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Residency Program Directors Survey

Start of Block: Welcome!

Q1 Medical students are often concerned about **how their research efforts during medical school are perceived by Program Directors during the residency application process.** We have found these concerns to be heightened as USMLE Step 1 transitions to pass/fail. **Thank you for completing this survey** so that we may better understand how Program Directors evaluate student participation in research. The survey is short and **should take less than 10 minutes to complete**. All responses are confidential. This survey has received exempt determination from the University of Chicago IRB.

End of Block: Welcome!

Start of Block: Demographics (Section 1/5)

Q2 **Section 1 of 5: Residency Program Characteristics**

Q3 **Your residency program is best described as:**

- ○ Academic Medical Center or University-affiliated (1)
- ○ Community Hospital (2)
- ○ Military (3)
- ○ Other, please describe (4) _____

Q4 **In what region of the country is your program located?**

- ○ Pacific (CA, OR, WA, AK, HI) (1)
- ○ Mountain (AZ, CO, ID, MT, NM, NV, UT, WY) (2)
- ○ West North Central (IA, KS, MN, MO, ND, NE, SD) (3)
- ○ West South Central (AR, LA, OK, TX) (4)
- ○ East North Central (IL, IN, MI, OH, WI) (5)
- ○ East South Central (AL, KY, MS, TN) (6)
- ○ New England (CT, MA, ME, NH, RI, VT) (7)
- ○ Middle Atlantic (NJ, NY, PA) (8)
- ○ South Atlantic (DC, DE, FL, GA, MD, NC, SC, VA, WV) (9)
- ○ Puerto Rico (10)

Q5 **For which specialty are you a Residency Program Director?**

▼ Anesthesiology (1) ... Other (31)

Display This Question:

If For which specialty are you a Residency Program Director? = Other

Q6 **If Other, please specify:**

_____

End of Block: Demographics (Section 1/5)

Start of Block: Research/Scholarly Work During Medical School

Q7 **Section 2 of 5: Research/Scholarly Work During Medical School**

Q8 **When reviewing a student's application for residency, of how much importance is participation in research/scholarly work during medical school?**

- ○ High importance (4)
- ○ Moderate importance (3)
- ○ Low importance (2)
- ○ Not considered (1)

Skip To: End of Block If When reviewing a student's application for residency, of how much importance is participation in... = Not considered

Page Break

Display This Question:

If When reviewing a student's application for residency, of how much importance is participation in... = High importance

Or When reviewing a student's application for residency, of how much importance is participation in... = Moderate importance

Or When reviewing a student's application for residency, of how much importance is participation in... = Low importance

X→

Q9 **Is completion of a research project *alone* (excluding case reports or literature reviews) a sufficient indicator of *meaningful participation in research*, or is presentation/publication of results required?**

- ○ Project completion is not required (1)
- ○ Project completion alone is sufficient (2)
- ○ Presentation/publication of results is needed (3)

X→

Q10 **How important is it that residency applicants completed scholarly work *in your residency specialty*, compared to work done in a different clinical specialty?**

- ○ High importance that research was done in my specialty (4)
- ○ Moderate importance that research was done in my specialty (3)
- ○ Low importance that research was done in my specialty (2)
- ○ Not important whether research was done in my specialty (1)

Display This Question:

If Device Type Is Not Mobile

Q11_A **How important is each of the following in assessing whether an applicant has *meaningfully participated in research* during medical school?**

	Not considered (1)	Low importance (2)	Moderate importance (3)	High importance (4)
Completion of an original research project (excluding case reports and literature reviews) (Q11A_1)	○	○	○	○
Acceptance of an abstract of poster to a regional or national meeting (may not have actually presented due to pandemic) (Q11A_2)	○	○	○	○
Submission of a manuscript for publication (Q11A_3)	○	○	○	○
One publication (Q11A_4)	○	○	○	○
More than one publication (Q11A_5)	○	○	○	○
First author publication (Q11A_6)	○	○	○	○
Publication in a high impact journal (Q11A_7)	○	○	○	○

Display This Question:

If Device Type Is Mobile

Q11_B **How important is each of the following in assessing whether an applicant has *meaningfully participated in research* during medical school?**

	High Importance (4)	Moderate Importance (3)	Low importance (2)	Not considered (1)
Completion of an original research project (excluding case reports and literature reviews) (Q11B_1)	○	○	○	○
Acceptance of an abstract of poster to a regional or national meeting (may not have actually presented due to pandemic) (Q11B_2)	○	○	○	○
Submission of a manuscript for publication (Q11B_3)	○	○	○	○
One publication (Q11B_4)	○	○	○	○
More than one publication (Q11B_5)	○	○	○	○
First author publication (Q11B_6)	○	○	○	○
Publication in a high impact journal (Q11B_7)	○	○	○	○

Page Break

Q12 **Students conduct many different *types* of research, including Basic Science, Translational Research, Clinical Research, Social Science, Ethics, Public/Community Health, Global Health, Medical Education, Medical Humanities, Quality Improvement, Health Systems Science, Business of Medicine, and others.**

In your residency applicant review process, do you value applicant research of all *types* equally, or do you value some types more than others?

- ○ I value all types of research equally (1)
- ○ I value some types of research more than others (2)

Display This Question:

If Students conduct many different types of research, including Basic Science, Translational Research, = I value some types of research more than others

Q13 **Please indicate which *types of research are valued highly* when you rate residency applicants. Select all highly valued types.**

- ☐ Basic science (1)
- ☐ Translational research (2)
- ☐ Clinical research (3)
- ☐ Social science (4)
- ☐ Ethics (5)
- ☐ Medical education (6)
- ☐ Medical humanities (7)
- ☐ Public/community health (8)
- ☐ Global health (9)
- ☐ Quality improvement (10)
- ☐ Health systems science (11)
- ☐ Business of medicine (12)
- ☐ Other, please specify (13) _____
- ☐ Other, please specify (14) _____

Page Break

Q14 **Do you weigh *measures of research productivity* (e.g. publication, poster presentation, etc) differently based on the *type* of research (e.g. basic science, clinical research, quality improvement, etc)?**

- ○ Yes, I weigh measures of research productivity differently based on the type of research (1)
- ○ No, I weigh measures of research productivity the same regardless of the type of research (2)

Display This Question:

If Do you weigh measures of research productivity (e.g. publication, poster presentation, etc) diffe... = Yes, I weigh measures of research productivity differently based on the type of research

Q15 **From which *types* of research do you expect *more research productivity* during medical school?**

- ☐ Basic science (1)
- ☐ Translational research (2)
- ☐ Clinical research (3)
- ☐ Social science (4)
- ☐ Ethics (5)
- ☐ Medical education (6)
- ☐ Medical humanities (7)
- ☐ Public/community health (8)
- ☐ Global health (9)
- ☐ Quality improvement (10)
- ☐ Health systems science (11)
- ☐ Business of medicine (12)
- ☐ Other, please specify (13) _____
- ☐ Other, please specify (14) _____

Page Break

Display This Question:

If Students conduct many different types of research, including Basic Science, Translational Research, = I value some types of research more than others

Or Do you weigh measures of research productivity (e.g. publication, poster presentation, etc) diffe... = Yes, I weigh measures of research productivity differently based on the type of research

Q16

It is often easier to compare research *productivity* between students doing the *same type* of research. This may become more complex when students conduct *different types* of work.

How do you weigh less productive work of a highly valued type, compared to more productivity of a lesser valued type of research?

- ○ High-value type of research weighs much more than productivity (1)
- ○ High-value type of research weighs somewhat more than productivity (2)
- ○ Both weigh about the same (3)
- ○ High research productivity weighs somewhat more than high value type of research (4)
- ○ High research productivity weighs much more than high value type of research (5)

Display This Question:

If Students conduct many different types of research, including Basic Science, Translational Research, = I value all types of research equally

And If

It is often easier to compare research productivity between students doing the same type of resea... != Both weigh about the same

Or It is often easier to compare research productivity between students doing the same type of resea... = High research productivity weighs somewhat more than high value type of research

Or It is often easier to compare research productivity between students doing the same type of resea... = High research productivity weighs much more than high value type of research

Q17 **Please indicate which *types of research are valued highly* when you rate residency applicants. Select all highly valued types.**

- ☐ Basic science (1)
- ☐ Translational research (2)
- ☐ Clinical research (3)
- ☐ Social science (4)
- ☐ Ethics (5)
- ☐ Medical education (6)
- ☐ Medical humanities (7)
- ☐ Public/community health (8)
- ☐ Global health (9)
- ☐ Quality improvement (10)
- ☐ Health systems science (11)
- ☐ Business of medicine (12)
- ☐ Other, please specify (13) _____
- ☐ Other, please specify (14) _____

Page Break

Q18 **Do you adjust your expectations for research productivity if medical school students...**

	Yes, I expect a lot more of such students (1)	Yes, I expect somewhat more of such students (2)	No, I do not adjust my expectations (3)
...complete a PhD along with their MD? (1)	○	○	○
...add a 5th year to their medical education dedicated to research? (2)	○	○	○

Page Break

Q19 **Please consider achievements that you indicated were of high or moderate importance in defining *meaningful participation in research* above. As a reminder, you selected the following:**

High importance: ${Q11_A/ChoiceGroup/SelectedChoicesForAnswer/1}

Moderate importance: ${Q11_A/ChoiceGroup/SelectedChoicesForAnswer/2} **When you assess residency applicants, do you use meaningful participation in research as a proxy for the following traits? Check all that apply:**

- ☐ Commitment to the residency specialty (1)
- ☐ Communication skills (2)
- ☐ Critical and analytic thinking skills (3)
- ☐ Intellectual curiosity (4)
- ☐ Interest in an academic career (5)
- ☐ Likelihood of research success during residency (6)
- ☐ Perseverance (7)
- ☐ Self-directed learning skills (8)
- ☐ Teamwork skills (9)
- ☐ Time management skills (10)
- ☐ Other, please specify (11) _____
- ☐ Other, please specify (12) _____

Page Break

Q20 **Section 3 of 5: Using Residency Application Components to Determine which Students to Interview**

Q21
Again, consider achievements that you indicated were of high or moderate importance in defining *meaningful participation in research*.

In the absence of a numeric USMLE Step 1 score, how will you weigh *meaningful participation in research* relative to the following 8 application components as you decide which applicants to invite to interview?

Q22 **To garner an invitation to interview, it is more important for an applicant to have:**

- ○ A high USMLE Step 2 score (1)
- ○ Meaningful participation in research (2)
- ○ Both are equally valuable toward an invitation to interview (3)

Q23 **To garner an invitation to interview, it is more important for an applicant to have:**

- ○ High clerkship grades (1)
- ○ Meaningful participation in research (2)
- ○ Both are equally valuable toward an invitation to interview (3)

Q24 **To garner an invitation to interview, it is more important for an applicant to have:**

- ○ Excellent performance in electives in your specialty (1)
- ○ Meaningful participation in research (2)
- ○ Both are equally valuable toward an invitation to interview (3)

Q25 **To garner an invitation to interview, it is more important for an applicant to have:**

- ○ Strong letters of recommendation (1)
- ○ Meaningful participation in research (2)
- ○ Both are equally valuable toward an invitation to interview (3)

Q26 **To garner an invitation to interview, it is more important for an applicant to have:**

- ○ Demonstrated leadership during medical school (1)
- ○ Meaningful participation in research (2)
- ○ Both are equally valuable toward an invitation to interview (3)

Q27 **To garner an invitation to interview, it is more important for an applicant to have:**

- ○ Service work during medical school (1)
- ○ Meaningful participation in research (2)
- ○ Both are equally valuable toward an invitation to interview (3)

Q28 **To garner an invitation to interview, it is more important for an applicant to have:**

- ○ Election to AOA or similar honor society (if available at the applicant's school) (1)
- ○ Meaningful participation in research (2)
- ○ Both are equally valuable toward an invitation to interview (3)

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Q29 **In the absence of a numeric USMLE Step 1 score, will meaningful participation in research have increased weight as you evaluate which applicants to invite to interview?**

- ○ Yes, with Step 1 being Pass/Fail, meaningful participation in research will be more important (1)
- ○ No, the weight of meaningful participation in research will not change (2)

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Q30 **Section 4 of 5: Using Residency Application Components to Determine Rank List Order**

Q31 **Again, consider your definition of *meaningful participation in research*. In the absence of a numeric USMLE Step 1 score, how will you weigh meaningful participation in research relative to the following 8 application components as you decide how to position applicants on your rank list?**

Q32 **For a higher rank on the Match list, it is more important for the applicant to have:**

- ○ A high USMLE Step 2 score (1)
- ○ Meaningful participation in research (2)
- ○ Both are equally valuable toward higher rank on the Match list (3)

Q33 **For a higher rank on the Match list, it is more important for the applicant to have:**

- ○ High clerkship grades (1)
- ○ Meaningful participation in research (2)
- ○ Both are equally valuable toward higher rank on the Match list (3)

Q34 **For a higher rank on the Match list, it is more important for the applicant to have:**

- ○ Excellent performance in electives in your specialty (1)
- ○ Meaningful participation in research (2)
- ○ Both are equally valuable toward higher rank on the Match list (3)

Q35 **For a higher rank on the Match list, it is more important for the applicant to have:**

- ○ Strong letters of recommendation (1)
- ○ Meaningful participation in research (2)
- ○ Both are equally valuable toward higher rank on the Match list (3)

Q36 **For a higher rank on the Match list, it is more important for the applicant to have:**

- ○ Demonstrated leadership during medical school (1)
- ○ Meaningful participation in research (2)
- ○ Both are equally valuable toward higher rank on the Match list (3)

Q37 **For a higher rank on the Match list, it is more important for the applicant to have:**

- ○ Service work during medical school (1)
- ○ Meaningful participation in research (2)
- ○ Both are equally valuable toward higher rank on the Match list (3)

Q38 **For a higher rank on the Match list, it is more important for the applicant to have:**

- ○ Election to AOA or similar honor society (if available at the applicant's school) (1)
- ○ Meaningful participation in research (2)
- ○ Both are equally valuable toward higher rank on the Match list (3)

Page Break

Q39 **How important to ranking is an applicant's ability to clearly discuss their research/scholarly work during their interview?**

- ○ High importance (4)
- ○ Moderate importance (3)
- ○ Low importance (2)
- ○ Not considered (1)

Q40 **In the absence of a numeric USMLE Step 1 score, will meaningful participation in research have increased weight as you consider which applicants to rank highly on your Match list?**

- ○ Yes, with Step 1 being Pass/Fail, meaningful participation in research will be more important (1)
- ○ No, the weight of meaningful participation in research will not change (2)

End of Block: Research/Scholarly Work During Medical School

Start of Block: About Your Residency Program

Q41 **Section 5 of 5: About your Residency Program**

Q42 **Upon completion of their training, approximately what percent of your residency program graduates pursue careers in academic medicine?**

- ○ 0-25% (1)
- ○ 26-50% (2)
- ○ 51-75% (3)
- ○ 76-100% (4)

Q43 **Upon completion of their training, approximately what percent of your residency program graduates pursue research as part of their career?**

- ○ 0-25% (1)
- ○ 26-50% (2)
- ○ 51-75% (3)
- ○ 76-100% (4)

Q44 **For your residency program, is sending graduates into academic careers...**

- ○ A central goal (1)
- ○ One goal among others (2)
- ○ Not a goal (3)

Q45 **For your residency program, is training physician-scientists (or clinician-scientists)...**

- ○ A central goal (1)
- ○ One goal among others (2)
- ○ Not a goal (3)

Q46 **Does your residency program have a research requirement?**

- ○ Yes (1)
- ○ No (2)

Display This Question:

If Does your residency program have a research requirement? = No

Q47 **In your residency program, is participation by residents in a hypothesis-driven research project...**

- ○ optional, but strongly encouraged (1)
- ○ optional, and not emphasized (2)

Q48 **Is there anything else that you would like to tell us about the role of medical school research experience in how likely prospective residents are to be invited to interview or in how those interviewed are ranked?**

_____

End of Block: About Your Residency Program

Start of Block: Block 6

Q49 **Thank you so much for your input! Please click the forward arrow to submit your survey.**

End of Block: Block 6

Supplemental Digital Appendix 2

Differences in Value of Types of Research by Specialty Competitiveness Category and by Program Setting

	Overall N=251	Least Competitive N=96	Competitive N=74	Most Competitive N=81	Academic N=183	Community N=65	Military N=3
Clinical research	210 (83.7%)	73 (76.0%)	64 (86.5%)	**73 (90.1%)^**	162 (88.5%)	**46 (70.8%)*** **	2 (66.7%)
Quality improvement	156 (62.2%)	76 (79.2%)	**40 (54.1%)*** **	**40 (49.4%)+++**	109 (59.6%)	44 (67.7%)	3 (100%)
Medical education	129 (51.4%)	52 (54.2%)	45 (60.8%)	32 (39.5%)	90 (49.2%)	37 (56.9%)	2 (66.7%)
Translational science	126 (50.2%)	42 (43.8%)	32 (43.2%)	**52 (64.2%)****	103 (56.3%)	**22 (33.9%)^^**	1 (33.3%)
Public/community health	125 (49.8%)	63 (65.6%)	42 (56.8%)	**20 (24.7%)+++**	80 (43.7%)	**42 (64.6%)++**	3 (100%)
Basic science	91 (36.3%)	22 (22.9%)	21 (28.4%)	**48 (59.3%)+++**	79 (43.2%)	**11 (16.9%)+++**	1 (33.3%)
Global health	75 (29.9%)	37 (38.5%)	19 (25.7%)	**19 (23.5%)+**	59 (32.2%)	14 (21.5%)	2 (66.7%)
Ethics	62 (24.7%)	27 (28.1%)	19 (25.7%)	16 (19.8%)	45 (24.6%)	16 (24.6%)	1 (33.3%)
Health systems science	52 (20.7%)	26 (27.1%)	16 (21.6%)	**10 (12.4%)^**	38 (20.8%)	13 (20%)	1 (33.3%)
Medical humanities	49 (19.5%)	21 (21.9%)	20 (27.0%)	**8 (9.9%)***	34 (18.6%)	14 (21.5%)	1 (33.3%)
Social science	49 (19.5%)	21 (21.9%)	15 (20.3%)	13 (16.1%)	35 (19.1%)	12 (18.5%)	2 (66.7%)
Business of medicine	25 (10.0%)	12 (12.5%)	5 (6.8%)	8 (9.9%)	17 (9.3%)	7 (10.8%)	1 (33.3%)

Among PDs who value some types of research more than others (n=251), there are differences among PDs from competitive and most competitive categorized specialties, compared to least competitive categorized specialties, and also among PDs from community-based programs, compared to academic medical center/university-affiliated programs. (* p=0.04, + p=0.03, ^ p=0.02, ** p=0.007, ++ p=0.004, ^^ p=0.002, *** p=0.001, +++ p<0.001).

Supplemental Digital Appendix 3

Odds That PDs From Competitive or Most Competitive Specialties Expect Increased Productivity From a Certain Type of Research, Compared to PDs From Least Competitive Specialties

	High value type (Table 2) (N=251) N (%)	Higher productivity expected (N=309) N (%)	Competitive specialties *(unadjusted)* OR	95% CI	p-value	Competitive specialties *(adjusted)* OR	95% CI	p-value	Most competitive specialties *(unadjusted)* OR	95% CI	p-value	Most competitive specialties *(adjusted)* OR	95% CI	p-value
Clinical research	210 (83.7)	206 (66.7)	0.96	0.52-1.75	0.887	0.77	0.41-1.47	0.43	**1.84**	**1.04-3.25**	**0.04**	1.26	0.68-2.35	0.46
Quality improvement	156 (62.2)	119 (38.5)	0.75	0.41-1.38	0.35	0.80	0.43-1.50	0.49	0.77	0.45-1.33	0.35	0.85	0.48-1.52	0.59
Medical education	129 (51.4)	95 (30.7)	0.69	0.37-1.29	0.24	0.69	0.36-1.30	0.25	**0.48**	**0.27-0.85**	**0.01**	**0.42**	**0.23-0.79**	**0.007**
Translational science	126 (50.2)	74 (24.0)	0.78	0.38-1.60	0.50	0.75	0.36-1.55	0.43	1.05	0.57-1.93	0.89	0.91	0.47-1.75	0.77
Public/community health	125 (49.8)	83 (26.9)	0.66	0.34-1.25	0.20	0.77	0.39-1.50	0.44	**0.48**	**0.27-0.88**	**0.02**	0.54	0.28-1.02	0.06
Basic science	91 (36.3)	72 (23.3)	1.41	0.69-2.88	0.34	1.55	0.74-3.24	0.24	1.38	0.72-2.63	0.34	1.49	0.74-3.00	0.26
Global health	75 (29.9)	37 (12.0)	0.60	0.24-1.52	0.28	0.58	0.22-1.48	0.25	0.72	0.33-1.57	0.41	0.65	0.28-1.50	0.31
Ethics	62 (24.7)	32 (10.4)	0.58	0.20-1.65	0.31	0.53	0.18-1.53	0.24	0.95	0.41-2.17	0.90	*0.75*	*0.31-1.82*	*0.53*
Health systems science	52 (20.7)	36 (11.7)	0.48	0.18-1.24	0.13	0.47	0.18-1.22	0.12	0.61	0.28-1.34	0.22	0.57	0.24-1.32	0.19
Medical humanities	49 (19.5)	46 (14.9)	0.81	0.36-1.84	0.62	0.81	0.35-1.86	0.62	0.75	0.36-1.57	0.45	0.80	0.36-1.74	0.57
Social science	49 (19.5)	33 (10.7)	0.86	0.37-2.02	0.73	0.84	0.35-2.02	0.70	**0.36**	**0.14-0.90**	**0.03**	**0.28**	**0.11-0.75**	**0.01**
Business of medicine	25 (10.0)	22 (7.1)	0.35	0.09-1.34	0.13	0.31	0.08-1.21	0.09	0.76	0.30-1.95	0.57	0.53	0.19-1.46	0.22

Both unadjusted model, and model adjusted for program setting (academic/university, community-based, military), importance of research in evaluating residency applicants, and whether sending graduates into physician-scientist careers is a program goal. N=309.

Supplemental Digital Appendix 4

Meaningful Research Participation Is a Proxy for Other Applicant Traits

	Overall N=875	Least Competitive N=294	Competitive N=286	Most Competitive N=305	Academic N=663	Community N=208	Military N=14
Intellectual curiosity	545 (62.3%)	176 (59.9%)	182 (63.6%)	187 (61.3%)	417 (62.9%)	119 (57.2%)	9 (64.3%)
Critical and analytic thinking skills	482 (55.1%)	164 (55.8%)	151 (52.8%)	167 (54.8%)	371 (56%)	101 (48.6%)	10 (71.4%)
Self-directed learning skills	455 (52.0%)	138 (46.9%)	152 (53.2%)	165 (54.1%)	346 (52.2%)	102 (49%)	7 (50%)
Perseverance	427 (48.8%)	141 (48%)	131 (45.8%)	155 (50.8%)	337 (50.8%)	**80 (38.5%)^**	10 (71.4%)
Interest in an academic career	413 (47.2%)	141 (48%)	155 (54.2%)	**117 (38.4%)****	328 (49.5%)	**81 (38.9%)$^{++}$**	4 (28.6%)
Likelihood of research success during residency	409 (46.7%)	128 (43.5%)	130 (45.5%)	151 (49.5%)	314 (47.4%)	89 (42.8%)	6 (42.9%)
Time management skills	382 (43.7%)	119 (40.5%)	116 (40.6%)	147 (48.2%)	295 (44.5%)	79 (38%)	8 (57.1%)
Teamwork skills	266 (30.4%)	91 (31%)	78 (27.3%)	97 (31.8%)	197 (29.7%)	64 (30.8%)	5 (35.7%)
Commitment to residency specialty	261 (29.8%)	73 (24.8%)	80 (28.0%)	**108 (35.4%)***	211 (31.8%)	**48 (23.1%)****	2 (14.3%)
Communication skills	153 (17.5%)	61 (20.8%)	**36 (12.6%)$^{+}$**	56 (18.4%)	115 (17.3%)	36 (17.3%)	2 (14.3%)

Frequency at which each trait was identified by all PD (overall) and then by either specialty competitiveness or by setting. (* p=0.005, $^{+}$ p=0.009, ** p=0.02, ^p=0.002, $^{++}$ p=0.008).