## Pre-Health Students' Attitudes towards the Relative Importance of Biology and Statistics



## for their Preparation for Professional School

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### Introduction

As part of a multi-year review of the MCAT exam, the MCAT Review (MR5) Committee conducted a survey of medical school faculty, residents and medical students to learn which concepts entering students need to know to succeed in medical school (1). Participants were asked to rate the relative importance of topics in the basic sciences and statistics for preparation for medical school.

Here, we use the MR5 survey to address four questions related to student preparation for professional school:

- 1. How do students' perceptions of the relative importance of biology and statistics compare to those of medical school faculty
- 2. Have students encountered different statistics topics in the context of a biology course?
- 3. Do students believe that working with statistics in biology courses would be beneficial to their preparation for professional school?
- 4. Is there a correlation between students' perceptions of the importance of statistics and their opinions about how helpful additional statistics exposure in biology courses would be?

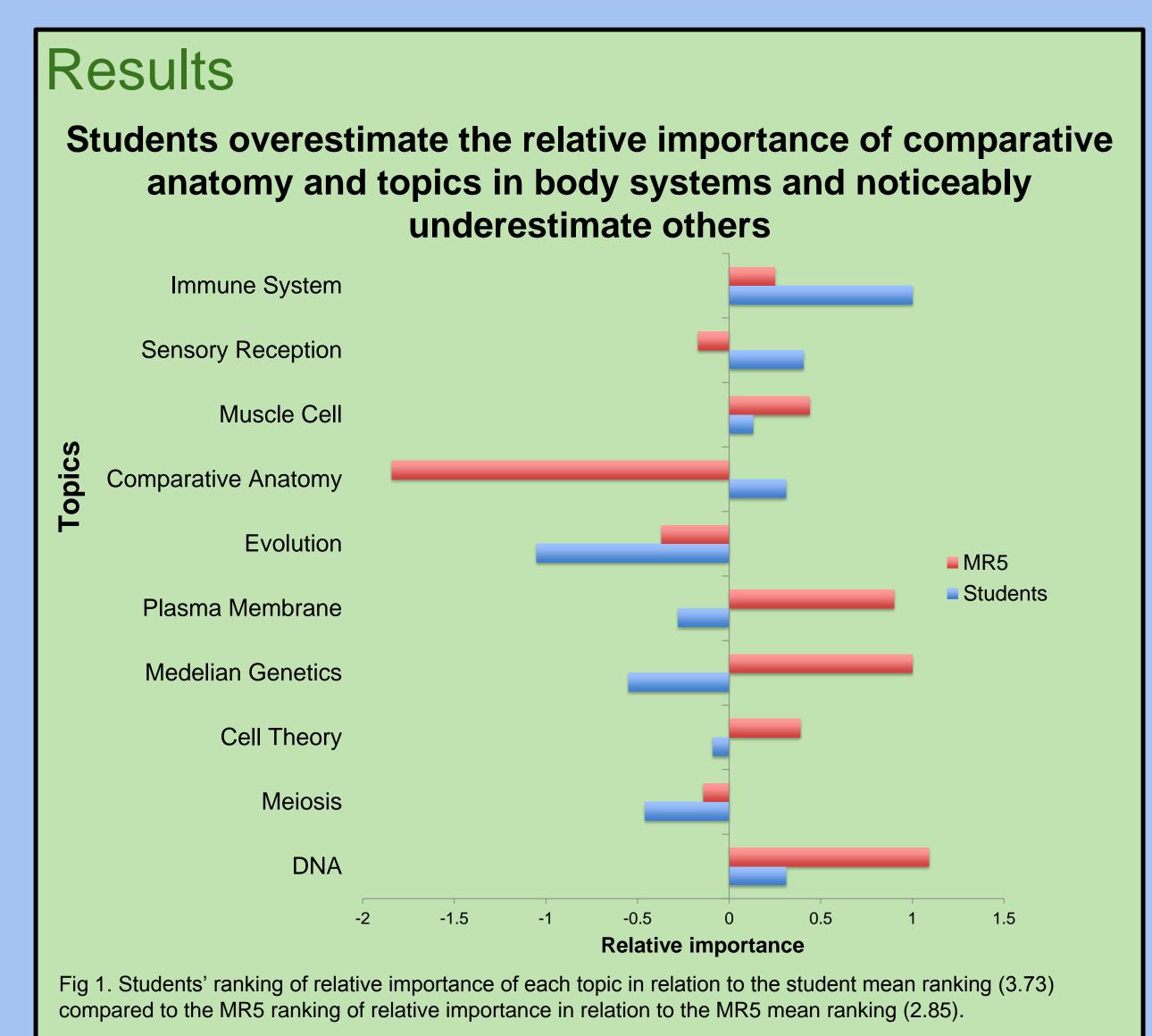
### Methods

We designed a survey for students who self-identify as pre-health (pre-med, pre-dental, pre-physical therapy, pre-vet, pre-pharmacy, and pre-health undecided). The first part of the survey was modeled after the MR5 survey. We chose 10 biology and 10 statistics topics from the original survey and asked participants to rate their relative importance on a Likert scale of 1-5 where 1 is equal to "not important," 3 is equal to "important," and 5 is equal to "extremely important." In the second half we asked participants two questions about each of the 10 statistics topics: 1) Have you encountered this topic in a biology course (yes or no) and 2) How helpful would additional exposure to this topic in the context of a biology course be for your preparation for professional school (Likert scale of 1-5)?

The survey was advertised in an introductory biology course, an upper-level writing course, POMS, and in the biological sciences newsletter. Spearman correlation coefficients were calculated to assess the relationship between students' perceptions of the importance of a topic in statistics and their opinion of how helpful it would be to explore this topic in a biology class.

#### Demographics of survey participants







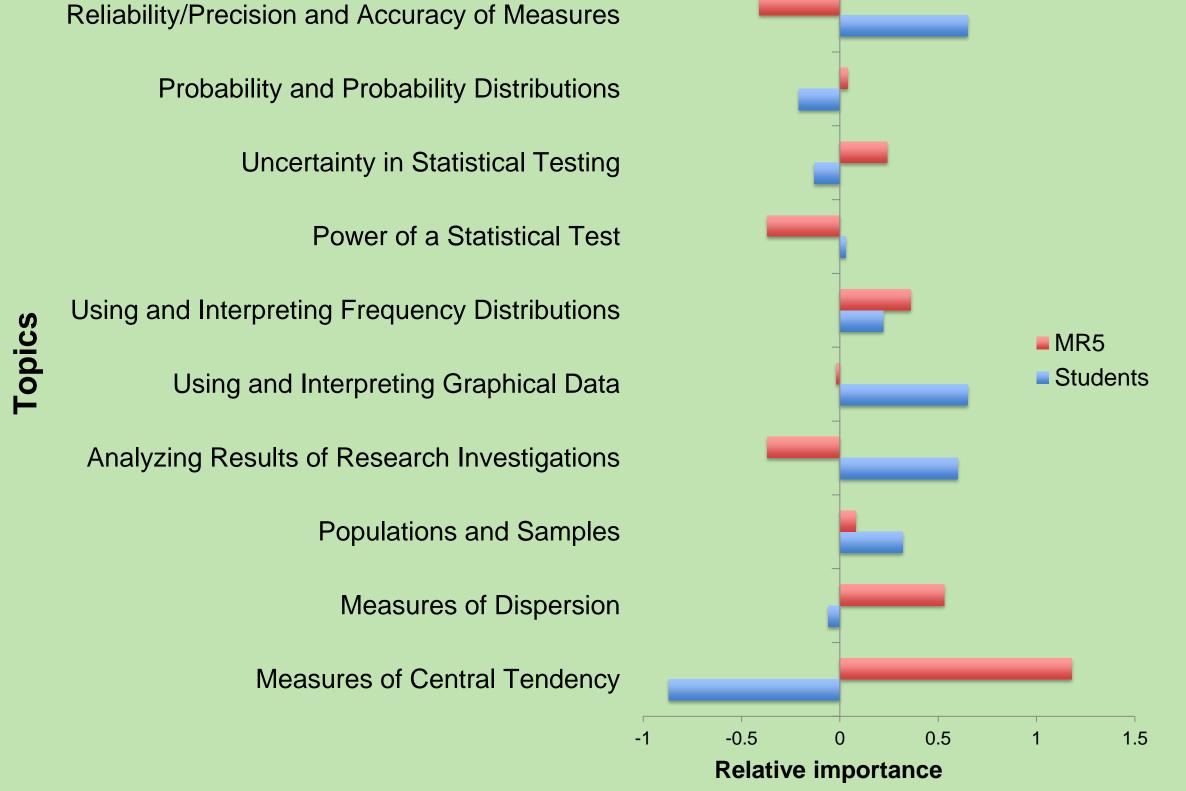


Fig 2. Students' ranking of relative importance of each topic in relation to the student mean ranking (3.73) compared to the MR5 ranking of relative importance in relation to the MR5 mean ranking (2.85).

# Students feel that additional exposure to statistics in biology class would help prepare them for professional school Reliability/Precision and Accuracy of Measures Probability and Probability Distributions

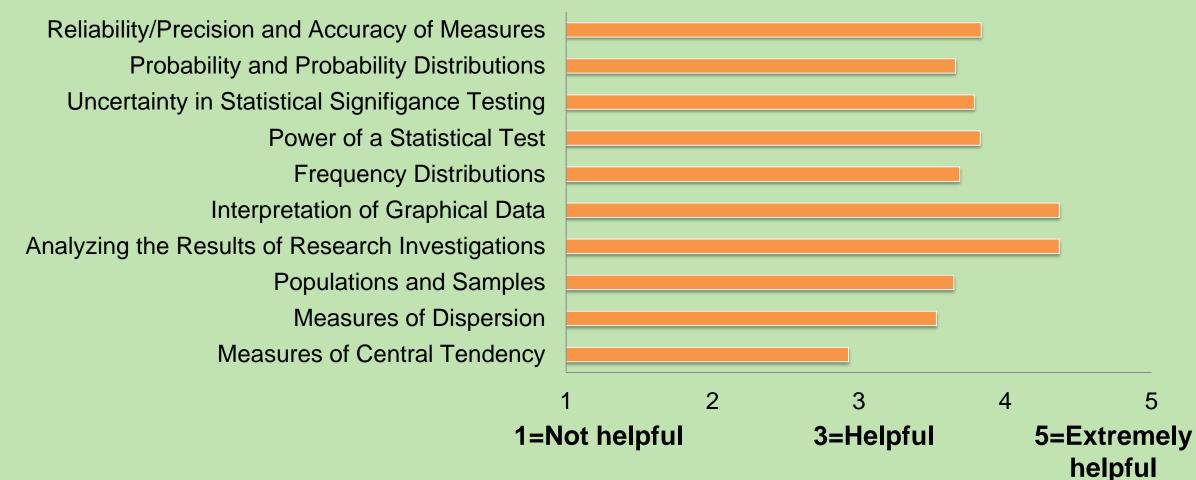


Fig 3. Average student ranking of how helpful additional exposure to a statistics topic in a biology course would be for their preparation for professional school

### Students' opinions of the importance of a statistics topic are correlated with their desire to experience it in biology class

Statistics Topic:	Spearman correlation coefficient	P-value
Reliability/Precision and Accuracy of Measures	0.41	0.01
Probability and Probability Distributions	0.42	0.01
Uncertainty in Statistical Significance Testing	0.35	0.04
Power of a Statistical Test	0.24	0.16
Using and Interpreting Frequency Distributions	0.39	0.02
Using and Interpreting Graphical Data	0.46	0.004
Analyzing the Results of Research Investigations	0.54	0.0006
Populations and Samples	0.28	0.08
Measure of Dispersion	0.35	0.03
Measures of Central Tendency	0.38	0.02

Fig 4. The correlation between students' rankings of the importance of a subject for preparation for professional school and their opinion of how helpful additional exposure to this topic in a biology course would be for their preparation for professional school.

### Conclusions

Students' ranking of the relative importance of several biology and statistics topics differed noticeably from the MR5 topic rankings. Students tend to overestimate the importance of comparative anatomy and topics in body systems, but underestimate the importance of Mendelian genetics, the plasma membrane, DNA, and evolution. Students' underestimate the importance of measures of central tendency and dispersion but overestimate the importance of topics more often stressed in lab courses (reliability/accuracy, using graphical data, and analyzing research investigations). Students believe that additional exposure to statistics in biology courses would be beneficial, and the topics that they most want to see in biology courses are directly correlated with their perceptions of the importance of statistical topics for their preparation for professional school.

### References

1. MR5 Advisory Committee. 2010. Ratings of the Importance of Natural Sciences, Research Methods, and Statistics Topics on the MR5 Content Surveys. American Association of Medical Colleges, Washington D.C.

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