

# Do Orthopaedic Residency Programs Have the Least Time Between Invitation and Interview?

David Ruckle, MD

Montri Daniel Wongworawat, MD

## ABSTRACT

**Background** The cost and stress of applying to residency programs are increasing. Planning for interviews with limited lead time can cause additional burden to residency applicants.

**Objective** We sought to determine if the specialty of orthopaedics was affording the same lead time between interview invitation and interview dates as its surgical and medical counterparts.

**Methods** Dates for the first interview invitation and last possible interview were gathered for each program in orthopaedic surgery, general surgery, otolaryngology, vascular surgery, plastic surgery, neurological surgery, internal medicine, psychiatry, pediatrics, and family medicine. Interview lead time was calculated for each specialty. Mann-Whitney U and independent sample Kruskal-Wallis tests were used for nonparametric data with  $P < .05$  considered as significant.

**Results** Orthopaedic surgery lead time is significantly different when compared individually and pairwise to other specialties ( $P < .05$  for all comparisons), with a median lead time of 57 days. The next lowest lead time specialty is otolaryngology with a 70-day lead time. The specialty with the longest is pediatrics (median 106 days).

**Conclusions** Residency programs (orthopaedic surgery in particular) vary widely in the amount of lead time given to schedule and attend interviews. The authors propose that interview invitations be extended into mid-October.

## Introduction

Residency applicants are spending more money to apply, interview, and match to residency programs now more than ever.<sup>1</sup> Since 1980, when total applicants exceeded total positions available, increasing competition drives students to apply to and interview at more programs each year.<sup>2,3</sup> The number of students applying has seen year-over-year growth since 2004 and does not seem to be slowing down.<sup>3</sup> Unfortunately, the number of residency spots have risen at a much slower rate and contribute to the bottleneck in physician supply.<sup>4</sup> For orthopaedic surgery, the average number of applications currently sent by residents (80) and reviewed by programs (598) has doubled when compared to 25 years ago.<sup>5</sup> Based on computer modeling of matching and application data, there is no benefit for applicants to send more than 50 applications, but the average applicant is sending nearly double that number and going on as many interviews as possible to increase the chances of matching.<sup>5</sup>

This behavior is mentally and financially costly to applicants. Application and interview costs incurred by the fourth-year medical student applying to orthopaedic surgery can be well in excess of \$10,000, which does not include additional costs incurred by doing rotations at programs away from

their medical school.<sup>6</sup> The average medical student is graduating with a \$250,000 record average in excess of schooling debt.<sup>7</sup> Mental stress is also an ever present reality. Stress to perform well and to match into the desired specialty of choice are common.<sup>8-11</sup> Due to the increasing number of surplus applicants being left unmatched each year (5818 unmatched of 40 084 applicants in 2020),<sup>12</sup> this stress is likely to continue unless changes are made.

Changes to the system can come from residency programs. Potentially modifiable factors include the timing of when interview invitations are sent out and the timing of when interviews are offered. These decisions set the window of time in which the applicant can arrange lodging and transportation. Additionally, when programs issue invitations at different times from one another, applicants may need to change previously made travel arrangements or interview arrangements at other earlier scheduled programs. Having a shorter window between interview invitation and interview gives less time for applicants to find the most convenient and inexpensive transportation and lodging options. Changing previously made arrangements can also increase costs due to fees that are levied. Anecdotally, we suspected that orthopaedic surgery historically has offered a relatively short window when compared to other specialties. A potential aid to this would be for orthopaedic surgery and other residency programs to lengthen the time from interview offer to last

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potential interview date (henceforth called “lead time”).

Our study aim was to determine if orthopaedic surgery was affording the same lead time between interview invitation and interview date as their surgical and medical counterparts, hypothesizing that it would be shorter. If orthopaedic surgery did not offer the same lead time, the authors aim was to propose a potential solution to the problem that would aid in decreasing scarcity, decreasing opportunity cost, and increasing choice of future orthopaedic surgeons and physicians in all specialties when selecting a residency program.

## Methods

In April 2020, the authors gathered dates for first interview invitation and last possible interview for each program in orthopaedic surgery, general surgery, otolaryngology, vascular surgery, plastic surgery, neurological surgery, internal medicine, psychiatry, pediatrics, and family medicine for a representation of both surgical and medical specialties. Complete lists of programs were obtained from the National Resident Matching Program (NRMP) 2020 statistics.<sup>12</sup> Data were extracted from a widely available, crowd-sourced compilation of interview data created each year on Google Sheets that are separate and continuously maintained for each specialty by applicants.<sup>13–22</sup> Applicants enter data as the interview offers are released and add to them daily until interview invites cease to be extended. A previous review comparing the NRMP data to the spreadsheets showed the accuracy of the quantifiable data with the added benefit of additional qualitative data that can be mined from these spreadsheets.<sup>23</sup>

We included data from the 2019–2020 interview season spreadsheets, compiled during the same time period. From this data, the number of days between invitation and interview was calculated. Additional verification was completed to ensure accuracy of the data. We spot checked a sampling of 10 of 163 national orthopaedic programs by contacting them and confirming the date interviews were first sent and the final interview date of the season.

Univariate analysis between orthopaedic surgery and each other specialty was individually performed using the Mann–Whitney U test for continuous variables due to nonparametric data. Pairwise comparison was performed using an independent sample Kruskal–Wallis test for nonparametric data. Medians were reported according to practice for nonparametric data. All data analysis was done using SPSS Statistics 22 (IBM Corp, Armonk, NY), with  $P < .05$  considered significant.

### Objectives

We sought to determine if orthopaedic surgery was affording the same lead time between interview invite and the interview as other specialties.

### Findings

Orthopaedic surgery has the lowest median time to interview of 57 days, the next closest is otolaryngology with 70 days, and the most is 106 days for pediatrics.

### Limitations

The data comes from a 1-year snapshot of an open source data set.

### Bottom Line

Orthopaedics and other specialties can ease stress on applicants by having an earlier, unified release date for interviews.

Loma Linda University deemed the study to be exempt from the Institutional Review Board process as it did not include any protected information or pose any risk to safety, privacy, or care.

## Results

Complete data on incoming postgraduate year 1 classes were available for 163 of 203 (80%) orthopaedic programs, 285 of 328 (87%) categorical general surgery programs, 117 of 129 (91%) otolaryngology programs, 56 of 59 (95%) vascular surgery programs, 81 of 84 (96%) integrated plastic surgery programs, 103 of 112 (92%) neurological surgery programs, 220 of 587 (37%) categorical internal medicine programs, 103 of 310 (33%) psychiatry programs, 142 of 222 (64%) pediatrics programs, and 384 of 706 (54%) family medicine programs.<sup>12</sup> Random spot check of programs showed a median difference of 0 days (IQR -1 to 0) from their report and what was depicted in the spreadsheets.

Orthopaedic surgery had the shortest time between interview invitation and last interview date, with a median of 57 days ( $P < .05$  for pairwise comparisons will all other specialties; TABLE and FIGURE) with the next being otolaryngology (median 70 days). Pediatrics had the highest median (106 days). The lead time from invitation to interviews were below the grand median (pooled median of all subspecialties) of 85 days for surgical specialties; primary care specialties were above the overall median. Orthopaedic surgery interview dates spanned 4 months.

## Discussion

Surgical specialties were found to provide shorter lead time between extending invitations and last available interview date than nonsurgical specialties, with orthopaedic surgery programs providing the least. This is unlikely due to anything more than habit, tradition, and no previously concerted effort to effect

TABLE

Number of Days Between Earliest Date Invitations Extended and Latest Interview Date Available

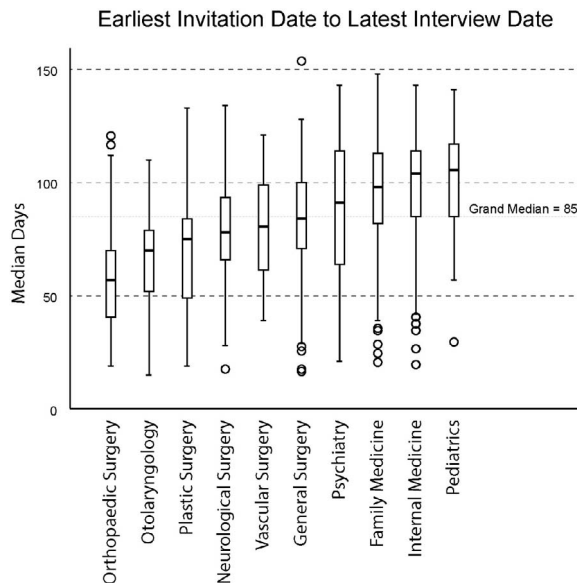
Specialty	Median (IQR) Days	P Value <sup>a</sup>
Orthopaedic surgery	57 (41–70)	Reference
Otolaryngology	70 (52–79)	.049
Plastic surgery	75 (49–84)	.005
Neurological surgery	78 (66–94)	< .001
Vascular surgery	81 (62–99)	< .001
General surgery	84 (71–100)	< .001
Psychiatry	91 (64–114)	< .001
Family medicine	98 (82–113)	< .001
Internal medicine	104 (85–114)	< .001
Pediatrics	106 (85–117)	< .001

<sup>a</sup> Pairwise comparison to orthopaedic surgery, independent sample Kruskal-Wallis test.

change. Working in a field with constantly evolving technology requires one to stay open to change and new ideas when they are presented. As such, the time may be right for change.

Relatively short lead times in any field may stem from a variety of historical reasons. It is possible that orthopaedic surgery residency programs have fewer education faculty to review applications. It is also possible that there are fewer total hours available to review because of fewer academic days and high clinic and surgical volume. Another hypothesis is that surgeons are adding more elective cases on prior to the Thanksgiving and Christmas holiday times to allow their patients recovery time while they are off. However, the short lead time can negatively affect residency applicants by adding financial and mental stress due to increased cost of last-minute flights and extra time needed to coordinate. Additionally, the opportunity cost of having to give up one interview for another that comes in at a random time can cause additional stress to an applicant. Currently, more than 50% of physicians and physicians-in-training are exhibiting symptoms of burnout leading to increased medical error, patient dissatisfaction, depression, substance abuse, divorce, suicide, interpersonal conflict, and provider attrition; external pressures are cited as a large part of the multifactorial etiology.<sup>24–29</sup> Residency programs can assist in decreasing stress and opportunity costs for applicants by considering the lead time they offer, especially if it imposes little burden to them.

Surgical subspecialty fields may consider releasing interviews at an earlier and unified date. This would grant applicants more time to seek cost-effective travel options and allow them to plan all of their residency interview scheduling at the same time,



FIGURE

Box and Whisker Plot of Time Between Interview Invitation and Last Interview Date for 10 Specialties

rather than adding and dropping interviews as offers arrive. While plastic surgery was the specialty with the third shortest (75 days) lead time, they employ a specialty-wide release of interviews. In the 2019–2020 plastic surgery interview year, 95% of the programs sent out their invitations on the same day.

This study has some potential limitations. First, data were from an open source platform that comes with the potential complication of a contributor incorrectly changing the data. However, the spreadsheet is continually peer-checked by applicants. Spot checking confirmed the results of a prior study that the data were similar to reality, and data taken after the interview season were concluded to ensure that there was no motivation for any manipulation of the spreadsheet. Not all medicine-based specialties were looked at, including urology and ophthalmology, because they are not part of the NRMP. We studied time from interview invitation to last interview. We are therefore not able to comment on the length of interview date windows or the time between invitation and first interview date, which also can contribute to applicant stress. Lastly, this was a 1-year snapshot at the data pre-COVID-19 and will not apply to the 2020–2021 video application season.

Assuming that there is a return to normalcy post-COVID-19, programs could help reduce the burden on applicants with a simple change. The authors propose a unified release date in mid-October for orthopaedic interviews, similar to a recent obstetrics and gynecology initiative.<sup>30</sup> We also propose that all specialties adopt a unified release date even if they currently afford ample

lead time to their applicants. Further research from the 2020–2021 virtual application cycle will also help guide decisions for future cycles.

## Conclusions

Orthopaedic surgery does not afford as much time to their applicants between first interview invitation and last possible interview day when compared to other surgical and medical specialties. A unified interview release day could decrease stress and reduce burden on applicants.

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**David Ruckle, MD**, is a Resident, Department of Orthopedic Surgery, Loma Linda University Health; and **Montri Daniel Wongworawat, MD**, is Program Director, Department of Orthopedic Surgery, Loma Linda University Health.

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Corresponding author: Montri Daniel Wongworawat, MD, Loma Linda University Health, [dwongworawat@llu.edu](mailto:dwongworawat@llu.edu)

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