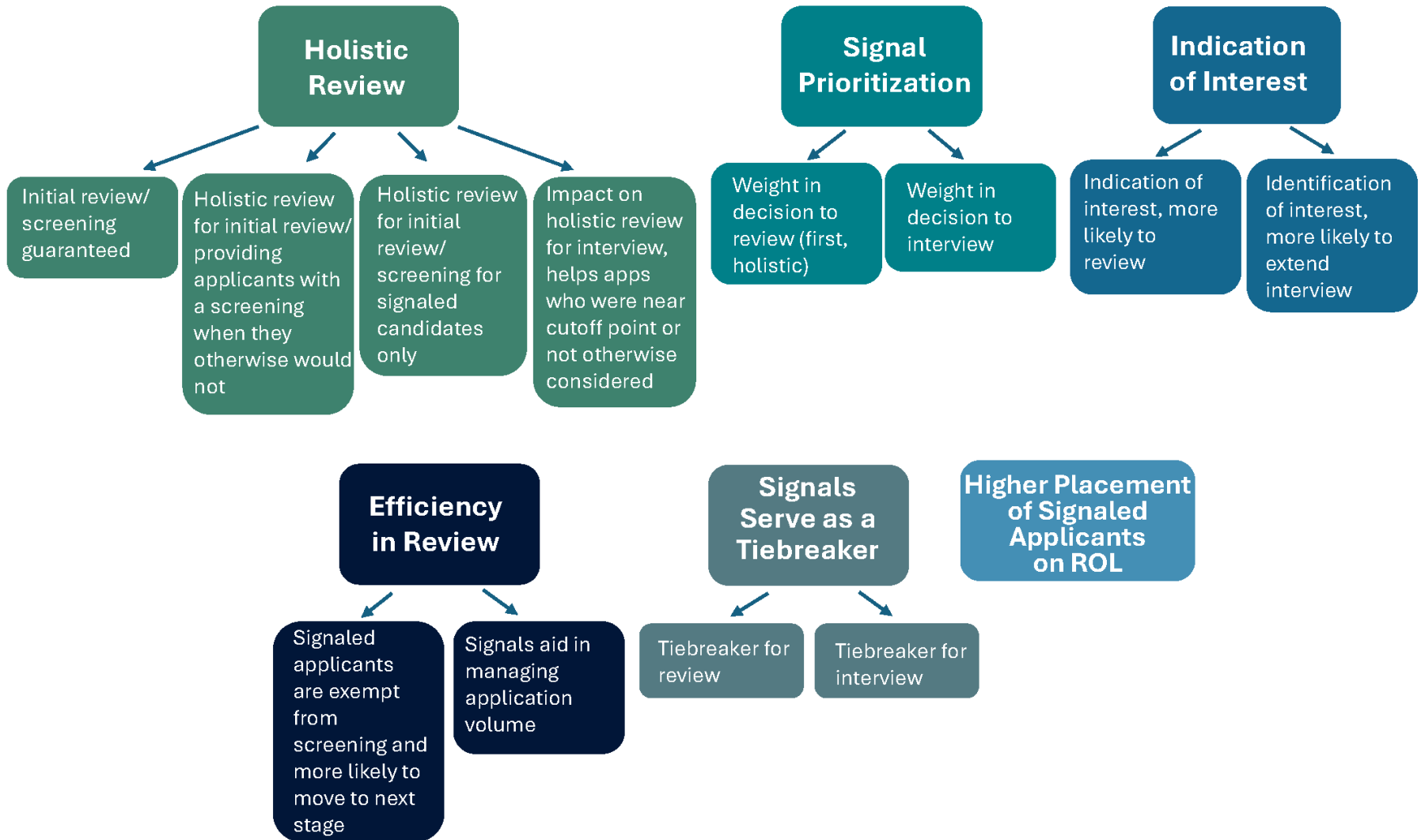


Qualitative Analysis

Of the 1,150 PDs who responded to the 2024 Program Director Survey, 411 (35.7 percent) provided a response to a program signaling open-ended question. Two NRMP research members compiled and analyzed responses, created a codebook, and independently coded responses using qualitative software, ATLAS.ti. They then consolidated codes and resolved discrepancies. A visualization of emerging themes is presented as a thematic map in **Figure 4**. It should be noted that in the open-ended responses, sometimes PDs provided answers to other questions in the text boxes.

Six themes emerged from the open-ended responses and were analyzed to recognize the intricacies of PD responses to better understand the usage and impact of program signals. As appropriate, these six themes were broken down into subthemes. The six overarching themes included 1) holistic review, 2) signal prioritization, 3) indication of interest, 4) efficiency in review, 5) signals to serve as tiebreakers, and 6) higher placement of signaled applicants on ROL. Themes and subthemes are described individually below. Selected responses for each theme/subtheme are presented in **Table 3**.

Figure 4. Thematic Map



Description of themes/Sub themes

All subthemes are closely related to their overarching parent theme, but each has distinct nuances in how they were addressed by respondents. In a cursory review, these differences might appear subtle, leading to a perception of significant overlap. However, when examined more closely, each theme contributes uniquely to the broader approach, offering specific insights that, collectively, support a comprehensive evaluation of how each theme and subtheme is distinct. Selected responses representing each theme/subtheme are available in **Table 3**.

Holistic Review

Initial review/screening guaranteed

Many PDs indicated that the receipt of a program signal was the initial metric used to screen applications across various specialties. PDs noted that utilizing the receipt of a program signal as an initial screener for narrowing down the number of applications to review helped facilitate their holistic review of applications. Since this metric helps narrow the application pool, programs can devote more time to reviewing each application.

Holistic review for initial review/providing applicants with a screening when they otherwise would not

Many PDs indicated that utilizing the receipt of a program signal as an initial screening criterion allowed them to find applicants that they likely would not have come across otherwise, either because the application would not have been reviewed at all due to previously utilized screening criteria, or because the program did not have time to review the application in detail. PDs report that in the past, they have missed out on strong candidates who would likely have been a good fit for their program because they did not holistically review their application due to using a past screening metric (like test score). They stated that they believe these candidates now have a higher likelihood of receiving holistic review and moving forward in the recruitment process due to the use of signaling as an initial application screener above previously utilized metrics.

Holistic review for initial review/screening for signaled candidates only

In some cases, PDs reported that only applications with a signal attached were reviewed. Some PDs indicated that they let applicants know ahead of time that due to high application volume they would only be reviewing signaling applicants. Programs noted their justification for this screening criteria was that it created the opportunity to closely review those applicants who “prioritized” their program.

Impact on holistic review for interview, helps apps who were near cutoff point or not otherwise considered

Signaled applicants, who might not have been considered otherwise, were also more likely to be selected for interviews. Several PDs noted that “borderline” applicants near the “cut-off point” or those lost in the heavy volume of applications were given interview opportunities. This process provided an advantage to these applicants, who might not have been considered based on other metrics alone. Additionally, some PDs mentioned that signaled applicants were interviewed earlier in the application cycle/season, giving them more consideration and an advantage.

Signal Prioritization

Weight in decision to review (first, holistic)

Signals carried significant weight in the application process, serving as a key factor in deciding to review applicants who signaled first (or to only review signaled applicants at all). By placing these applicants at the front of the review queue, they gained the advantage of being reviewed and potentially advancing to the next stage ahead of others. PDs explicitly mentioned that applicants who signaled were prioritized for a thorough holistic review as the starting point of their extensive review process. Additionally, some PDs found signal prioritization helpful as it allowed them to concentrate on a subset of applications and reject those who did not signal.

Weight in decision to interview

Signals were also prioritized in the interview process. PDs indicated that they interviewed applicants who signaled them first, moving on to those who did not signal only if necessary. This prioritization extended to scheduling interviews both early and later in the application season to fill remaining spots. One PD mentioned that signals were the only factor considered in the interview selection process, with other forms of applicant outreach, such as emails, being disregarded.

Indication of Interest

Indication of interest more likely to review

Many PDs interpreted signals as an indication of interest in the program and indicated they would be more likely to review (or would only review) applications with a signal attached. One PD mentioned that they felt that signals provided applicants with a voice, and that recruiting residents is not always about finding the "...smartest mind, it's about getting someone who wants to be here and feels at home, in the environment they feel comfortable and can succeed. This signal allows us to find the applicants who truly want to be here which is the biggest predictor of success in my experience!"

Identification of interest, more likely to extend an interview

In addition to signaling leading to programs being more likely to thoroughly review an application, PDs reported that they were also more likely to extend an interview to applicants who sent a signal. One PD mentioned that over 90% of their interviews were with signaled applicants. Another PD noted that they used the receipt of a signal to determine which applicants were more likely to attend the interviews.

Efficiency in Review

Signaled applicants are exempt from screening and more likely to move to next stage

In many cases, PDs explained that signaling served as an exemption tool, allowing applicants to bypass other initial screening criteria facilitate the process. As mentioned previously, some programs only reviewed applications with attached signals, but in other cases programs did move other non-signaled applications through the review process but only after employing more thorough screening that the signaled applications had not been subject to.

Signals aid in managing application volume

PDs noted program signals aided in managing application volume in several different ways. Many PDs stated that the receipt of signals allowed them to focus their review only on signaled applicants, greatly reducing the number of applications they had to read through, which helped prevent burnout, gave them more time to thoroughly review applications, and served as a preliminary screening metric. While not all PDs solely reviewed signaled applications, many mention that their initial review prioritized applicants who signaled, or that they only did a *thorough* review of signaled applicants, which still helped cut down on review times, and helped fill interview spots with candidates that PDs felt confident about regarding their interest in the program earlier in the process. The commentary from PDs on how this has helped their recruitment process was largely positive, as one PD said: “Signaling has made the process easier and much more efficient! Less time wasted looking at/interviewing applicants who do not really want our program.”

Signals Serve as a Tiebreaker

Tiebreaker for review

Program signals were used by some PDs to help determine which applicant to spend time reviewing between equally or similarly qualified applicants when one signaled and the other did not. A select number of PDs stated that while they did not generally change the review process because of program signals, the signals did aid in deciding between similarly qualified candidates as tiebreakers, choosing to prioritize the applicant who signaled.

Tiebreaker for interview

PDs mention utilizing signals as a tiebreaker between applicants for limited interview spots. When the applicants are similarly qualified, the PDs would select the applicant who signaled for the interview slot. A few PDs mentioned that they are more interested in interviewing applicants who demonstrate a real interest in their program, for which the program signal is helpful, especially since programs have had such a dramatic increase in applications. One PD mentioned needing to “figure out who is higher yield” (i.e., more likely to actually come).

Higher placement of signaled applicants on ROL

Many PDs stated that receiving a signal often leads to applicants being ranked higher than they may have been without signals. Several PDs mentioned that they also felt more confident ranking signaled applicants higher than their non-signal counterparts, as they felt it was more likely the applicant would rank their program as well. A few responses mentioned that while the signal may not play a direct role in their ranking decisions, the impact earlier in the process (initial review, interview) may lead to more signaled applicants getting to the point of being ranked than non-signaled, even if the signal is not directly considered during ROL selection.

Table 3. Themes and Selected Response Summaries

Theme/sub theme	Selected Responses
Holistic Review	
initial review/screening guaranteed	<p><i>"We include it in our initial screening criteria to include those that signaled our program"</i> Participant #50</p> <p><i>"All signal applicants receive a holistic review and preference for interview selection committee review. Nonsignal applicants undergo a superficial screen with only a select group considered for interview selection committee holistic review."</i> Participant #117</p> <p><i>We perform holistic review of every candidate who preferences us, regardless of filters/screens.</i> Participant #252</p>
holistic review for initial review/providing applicants with a screening when they otherwise would not	<p><i>"If they would have fallen into category that was screened out. They would at least have the application reviewed"</i> Participant #25</p> <p><i>"Initial step added was to review signaled applicants who may not have otherwise been reviewed and/or interviewed"</i> Participant #1</p> <p><i>"Finding candidates that we would not have found otherwise. We gave preference to interviewing preliminary candidates who had signaled"</i> Participant# 97</p>
holistic review for initial review/screening for signaled candidates only	<p><i>"Interviewed a few below our cut score that otherwise wouldn't have been offered an interview because they signaled us..."</i> Participant #340</p> <p><i>Leads me to invite out of state applicants I would not have otherwise interviewed due to my past experience that there is a much lower likelihood they will match to my program</i> Participant #2</p> <p><i>"It has likely increased the chances of borderline applicants getting an interview. It was very helpful for our smaller programs (prelim and PSTP)"</i> Participant #19</p>
impact on holistic review for interview, helps apps who were near cutoff point or not otherwise considered	<p><i>"Interviewed a few below our cut score that otherwise wouldn't have been offered an interview because they signaled us..."</i> Participant #340</p> <p><i>"Leads me to invite out of state applicants I would not have otherwise interviewed due to my past experience that there is a much lower likelihood they will match to my program"</i> Participant #2</p>

	<p><i>"It has likely increased the chances of borderline applicants getting an interview. It was very helpful for our smaller programs (prelim and PSTP)"</i> Participant #19</p>
Signal Prioritization	
weight in decision to review (first, holistic)	<p><i>"We focused on signaled applications and provided only a cursory review to unsigned apps"</i> Participant #274</p> <p><i>"The pool that was selected for holistic reviews was heavily weighted towards those who signaled us."</i> Participant #239</p> <p><i>"Placed applicants who signaled at the top of the list to be reviewed sooner. Also more points were allocated to those who signaled the program directly."</i> Participant #339</p>
weight in decision to interview	<p><i>"We use it as a sign that they are very interested in our program. We are not a geographic or famous program so if they signal us that is very important to us. We offer interviews to almost all the signals unless they have something that is a red flag. I think we offered all our signals interviews"</i> Participant #230</p> <p><i>"We add extra credit during reviewing application prior to invitation"</i> Participant #336</p> <p><i>"Given a small number of signals for our program I reviewed them first for interviewing before other filters were used. Signaling did increase their likelihood of an interview."</i> Participant #349</p>
Indication of Interest	
indication of interest more likely to review	<p><i>"I personally did a holistic review of every student who signaled us who met our admission criteria (we do not take any visas, we have a certain cutoff of shelf/step/part/course failures, etc.). We viewed the signal as a measure of interest in the program and were more likely to give an interview to someone who signaled"</i> Participant #38</p> <p><i>"It has helped us pay more attention to the applications which signaled us so they don't get "lost" in the pile of similar applicants. It helps us realize they are interested in us and therefore improves their application overall."</i> Participant #146</p> <p><i>"Help the review committee know who is actually interested in coming to our program."</i> Participant #233</p>

<p>identification of interest, more likely to extend an interview</p>	<p><i>"We use it as a sign that they are very interested in our program. We are not a geographic or famous program so if they signal us that is very important to us. We offer interviews to almost all the signals unless they have something that is a red flag. I think we offered all our signals interviews"</i> Participant #230</p> <p><i>"We considered receipt of a signal as a sign of interest by an applicant, and the bulk of our interviewees (over 90%) provided signals."</i> Participant #11</p> <p><i>"When we are selecting people to interview, we have to try to select the people that we will be most competitive for in the match. Prior to signaling, we relied heavily on geography to try to predict that. But this helps considerably to identify those applicants with the most interest in our program so we can make sure we get them in the door for an interview."</i> Participant #130</p>
<p>Efficiency in Review</p>	
<p>signaled applicants are exempt from screening and more likely to move to next stage</p>	<p><i>"We used signals to help us with the screening process -- if an applicant didn't meet our initial screens but signaled our program, we reviewed their application."</i> Participant #103</p> <p><i>"I screen the applicants who signaled our program first, then progress onto other criteria for selection to interview."</i> Participant #66</p> <p><i>"All signaled applicants received holistic review and were not screened out by any other filter. It is the starting point of my review and I fill interview spots from here first."</i> Participant #74</p>
<p>signals aid in managing application volume</p>	<p><i>"Applicants were screened based on the signaling this year. They were able to signal so many more programs and I felt it was a more effective tool"</i> Participant #407</p> <p><i>"It is wonderful. It has decreased the total number of applications and limits it to individuals who are going to legitimately consider our program."</i> Participant #148</p> <p><i>"Given the large volume of applications it has allowed the program to focus on signaled applicants for holistic review that may prior have been a lower priority for review. It did not change our rank listing."</i> Participant #114</p>
<p>Signals Serve as a Tiebreaker</p>	

<p>tiebreaker for review</p>	<p><i>"For students with the same score on our initial holistic review we will use preference signals as a tiebreaker"</i> Participant #285</p> <p><i>"In the case of a tie on holistic review, preference is given towards applicants who signaled our program over those who did not."</i> Participant #28</p> <p><i>"When considering applicants with relatively similar accomplishments, will favor one that signaled"</i> Participant #222</p>
<p>tiebreaker for interviews</p>	<p><i>"During our second and third pass review of applicants, if an applicant signals us and all other things are equal, we will offer the signal applicant an interview over others"</i> Participant #138</p> <p><i>"For two applicants with similar scores, will offer interview to applicants who provided a program signal"</i> Participant #54</p> <p><i>"I reviewed all applications that came with a signal. In the event that there were two equally strong candidates, I used the signal as a tie-breaker for an interview invitation."</i> Participant #112</p>
<p>Higher Placement of Signaled Applicants on ROL</p>	<p><i>"It increases the likelihood of the applicant ranking us highly. Our goal was to have at least half of our interviewees have signaled us to ensure we match candidates that we rank highly"</i> Participant #108</p> <p><i>"We ranked higher those who signaled us."</i> Participant #251</p> <p><i>"It only came into play if two candidates had the same objective score and if one signaled us and the other did not, the one that signaled would be placed on the list immediately above the one who did not signal us."</i> Participant #379</p>

Note: All quotations listed in Table 3 are written verbatim (i.e., exactly how the participant responded).

Summary of findings

The 2024 Program Director Survey revealed changes in PD review and selection processes due to the implementation of the program signaling. Six overarching themes emerged from the 411 responses that were received. Many respondents reported that the use of program signals allowed for more holistic review of applicants. Holistic review entailed giving applicants in-depth review, priority in review, and reviewing candidates less likely to have been reviewed without sending a signal. Program signaling also influenced interview decisions, which benefited applicants who would not otherwise be invited to interview and served as a tie breaker for interview invitation when comparing applicants with similar qualifications. Many reported the receipt of signals helped with interview prioritization as the receipt of a signal indicated genuine applicant interest in the program. Some PDs interpreted this genuine interest in their program as an indication that their program would be more highly ranked by the applicant. Signals also created a system of efficiency for application review, as signaled applications often bypassed initial screening and made it more apparent which applicants should be reviewed. This system also helped with management of application volume. Lastly, as programs interpreted the receipt of a signal as an applicant being genuinely interested in the program, programs also felt this would lead to the program being ranked higher on the applicant's rank order list. Many PDs reported that if they felt their program would be ranked highly by the applicant, they were more likely to rank that applicant highly to facilitate the chance of a match.

While these findings are interesting and not unexpected, the impact of signaling on ranking and matching is just beginning to be studied by the NRMP. While we agree that signaling may foster a more diverse interview pool and may surface applicants who might not otherwise receive consideration, research needs to be done to understand if signaling results in a more diverse and equitable selection of residents across all categories of applicants. In March 2024, the NRMP launched a collaboration with the AAMC, NBME, and OPDO aimed at evaluating the impact of program signals on ranking and matching outcomes. More specifically, the collaboration is currently focused on examining the impact of signaling implementation on PD selection behaviors later in the transition to residency process (i.e., during ranking and matching). Data resulting from this collaboration will be analyzed in two phases:

- Phase I: Will focus on the first three years of signaling data collected from seven specialties—Internal Medicine (Categorical), Emergency Medicine, General Surgery, Dermatology, Orthopaedic Surgery, Obstetrics and Gynecology, and Otolaryngology.
- Phase II: This phase will include all additional specialties that participate in the Main Residency Match with at least two years of signaling data available.

The first findings resulting from this work will be presented at the NRMP Transition to Residency Conference in early October 2024. This presentation will focus on results from two initial specialties, General Surgery and Otolaryngology. The intent of this overarching work is to provide applicants, advisors, and program directors with empirical evidence to evaluate the use of signaling in the resident selection process, including its impact on resident cohort composition and its potential to mitigate overapplication, as well as to inform program improvement and/or policy decisions related to this process. This report and the results being presented at the NRMP Transition to Residency Conference represent the NRMP's first steps towards informing the broader graduate medical education community on this topic.

Appendix. Selected Program Signaling Items

1. Have the receipt of preference (program) signals changed your review and selection process?
 - a. Yes
 - b. No
 - c. Not applicable (my program did not participate in preference signaling)
2. What part(s) of the review and selection process has been changed with the receipt of preference (program) signals? (check all that apply)
 - a. Initial review/screening of applications
 - b. Selecting applicants for interviews
 - c. Selecting applicants for inclusion on your rank order list
 - d. Other (please describe)
3. (*if 2a only selected*) How has signaling changed your initial review/screening of applications? (open-ended)
4. (*if 2b only selected*) How has signaling changed your selection of applicants for interviews? (open-ended)
5. (*if 2c only selected*) How has signaling changed your selection of applicants for inclusion on your rank order list? (open-ended)
6. (*if 2d or multiple selected*) How has signaling changed your review and selection process? (open-ended)