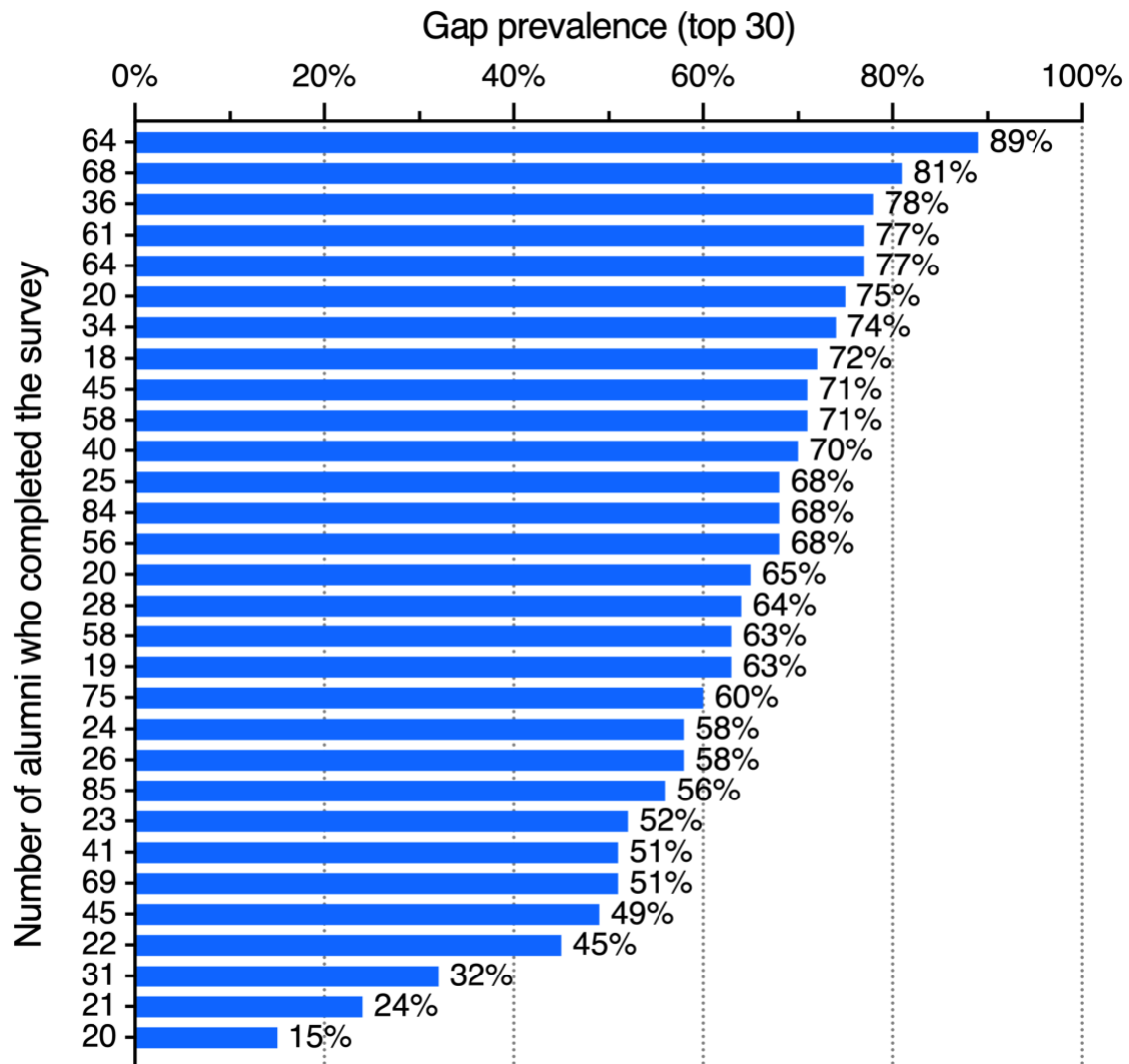


Supplemental materials



Supplemental Figure S1. Gap prevalence based on the undergraduate institution that the student attended. The gap prevalence for the 30 colleges with the largest number of respondents, and the number of respondents is shown. Fifty percent of the trainees reported attending one of these 30 colleges.

Supplemental Table S1

Participating programs

Albert Einstein College of Medicine	University of California Irvine
Baylor College of Medicine	University of California San Diego
Case Western Reserve University	University of California San Francisco
Columbia University College of Physicians and Surgeons	University of Cincinnati
Duke University	University of Colorado
Emory University	University of Illinois College of Medicine
Geisel School of Medicine at Dartmouth College	University of Iowa
Harvard Medical School	University of Kansas Medical Center
Icahn School of Medicine at Mount Sinai	University of Kentucky
Indiana University School of Medicine	University of Louisville
Johns Hopkins University	University of Maryland School of Medicine
Lewis Katz School of Medicine	University of Massachusetts Medical School
Loma Linda University	University of Miami
Louisiana State Univ. Health Sciences Center- New Orleans	University of Michigan
Loyola University Chicago	University of Minnesota
Mayo Clinic	University of Missouri School of Medicine
Medical College of Wisconsin	University of Nebraska Medical Center
Medical University of South Carolina	University of New Mexico Health Sciences
Michigan State University College of Human Medicine	University of North Carolina Chapel Hill
Northwestern University	University of Oklahoma Health Science Center
New York University Grossman School of Medicine	University of Pennsylvania Perelman School of Medicine
Ohio State University	University of Rochester
Oregon Health & Science University	University of Southern California
Penn State College of Medicine	University of Texas Health San Antonio
Rutgers University	University of Texas Houston
Saint Louis University	University of Texas Southwestern
Sidney Kimmel Medical College/Jefferson University	University of Utah School of Medicine
Stanford University	University of Virginia
Stony Brook University	University of Washington
SUNY Downstate	University of Wisconsin - Madison
Texas A&M University Health Science Center	Upstate Medical University
The University of Chicago	Vanderbilt University
Tufts University	Virginia Commonwealth University
UCLA-Caltech MSTP	Washington University in St. Louis
University of Alabama at Birmingham	Weill Cornell Tri-Institutional Program
University of Arkansas for Medical Sciences	Yale University School of Medicine
University of California Davis	

Supplemental Table 2

Q7. Why did you take a gap?
Answer = "Others"

Answer	Occurrences	%
Work/volunteer/fellowship opportunity	101	21%
Needed to learn more about MD-PhD/unsure whether to apply	85	17%
Needed to reapply (not accepted)	83	17%
Needed to take MCAT	69	14%
Complete research projects/publications/degrees	45	9.2%
Timing	32	6.6%
Change field of study/career	17	3.5%
Onboard (joined after MD matriculation)	15	3.1%
Health issues	12	2.5%
Advisor strongly suggested a gap	10	2.1%
Deferred	9	1.8%
Improve GPA	7	1.4%
Visa/immigration status	2	0.4%
Total	487	100%

2021 MD-PhD GAP2 Study

Survey for current MD-PhD students

Q1

Several studies have shown that over the past 50 years there has been a steady increase in the time to degree for students graduating from MD-PhD programs. A recent preliminary study (the Gap1 survey) suggested that rather than applying before their senior year, there has also been an increase in the number of students entering MD-PhD programs who have worked for one or more years, typically in a research-focused gap after college, before entering MD-PhD programs. If true, this means that the total time from college graduation to MD-PhD graduation is growing even longer from the combined effects of a growing gap and increasing time to degree.

The purpose of this study is to 1) determine whether the gaps before medical school matriculation are growing longer and more prevalent, 2) how the time is being used, and 3) better understand why this change has occurred. The goal is to provide data for policy discussions about the best approaches to physician-scientist training.

The data to answer these questions are being gathered through this short, anonymous survey that will be distributed to all students currently enrolled in participating MD-PhD programs in the U.S. Completion of this survey by current MD-PhD students will be greatly appreciated, but is entirely voluntary. You have the right to refuse to participate at no penalty to you. The results will be aggregated before presentation and/or publication. Each participating program will receive de-identified results from their own program as well as the national data.

Thank you in advance,

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Start of Block: Demographics

Q2 Gender

- ☐ Male
- ☐ Female
- ☐ Non-binary
- ☐ Prefer not to respond

Q3 Race/Ethnicity (*select all that apply*)

- ☐ American Indian or Alaska Native
- ☐ Asian or Asian-American
- ☐ Black or African American
- ☐ Hispanic or Latino
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White or Caucasian
- ☐ Prefer not to respond

Q4 Undergraduate graduation year

2020
2019
2018
2017
2016
2015
2014
2013
2012
2011
2010
2009
2008
2007
2006
2005
2004
2003
2002
2001
2000

Q5 MD-PhD Program matriculation year

2020
2019
2018
2017
2016
2015

2014
2013
2012
2011
2010
2009
2008
2007
2006
2005
2004
2003
2002
2001
2000

Q6 Did you start medical school as an MD-only student and then join the MD-PhD program after a year or more?

- ☐ Yes
- ☐ No

End of Block: Demographics

Start of Block: Why

Q7 WHY did you take a gap year(s)?

Select all that apply.

- ☐ Learned about MD-PhD programs too late to apply during my junior year
- ☐ Unable/unwilling to find time during my junior year to apply
- ☐ Burnt out from school and needed time off
- ☐ Wanted more clinical experience
- ☐ Wanted more research experience to solidify my decision to pursue a research-active career
- ☐ I thought that more research experience would make me a more competitive applicant to MD-PhD programs
- ☐ Needed to take prerequisite courses that I did not complete during college
- ☐ Wanted to take additional courses to improve my academic record
- ☐ Wanted to retake the MCAT exam
- ☐ Wanted personal time (e.g., for travel, rest, family)
- ☐ Needed to make money
- ☐ Other (please specify) _____

Display This Question:

WHY did you take a gap year(s)? Select all that apply. q://QID6/SelectedChoicesCount Is Greater Than 1

Carry Forward Selected Choices - Entered Text from "WHY did you take a gap year(s)? Select all that apply. "

Q8 Of the reasons you selected above, which was to MOST RELEVANT reason why you took a gap year?

- ☐ Learned about MD-PhD programs too late to apply during my junior year
- ☐ Unable/unwilling to find time during my junior year to apply
- ☐ Burnt out from school and needed time off
- ☐ Wanted more clinical experience
- ☐ Wanted more research experience to solidify my decision to pursue a research-active career
- ☐ I thought that more research experience would make me a more competitive applicant to MD-PhD programs
- ☐ Needed to take prerequisite courses that I did not complete during college
- ☐ Wanted to take additional courses to improve my academic record
- ☐ Wanted to retake the MCAT exam
- ☐ Wanted personal time (e.g., for travel, rest, family)
- ☐ Needed to make money
- ☐ Other (please specify)

Q9 WHAT did you do during your gap year(s)?

Select all that apply.

- ☐ Studied for and took the MCAT exam
- ☐ Took additional coursework
- ☐ Accepted a competitive fellowship (e.g., Rhodes, Marshall, Fulbright, etc.)
- ☐ Enrolled in a Master's degree program
- ☐ Enrolled in a post-baccalaureate research program
- ☐ Worked/volunteered in a research laboratory
- ☐ Worked/volunteered in a clinical research setting
- ☐ Worked/volunteered in a social science research setting
- ☐ Worked/volunteered in a medically-related field to gain clinical experience (e.g., scribe, EMT, Medical assistant, etc.)
- ☐ Worked/volunteered in a field unrelated to medicine/research (please specify)
- ☐ Other (please specify) _____

Display This Question:

WHAT did you do during your gap year(s)? Select all that apply. q://QID39/SelectedChoicesCount Is Greater Than 1
Carry Forward Selected Choices - Entered Text from "WHAT did you do during your gap year(s)? Select all that apply."

Q10 Of the reasons you selected above, which was your PRIMARY activity during your gap year?

- ☐ Studied for and took the MCAT exam
- ☐ Took additional coursework
- ☐ Accepted a competitive fellowship (e.g., Rhodes, Marshall, Fulbright, etc.)
- ☐ Enrolled in a Master's degree program
- ☐ Enrolled in a post-baccalaureate research program
- ☐ Worked/volunteered in a research laboratory
- ☐ Worked/volunteered in a clinical research setting
- ☐ Worked/volunteered in a social science research setting
- ☐ Worked/volunteered in a medically-related field to gain clinical experience (e.g., scribe, EMT, Medical assistant, etc.)
- ☐ Worked/volunteered in a field unrelated to medicine/research (please specify)
- ☐ Other (please specify)

Q11 Income during your gap year(s):

- ☐ Unpaid
- ☐ Paid position: full-time
- ☐ Paid position: part-time

Q12 Did you feel that a gap year was necessary to maximize your candidacy as an MD-PhD applicant?

- ☐ Yes
- ☐ Not sure
- ☐ No

Display This Question:

Did you feel that a gap year was necessary to maximize your candidacy as an MD-PhD applicant? = Yes

Q13 How did you come to the conclusion that a gap year(s) was necessary? *Select all that apply.*

- ☐ College pre-health advisor
- ☐ Current MD-PhD students
- ☐ Advice from MD-PhD Program Directors
- ☐ Online forums
- ☐ Personal opinion
- ☐ Other, please specify _____

Display This Question:

How did you come to the conclusion that doing gap year(s) was necessary? Select all that apply.

q://QID23/SelectedChoicesCount Is Greater Than 1

Carry Forward Selected Choices - Entered Text from "How did you come to the conclusion that a gap year(s) was necessary? Select all that apply."

Q14 Which was the most influential in your conclusion to take a gap year?

- ☐ College pre-health advisor
- ☐ Current MD-PhD students
- ☐ Advice from MD-PhD Program Directors
- ☐ Online forums
- ☐ Personal opinion
- ☐ Other, please specify

Q15 Would you recommend taking a gap year(s) to prospective MD-PhD students?

- ☐ Yes
- ☐ No

End of Block: Why

Start of Block: Undergraduate

Q16 Primary category (most relevant) undergraduate major (for a full list of sub-categories, please see [NIH PHS 2271](#)).

- ☐ Biological & Biomedical Sciences
- ☐ Health Sciences
- ☐ Chemistry
- ☐ Physics
- ☐ Computer Sciences
- ☐ Mathematics
- ☐ Engineering
- ☐ Psychology
- ☐ Social Sciences
- ☐ Humanities, Other

Q17 Undergraduate Institution (*optional*)

Q18 What significant research opportunities did you engage in BEFORE joining the MD-PhD Program? (select all that apply)

- ☐ Research during the academic year while an undergraduate
- ☐ Summer research while an undergraduate
- ☐ postbaccalaureate research (non-degree granting)

- o degree-granting or certification program (e.g., Master's program)
- o None of the above

Display This Question:

What significant research opportunities did you engage in BEFORE joining the MD-PhD Program? (sel... = Research during the academic year while an undergraduate)

Q19 How many semesters of research while an undergraduate?

(assume 2 semesters per year; 8 semesters for 4 years)

- o 1
- o 2
- o 3
- o 4
- o 5
- o 6
- o 7
- o 8

Display This Question:

If What significant research opportunities did you engage in BEFORE joining the MD-PhD Program? (sel... = Summer research while an undergraduate)

Q20 During which summers did you engage in research while an undergraduate?

(select all that apply)

- o Summer after freshman year
- o Summer after sophomore year
- o Summer after junior year

Q21 Did the research prior to MD-PhD program matriculation yield any publications at the time of your application to the program? Indicate how many were either submitted, in press or published (total of all three) at the time of your application. Do not include abstracts or manuscripts that were in preparation, but had not been submitted.

- o Yes (indicate how many submitted, in press or published)

- o No

End of Block: Undergraduate

Start of Block: Final

Q22 Thank you very much for your participation in this survey.

Please share any additional thoughts or comments regarding research requirements or gaps taken prior to matriculation in your MD-PhD program.

End of Block: Final

Survey for Program Directors

Q1

Data from the AAMC and from a recent survey of current MD/PhD students show that more and more of our trainees are choosing to wait 1 or more years from when they graduate from college to when they begin medical school. The ongoing GAP2 study has gathered information from current MD/PhD students about their choice to do a gap and the reasons why matriculants chose them. In this brief survey for program directors, we are gathering information about MD/PhD program admission policies and preferences, in part to see whether the impressions held by applicants reflect actual preferences on the part of programs. The results obtained from this survey will be used to inform applicants and program directors, but the results will be aggregated and de-identified in presentations and publications.

Q2 Recognizing that your answer might be “depends on what was done with the time”, is the existence of a gap between college and medical school a factor that you consider when making interview and admission decisions?

- ☐ Yes
- ☐ No

Display This Question:

Recognizing that your answer might be “depends on what was done with the time”, is the existence... = Yes

Q3 Which of the following best reflects how your admissions committee uses that information when evaluating a candidate for interview or acceptance. Assume for this particular question that the time is spent doing research.

- ☐ we ONLY SELECT candidates who have spent 1 or more years doing full time research after college
- ☐ we STRONGLY PREFER candidates who have spent 1 or more years doing full time research after college
- ☐ we SOMEWHAT PREFER candidates who have spent 1 or more years doing full time research after college
- ☐ NEUTRAL (i.e. no impact)
- ☐ we prefer and advise candidates to not do a gap
- ☐ adverse impact (i.e., we prefer candidates who have just graduated from college)

Q4

Do you view a gap spent doing research as being a favorable prognostic indicator for commitment to complete an MD/PhD program?

- ☐ Definitely yes
- ☐ Probably yes
- ☐ Not enough to be useful
- ☐ No

Q5

Do you view a gap spent doing research as being a favorable prognostic indicator for commitment to a career as a physician-scientist?

- ☐ Definitely yes
- ☐ Probably yes
- ☐ Not enough to be useful
- ☐ No

Q6 Do you care how candidates spend their time during a gap between college and medical school?

- ☐ Yes
- ☐ No

Display This Question:

Do you care how candidates spend their time during a gap between college and medical school? = Yes

Q7 Which of the following activities are viewed favorably? Select all that apply.

Studying for and taking the MCAT

- ☐ Additional coursework
- ☐ Accepted a competitive fellowship (e.g. Rhodes, Marshall, Fulbright, etc.)
- ☐ Enrolled in a Master's degree program
- ☐ Worked in a research setting
- ☐ Worked in a medically-related field to gain clinical experience (e.g., scribe, EMT, Medical assistant, etc.)
- ☐ Worked in a field unrelated to medicine/research

Display This Question:

Do you care how candidates spend their time during a gap between college and medical school? = Yes

Carry Forward Selected Choices from "Which of the following activities are viewed favorably? Select all that apply."

Q8 Which of the following activities is the MOST PREFERRED? Select all that apply.

- ☐ Studying for and taking the MCAT
- ☐ Additional coursework
- ☐ Accepted a competitive fellowship (e.g. Rhodes, Marshall, Fulbright, etc.)
- ☐ Enrolled in a Master's degree program
- ☐ Worked in a research setting
- ☐ Worked in a medically-related field to gain clinical experience (e.g., scribe, EMT, Medical assistant, etc.)
- ☐ Worked in a field unrelated to medicine/research

Q9 Do you ask applicants whether they already have research papers submitted, in press or published in your program's application?

- ☐ Yes
- ☐ No

Display This Question:

Do you ask applicants whether they already have research papers submitted, in press or published... = Yes

Q10 Please indicate the importance of the following

	Essential (no pubs, no interview/acceptance)	Preferred	Good if present; not negative if absent	Neutral (i.e., we don't care either way)	Negative impact	N/A (we never ask)
1st Author Publications	☐	☐	☐	☐	☐	☐
Co-Author Publications	☐	☐	☐	☐	☐	☐
Research Abstracts	☐	☐	☐	☐	☐	☐

End of Survey