

## INTRODUCTION

Medical students begin their healthcare education with varied levels of understanding in anatomy, a fundamental subject for acquiring clinical skills and ensuring patient safety. The Gross Anatomy and Embryology (GAE) course at the Brody School of Medicine (BSOM) is a crucial component of the early curriculum, designed to provide students with vital anatomical knowledge. To support this objective, mock exams that replicate the timing, duration, and structure of actual lab exams have been introduced. However, while similar mock exams have been utilized at other institutions, their effectiveness has varied. This variability is largely attributed to a lack of standardization. This study outlines a sustainable framework for student-led mock practicals to be easily adopted by future cohorts that aims to enhance anatomical structure identification and minimize exam-related anxiety. Moreover, this research aims to evaluate the structure and educational impact of the mock practicals by analyzing their effectiveness in improving student performance on a set of questions representative of those found in course practicals.

*"I felt very comfortable going into the lab practical because I already knew what to expect flow wise/timing wise." - M1 student*

## RESULTS

- Over 95% of all students participated in each of the 4 mock practicals, with response rates of approximately 75% on pre-test and 38% on post tests.
- No significant difference in **Post-1** and **Post-2** scores across all mocks.
- An average score increase of +16.0 was observed between **Pre-1** and **Post-1** and a increase of +14.4 between **Pre-1** and **Post-2**
- Mock 2 - *Anatomy of the Head and Neck* - was associated with the largest increase from **Pre-1** to **Post-1** (+20.9) and **Pre-1** to **Post-2** (+18.3).



STUDENT COLLABORATIVE RESOURCES FOR UNDERSTANDING AND BRODY SUCCESS

## MATERIALS AND METHODS

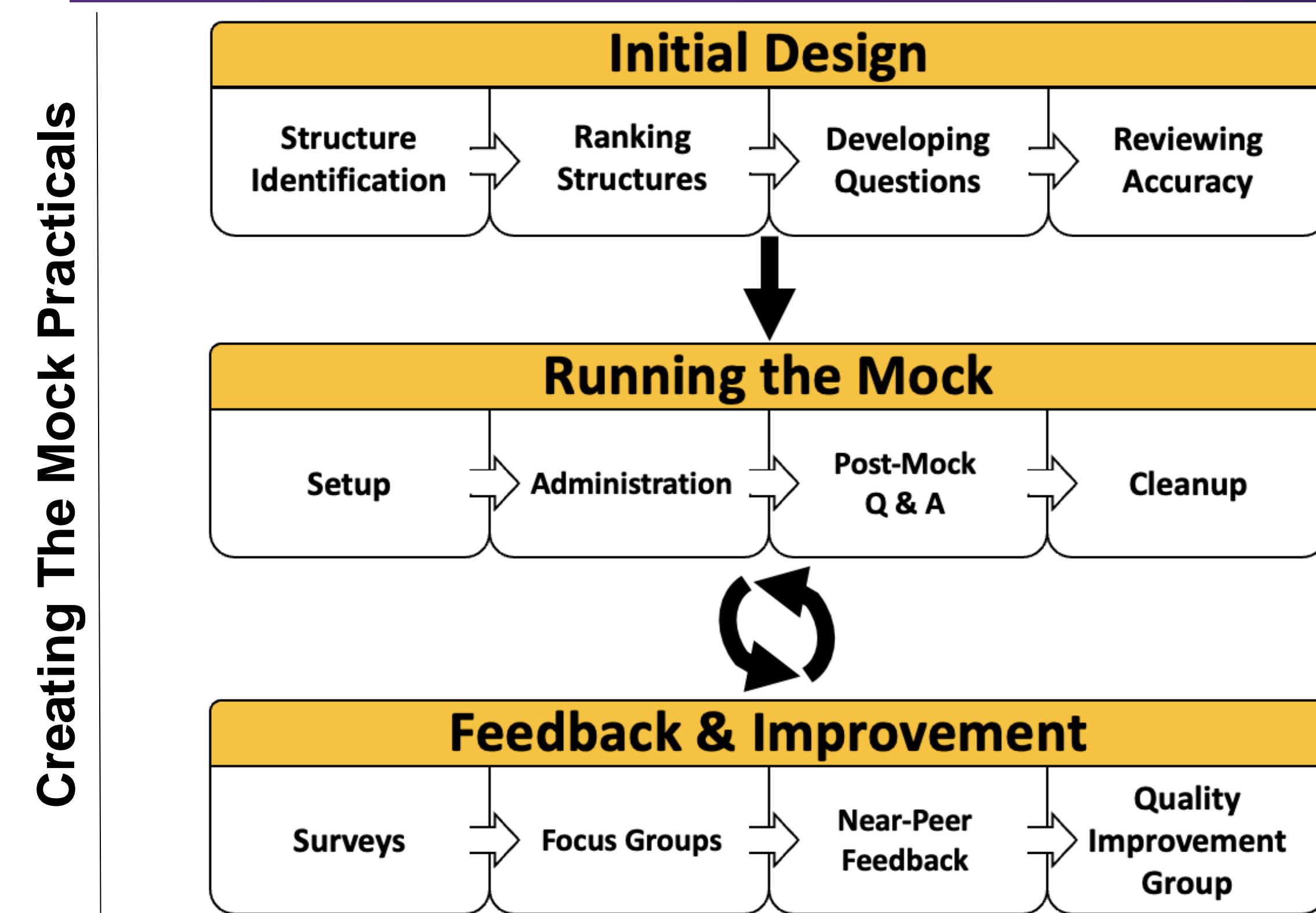


Figure 1: Methodology for creation and implementation of near-peer mock practicals

## Evaluation Design

Students in the Fall 2023 GAE course participated voluntarily with no impact on their course grades. Participation was anonymous, and students self selected into Group 1 or Group 2 for each mock. Two distinct digital sets of questions were crafted for every mock, each consisting of 10 multiple-choice questions. Prior to the mock practical students completed a pre-test to establish a baseline, followed by a posttest after administration of the mock. Both were conducted virtually via Qualtrics software.

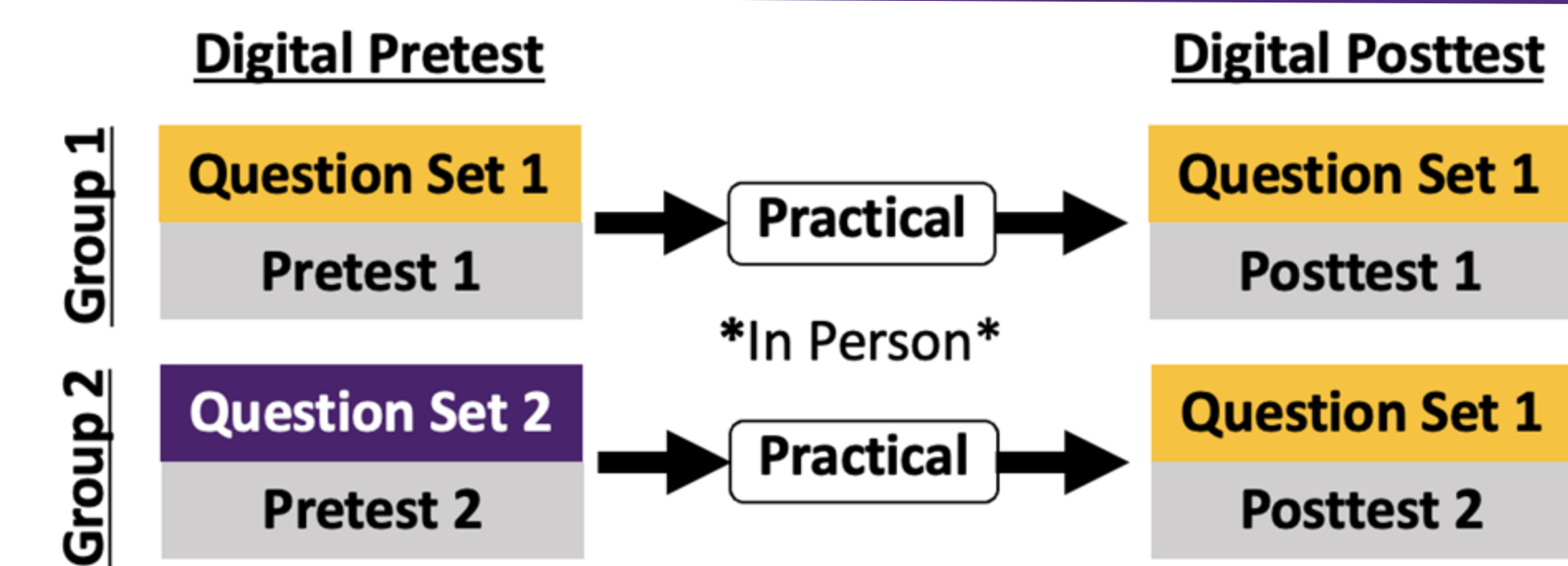
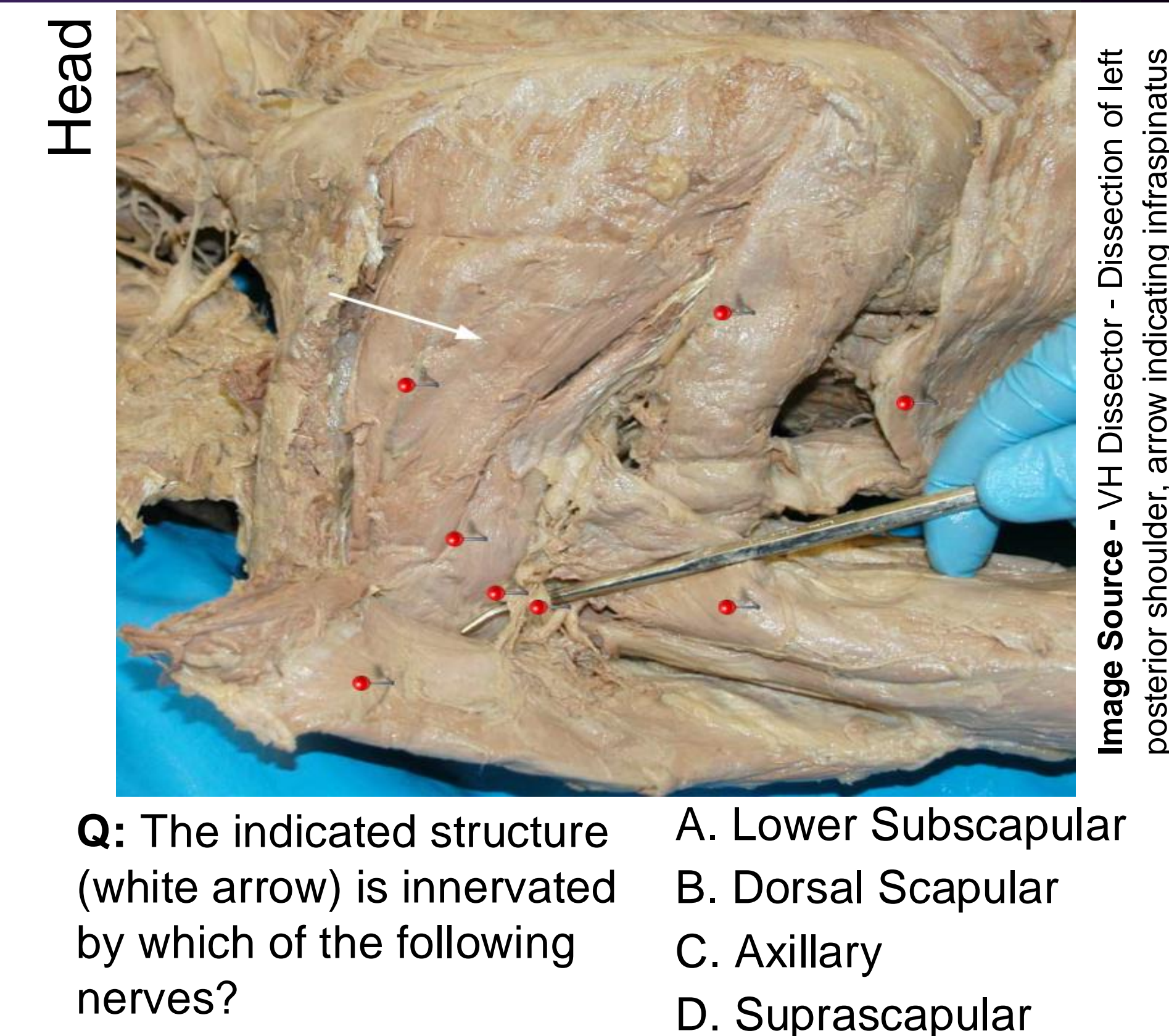


Figure 2: This flow diagram illustrates the distribution of question sets to each group before and after participating in mock practicals. The mock exams were conducted in person and featured 50 multiple-choice questions based on cadaveric structures.

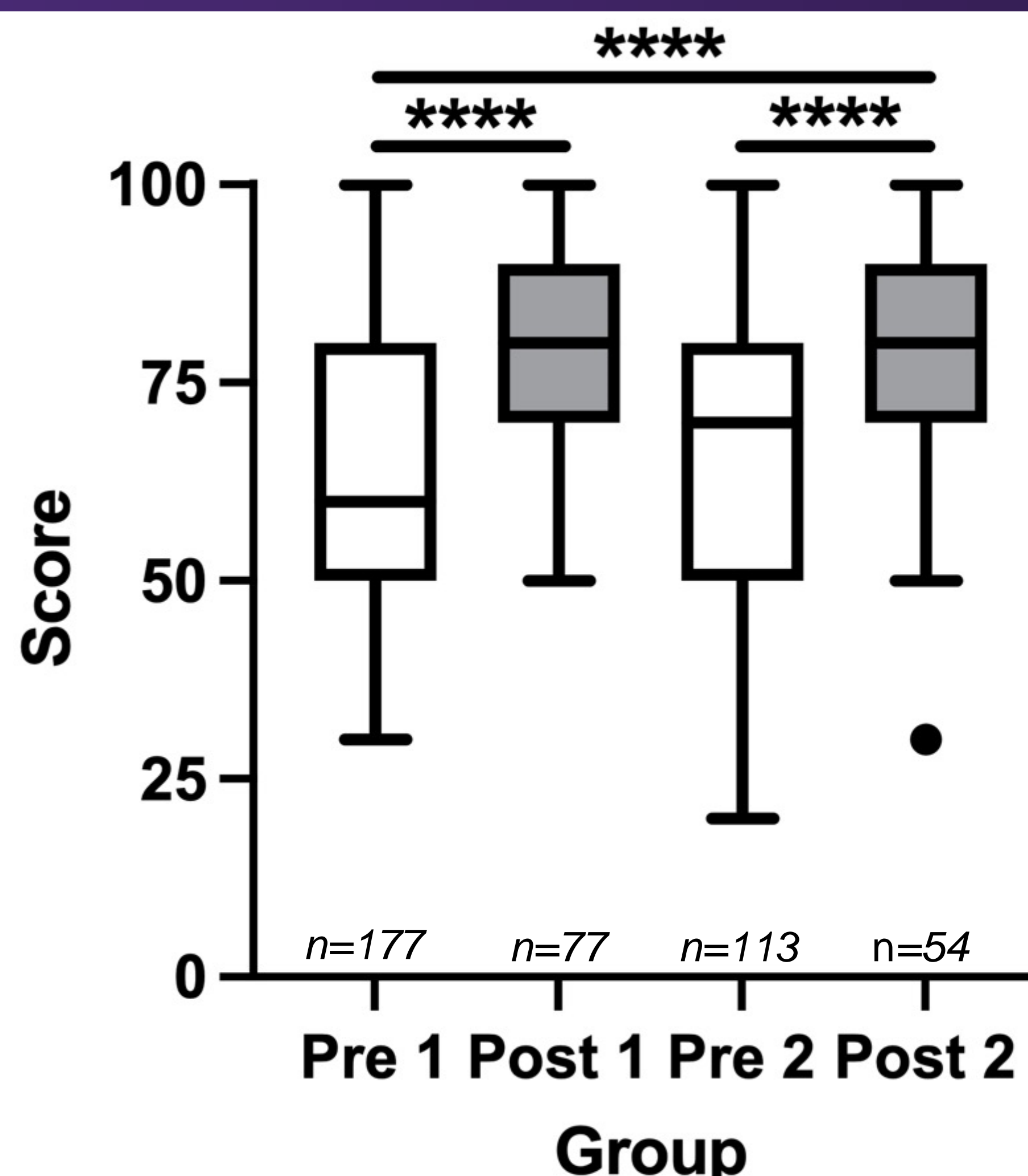


Figure 3: Box plot comparison of pre- and posttests of combined mocks 1-4. Values represent combined values of pre- and posttests 1-4. \*\*\*\* indicates  $p < 0.0001$ . Bars indicate the distribution of scores for each group. Significance determined via t-test analysis.

Compared Tests	Mock	Score $\Delta$	Significance	Question Addressed
Pre 1 vs Post 1	1	+9.1	**	Do mocks affect student performance on previously seen questions?
	2	+20.9	****	
	3	+10.6	N.S.	
	4	+18.7	**	
	Combined	+16.0	****	
Pre 2 vs Post 2	1	+17.0	**	Do mocks increase student performance on novel questions?
	2	+19.3	**	
	3	+2.8	N.S.	
	4	+10.8	N.S.	
	Combined	+13.4	****	
Post 1 vs Post 2	1	-0.7	N.S.	Does seeing the questions beforehand alter results?
	2	-1.0	N.S.	
	3	+1.3	N.S.	
	4	-2.6	N.S.	
	Combined	-1.6	N.S.	
Pre 1 vs Pre 2	1	-8.6	*	Were one of the problem sets administered significantly more challenging?
	2	-1.0	N.S.	
	3	-9.1	*	
	4	+5.3	N.S.	
	Combined	+1.0	N.S.	
Pre 1 vs Post 2	1	+8.4	*	What is the impact on performance from participation in the mocks alone?
	2	+18.3	***	
	3	+11.9	N.S.	
	4	+16.1	**	
	Combined	+14.4	****	

Table 1 Comparisons of scores across groups and mocks with the question that the comparison aims to address. N.S. indicates  $p$ -value greater than 0.05, \* indicates a  $p$ -value less than 0.05, \*\* indicates a  $p$ -value less than 0.01, \*\*\* indicates a  $p$ -value less than 0.001, and \*\*\*\* indicates a  $p$ -value less than 0.0001. Significance determined via t-test analysis.

## DISCUSSION

**Mock Exam Efficacy:** Mock exams significantly improve anatomical identification skills in medical students, with average score increases of 14.4-16 points across all mocks, indicating strong learning benefits across different anatomical regions. Furthermore, the minimal variability observed in Post-1 and Post-2 scores suggests improvement was not primarily attributed to prior exposure to the digital question set.

**Learning and Comprehension:** The study underscores mocks as valuable learning aids that contribute to deeper understanding and retention of anatomical concepts, beyond just improving exam scores.

**Sustainable Model Development:** The near-peer facilitated mock exam model presents a sustainable approach for future cohorts, minimizing the need for extensive resources while maintaining educational quality.

**Study Limitations:** Challenges include response bias, self-assigned group variability, poor posttest response rate, and the potential skewing of data due to student collaboration, alongside the limitations of virtual identification questions' scope.

*"It was an incredible learning event. Really helped highlight my inadequacies and showed me what I needed to work on in the days prior to the exam." - M1 student*

## FUTURE DIRECTIONS

Our study presents opportunities for improving mock exams in medical education, including the development of detailed answer keys with step-by-step solutions to deepen anatomical knowledge. Administrative support is crucial for embedding mock exams as a core curriculum component, ensuring their sustainability. Expanding this model to other courses and sharing our framework with other institutions can broaden its impact, serving as a blueprint for enhancing medical education.

## ACKNOWLEDGEMENTS

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This project was deemed IRB Exempt: UMCIRB 23-001512