

Improving Research Participation at National Academy Meetings Amongst Residents

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Objective: identifying a reproducible research pipeline at the individual resident level

Background: An unmet need in residency programs is identifying a specific route to get residents involved in original research and present findings.

Intervention: Pre-assessment of PGY-2 residents research and fellowship goals, with paired group faculty meetings followed by post intervention assessment of submitted presentations. Comparative Group: PGY 3 residents who did not undergo faculty pairing and meetings

Hypothesis: Trainees who will be matched into faculty pairing will have higher number of national meeting presentations as compared to residents who did not undergo faculty pairing.

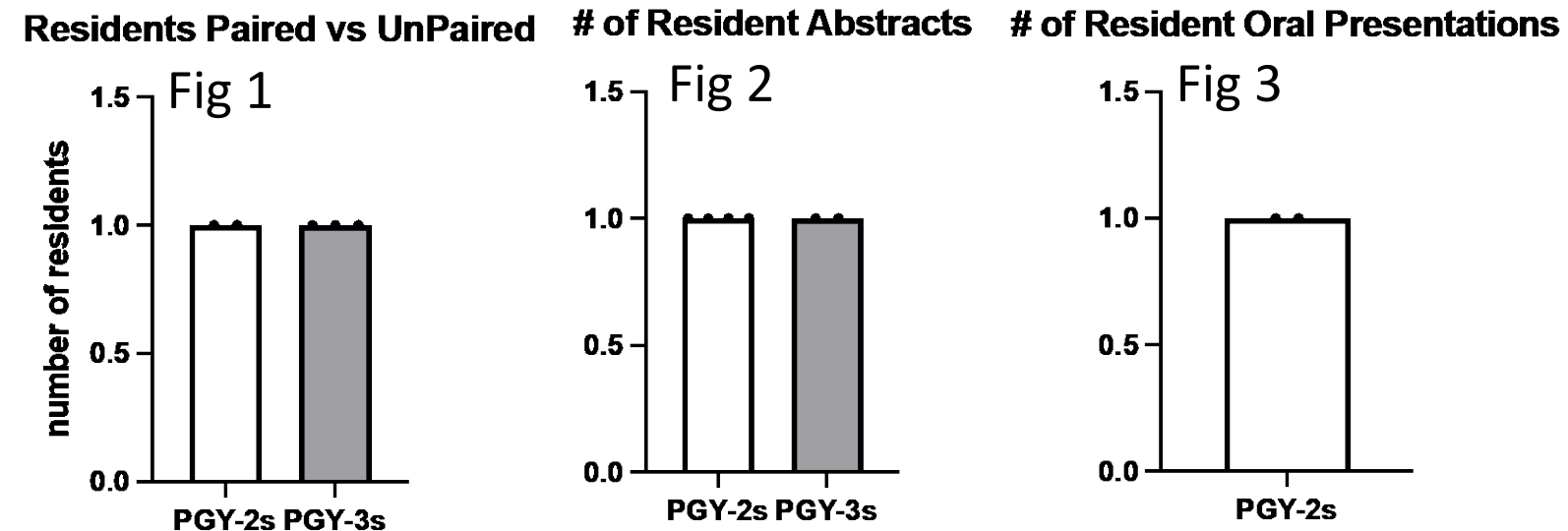


Fig 1. Number of PGY-2's (n=2) and PGY3's (n=3). Fig 2. 2 PGY2's presentations (n=4) and PGY3's presentations (n=2). Fig 3. PGY-2's national presentations n=2. PGY-3 n=0

Conclusion: Trainees who were directly matched with a faculty mentor had more exposure to national abstract and oral presentations as compared to residents who did not undergo faculty pairing.

Advancing PM&R Residency Research Education with Research Curriculum

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INTRODUCTION / PLAN

Scholarship is a core ACGME requirement of all PM&R residency programs. IV.D.3.a).(1) of the program requirements states:

“The curriculum must advance residents’ knowledge of the basic principles of research, including how research is conducted, evaluated, explained to patients, and applied to patient care. (Core)”¹

The literature has noted that a curriculum on evidence-based medicine (EBM) with or without a journal club improved resident knowledge of EBM.^{2,3}

In prior years, residents participated only in journal club.

During the 2023-2024 academic year, a monthly Research Curriculum was introduced. However, we were uncertain if the curriculum was effective in advancing our residents’ knowledge.

This QI projected aimed to assess if the Research Curriculum is advancing residents’ knowledge of EBM.

METHODS / DO

Residents complete a survey rating which topics they found most advantageous to advance their EBM knowledge. The selected topics were based on what was reviewed during the 2023-2024 curriculum and resident feedback.

The residents participated in 3 educational sessions:

- Research methods and study design on September 11, 2024
- Statistics part 1 on October 9, 2024
- Statistics part 2 on December 11, 2024

Six-question pre- and post- quizzes were administered before and after the educational sessions to assess knowledge acquisition.

Graph 1.

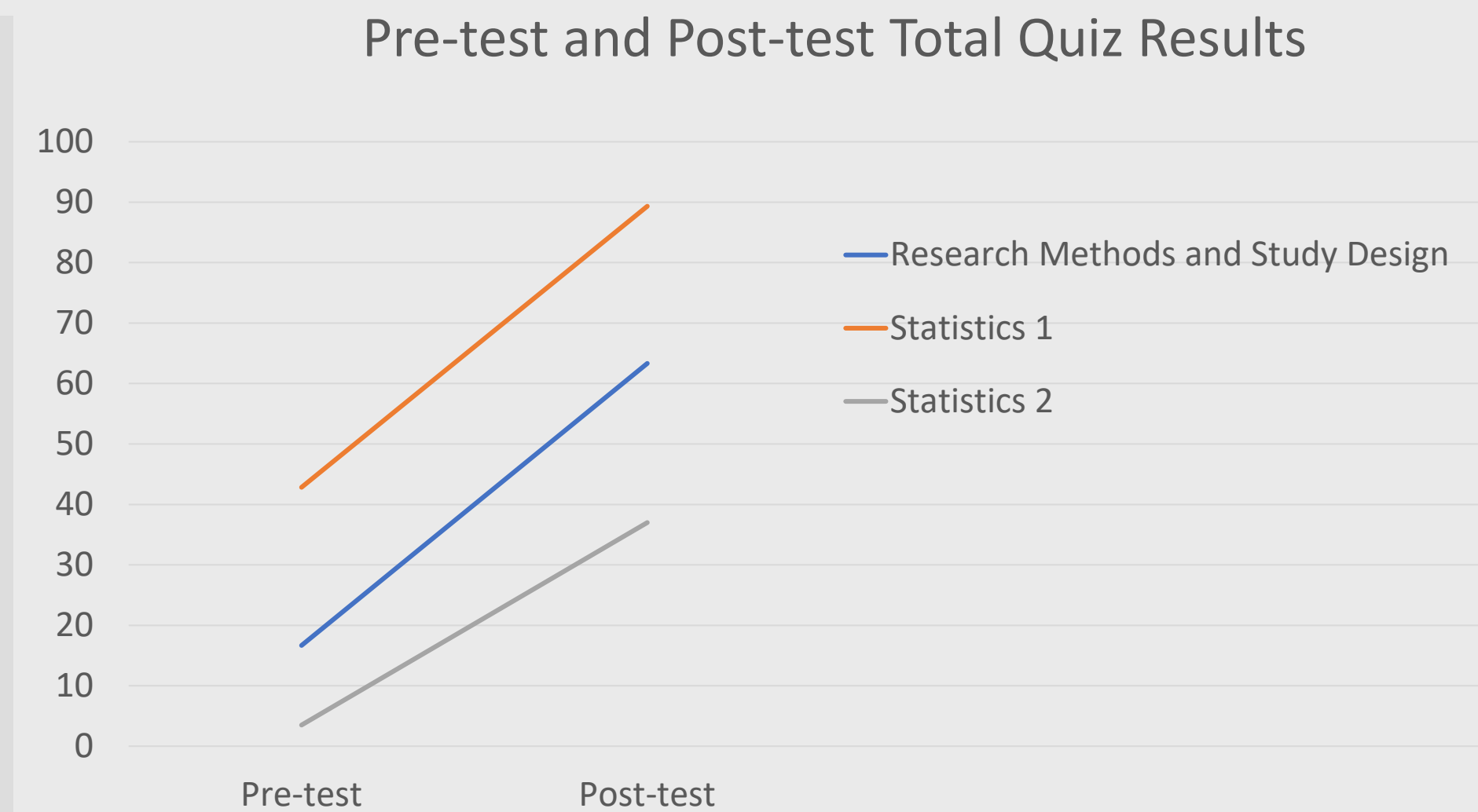


Table 1. Research Methods and Study Design Quiz Total Results

Pre-test total % correct	Post-test total % correct	Total % Improvement
16.67%	63.33%	46.67%

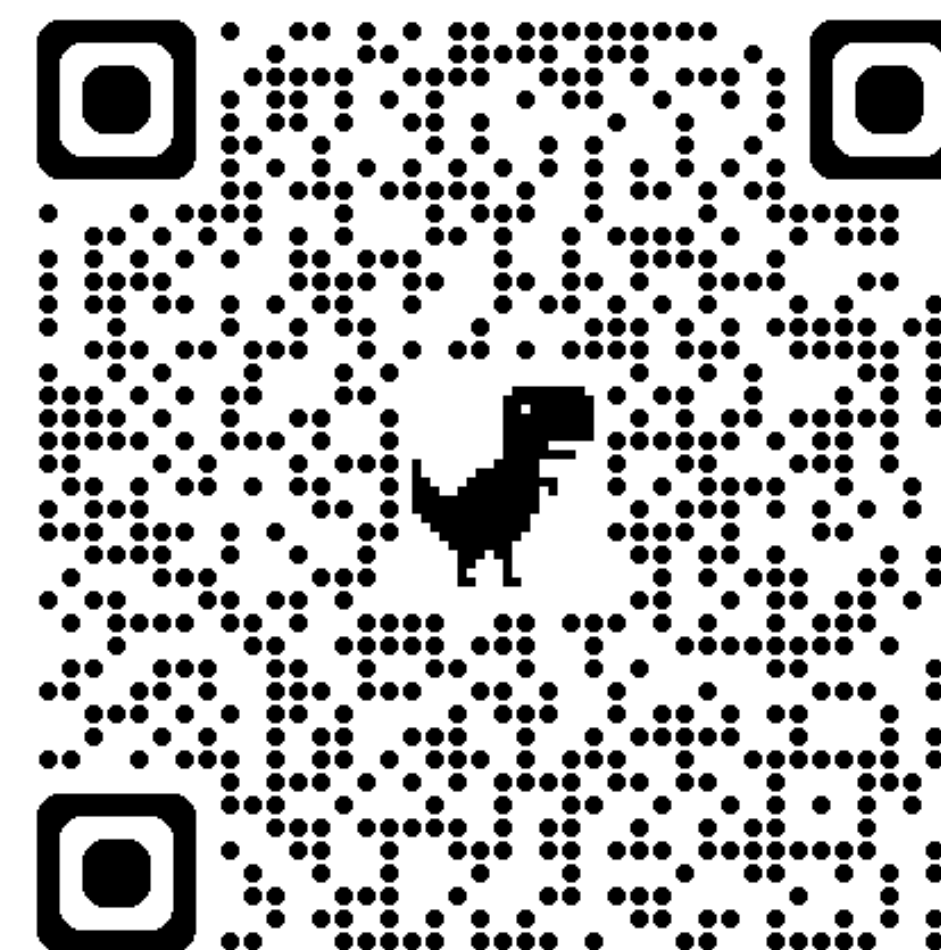
Table 2. Statistics Part 1 Quiz Total Results

Pre-test total % correct	Post-test total % correct	Total % Improvement
42.83%	89.33%	46.50%

Table 3. Statistic Part 2 Quiz Results

Pre-test total % correct	Post-test total % correct	Total % Improvement
3.5%	37%	33.5%

Quiz Results



RESULTS / STUDY

The questions and percentage of residents that correctly answered each question on the pre-tests and post-tests are accessible by scanning the QR code.

The graph and tablets demonstrate the total percentage of correct responses on the pre-tests and post-tests for each of the 3 sessions.

DISCUSSION / ACT

After each session, there was an improvement in the percentage of residents that answered the questions correctly.

Statistics part 2 had the least percentage of improvement and had the lowest scores. It is possible the material was the most challenging and/or perhaps there was less engagement with the session being around the holiday season. The information was provided in a table, which they had access to during the quizzes. It is likely if they were reminded to utilize the resources available, there would be a significant increase in the overall scores. There was noted to be time effect; those that completed the post-quiz immediately scored higher than those that completed the quiz a week or more after the educational session.

We will be planning a feedback session with all the residents. We will consider utilizing interactive participation software to improve resident engagement during the sessions.

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Redesigning a Resident Research Curriculum

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Introduction

- Participation in research is a residency program requirement¹
- Many residents lack knowledge in core research principles²
- Resident interest in future research participation varies³
- Research participation is critical for fellowship application and academic promotion^{4,5}
- Reducing barriers to research participation may increase productivity during training

Methods

- 8-topic research curriculum developed with division & mentor input, delivered longitudinally.
- Curriculum started April, 2024, completing in November, 2024 (crossed academic years)
- 2 hour poster design workshop implemented
- Survey regarding research comfort, productivity, and value of research given pre- and post-intervention, responses rated 1 (disagree) to 5 (agree)
- Resident research knowledge quiz adapted from published study⁶ completed pre- and post-intervention

Curriculum Components

- Why research matters
- Developing a research question
- Types of research studies
- Research ethics
- Parametric statistics
- Nonparametric statistics
- Posters (+ design workshop)
- Manuscript writing & journal selection

	Pre (n = 10)	Post (n = 6)
Types of Data (continuous, ordinal, etc.)	63.3%	43.3%
Types of Studies	45.0%	40.0%
Study Design Principles	90.0%	60.0%
Statistical Methods	50.0%	36.7%
Types or Error and Biases	40.0%	30.0%
Interpreting Data, Drawing Conclusions	80.0%	55.0%
Research Ethics / IRB Processes	46.7%	30.0%

Table 1: Results from resident research knowledge quiz, both pre- and post-intervention. Post-test intervention results impacted by timing in academic calendar (not all residents in post-test yet received all parts)

	Pre (n = 8)	Post (n = 6)
PGY2	50.0%	50.0%
PGY3	12.5%	33.3%
PGY4	37.5%	16.7%
Satisfaction with Curriculum	3.50	3.65
Confidence: Question to Study	3.38	3.17
Knowledge of Study Types	3.86	4.00
Confidence Starting IRB Protocol	3.00	3.00
Comfort with Statistical Methods	2.00	4.00
Confidence Presenting My Work	3.63	3.83
Research Is Important to PM&R	3.63	4.00
I Will Continue with Research	3.00	3.16
None	1 (12.5%)	2 (33.3%)
1	0 (0.0%)	1 (16.7%)
2	2 (25.0%)	2 (33.3%)
3	2 (25.0%)	0 (0.0%)
4+	3 (37.5%)	1 (16.7%)
Articles Submitted (Accepted)	1 (0)	1 (0)
Conference Session Submitted (Accepted)	1 (1)	0 (0)
Curriculum Expanded Research Knowledge		4.17
Poster Workshop Was Effective		4.40
I Will Pursue More Research Projects Now		4.50

Table 2: Resident satisfaction and confidence, with productivity.

Discussion

- Curriculum alone may not be sufficient to impact productivity
- Practicum may be more effective
- Not all aspects improved similarly
- Resident knowledge by research subtopic varies widely
- Future directions needed to more fully realize intended goal
- Efficacy determination limited by sample size, sampling bias
- Results impacted by project timeline (i.e. junior residents not yet received all components of curriculum)

Future Directions

- Resident research mentorship program
- Division-wide research meeting to discuss projects & troubleshoot ongoing projects
- Formulation of an IRB submission guide
- Start curriculum at start of academic year 2025-2026
- Exploration of further funding sources
- Expansion of academic faculty research FTE
- Early career research faculty mentorship
- Structured resident research practicum experience

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Creating a Registry for Brain Injury Patients

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Plan

The brain injury rehabilitation program at the University of Rochester Medical Center (URMC) has grown since beginning a few years ago. There is tremendous interest in program development, but minimal formal program infrastructure. Currently, there is no way of tracking patients who have come through the acute inpatient rehabilitation program.

Because long-term functional outcomes are important, yet rarely available for our patients, and are not standardized, staff remain unaware of the effects of their efforts on the future of these patients. Furthermore, there is no way to track these patients over time.

Do

URMC is a level I trauma center. In the Trauma division, there are outcomes recorded for each patient seen after acute trauma, pertinent to their emergency care.

In Neurology and Neurosurgery, there are outcomes recorded for patients admitted after acute strokes.

We hope to develop a registry, in collaboration with Trauma, Neurology, and Neurosurgery, with pertinent outcomes for patients who have gone through the URMC PM&R inpatient and outpatient systems. This registry will have to be easy to update, HIPAA compliant, and include pertinent functional outcomes. Furthermore, these patients will need to be contacted and followed long-term.

Of note, URMC has a total of 31 acute inpatient rehabilitation beds.

We are creating a registry in EPIC to track these patients.

Results

- The TBI Model Systems variables were reviewed.
- The outcomes collected by Trauma were reviewed.

Conclusion

We anticipate that the creation of this research registry will be able to be used for retrospective studies as well as a database of possible former patients willing to participate in future, prospective research.

Variables

MRN	currently home?
date of birth	can be left unsupervised?
age at injury	current working or in school?
gender	assistive device
date of acute hospital admission (injury)	GOS-E
initial GCS	DRS
vent duration (days)	duration of post-traumatic amnesia
trach/PEG?	history of substance use
ICU duration	current substance use
date of rehab admission	pre-injury function level
admission FOM	PMH
date of rehab discharge	PSH
discharge FOM	psychiatric problems (new or prior)
discharge destination	PHQ-9 (Depression)
date of SNF discharge	GAD-7 (Anxiety)
date of home health discharge	pituitary function labs drawn
date of outpatient therapy discharge	extent of brain damage
date of last clinic follow-up	concomitant injuries
	cranial surgery
	Injury Severity Score (ISS)

Next Steps

- Meeting with the EPIC builder in PM&R as well as with university IT employees to help create a registry list.

REFERENCES

Introduction

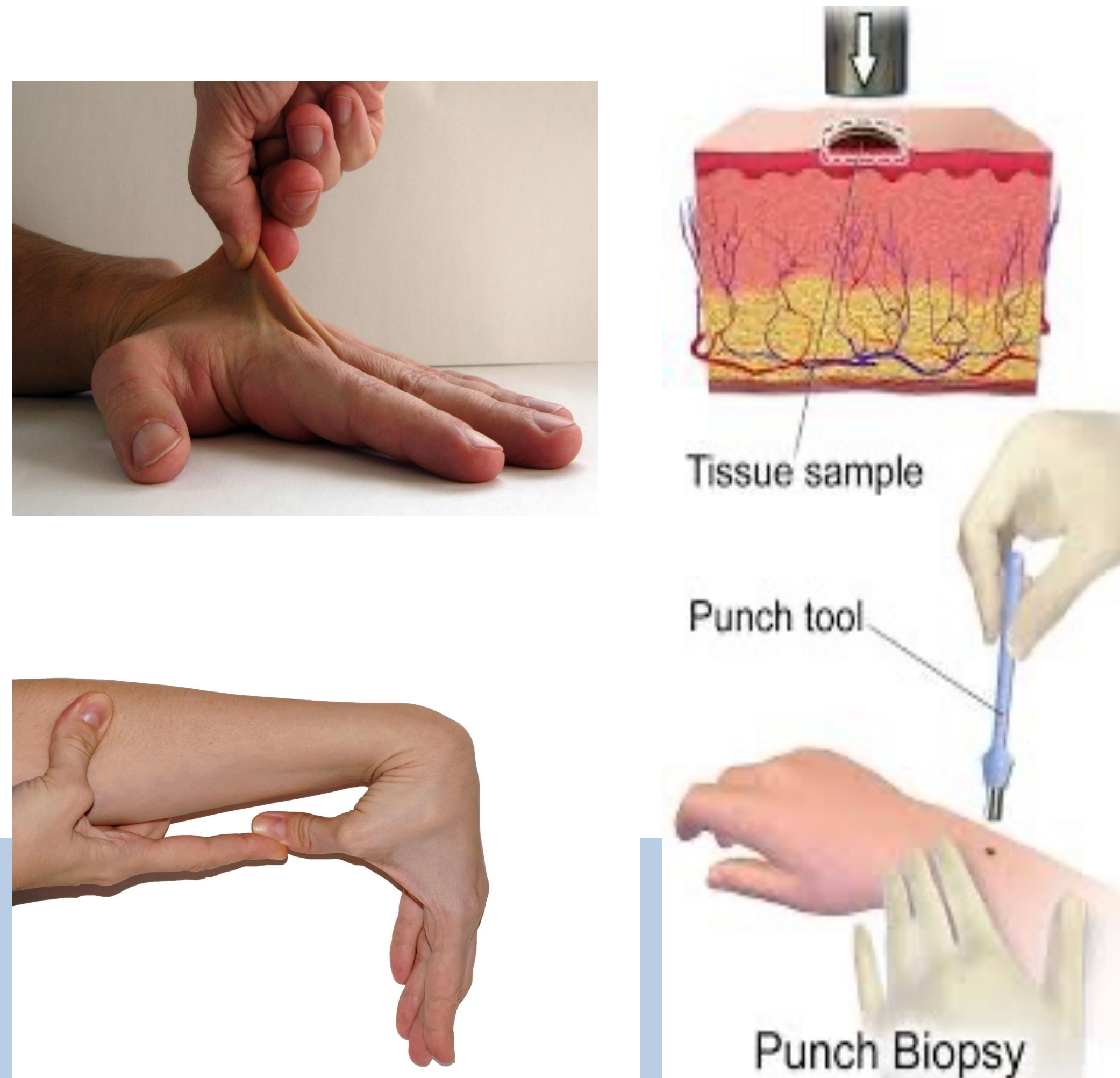
- Ehlers Danlos Syndromes (EDS) are a group of connective tissue disorder that affect approximately 1 in 2000-5000 individuals and are characterized by joint hypermobility, multisystemic manifestations and chronic pains.
- Absence of specific structural or biochemical markers for EDS often lead to delayed and inaccurate diagnosis limiting healthcare access and increasing disease burden.
- Translational research for biomarker identification is crucial for advancing diagnosis, yet patient participation in invasive research studies remains low due to multiple factors.
- The current study examines the factors influencing patient participation in tissue sample-based research to improve engagement and diagnostics

Methods and Materials

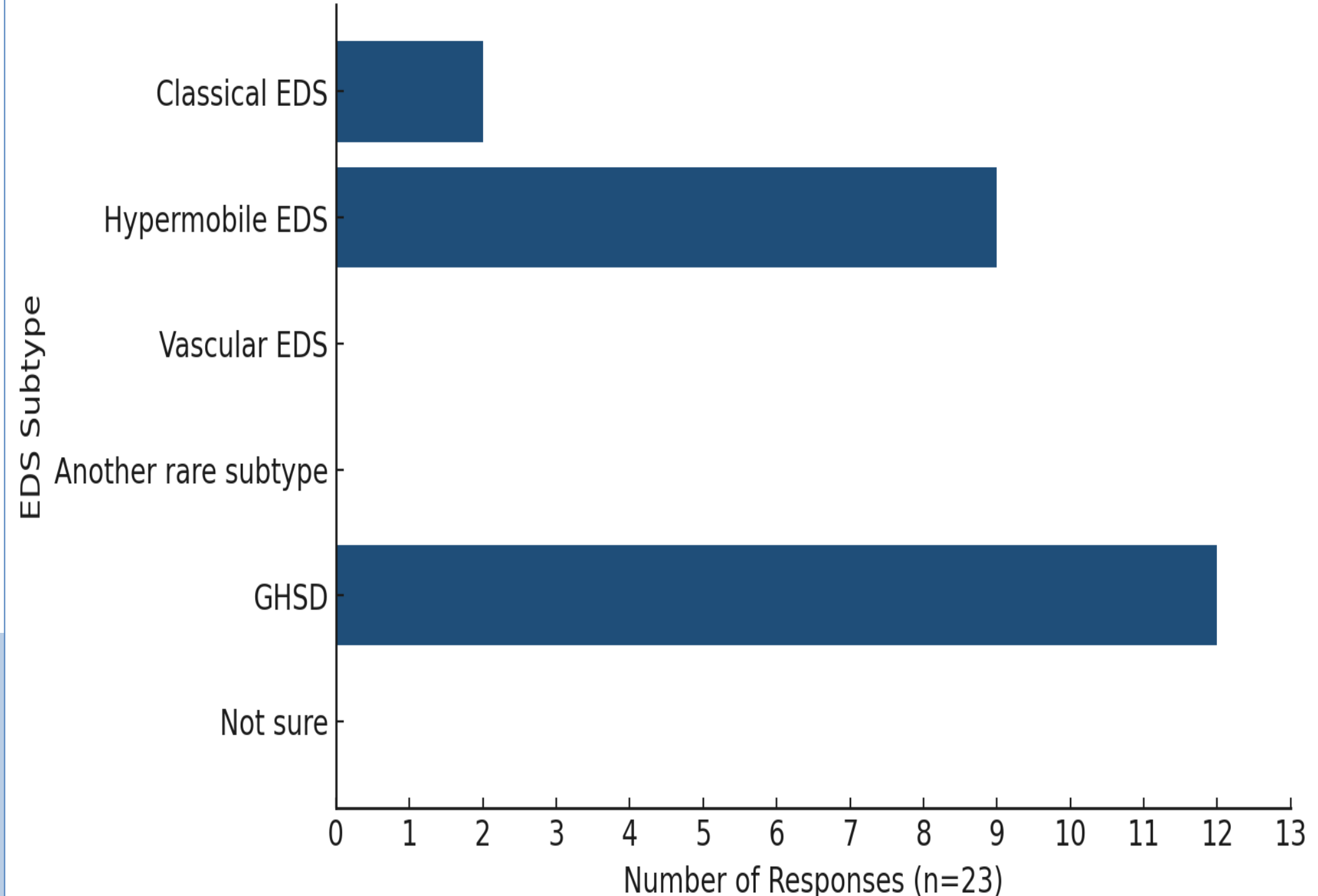
- An anonymized survey was conducted using REDCap with a purposive sample of patients aged 18 years or more at the GoodHope EDS Clinic, Toronto
- A custom survey was developed based on literature review and stakeholder input due to the absence of a validated data collection tool.
- Sample size estimation was based on convenience sampling, targeting approximately 50 participants for exploratory analysis.
- Collected data included demographics, EDS diagnosis details, and perceptions of EDS research participation, including those involving invasive procedures for biobanking, such as skin biopsies and blood collection.
- Descriptive and inferential statistical analysis is being conducted to determine relationship between perceptions of EDS diagnosis and willingness to participate in research.

Results

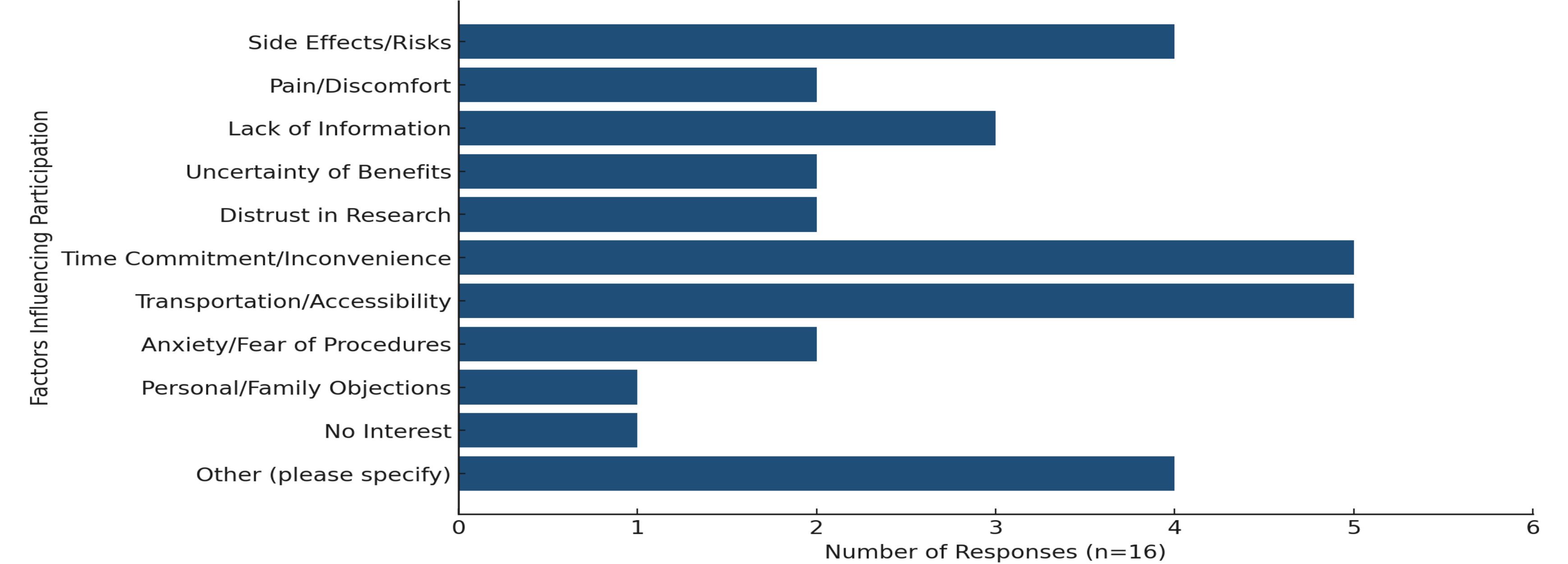
- Out of 300 patients contacted, only 23 responded in two weeks, with the majority being GHSD (n = 12), hEDS (n = 9), and Classical EDS (n = 2).
- The most common gaps in EDS research were reported as lack of treatment and management options (68.2%), opportunities for research participation (54.5%), and knowledge of long-term prognosis and outcomes (50%).
- Time commitment/inconvenience (31.3%), lack of transportation/accessibility (31.3%), and concerns about side effects/risks (25.0%) were the top factors influencing research participation.
- Obtaining REB approval was delayed due to re-direction between REB, QI, and QA, compounded by time constraints and technical issues on REDCap, highlighting the need for longer timelines in similar projects.



Distribution of EDS Subtypes Among Survey Participants



Factors Influencing Research Participation



Discussion

- Enhanced education on safety and risk profiles, along with developing non-invasive alternatives to tissue-based research, may reduce apprehension and encourage participation.
- Flexible scheduling and remote participation options could increase engagement in EDS research.
- Transparency and community engagement are essential to address distrust (12.5%) and information gaps (18.8%), fostering informed participation.
- Targeted education, improved communication strategies, and accessible participation models can help bridge the gap in EDS research participation.

BACKGROUND

The Division of Physical Medicine and Rehabilitation (PM&R) within the Department of Orthopedics and Physical Medicine & Rehabilitation at MUSC has been a missing link in the care of patients for many years. In the past 2 years, the division has undergone substantial growth with the hiring of 12 physiatrists, starting medical student rotations, and the ongoing development of a new residency program. As we welcome learners within our division, there should be a structure to enhance the research culture within our department.

Involvement in research activity is important to an academic department for many reasons including but not limited to: to be competitive for acceptance to many residency and fellowship programs, research is needed to bolster a learner's CV, ACGME requirement for residents to participate in scholarly activity, Research activities are also desirable for an academic career path, and research activities are a requirement for existing faculty desiring promotion in academic tracts.

Second year medical students attending MUSC college of medicine have dedicated time within their curriculum to pursue research projects in the specialty of their choosing. Though we do not have dedicated research faculty, there are several faculty engaged in research. Thus, there is ability to engage learners in research efforts. With a new and growing division, there are not dedicated personnel responsible for organizing PM&R research projects within our division; rather, PM&R faculty with current research are individually supported by departmental Orthopedic Surgery research faculty. There is no standard method for learners to access ongoing research projects. Furthermore, there is no central resource for students or incoming residents to access ongoing research projects.

The goal of this project is to provide a central resource for active and ongoing research projects that can be easily accessed by students, current PM&R faculty, individuals in other disciplines who are interested in multidisciplinary collaboration, and eventually our future resident cohort.

STUDY DESIGN

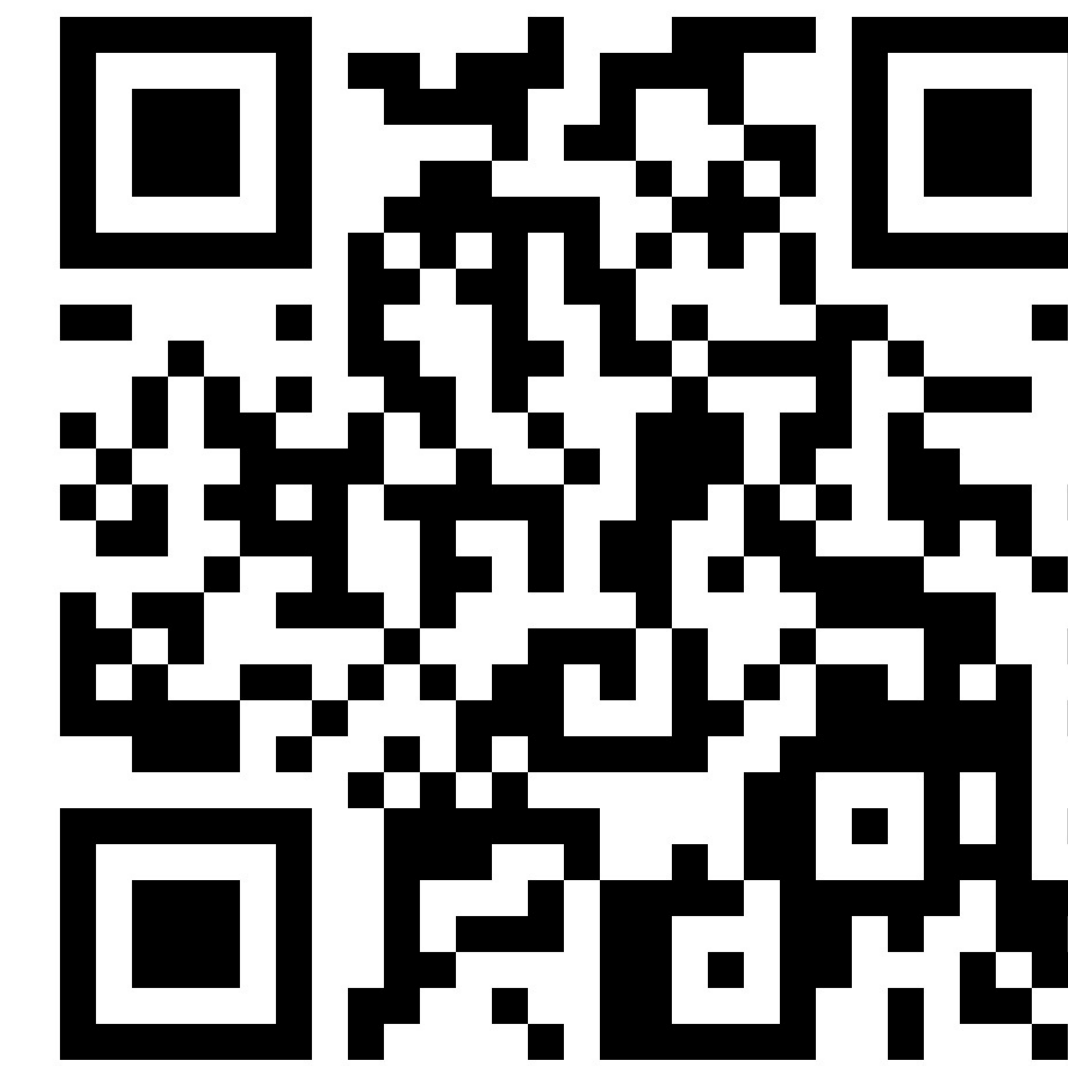
A survey was sent to PM&R faculty inquiring about knowledge of ongoing research projects within our department, how to engage learners in ongoing research projects, and barriers to involving learners in their projects. A similar survey was sent to the medical students in the PM&R interest group to formally assess how they currently find out about research projects, the knowledge of current research activities within our division, and barriers to participating in research activities.

A database was developed for ongoing research projects in the division of PM&R using a google doc with a link that is provided to each individual faculty member and posted on our division website. The database includes project topic, faculty contact, status of the project, availability for assistance, associated publications. Faculty was asked to fill in the database with current individual research projects with plan to update on a quarterly basis.

Prior to widespread distribution of the database, discussion and education was provided for faculty as well as students in the PM&R interest group including review of the database, its purpose, and to ensure they are knowledgeable about accessing.

A post-database implementation survey was utilized to evaluate the success of our database including students actively engaged in PM&R research projects and knowledge about accessing the database should they pursue research opportunities in the future.

QR code to Research Database



NEEDS ASSESSMENT

FACULTY AND STUDENT SURVEY RESPONSE

A total of 20 responses were received on an initial survey, 10 faculty members and 10 students from the PM&R student interest group.

Four faculty members reported they are currently participating in at least one research project with 90% of faculty reporting they are aware of ongoing research within our division excluding their own studies. Three out of the four faculty with current research projects have learners engaged in their study with only 1 learner from the PM&R interest group participating in a study within the PM&R division. The faculty member who does not have active learner engagement in their study reported this was due to lack of awareness of students or residents interested in PM&R research. Nine out of 10 student respondents reported they were not aware of any ongoing research within the PM&R division; all reported they would increase participation in research if there was an easily accessible resource to learn about opportunities.

There was no unified consensus by faculty for action if contacted by a learner (student or resident) to engage in PM&R research; respondents stated they would invite them to participate in their own research studies, suggest working together to produce ideas of interest, refer to another colleague who has ongoing research, or refer them to our division chief to help point them in the right direction. All faculty reported interest in single central resource to increase in collaboration for research within the division.

METHODS UTILIZED BY STUDENTS TO LEARN ABOUT RESEARCH PROJECTS PRIOR TO DATABASE IMPLEMENTATION

Word of Mouth

Cold call or ask individual faculty members

Research Portal

Table 1: BARRIERS TO RESEARCH PARTICIPATION

FACULTY	STUDENTS
Lack of knowledge of opportunities to help with ongoing research projects	Lack of Time
Not sure how to start a project	
Desire to solidify clinical practice per new faculty prior to partaking in research	
Lack of ideas to start novel project	

POST IMPLEMENTATION SURVEY

Following education and distribution of the database, one new student has engaged in a current PM&R research project with all faculty members current engaged in research projects reporting increase in student inquiry for participation.

100% of respondents, both faculty and students, indicated they will access the database should they be asked about ongoing projects and/or wish to pursue research projects in the future.

DISCUSSION

BARRIERS TO IMPLEMENTATION

There were many barriers to successful implementation of the research database:

- New and rapidly growing division with addition of 7 new faculty during assessment period
- limited interaction with learners – residency program in development but remains awaiting accreditation, currently only one 4th year medical student rotation
- Timing of study initiation was after start of medical school academic year, many students were not looking to join current projects
- Remain awaiting publication of link to division website for easy accessibility

FUTURE DIRECTIONS and NEXT STEPS

We are hopeful this database will help with learner engagement in research activities as we continue to expand in corporate residents into our new residency program.

This database can serve as a reference for mandatory attending scholarly activity reporting to the ACGME and annual research activity reporting by our division chief to the department chair.

We are awaiting approval for addition of PM&R section to the Orthopedic Surgery college of medicine website which will also contain a link to the shared database.

We will be able to utilize the database to share ongoing research projects with our future resident candidates as well as celebrate program achievements and publications via social media from information contained within the database.

INTRODUCTION

Research competency is a cornerstone of PM&R residency. This project aims to enhance academic productivity and increase the research level of comfort among PM&R residents.

The barriers identified included:

- Lack of early research guidance and limited exposure to diverse scholarly activities.
- Perceived research complexity leading to anxiety and delayed engagement.

METHODS SECTION

To address these barriers, we developed a PGY2 Research Bootcamp. The key points of the curriculum were identified through an analysis of alums' research output and resident feedback:

- Alums from the 2022 class showed wide discrepancies in research productivity, highlighting a lack of consistent engagement.
- Residents reported feeling unprepared and overwhelmed, often delaying research engagement until later in residency.

To address these gaps, the PGY2 Bootcamp curriculum focused on:

- Introducing core research skills specific to PM&R.
- Providing an overview of research resources and opportunities within and outside the department and institution.
- Early introduction of our structured point system to track, diversify, and incentivize scholarly activity.

Evaluation of effectiveness:

- Pre- and post-surveys were administered to assess residents' confidence and preparedness (Table 1).
- These surveys captured quantitative changes in key competencies and provided qualitative feedback to refine future iterations of the Bootcamp.

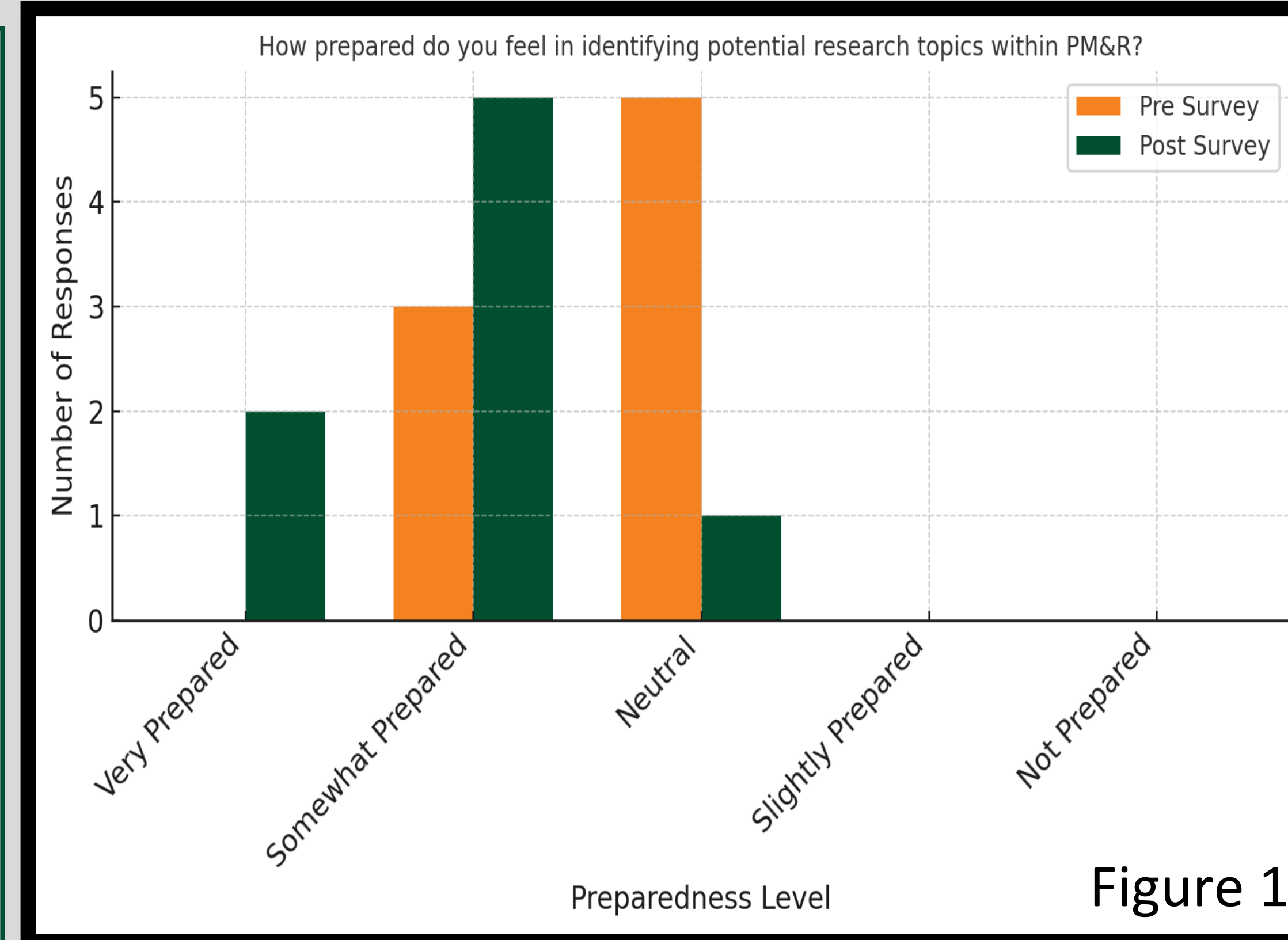


Figure 1

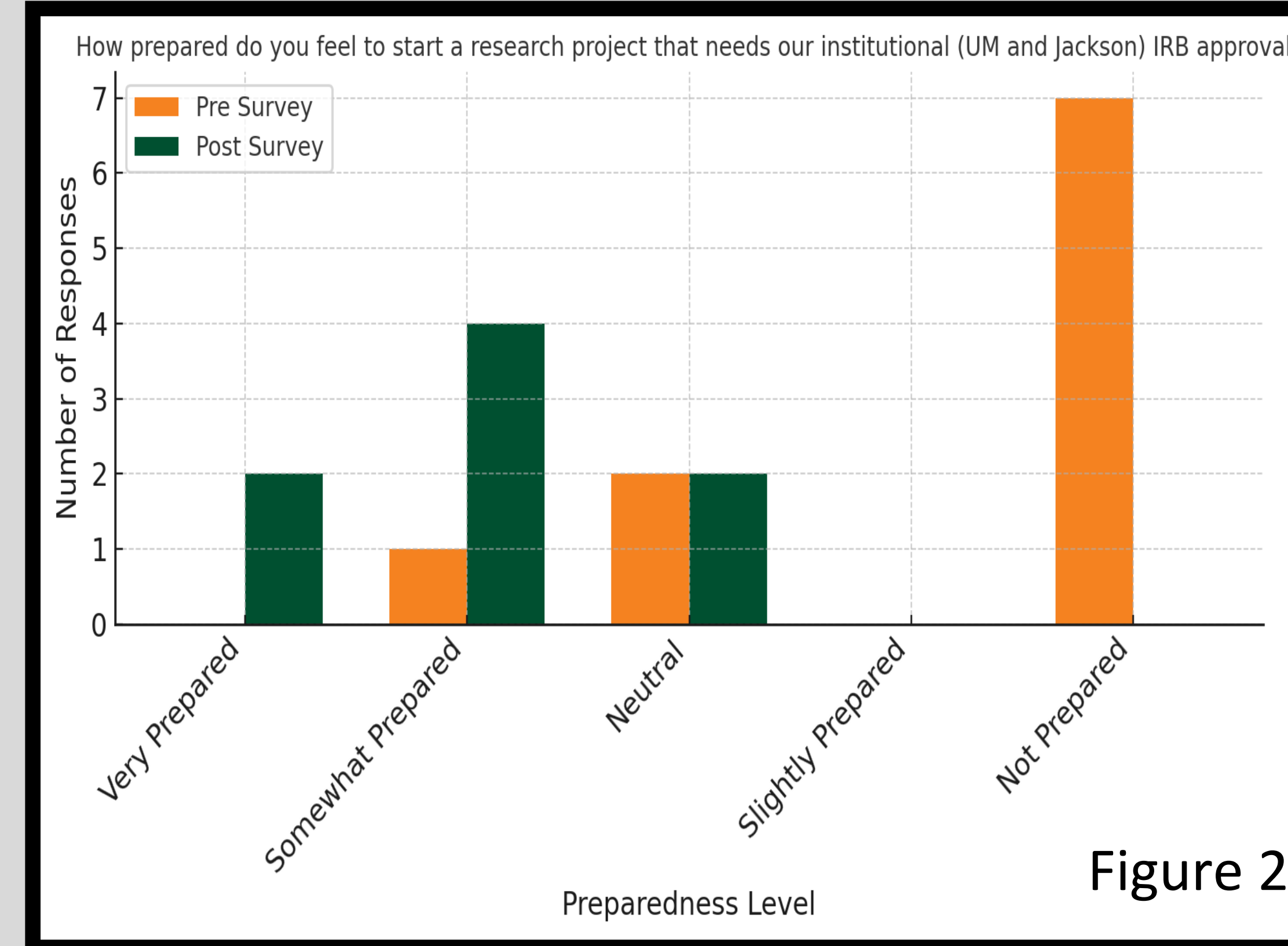


Figure 2

Table 1

How prepared do you feel identify clinical cases appropriate to submit for poster presentation?	How prepared do you feel in identifying potential research topics within PM&R?	How prepared do you feel to start a research project that needs our institutional (UM and Jackson) IRB approval?	How prepared do you feel to define a research question?
How prepared do you feel utilizing research databases (e.g., PubMed, Cochrane) and conducting a literature review?	How prepared do you feel developing a structured abstract?	How prepared do you feel selecting appropriate research methodologies (e.g., RCT, case-control, cohort)?	How familiar are you with research projects within our PM&R department?

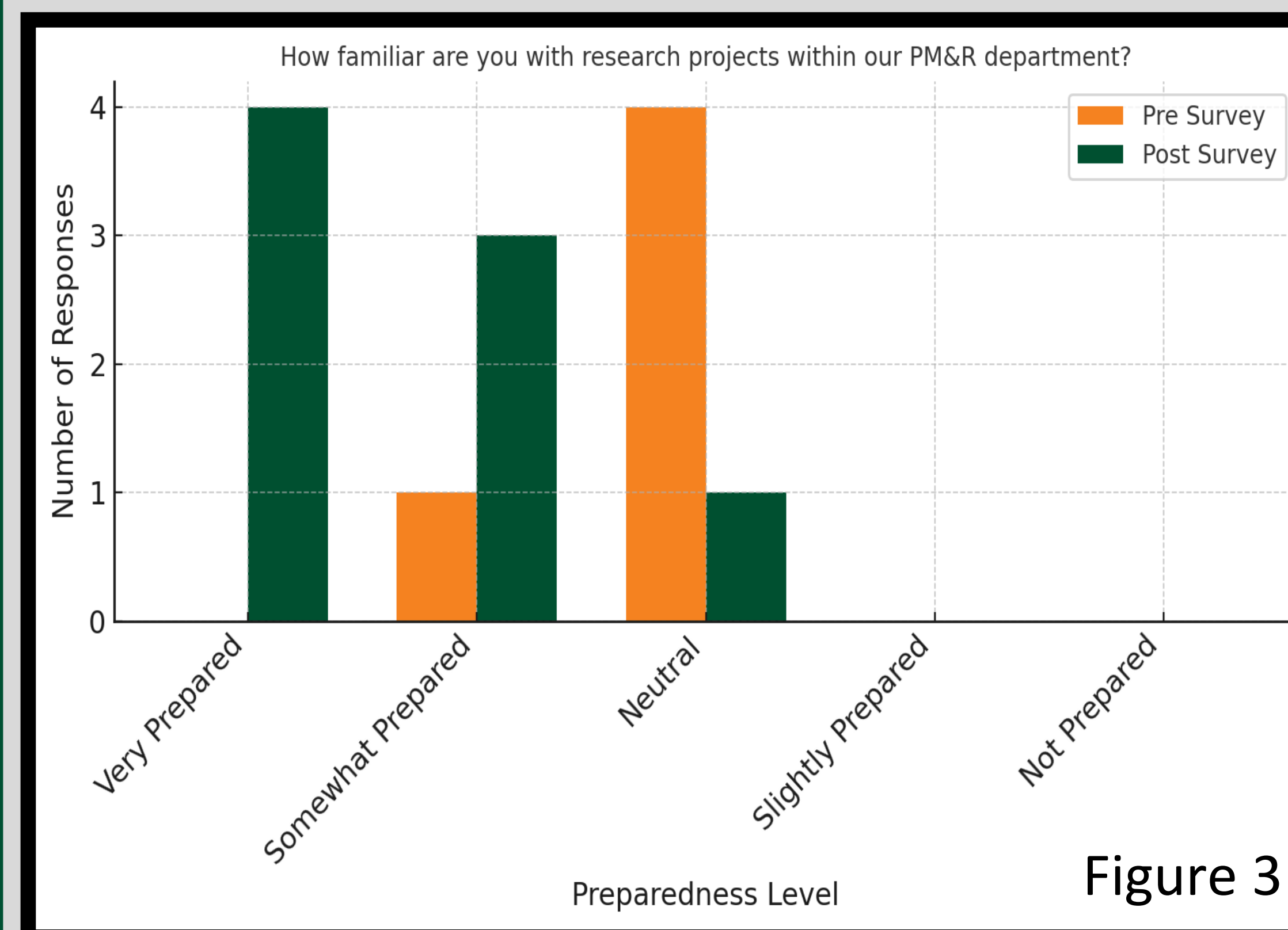


Figure 3

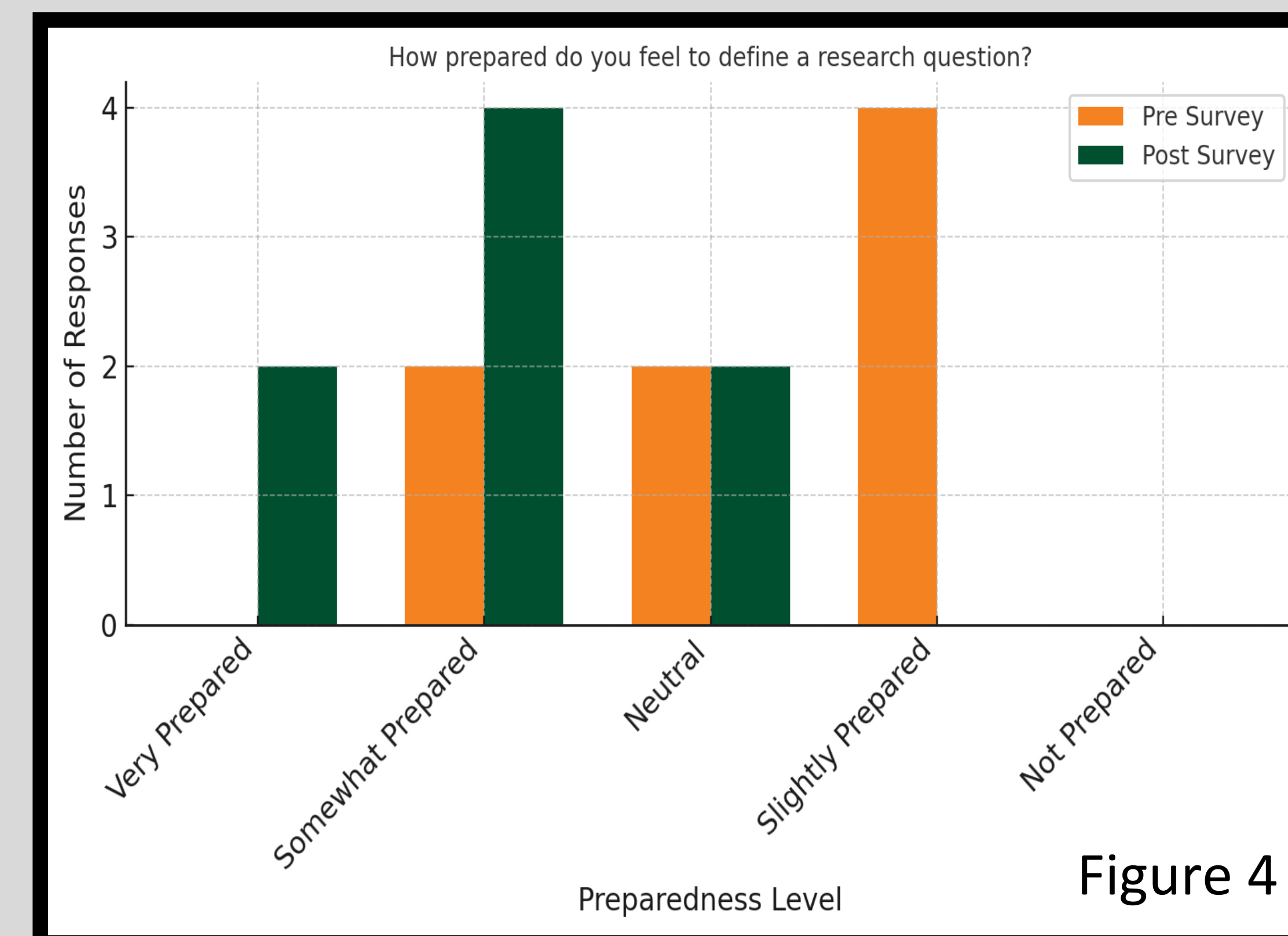


Figure 4

RESULTS & DISCUSSION

The PGY-2 Research Bootcamp significantly improved residents' confidence and preparedness for research. The most substantial gains were observed in four key areas (Figures 1-4):

- Familiarity with departmental research opportunities.
- Starting projects requiring IRB approval.
- Defining research questions.
- Identifying potential research topics.

Moderate improvements were also observed in other domains, increasing proficiency in applying research methodologies, developing abstracts, identifying clinical cases for posters, and conducting literature reviews.

These results highlight the Bootcamp's effectiveness in reducing barriers to research engagement. By equipping residents with these critical skills, we anticipate the Bootcamp will improve residents' academic productivity. These findings underscore the importance of foundational training while identifying areas for refinement in future sessions.

The Bootcamp has established a foundation for fostering a culture of inquiry. Future data collection will include longitudinal tracking of scholarly activities to assess the sustained impact of the Bootcamp on academic productivity and resident research engagement.

CONCLUSION

The PGY-2 Research Bootcamp effectively addressed barriers to research engagement by fostering early exposure and diversifying scholarly opportunities. Significant improvements in resident preparedness and confidence reinforced its impact on research training.

While the residency program had made strides in research engagement, the Bootcamp formalized these efforts, creating a sustainable framework for long-term improvements.

Future data collection will focus on measuring the Bootcamp's impact on long-term academic activity and sustained scholarly output.

Faculty Research 101 Module Q&A Sessions

Clausyl Plummer II, M.D., Mohammad Agha M.D., David Kennedy M.D.



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Background

Academic medical centers aim to remain at the cutting edge of medical advancement and make it a goal to do so through evidence-based approaches. It is generally an expectation that physicians who practice medicine in these settings do so with the intent of contributing to the body of literature geared towards medicine. Unfortunately, as clinical and administrative demands increase on these institutions, so do the demands placed on the healthcare team. Attending physicians play an integral part of the medical team and are subject to many of these pressures, even as they are expected to remain academically productive. This remains true amongst attending physicians practicing within the field of Physical Medicine and Rehabilitation (PM&R). PM&R attending physicians face many barriers to developing their research abilities especially when considering the pressures of clinical practice with staffing issues, increasing administrative burden, insurance denials, and changes in trainee work hour restrictions. It is also true that many of these barriers have been cited in literature for contributing to high burnout levels amongst PM&R attending physicians (1) and is also likely why many feel they do not have time to truly develop or conduct research abilities/projects. Unfortunately, it also tends to be true that many have never received formal teaching on the basics of conducting research; even though it is an expectation for many in the academic setting. More is needed to combat these barriers amongst attending physicians in all fields of medicine.

There is no national standard dedicated to establishing core competencies in developing attending physician research abilities. This is also true in my department here at Vanderbilt Medical Center. To my knowledge, there is no current mechanism specifically for faculty development in research (outside of formally pursuing a Masters or Ph.D. level degree). In discussions with most of the clinical/educator faculty physicians in my department, most disclosed that that they have never received training in the basics of research, though most desired it to some extent. Unfortunately, this is likely the case in many PM&R departments across the US and to my knowledge, no published studies have been completed exploring development of research 101 modules for teaching PM&R attending physicians these skills. My hope is that project leads to more clinicians discovering all the ways that research projects (no matter how large or small) can be implemented into the daily work being conducted.

OBJECTIVES

My primary goal with this quality improvement project is to develop a high yield and interactive qualitative curriculum for teaching PM&R attending physicians at Vanderbilt Medical Center the basics of conducting research.

Methods

My primary intervention was implementation of a 2-point module mini course developed by myself with several components of a curriculum published in 2007 that aimed to provide practical training to attending physicians, medical students and allied health professionals (2). The first installment titled, "Research 101 Part 1," was set up as an informal hybrid (in person and via teams) Q&A session between the chair of our PM&R department and our primary PM&R faculty. I provided a list of questions I created from various sources to assist in facilitation of the discussion (see Appendix). Many of the questions were ones generated from those faculty members in attendance. The focus for this session included discussion about research terminology, turning a research idea into a research question, and learning logistics of implementing a research project (this will include grant writing, coordinating with a statistician if needed, inclusion of learners like medical students, residents and fellows). Part 2 of the project will further expound on these topics and will include discussion on data acquisition, publishing research and live discussion (crowdsourcing) through sample research ideas attendees present.

I conducted pre-module surveys prior to the 2-module mini-course and followed Part 1 with a post-module survey targeting the topics covered in this initial session. These served as my primary outcome measures for this QI project. These surveys were geared towards attending physicians and other primary faculty (Ph.D. and Psy.D.) who attended the sessions.

PRELIMINARY RESULTS (Part 1)

Figure 1 years since training and level of education



Figure 2. Pre-module Survey vs Post module survey results (left to right respectively).

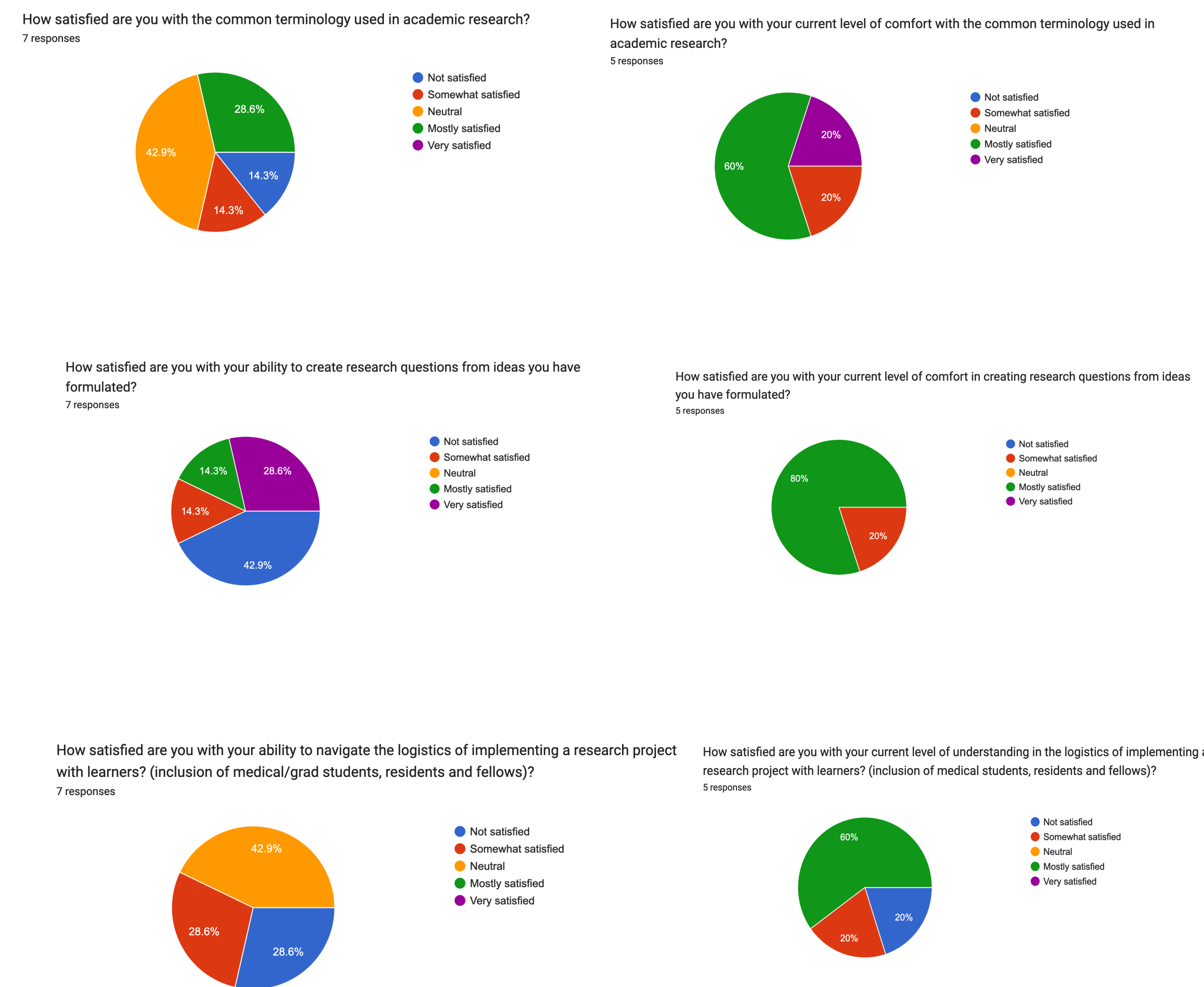
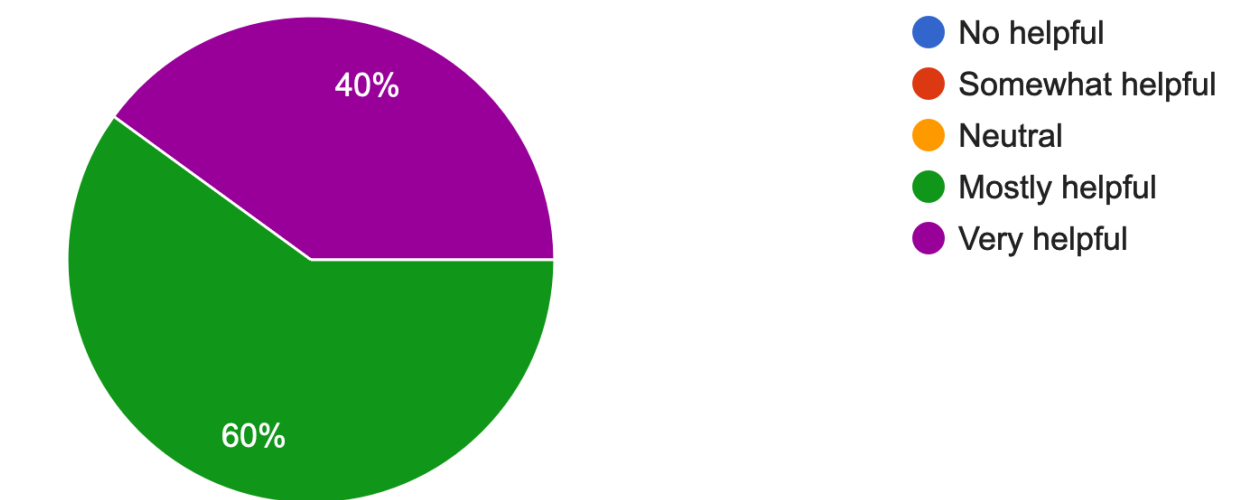


Figure 3. Utility of Research Q&A session Part 1

How helpful did you find Research 101 Q&A: Part 1? 5 responses



- 7 faculty members completed the pre-survey for Research 101 part 1 (71.4% MD/DO and 28.6% Ph.D. or Psy.D.).
- 5 faculty member completed the post survey for Research 101 part 1 (80% MD/DO and 20% Ph.D. or Psy.D.).
- 28.6% (n=7) reported being mostly satisfied with the common terminology used in academic research while 80% (N=5) reported the being mostly satisfied with common terminology used in academic research after the Q&A session Part 1.
- 14% (n=7) reported being mostly satisfied with their ability to create research questions from ideas they formulated prior to the Research Q&A session and 80% (n=7) reported being mostly satisfied with ability to creating research questions from ideas they formulated, after the Q&A session Part 1.
- Before the Q&A session for Part 1, no faculty (n=7) reported feeling satisfied with their ability to navigate the logistics of implementing research projects with learners (medical/grad students, residents, and fellows) while 60% (n=5) reported being mostly satisfied with this after the Research Q&A session Part 1.

Discussion

Overall, the research 101 Q&A session appeared to help facilitate improvement in the areas of common research terminology, exploring/creating research questions, and utilizing trainees during research projects. These areas were targeted in this first of 2 sessions (Part 2 pending in the first quarter of 2025) and were intended to serve as a foundation to build upon. The feedback (both written and verbally) was positive and it appears as though there was a strong desire to be given space to explore the basics of logistics of research development. There were several limitations to include the number of faculty (small sample), one PM&R department involved, and a lack of robust Ph.D./Psy.D. level participation. Another limitation was a lack of more objective post session assessment tools. This was challenging to implement given the fluid, open-ended nature of the session.

Admittedly, this session was geared towards faculty members who were a part of the clinical track and the clinical educator track here at Vanderbilt Medical Center so the participation from PH.D./Psy.D. level faculty was likely affected by the introductory nature of these topics. There is a need to further generalize the topics and to facilitate more individualized discussion on specific potential projects as well.

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Improving Research in our PM&R Residency



Michelle Poliak-Tunis, MD | Internal Mentors: Nathan Rudin, MD¹, External Mentor: Daniel Cushman, MD²
¹University of Wisconsin ²University of Utah

Background

Participation in research is essential for PM&R (Physical Medicine and Rehabilitation) residents and faculty as it drives the advancement of evidence-based practices and enhances the specialty's scientific foundation. Engaging in research not only fosters critical thinking and lifelong learning but also equips clinicians with the skills to evaluate and apply emerging evidence effectively. Studies show that research involvement during residency improves understanding of clinical methodologies and contributes to better patient outcomes. For example, a study in the Journal of Graduate Medical Education found that residents engaged in research were more likely to publish, present at conferences, and pursue academic careers, thus enriching the field. Additionally, research by Asch et al. demonstrated that patient outcomes are improved in teaching hospitals with active research programs, highlighting the direct benefit of scholarly activity on care quality. However, conducting research within the constraints of a PM&R residency can be challenging due to time limitations, demanding clinical responsibilities, and restricted access to resources. These barriers often make it difficult for residents to design, execute, and complete meaningful studies. Overcoming these challenges requires institutional support, such as dedicated research time, mentorship programs, and access to funding, which are crucial to fostering a culture of scholarly activity within the residency. For faculty, leading and mentoring research initiatives promotes innovation, attracts funding, and raises institutional prestige. Overall, integrating research into PM&R training ensures that the field continues to evolve, addressing the complex needs of patients with physical disabilities and functional impairments.

Plan

Although our PM&R division is housed within the Orthopedics Department, we tend to lag behind our Orthopedic colleagues in both research participation and production. This disparity can be attributed to a variety of factors, including the smaller size of our division, the heavy clinical workload of PM&R faculty and residents, and a lack of streamlined opportunities for interdisciplinary collaboration. Unlike Orthopedics, which often has well-established research infrastructure, funding, and a tradition of producing high-impact studies, PM&R's focus on functional outcomes, rehabilitation, and quality of life may face challenges in securing the same level of resources or institutional emphasis.

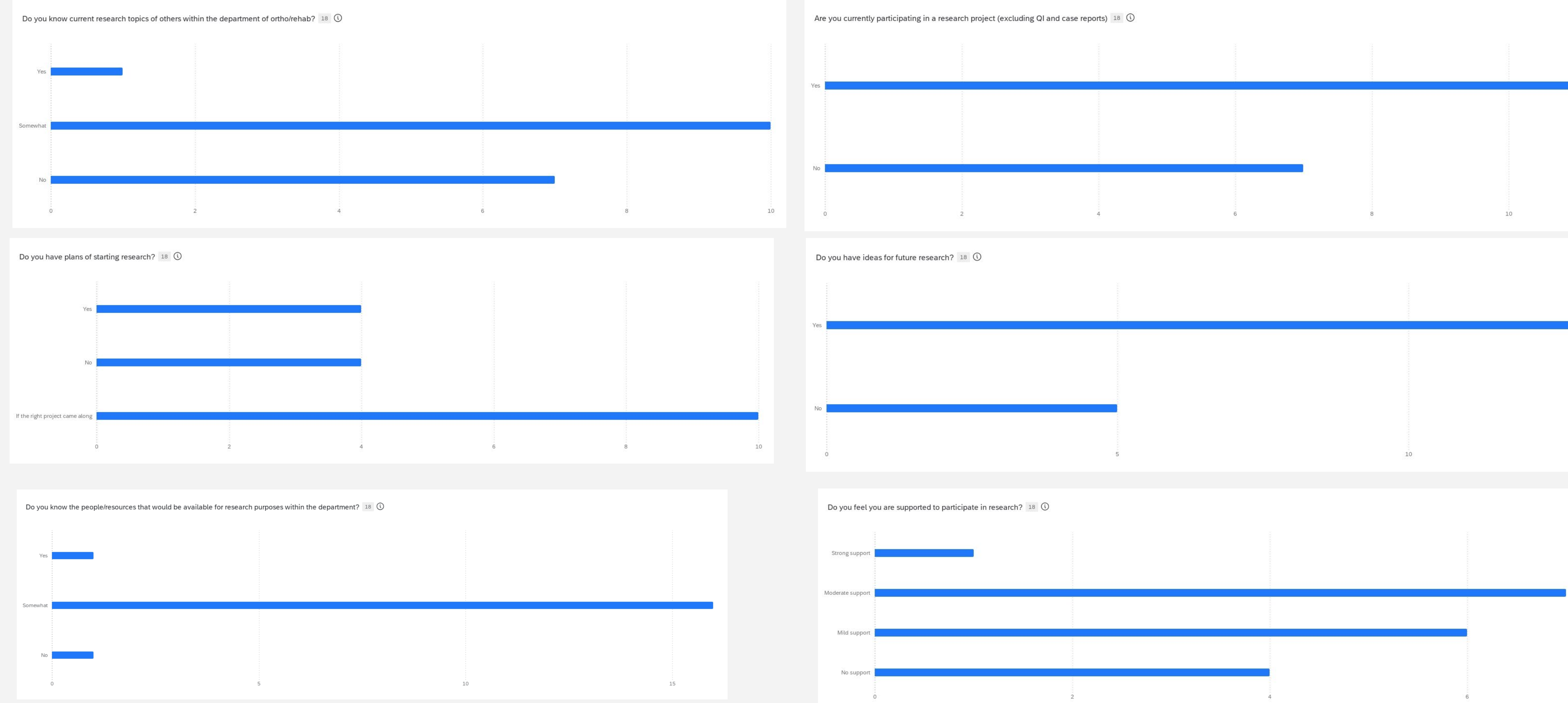
Our challenge is twofold: first, to cultivate a stronger culture of research interest and engagement within the PM&R division, and second, to bridge the gap between PM&R and Orthopedics to foster mutually beneficial research collaborations. Increasing collaboration could open up opportunities to explore shared areas of interest, such as musculoskeletal rehabilitation, post-surgical recovery optimization, and innovative technologies in patient care.

My goal with this quality improvement (QI) project is to create a sustainable framework that promotes research enthusiasm among PM&R residents and faculty, while also building pathways for collaborative research with our Orthopedic colleagues. This could include hosting joint research brainstorming sessions, establishing a mentorship program that pairs PM&R and Orthopedic researchers, and developing pilot projects to explore overlapping interests. By enhancing communication and shared goals between the two specialties, we can leverage the strengths of both fields to produce impactful research, elevate the academic profile of our division, and improve patient care.

Do

- **Joint Research Day Collaboration**
 - o For the first time, PM&R partnered with Orthopedic colleagues for a joint research day.
 - o This event aimed to:
 - o Foster interdisciplinary engagement.
 - o Elevate the research culture within the PM&R division.
 - o Showcase ongoing research projects.
 - o Build bridges between specialties to spark new ideas and collaborations.
- **Measuring Impact: Surveys**
 - o Initial Survey (Pre-Event):
 - o Assessed baseline attitudes toward research.
 - o Measured current levels of engagement and perceived barriers.
 - o Gauged interest in collaboration with Orthopedic colleagues.
 - o Follow-Up Survey (Post-Event, 6 Months Later):
 - o Collected participants' impressions of the event.
 - o Evaluated the perceived value of the joint format.
 - o Measured whether the event stimulated research interest and collaboration.
 - o Looked for tangible outcomes (e.g., new projects, partnerships, publications).
- **Data Analysis and Outcomes**
 - o Analyzed survey data to assess the event's effectiveness.
 - o Identified areas for improvement and refined strategies to:
 - o Promote a robust research culture within PM&R.
 - o Encourage sustained interdisciplinary collaboration with Orthopedics.
 - o Aimed to enhance academic output and build a foundation for long-term partnerships.
- **Long-Term Vision**
 - o Ensure the joint research day becomes a springboard for growth and success.
 - o Lay the groundwork for future collaborations, benefiting both PM&R and Orthopedics.

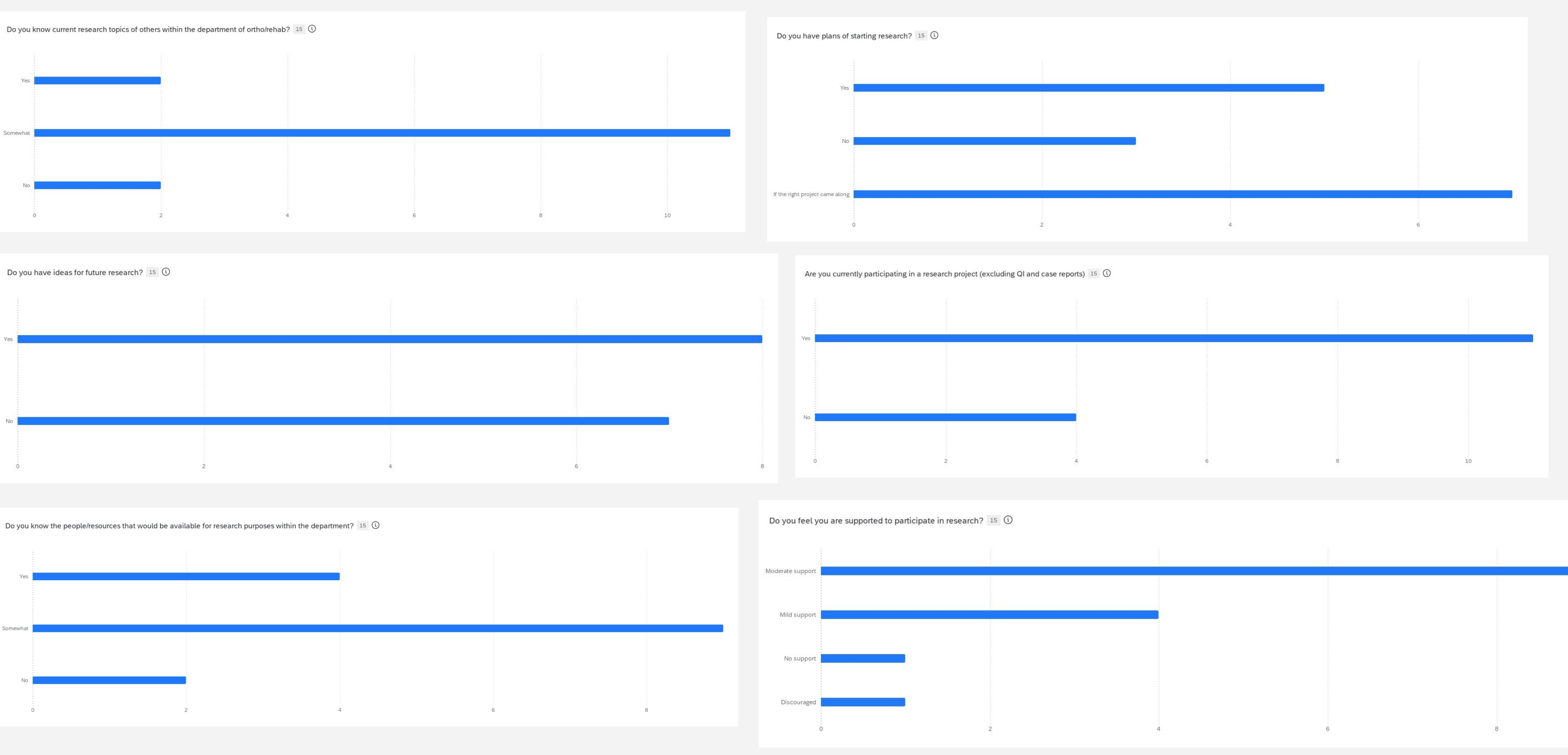
Initial Survey Results from both faculty and PM&R Residents



Some of the comments from our initial survey:

“Network, hear about other projects, think about possible project that I could do in my clinic.”
“Potential future projects to be involved with”
“successfully present my project and ideally get feedback. Otherwise not really sure what to expect.”

Survey Results 6 months post joint research day (including faculty and PM&R residents)



Results

- Following combined research day, there was an improvement in understanding current resources that our division has for research.
- There was some increase in ideas for research
- Both residents and faculty noted increase in support to participate in research

Discussion/Next Steps

- While immediate interest is expected, sustained increases in research participation may take longer than six months to fully materialize.
- Building a research culture is gradual and requires time for:
 - o Ideas to mature.
 - o Collaborations to develop.
 - o Tangible outcomes (e.g., publications, conference presentations, grant applications) to emerge.
- Early Success Indicators
 - o Increased dialogue about research within the PM&R division.
 - o A rise in inquiries or proposals for collaborative projects.
 - o Higher participation in research-related activities (e.g., workshops, brainstorming sessions).
- Sustaining Momentum
 - o Regular follow-ups to nurture interest generated by the joint research day.
 - o Provide targeted mentorship opportunities and accessible research resources.
- Celebrate small wins, such as:
 - o New collaborative studies.
 - o Residents securing conference presentations.
- Long-Term Goal
 - o Lay the foundation for a sustainable and integrated research culture within PM&R.
 - o The joint research day serves as a pivotal first step in this journey.
- Next Steps
 - o Plan to participate in the joint PM&R and Orthopedic Research Day again this upcoming spring.

Formalizing the Journal Club format for UT Health San Antonio PM&R program

Aditya Raghunandan, MD

Internal Mentor: Benjamin Seidel, DO, External Mentor: Kim Barker, MD



UT Health San Antonio Long School of Medicine Department of Rehabilitation Medicine

Background

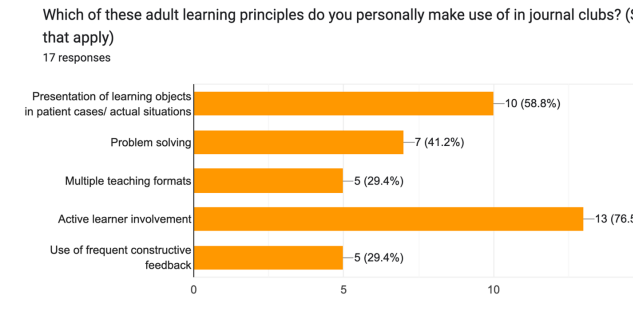
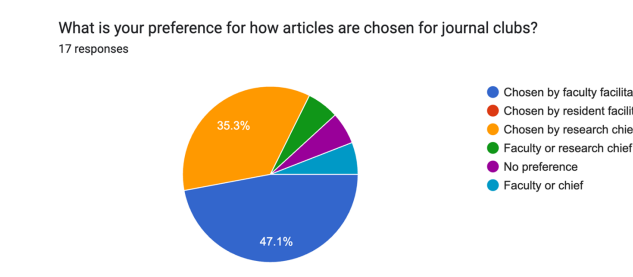
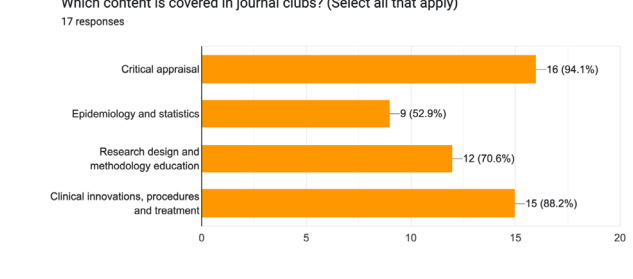
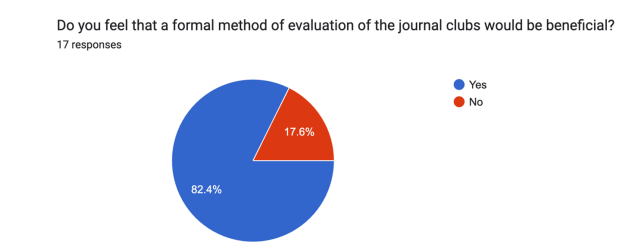
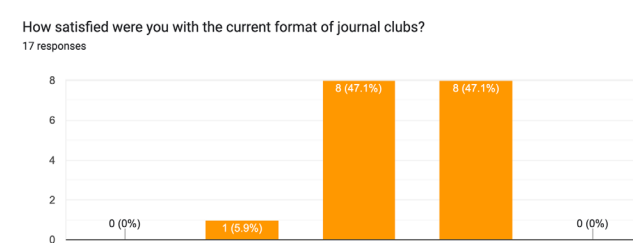
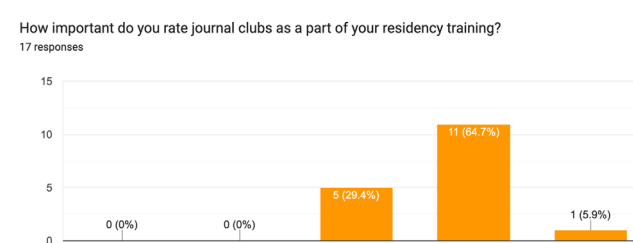
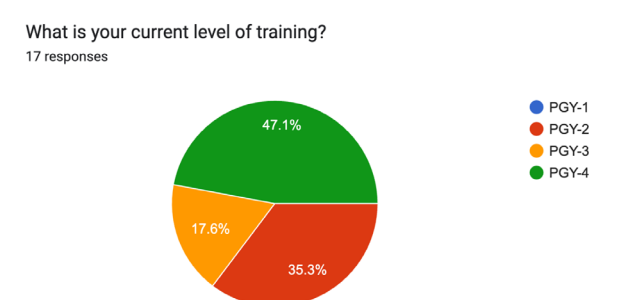
The resident didactics curriculum at UT San Antonio follows a systems-based module (e.g., brain injury, SCI, MSK, spine, etc.), which is scheduled twice per week in 2-hour blocks.

Previously, journal clubs were scheduled once/month without a specific theme. Two articles were chosen by the research chief resident, summarized and presented via Powerpoint, with unstructured discussion to follow. Most importantly, a faculty mentor was not always selected/present for these discussions, and therefore no discussion or critical appraisal of specific topics occurred.

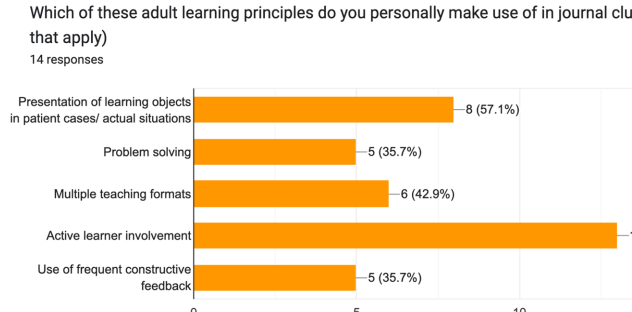
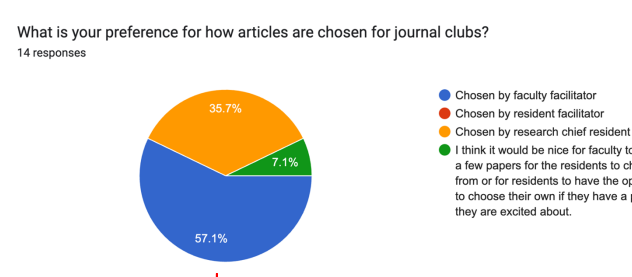
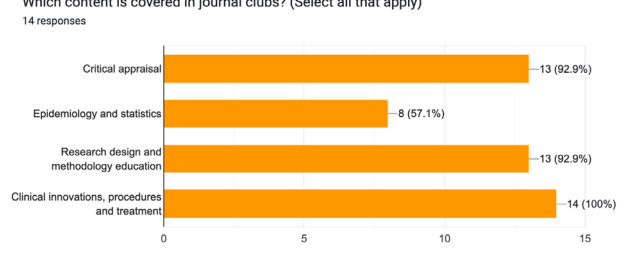
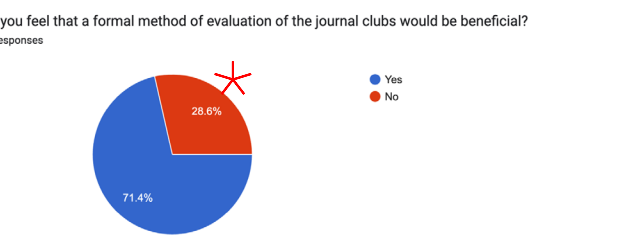
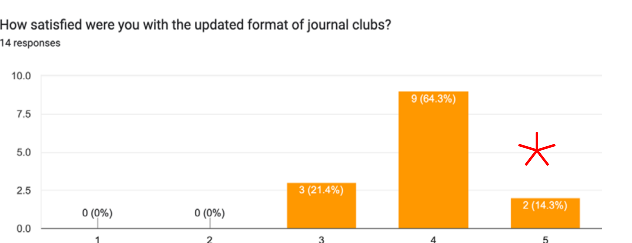
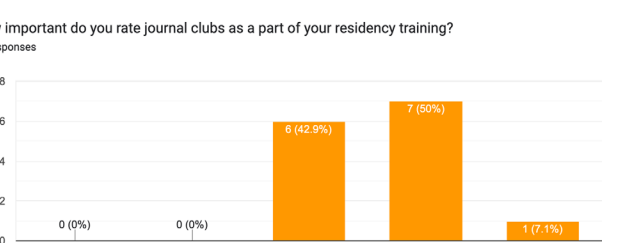
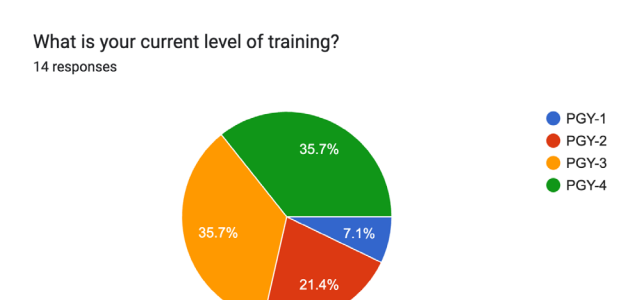
Plan

- Align each session to the theme of the module that month
- One of the journal articles should be foundational knowledge (e.g. anatomy, pathophysiology, etc.) presented by a junior resident. The other should be either be a clinical application or "frame shifting" article presented by a junior resident.
- A specific format should be followed to critically appraise each article (rather than a book report type of summary).
- A faculty mentor either chooses or helps the research chief select articles and should be present for the journal club to facilitate discussion.

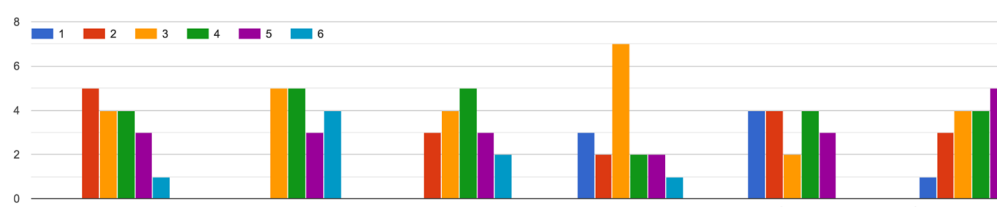
Pre-Intervention Survey



Post-Intervention Survey

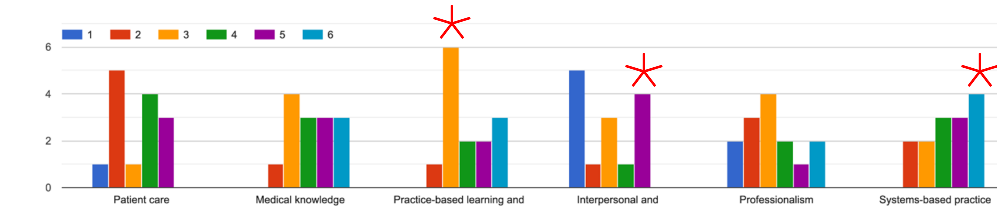


Please rank the ACGME core competencies according to how much they are emphasized in journal clubs. Each rank may only be used once (1 = least emphasized, 6 = most emphasized).



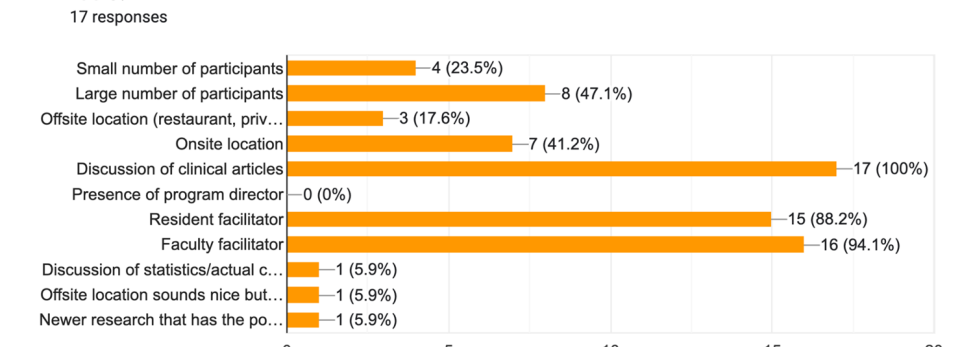
Pre-intervention

Please rank the ACGME core competencies according to how much they are emphasized in journal clubs. Each rank may only be used once (1 = least emphasized, 6 = most emphasized).



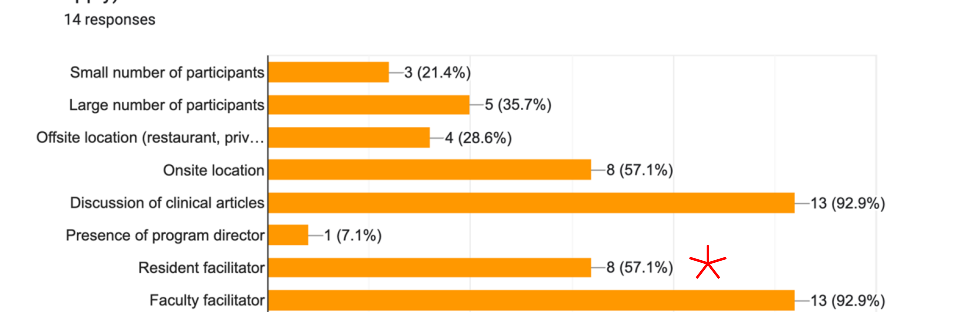
Post-intervention

What do you think makes a successful journal club in an PM&R residency program? (Select all that apply) 17 responses



Pre-intervention

What do you think makes a successful journal club in an PM&R residency program? (Select all that apply) 14 responses



Post-intervention

Results

After implementation of the new journal club format there was noted to be an overall shift towards increased resident satisfaction (5.9% to 0% rated as level 2, 47.1% to 64.3% rated as level 4, and 0% to 14% rated as level 5). There were interestingly more residents (17.5% to 28.6%) who felt that formal evaluation would be less beneficial. More residents preferred a faculty preceptor (47.1% to 57.1%) after the implementation. There were also some perceived increases in ACGME competencies particularly "Practice based learning and improvement," "interpersonal and communication skills" and "systems based practice." Residents also felt that decreased resident facilitation (88.2% to 57.1%) created more successful journal club sessions.

It is fascinating to note no perceived changes regarding the importance of journal club as part of PM&R residency training, content coverage during the sessions, or adult learning principles.

Discussion and Future Direction

Overall, the new format for the journal club did yield quite a few positive results. The goal is for this format to become standardized and the expected norm for the journal clubs moving forward. Critical thinking and appraisal of literature is an ACGME required component for resident core competencies and crucial for all future physiatrists as our body of knowledge grows exponentially.

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Behavioral Assessment and Intervention to Optimize Faculty Research Support and Resource Allocation

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INTRODUCTION

- Academic physician faculty come to a department with widely varied research experience, interest, and goals.
- Physician perceptions of their own research capabilities and resources may become barriers to engagement.
- Common one-size-fits-all strategies to incentivize research participation may not be sufficient to promote engagement among physician faculty, given competing priorities and demands on faculty time and energy.
- Many departments and institutions offer a wide variety of initiatives, resources, and programs designed to build faculty research skills with unclear impact. Faculty can find this to be overwhelming and difficult to navigate.
- HYPOTHESIS: Behavioral assessment of faculty research goals and attitudes coupled with needs assessment may promote efficient matching of faculty to available department- and institution-wide resources.
- GOAL: Increased faculty engagement with research

METHODS

- Available department-wide and institution-wide research resources were compiled and categorized as 1) Faculty-oriented; 2) Project-oriented; 3) System-oriented
- A behavioral assessment survey was developed and distributed to characterize faculty perceptions and intentions towards research and readiness for change according to the Trans-Theoretical Model of Behavior Change (TTM).
- A needs assessment survey was developed and distributed to identify the leading resource gap/barrier preventing engagement with research.
- An attempt will be made to match faculty with the most appropriate resource for their assessed goal and stage of readiness for change.

RESULTS

Figure 1. Single leading resource gap and barrier

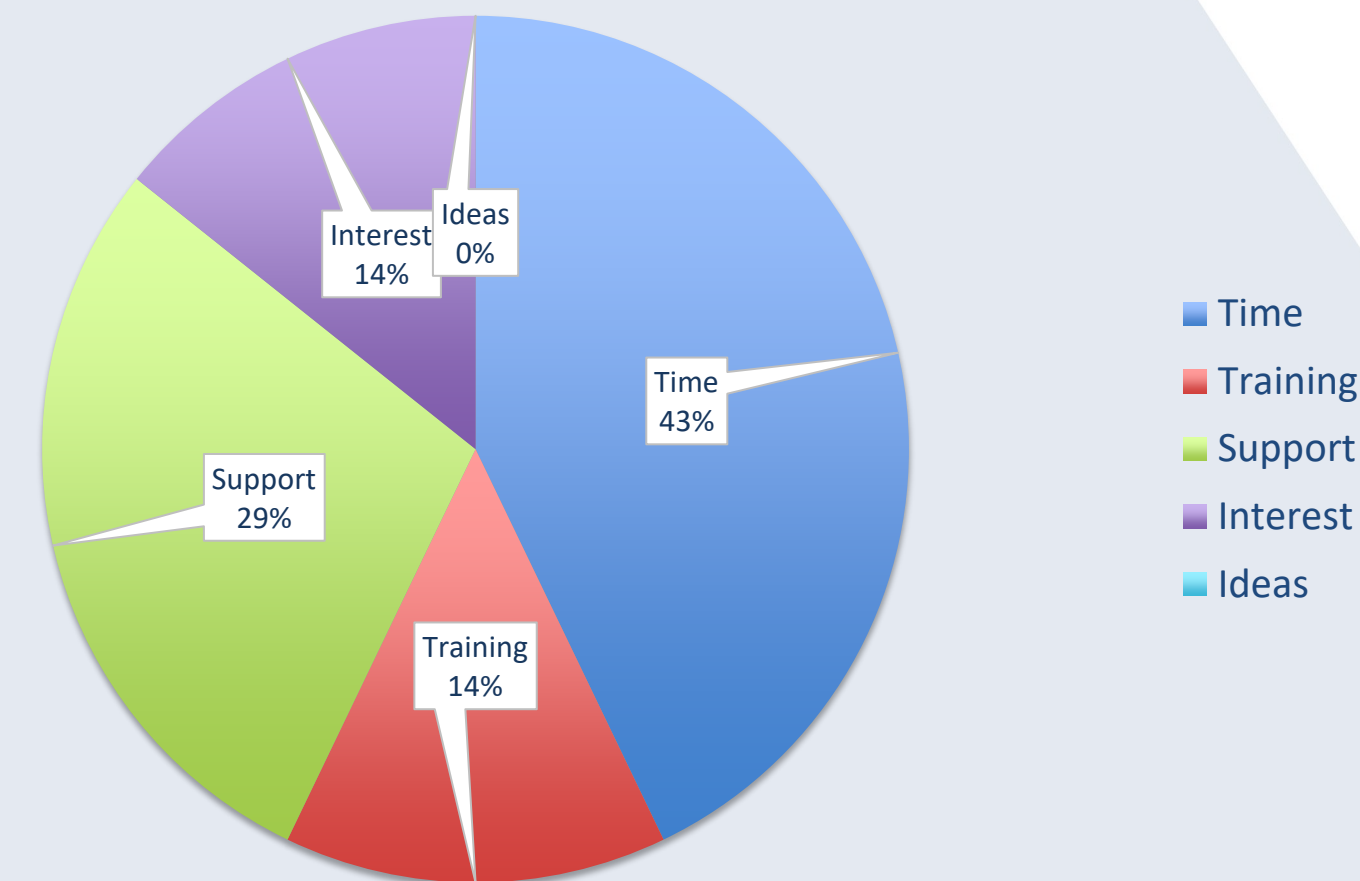


Figure 2. Faculty Stage of Readiness for Change

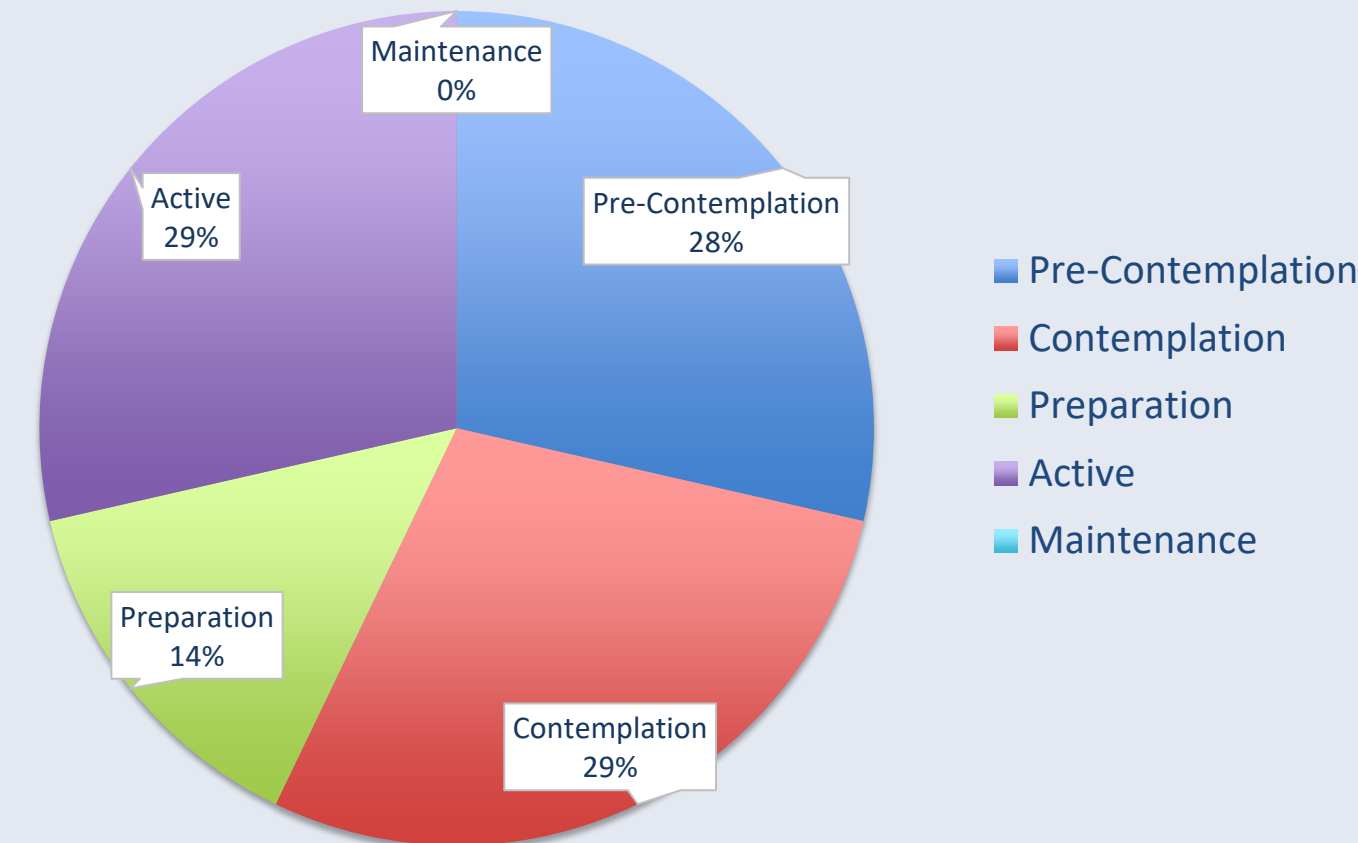


Table 1. Resource Class-Behavioral Stage Match Matrix

	System-oriented	Faculty-oriented	Project-oriented
Pre-Contemplation	X		
Contemplation	X	X	
Preparation	X	X	X
Active	X	X	X
Maintenance	X	X	X

DISCUSSION

- Lack of **time** was identified as the most significant single barrier to participation in research
- Surveyed faculty fall more in the “Intention” stages of behavior change (pre-contemplation/contemplation)
- System-oriented and faculty-oriented interventions (i.e. implementation of PROMs, standardized assessments, database construction, research design and methodology training, etc) are perceived to be effective sources of resource-limited and time-constrained insights for project ideas and design.
- Project-oriented interventions are high yield for faculty in the “Active” stages of behavior change (preparation, active, maintenance) through direct mentorship and design feedback, funding streams, and project scaling.
- Faculty reported appreciation and motivation when matched with resource.

CONCLUSIONS

While final impact of matching strategy remains to be assessed, initial motivation to engage improved when behavior stage was assessed prior to seeking resource support for budding research efforts.

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**Weill Cornell
Medicine**

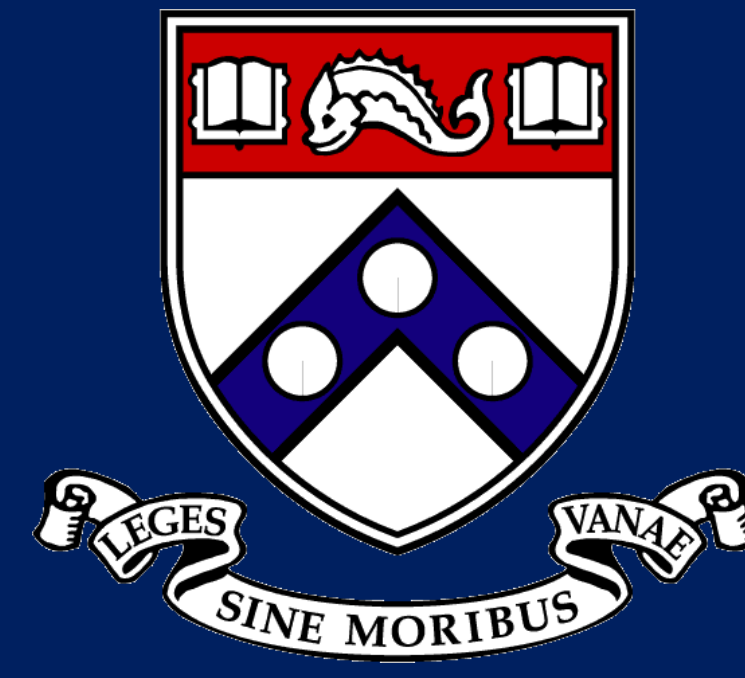
New York-Presbyterian
Rehabilitation Medicine



COLUMBIA UNIVERSITY
Vagelos College of Physicians and Surgeons



Resident Research Electronic Infrastructure Transition for Increased Use, Compliance, and Accountability



Randel Swanson, DO, PhD
Mentors: Keith Robinson, MD & Dixie Aragaki, MD

Background:

- Complete, accurate, timely recording of research-related activities in an encrypted, secure, HIPPA-complaint platform is a fundamental research requirement
- In 2022, our Department implemented a new electronic laboratory notebook (ELN) for all resident research, which was a third-party platform that did not seamlessly interface with the clinical or academic computing environment
- Over the past three academic years, appropriate and timely utilization of this platform has been suboptimal, and satisfaction amongst both residents and faculty has been low
- In collaboration with our resident research committee faculty, chief residents, and institution IT department, we sought an effective alternative solution

Setting:

- Private Academic Medical Center

Intervention:

- Transition to new cloud-based, HIPPA compliant, Institution approved, computing infrastructure for all resident research-related documentation, using a platform that is fully integrated into existing clinical workflow.
 - Develop hierarchical file organization, with administrative control and backup redundancy - Done
 - Migrate all prior files from "old platform" to "new platform" - Done
 - Train residents / faculty on new infrastructure - Done
 - Monitor utilization / compliance over next academic year - Ongoing
 - Survey residents / faculty about satisfaction with new platform - Pending

Timeline:

- Build, Migration, training began 8/2024; completed 11/2024

Metrics:

- Initial assessment involves quantification of "old" vs. "new" platform usage, stratified by user group (admin vs. trainee)

Data Analysis Methods:

- Categorical variables reported as count (%) and assessed using Pearson's Chi-Squared test
- Continuous variables reported as median (p25, p75; min, max) and assessed using Mann-Whitney test, given skewed distribution

Results:

- Old platform
 - Between 7/2021 and 8/2024, 1,369 unique research-related files were uploaded, from the 49 unique expected users, [10 (20.4%) admin; 39 (79.6%) trainee]
 - The proportion of expected users who utilized the platform did not differ significantly between admin and trainee groups (60.0% vs. 64.1%, respectfully, $p=0.810$)
 - The median number of unique files users uploaded did not differ significantly between admin and trainee groups (3[0,8] vs. 2[0,14], respectfully, $p=0.839$); however, there was significant variability in the range of entries per user in both groups (0-617 vs. 0-216, respectfully)
- New platform
 - Since 8/2024, 349 unique research-related files were uploaded, from 28 unique expected users, [10 (35.7%) admin; 18 (64.3%) trainee]
 - The proportion of expected users who utilized the platform was statistically significantly different between admin and trainee groups (20.0% vs. 61.1%, respectfully, $p=0.037$)
 - The median number of unique files users uploaded did not differ significantly between admin and trainee groups (0[0,0] vs. 1[0,2], respectfully, $p=0.142$); however, there was significant variability in the range of entries per user in both groups (0-155 vs. 0-120, respectfully)
 - The proportion of New (vs. Prior(Archive)) entries into this new platform was statistically significantly different between admin and trainee groups (19.3% vs. 4.3%, $p<0.001$)
- Limitations
 - Results presented are preliminary
 - Analyses for New Platform data is limited to 4 months of available data

Table 1: New Platform Entry Category by User Group

	User Group			p-value
	Admin	Trainee	Total	
N	200 (50.8%)	194 (49.2%)	394 (100.0%)	
New Platform Entry Cat				
Prior (Archive)	155 (80.7%)	179 (95.7%)	334 (88.1%)	<0.001
New	37 (19.3%)	8 (4.3%)	45 (11.9%)	

*reported as #(%); Pearson's chi-squared test

Table 2: Distribution of New Platform Entries by User Group

	User Group		
	Admin	Trainee	Total
N	10 (35.7%)	18 (64.3%)	28 (100.0%)
Total Entry Count			
0	8 (80.0%)	7 (38.9%)	15 (53.6%)
1	0 (0.0%)	6 (33.3%)	6 (21.4%)
2	0 (0.0%)	1 (5.6%)	1 (3.6%)
5	0 (0.0%)	1 (5.6%)	1 (3.6%)
11	0 (0.0%)	1 (5.6%)	1 (3.6%)
37	1 (10.0%)	0 (0.0%)	1 (3.6%)
44	0 (0.0%)	1 (5.6%)	1 (3.6%)
120	0 (0.0%)	1 (5.6%)	1 (3.6%)
155	1 (10.0%)	0 (0.0%)	1 (3.6%)

Total Entries: 349

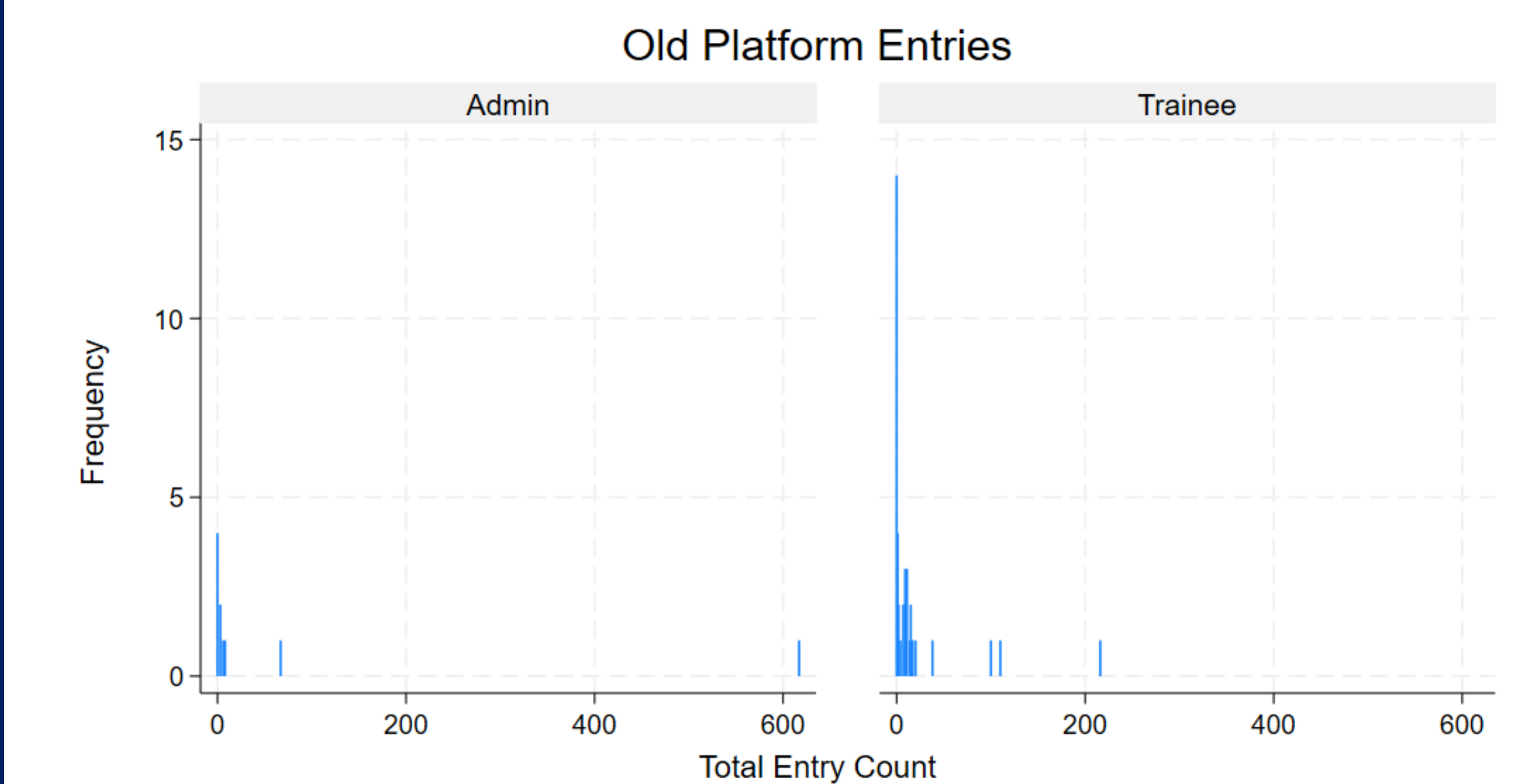
Table 3: Old Platform Entries by User Group

	User Groups*			p-value
	Admin	Trainee	Total	
N	10 (20.4%)	39 (79.6%)	49 (100.0%)	
ANY Platform Entry YN**				
No	4 (40.0%)	14 (35.9%)	18 (36.7%)	0.810
Yes	6 (60.0%)	25 (64.1%)	31 (63.3%)	
Total Entry Count***	3 (0,8; 0,617)	2 (0,14; 0,216)	3 (0,11; 0,617)	0.839

*user groups encompass all expected platform users

**reported as #(%); Pearson's chi-squared test

***reported as median(p25, p75; min, max); Mann-Whitney test



Graphs by User Group Binary
Distribution of platform entries across Administrative (n=10) and Trainee (n=39) sub-cohorts

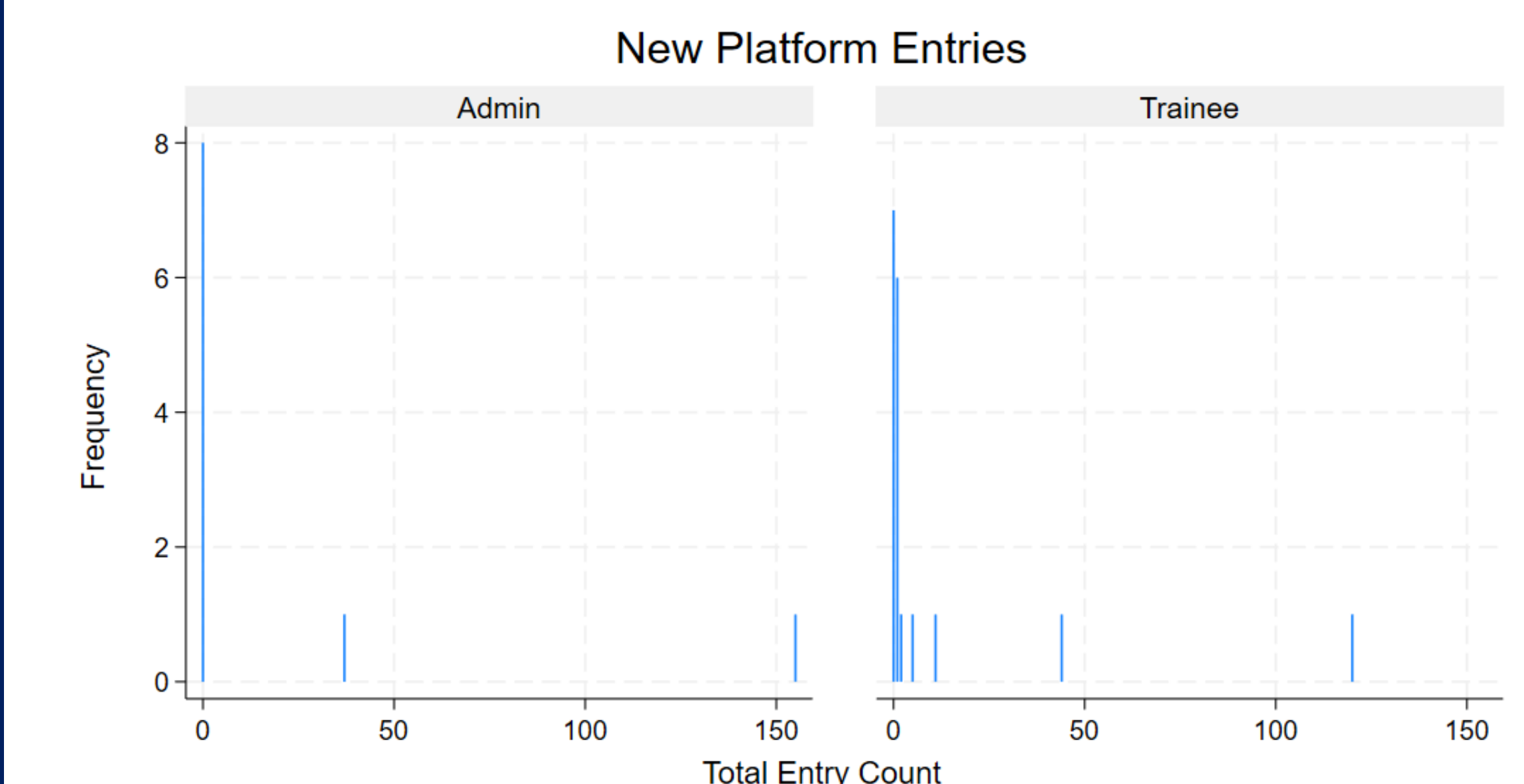
Table 4: New Platform Entries by User Group

	User Groups*			p-value
	Admin	Trainee	Total	
N	10 (35.7%)	18 (64.3%)	28 (100.0%)	
ANY Platform Entry YN**				
No	8 (80.0%)	7 (38.9%)	15 (53.6%)	0.037
Yes	2 (20.0%)	11 (61.1%)	13 (46.4%)	
Total Entry Count***	0 (0,0; 0,155)	1 (0,2; 0,120)	0 (0,1.5; 0,155)	0.142

*user groups encompass all expected platform users

**reported as #(%); Pearson's chi-squared test

***reported as median(p25, p75; min, max); Mann-Whitney test



Graphs by User Group Binary
Distribution of platform entries across Administrative (n=10) and Trainee (n=18) sub-cohorts



Improved recruitment in SCI research by collaboration

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Background:

MetroHealth is a SCI Model system and active research center. SCI studies are run by single labs/investigators without significant shared planning or central support. Currently changing to institute structure with increased central leadership, organization, and support setting the stage for better participant recruitment.

SCI is a challenging population to study due to small population with limited support and transportation. Worse with common study criteria (e.g. traumatic C3-7 incomplete from 6-12 months since injury)

Target Barriers to SCI Study Recruitment:

- Participant awareness and access
- Staff and funding discontinuity
- Lack of shared study goals and leadership
- Duplicate candidate lists and recruitment efforts

Primary Outcome:

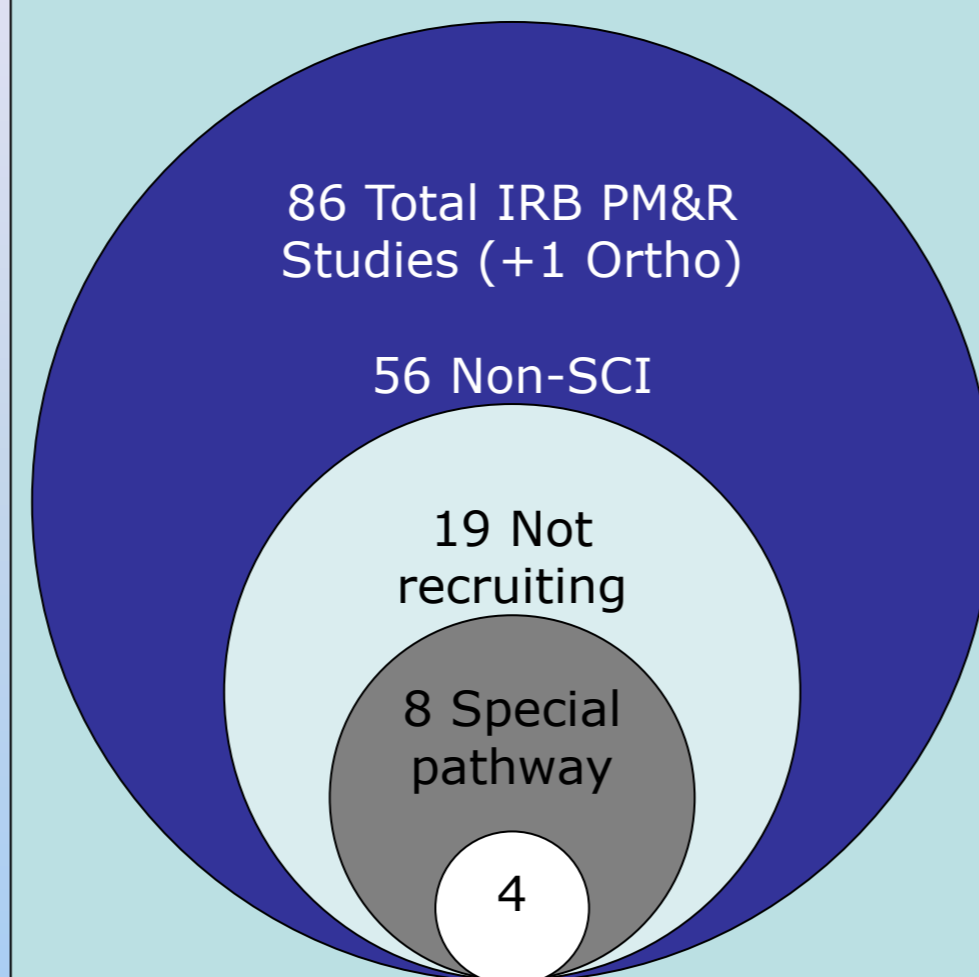
- 1) Increase RedCap SCI participant enrollment

Secondary Outcomes:

- 1) Create a live updating, comprehensive list of all SCI human research studies in the system. Establish central recruitment contact information online.
- 2) Establish wide use of RedCap tool (>80% of studies). Educate study staff about use, submit IRB amendments to allow recruitment from registry, update registry with inclusion/exclusion from all studies

Action steps

- 1) Advertise RedCap via flyer distribution (inpatient, outpatient, EMR message)
- 2) Use IRB to get a comprehensive list of recruiting SCI studies
- 3) Meet with all SCI labs, investigators, and staff. Rebuild RedCap for collaborative use in each study



Comprehensive Study List

- Created IRB query for PM&R department
- Filtered by SCI PIs
- Discovered 1+ legacy studies via Ortho dept
- 8 studies recruited only via specific methods such as Model system participants
- Eventually identified 4 active studies for focused efforts
- Live updatable
- Still needs manual confirmation from study staff after alert

Recruiting Studies to RedCap

- All study PI's onboard for collaborative recruitment
- Some hesitation: start-up time to learn and update new system, balance effort across all studies, avoid duplicated effort across studies or within studies (i.e. recruitment log vs study database)
- All studies pledged to include RedCap use in future IRB. No updates needed to current IRBs

RedCap Setup

- After PI feedback, plan changed to Internal Recruitment via *ScreenLog*, External Recruitment via *Registry* (participant initiated, IRB-consent)
- All 4 actively recruiting studies added to *ScreenLog*
- System to alert study staff of new candidates

	ScreenLog	Registry
Consent Barrier	👍	👎
Staff Time	👍	👍
Distant Outreach		👍
Patient/Staff initiated	👍	👎

Increasing enrollment in RedCap:

- *Registry* with 14 complete entries (7 other abandoned)
 - Provided flyer to all SCI inpatients
 - Provided flyer to outpatient (all long-term primary care and many specialty care)
 - Link posted online
- *ScreenLog* with **339 unique entries** (63 added in 2024)

Discussion/Future Steps:

Successful institutions require many positive attributes. Measurable factors like space, technology, and people are more obvious to correct. Less tangible attributes like leadership and culture take top down and bottom up iterative efforts. Maintaining these collaborative recruitment strategies will require a culture change. Collaborative participant tracking is a small portion of an effective institutional recruitment strategy. Automated consumer facing systems bring appeal of cost, scalability and efficiency; however, without personal interaction, they are at higher risk of failure. No IRB amendments were required.

Outreach to stakeholders remains the most important incomplete step. Unilateral recruitment efforts are flawed and stronger community engagement outside of research is vital for long lasting improvement (for recruitment and all other aspects of successful clinical research). Codifying the institution's role in shared recruitment should also help ensure healthier, long-lasting results.

Conclusion:

SCI researchers unanimously agreed to support a collaborative recruitment model. The primary outcome was adjusted; however, passive emails and flyers was not successful. Secondary outcomes were achieved. Next steps include increasing transparency and outreach to the SCI community, continuous process improvement and additional institutional support.

Collaborative approach to improve resident research experience from the eyes of the resident, research mentor, and faculty mentor



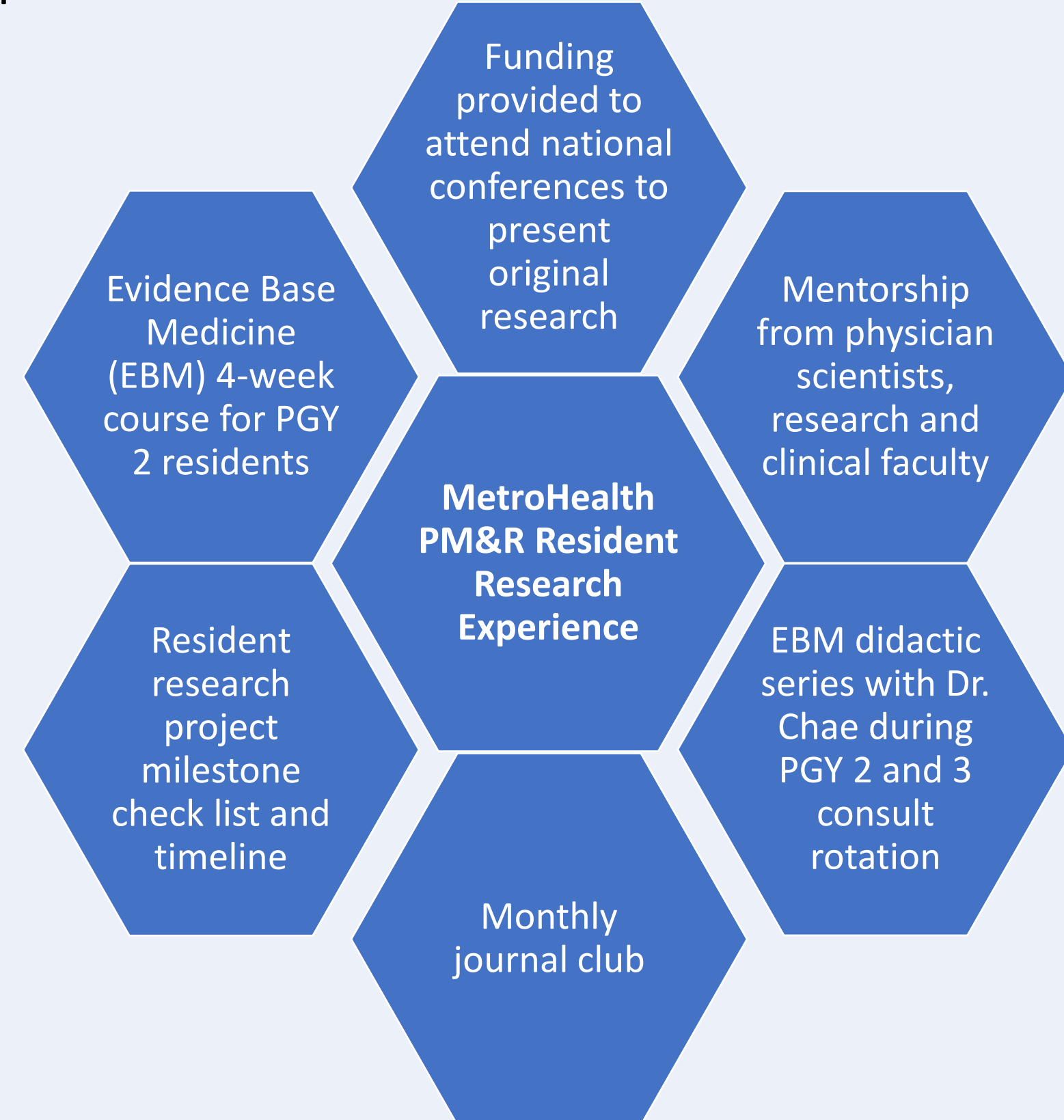
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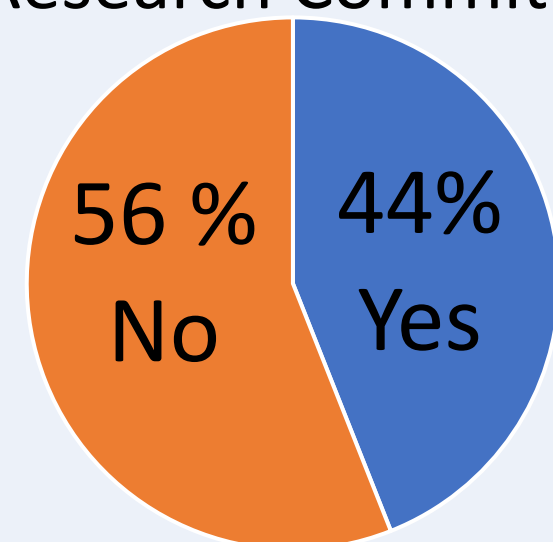
Background:

- MetroHealth Department of PM&R has robust resources to support resident research.



- Despite these resources, all PGY 4 resident in 2024, needed major revisions to their capstone research project when reviewed by the Residency Research Committee.

Resident Interest in Participating in Research



Plan:

- Identify why residents have difficulty completing the required research project by investigating the following:
 - Barriers to participate in the resident research experience from the perspective of the resident, clinical faculty, and research scientist.
 - Motivating factors to participate in the resident research experience from the perspective of the resident, clinical faculty, and research scientist.
- Develop an accountability program for residents to stay on track with the resident research milestone timeline.
- Improve timely completion of resident research milestones.

Do:

- Perform qualitative analysis of barriers and motivations for those who participate in resident research projects by interviewing residents, clinical faculty, and research scientists.
- Hold residents accountable to research milestone timeline at semi-annual evaluation in June and December.
 - If milestone not achieved, then identify barrier to success and form plan to catch up.

Results of Study:

Figure 1. Barriers for Residents and Faculty to Participate in Resident Research

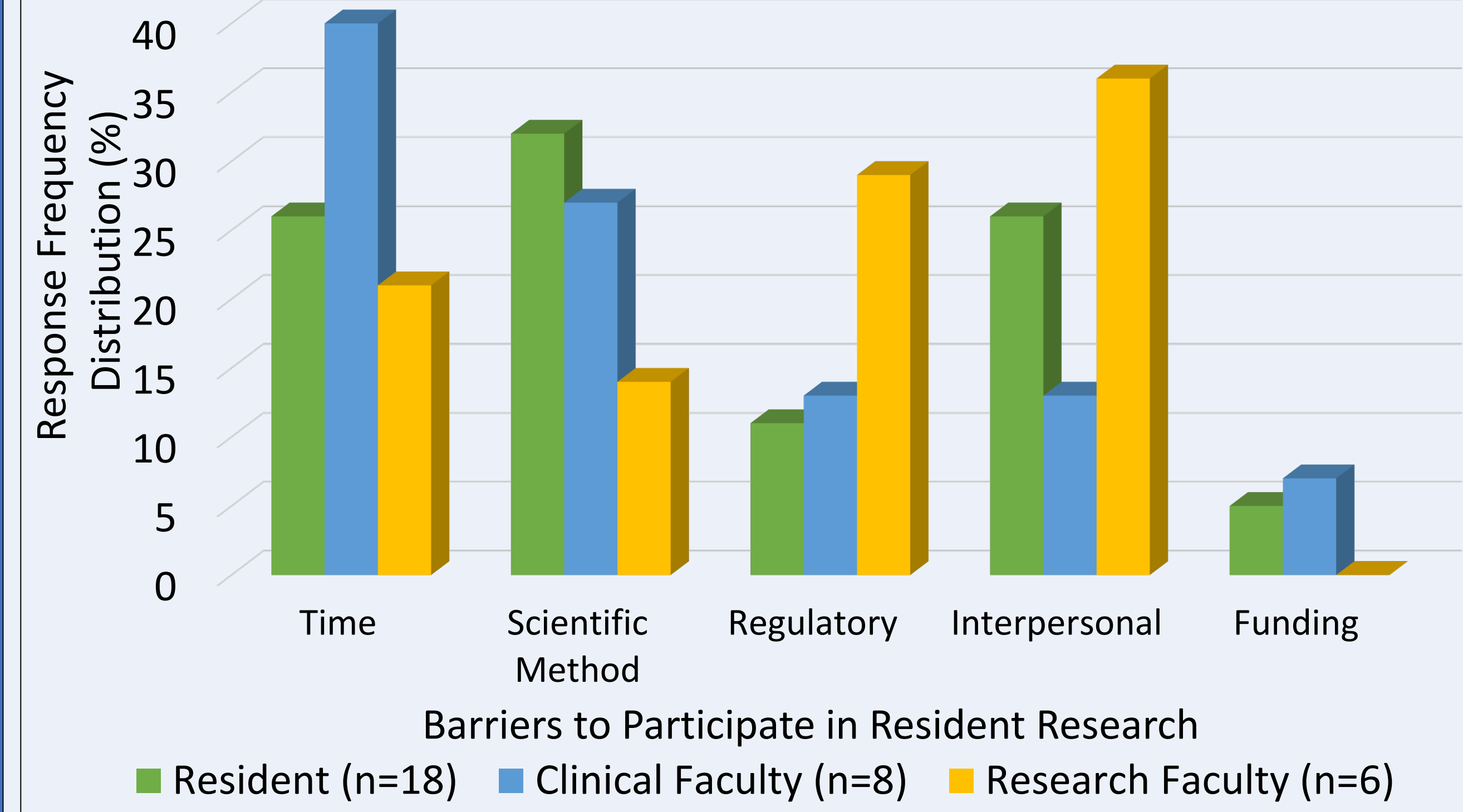


Figure 2. Motivations of Resident and Faculty to Participate in Resident Research

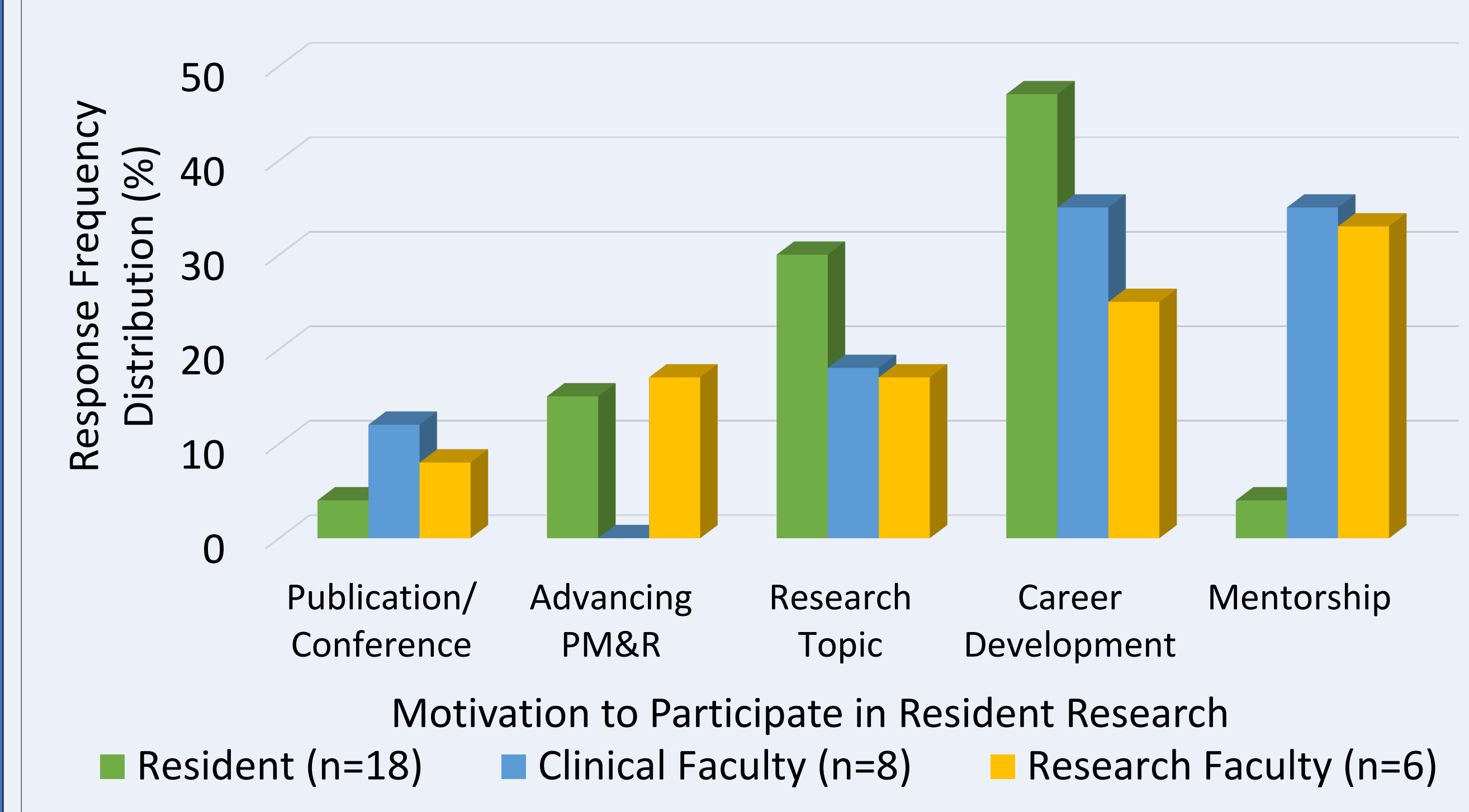


Figure 3. Accountability Program Improves Completion of Resident Research Milestones

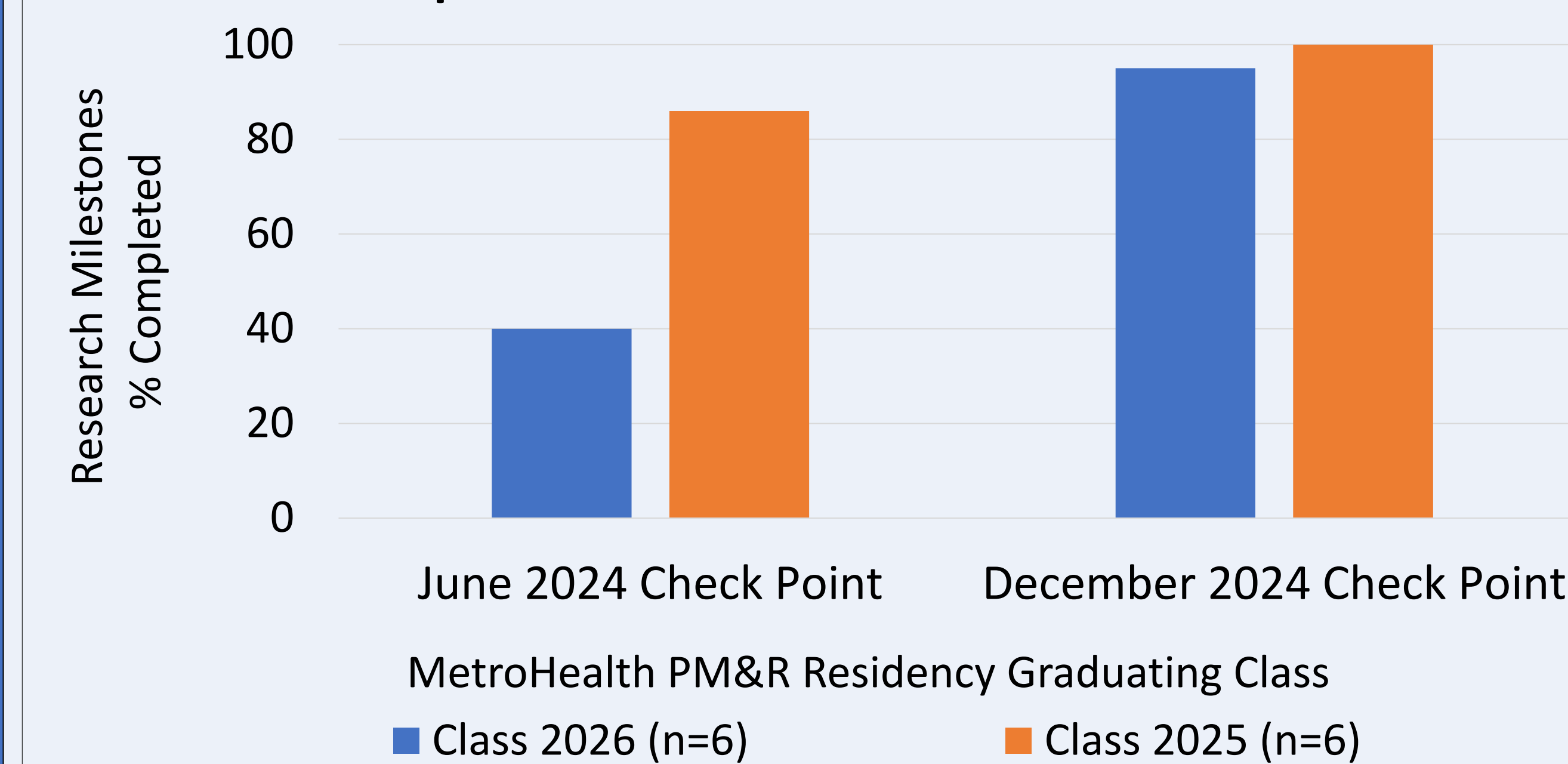


Table 1. Examples of Barriers to Participate in Resident Research

Barrier	Resident (n=18)	Clinical Faculty (n=8)	Research Faculty (n=6)
Time	High clinical volume, call, personal life events	Balancing clinical duties, no dedicated research time	Limited time to mentor residents outside of research duties. Residents have little research experience so mentoring requires lots of time
Scientific Method	Developing research question, data collection, statistical analysis, patient recruitment	Statistical analysis	Lack of statistical analysis skills of resident, lack of resident research experience
Regulatory	IRB approval	IRB approval, resident credentialing	IRB approval, resident credentialing
Interpersonal	Finding mentor with similar interests, meeting with mentor, faculty departure	Lack of resident motivation and follow through, finding resident with similar interests	Lack of resident motivation and follow through, variable research skills in residents, unknown availability of resident to work on research, lack of time in resident schedule for research, location.
Funding	Awaiting funding to support data collection	Lack of funding to complete a project	None

Table 2. Examples of Motivations to Participate in Resident Research

Motivation	Resident (n=18)	Clinical Faculty (n=8)	Research Faculty (n=6)
Publication/Conference	Publication pursuit, present at national conference	Opportunities for publications and conference presentations	Need for researcher to present at conferences
Advancing PM&R	Improve patient outcomes, advance field of PM&R	None	Opens a new line of research without a full investment of the researcher's time
Research Topic	Research topic is interesting/ meaningful to me, scientific intrigue	Research topic is interesting/ meaningful to me, curiosity about clinical question	Resident research project aligns with my interests, to help residents because I think research is interesting, collaborative enjoyment
Career Development	Graduation requirement, improve knowledge/skills in research/topic of interest, competitive applicant for job/fellowship	Academic Promotion	Academic Promotion, feeder research for future projects/ grants
Mentorship	To take advantage of incredible backbone for research at MetroHealth, mentor holds me accountable	Enjoy mentoring residents, desire to help residents learn, improving resident success with fellowship match	Enjoy mentoring talented people, enjoy teaching residents research skills, no obligation to support resident financially, personal satisfaction, mentoring a reliable and self-driven resident can make a researcher more productive

Table 3. Research Milestone Timeline

Month	Research Milestone	Yes/No
Aug	EBM Didactics	
Oct	Identify a clinical problem to study	
Nov	Complete informal literature review Define project with mentoring team	
Dec	Send project description and names of mentoring team to PD Complete CREC certification Complete IRB registration	
Jan	Establish research protocol Establish data collection forms Meet with mentoring team	
Feb	Submit IRB protocol	
Mar	Prepare for the study	
Apr	Receive IRB approval/exemption	
May	Start Data Collection	
PGY 3		
July	Continue data collection	
Sep	Present progress to mentoring team	
Jan	Present results to mentoring team	
Feb	Data Collection completed Data Analysis completed Abstract submitted to a national conference	
PGY4		
Feb	Attend conference to present research	
May	Present research project at visiting professor day	

Discussion:

- Barriers to participating in resident research included the following: time, scientific method, regulatory, interpersonal and funding.
 - Residents and research scientists identified that lack of resident experience and skill with components of the scientific method was the most frequent barrier to participating in resident research projects.
 - Clinical faculty expressed lack of time as the biggest barrier to participating in resident research followed by lack of personal experience with performing components of the scientific method (ie: statistical analysis).
- Motivation to participate in resident research included the following: publication/conference presentation, advancing the field of PM&R, interest in research topic, career development, and mentorship.
 - Residents were highly motivated to partake in research for career development (ie graduating and/or matching into fellowship).
 - Clinical faculty and research scientists were most frequently motivated to participate in resident research due to career development (ie academic promotion) and personal enjoyment from mentorship role.
- Semi-annual evaluation meeting between residency program director and resident improved timely completion of resident research milestones.

Act:

- Future quality improvement projects to address each individual barrier in more detail may be beneficial to improve participation in resident research.
 - Advancing resident knowledge and experience with the scientific method may improve resident research.
- Future quality improvement projects to address each individual motivation in more detail may be beneficial to improve participation in resident research.
 - Identifying clinical and research faculty who are motivated to participate in resident research due to career development or mentorship may improve resident research experience in the future.
- The accountability program was successful; therefore, continuing semi-annual meetings between residency program director and resident to discuss research progress is recommended.