



CWRU SOM ACADEMIC RESEARCH TRAINING

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OBJECTIVES

- Describe academic research
 - Describe how to find a project
 - Outline general processes
 - Formulating research questions/hypotheses
 - Internal Review Board (IRB)
 - Data collection
 - Data analysis
 - Abstract writing
 - Manuscript writing
 - General advice
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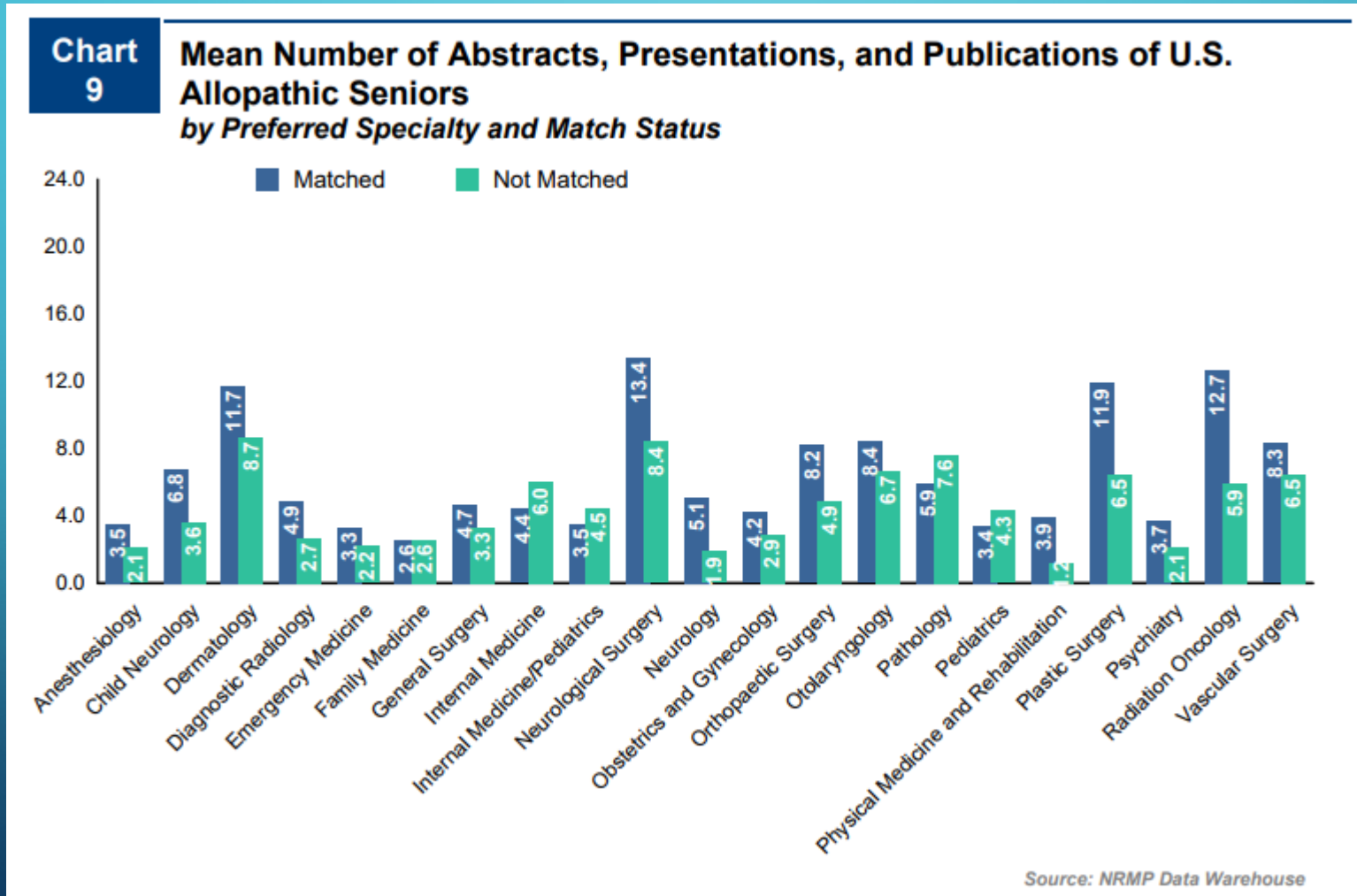
WHAT IS ACADEMIC RESEARCH?

- How new medical (and other) knowledge is established
- Results shared with scientific community via abstracts, conferences, papers
- Builds your capability as a physician
- Is part of graduation requirements
- Two broad categories
 - Basic Science: aka “bench research”, “bench science”, typically in a lab and doing actual lab work, generally takes longer to reach publication than Clinical research and may require time off from medical school
 - Clinical: focused on working with patients in the clinic/hospital or their medical records, usually quicker to reach publication versus Basic Science research

WHY ACADEMIC RESEARCH?

- Helps distinguish you vs. others for residency/fellowship
 - Residency programs use STEP 1 as first cut
 - # of “publications” may be part of 2nd or 3rd cut
 - ERAS (residency application system) treats posters and oral presentations similarly to actual publications
 - Reviewers will value actual publications more highly
- Being first author on an actual publication is a significant achievement

ABSTRACTS, PRESENTATIONS, & PUBLICATIONS BY SPECIALTY





FINDING A PROJECT

- Consider the most competitive specialty you may want to pursue
- Research who regularly publishes and/or is well-known in that field
- Talk to other students about physicians/research groups they have worked with
- Discuss with your Dean
- Talk to Research and Scholarship office Dr. Colleen Croniger or Sharon Callahan medstudentresearch@case.edu. They can help you with finding a mentor, IRB questions, credentialing, poster guidelines/printing, questions answered about summer research and research block





WHAT TYPES OF RESEARCH CAN I DO?

- Clinical- Retrospective studies, prospective studies
 - Translational
 - Basic Science
 - Medical Education
 - Quality Improvement
 - Public Health
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FINDING A PROJECT - ADVICE

- Gems

- Getting a letter of recommendation from someone well-known in the field can be very helpful in residency matching
- Start early – this can take weeks-months
- Doing research in one field and matching into another is not typically a big issue
- Consider how much time you have before committing to a project
- After selecting a project, start the credentialing/on-boarding process at that institution asap – this can take several months! (<https://casemed.case.edu/msr/>)
- Consider working with more than one PI/lab if you have time

- Pitfalls

- Be wary if a physician/lab coordinator is unresponsive. This may hinder progress.
- Just because you get a response, doesn't mean you're committed to doing the research. Communicate proactively!



PROCESS – RESEARCH QUESTIONS/HYPOTHESES

- Often formulated by faculty, fellows, residents
 - Med students can also create research questions for study
 - Step 1: Read the literature!
 - Make sure your question has not already been researched
 - If it has, there may still be room for contribution – more up to date data, larger base size study, improving generalizability, testing others' findings
 - Google Scholar, PubMed, Cleveland Health Sciences Library
 - Step 2: Formulate your question
 - Carefully consider wording, scope, study population
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RESEARCH QUESTIONS/HYPOTHESES – ADVICE

- Gems

- Use a program (Endnote, Zotero, Refworks, Excel) to organize literature sources
- Play Devil's Advocate with your hypothesis
- Sub-segmenting patient populations can multiply the # of ideas (i.e. an idea for cervical spine patients may be applicable to lumbar spine patients)
- Ask your principal investigator (PI) about stats support and have them review the question/hypothesis
- [Read this article on how to develop and write medical papers:](#)



Adobe Acrobat
Document

- Pitfalls

- Suggesting research projects without researching the literature first
- Creating a massive project with little to no research experience or not enough help



PROCESS – IRB

- Oversight of research projects in an institution
 - They vary - ask about the IRB process at your institution
 - Create project proposal with team members and submit to IRB
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IRB - ADVICE

- Gems

- Get example IRB protocols from your lab and review format/key features
- Update IRB protocols promptly if the project/personnel change
- Include all data that you might need in proposal to avoid re-loops
- Joining an existing project can remove this step, though you still need to be added to the IRB document/system

- Pitfalls

- IRB review processes can take weeks to months (up to 6). Plan ahead for summer/research blocks
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PROCESS – DATA COLLECTION

- Very project dependent
 - May involve creating a database (Redcap or Qualtrics)
 - Additional data may be needed as project evolves
 - Time required depends on type of research, # of patients/samples, and # of variables
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DATA COLLECTION - ADVICE

- Gems
 - Review your data collection tool with your statistician to ensure it gathers the right data to test your hypothesis
 - Include a way in your database to write notes about data points or flag them
 - Look for ways to answer additional questions with your data or by collecting a few extra data points while doing your work (add to IRB protocol)
 - Walk through every data field with your PI so you're clear on how to record the data
 - Pitfalls
 - Not doing a trial run with a few test samples/patients prior to finalizing database
 - Going too fast and not double checking chemicals, samples, etc.
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DATA ANALYSIS



- Align at the start of the project who will analyze the data
 - Having some simple training in statistical analysis can be a big help to your PI
 - Locating and having a statistician do this can take several months
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PROCESS – ABSTRACT WRITING

- Summary of the paper focusing on key findings (i.e. concise!)
 - Usually contains Objective, Methods, Results, and Conclusions sections
 - Roughly 1 page in length
 - Can be submitted to conferences, symposia, and other relevant events
 - Authorship order may differ from the manuscript
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ABSTRACT WRITING - ADVICE

- Gems
 - You can submit the same abstract to many different conferences – great way to boost residency application
 - Covers most of what you need for a Lepow Day poster or Research ShowCASE
 - May need PI and other author input before submitting to journals/conferences
 - Check out journal/conference guidelines prior to writing
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PROCESS – MANUSCRIPT WRITING

- More details than abstract, a complete description of the research
 - Includes Limitations and Discussion sections, figures, tables, and references
 - Gathering input from all authors can take time
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MANUSCRIPT WRITING - ADVICE



- Gems

- Ask about key features or style approaches for your lab/PI
- Use high-quality papers in your target journals as guides
- Make every sentence work. There is no room for superfluous language
- Use Mendeley or another citation organizer

- Pitfalls

- Trying to publish too close to residency application submission
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GENERAL ADVICE

- Gems
 - Ask about authorship requirements for your lab/project
 - New to academic research? Working with another student(s) on a project before taking on your own is highly recommended.
 - PI's/clinicians are very busy – you need to take the lead on pushing your project forward
 - Start early in medical school – it can take 2 years or more from conception of an idea to publication in a peer reviewed journal
 - Don't plan on doing much research during 3rd year (besides research block)
 - Summer and year out funding opportunities
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GENERAL ADVICE

- Pitfalls

- Waiting until a summer break/research block to find research. Start 4-6 months prior to this.
 - Expecting first author for not doing the majority of the work.
 - Staying in a lab where you're not getting the support, progress, etc. that you need. Change labs, but communicate this to the lab leadership in an appropriate manner.
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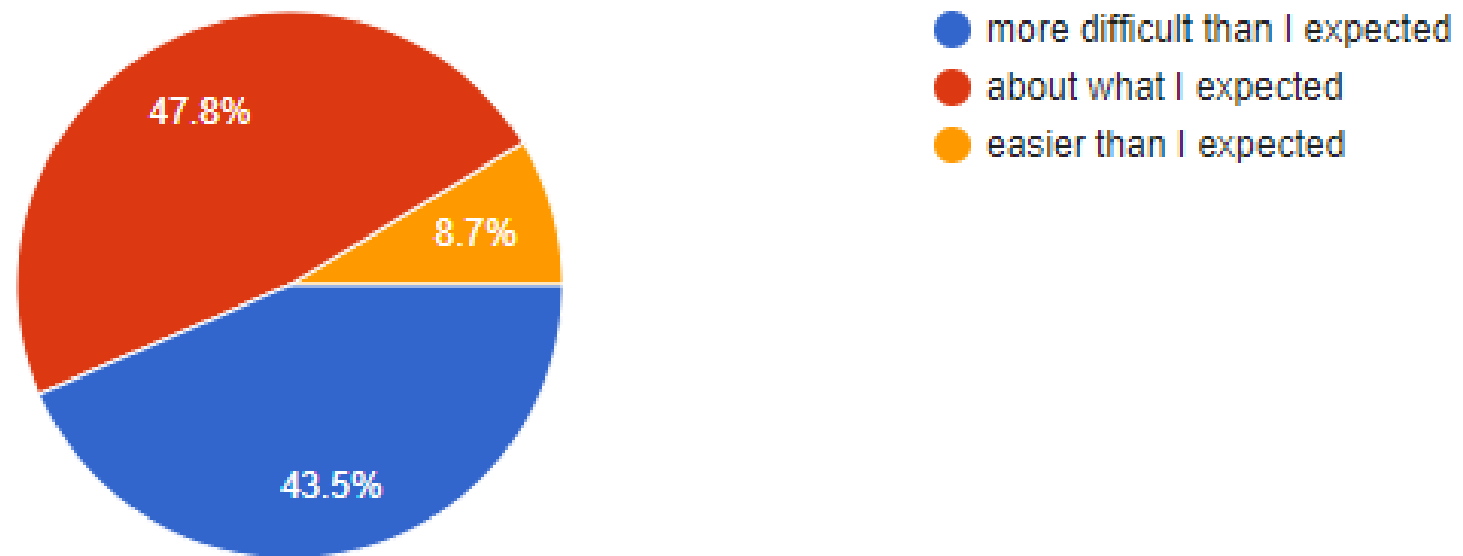
QUESTIONS?



ADDITIONAL INFO FROM M3'S/M4'S

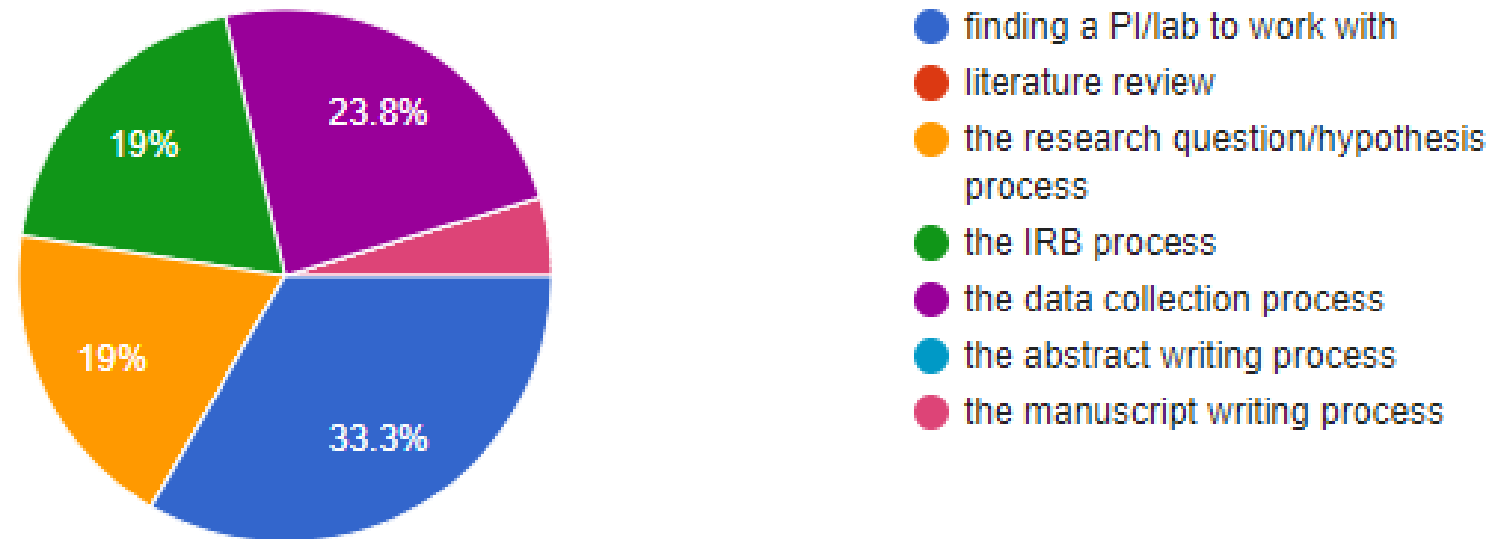
8) My overall research experience in medical school has been: (choose one)

23 responses



9) The most challenging part of my research experience in medical school has been: (choose one)

21 responses



10) The most rewarding part of my research experience in medical school has been: (choose one)

22 responses



11) How long did it take for your average project to go from idea generation to publication?

21 responses

