

RESEARCH PROTOCOL

Protocol Title

Reassurance Tool for Emergency Medicine Applicants

Study Title

*Impact of an Emergency Medicine Reassurance Tool on Medical Student Applicants
Perception of Competitiveness in the Resident Match*

I. Investigators

Principal Investigator: Lucienne Lutfy-Clayton, MD, Associate Professor of
Emergency Medicine

Sub Investigator: [William Soares MD](#)

II. Abstract

Despite a proportional increase of Emergency Medicine (EM) residency positions, the average number of applications per US Allopathic applicant has risen from 36.4 to 50.8 between 2014 and 2018.¹ This increase in applications causes a significant burden on both program administrators and applicants. Recent research by the Council of Residency Director's Application Process Improvement Committee has shown that applicant perception of competitiveness and peer advice were drivers in the increasing number of applications per applicant. Our study attempts to use a tool derived using AAMC and NRMP data and surveys on match rates and important applicant factors cited by program directors, to help applicants [better](#) understand their actual competitiveness in the resident match process.

III. Definitions

Applicants – any [current or planned](#) applicant to [a](#) United States RRC approved EM residency.

EM – Emergency Medicine

IV. Protocol

A. Specific Aims and Hypotheses

Primary Aim: The purpose of this study is to explore emergency medicine applicant's perception of competitiveness through responses to an anonymous questionnaire developed to assess competitiveness in the match process.

Hypothesis: *Participants who have no risk factors based on the Emergency Medicine Reassurance Tool will self-identify higher perception of competitiveness and lower planned number of residency applications after using the tool (posttest) compared*

with self-reported competitiveness and applications prior to the use of the tool (pre-test)..

B. Background

Despite a proportional increase of Emergency Medicine (EM) residency positions, the average number of applications per US Allopathic applicant has risen from 36.4 to 50.8 between 2014 and 2018¹. This dramatic increase in applications causes a significant financial and time burden on both programs and applicants. Recent research by the Council of Residency Director's Application Process Improvement Committee has shown that applicant perception of competitiveness and peer advice were drivers in increasing the number of applications per applicant.

Emergency Medicine Programs and Applicants were found to spend a total of 66 million dollars per cycle on the application and interview process.² This represents a huge investment by all stake holders without an appreciable gain, as overall filling in EM has remained unchanged. Applicants incur an aggregate of \$906.00 in ERAS fees in 2015. Combining this aggregate with mean interview costs, results in a total of \$5,065.44 per student.² For the same year program faculty time spent on selection resulted in \$43,201.84 in mean expenses per program.²

The Council of Residency Director's Application Process Improvement Committee surveyed applicants between the submitting rank lists and match day of the 2016 season to assess the drivers of increased applications per applicant. This survey revealed the greatest applicant drivers toward increased applications included peer influence and self assessment of competitiveness within the specialty. Self assessment was noted by 61.54% of respondents to have influenced them to increase their applications. When queried regarding external influences 63.08% of respondents reported peers going into EM increased the number of their applications. Additionally USMLE board scores were the next most common influence noted to increase the number of applications by applicants at 50.77%.

AAMC³ and NRMP have extensive data on match likelihood by applicant type, USMLE board scores, and number of applications. The NRMP program directors survey additionally identifies the importance factor of different applicant characteristics⁴.

Since all applicants do not have direct access to EM advisors with expert knowledge to assist in strategizing applications the Council of Residency Director's Student Advising Task Force(SATF) undertook developing consensus data driving advising resources for applicants now on their 3rd iteration. Additionally SATF has developed specific resources for applicants with at risk characteristics that may reduce the likelihood of matching.

Our study attempts to directly change applicant's perception of competitiveness and attain anticipated impact on number of planned applications before and after utilizing the tool. This approach is to directly combat the self assessment influence of applicants, affect the peer influence those using the tool will have, and provide direct links to expert advising resources and tips to improve the accuracy of self assessment.

C. Significance

This is the first study to compare perceptions of competitiveness by EM applicants before and after using a reassurance tool developed using AAMC and NRMP data. Results from the proposed study will help to determine the impact this reassurance tool might have on number of applications per applicant. If significant differences in pre and post perception of competitiveness and planned number of applications [can be shown](#) it may spur further distribution of this reassurance tool.

D. Research Design and Methods

This is a pretest, posttest educational intervention study, presented as a cross sectional survey with embedded teaching and utilization of the reassurance tool as part of the survey.

Aims and Hypotheses:

Expert opinion and prior literature believe that the average medical students' perception of competitiveness in the EM match is low compared to peers, leading to an increased number of applications per student. Implementation of the EMATCH tool will help to raise student's perception of competitiveness, leading to decreased proposed number of applications.

Aim 1: Evaluate participants self-perceived competitiveness in the EM match before and after the EMATCH self-assessment tool

Hypothesis: [P](#)articipants mean self-perceived competitiveness score will increase after engaging with the EMATCH self-assessment tool.

Aim 2: Evaluate participants proposed number of applications in the EM match before and after the EMATCH self-assessment tool

Hypothesis: [P](#)articipants mean proposed number of application scores will decrease after engaging with the EMATCH self-assessment tool.

Study Population:

The study population will include [applicants](#) to emergency medicine in the US residency match. [First and second year Medical Students will be excluded](#). Those who agree to be included in the study will be asked to complete a brief online survey.

Participant Recruitment and Instructions:

EM applicants will be invited to participate in the study via email distributed on the EMRA and CORD listservs. There will be a one-page consent that details participation in the study included in the email. Completion of the survey will serve as consent to participate. It will be stressed that participants can stop the survey at any time. (see attached email transcript)

Reminder emails will be sent vial the EMRA and CORD listserv every 2 weeks over a 3-month time period, or until we have reached our stated sample size.

Those who wish to participate in the study will be able to anonymously complete the REDCAP survey.

Procedure:

The average on-line survey will take approximately 10-15 minutes to complete, however if the individual chooses to review the resources during the survey, the length of time can vary. REDCAP will retain anonymous responses.

Materials:

A. REDCap Survey

The written questionnaire begins and ends with self-reflective questions related to competitiveness and planned number of applications. The reassurance tool with associated linked advising resources is provided between these reflective questions.

B. One Page Consent Form

Participants will review a one page consent form detailing their participation in the survey. It will be made clear that participation is voluntary, and participating or not participating will not have any negative impacts for them. It will be assumed that consent is given by completing the survey tool. Participants will have the opportunity to skip any questions or to stop taking part in the survey at any time.

Data Collection:

All surveys are anonymous. Data will be directly collected into the secure REDCap via Tuft's electronic database.

Primary Outcome:

The primary outcome of the study will [be](#) the self-identified perception of competitiveness (ordinal 1-10) and number of planned applications (continuous) before and after using the reassurance tool.

Covariates:

We will measure the following covariates, which will be incorporated into analysis: participant gender, year in medical school, geographic location of school, presence of an EM advisor at their medical school, answering yes to minor red flag questions, answering yes to major red flag questions.

Analysis:

Data will be collected on the REDCAP electronic data capture and analyzed using R statistical software package.

We will use paired hypothesis testing to evaluate for significant differences in mean (or median) perceived competitiveness as well as the mean or median number of planned applications before and after the EMATCH tool.

Participants will then be grouped into high and low self-perceived competitiveness. McNemar's test will be used to identify differences in participants stratified into high and low competitiveness before and after the EMATCH tool. Further, regression analysis will identify participant covariates (Demographic, resources, identified red flags) that are associated with outcomes of interest, including, number of applications (pre and posttest), and perceived competitiveness (pre and posttest).

For a multivariable approach, linear regression will be used if the pre-post difference score is continuous. For a dichotomous outcome, multilevel logistic regression or GEE will be used in which TIME will be entered as an indicator and a cluster variable will account for the within-subject correlation. For the logistic regression approach, robust standard errors will be used.

Sample Size / Power Analysis:

The proposed study is a pre-post educational intervention of current EM applicants. We hypothesize that there will be a difference in pre and post responses of perceived competitiveness and reduction in number of planned applications after using the tool. We know that the mean number of applications per student in 2018 was 55. We believe a clinically significant change in the number of applications would be 10% or more, or a decrease of 5 applications per student. While the standard deviation is not available, reviewing previous data, mean applications for AOA "honors" students was 19, allowing a rough estimated pooled standard deviation of approximately 20. Assuming an alpha (two-tailed) of 0.05 and a beta of 0.20, we estimate a small effect size of 0.25 which produces a sample size requirement of 127 pairs. As a more conservative estimate, if the pooled standard deviation was larger, decreasing the effect size to 0.2, the sample size requirement

would be 198 participants. Accounting for the possibility of incomplete surveys (as the survey takes 10 minutes or more to complete), our goal is a sample size of 250 participants.

For a dichotomous outcome using McNemar's test, a sample size of 137 pairs of responses would be required. This estimate assumes that at least 50% of all pairs are discordant, the minimum detectable odds ratio is 2.0, and power is 80%.

While the numbers above represent our goal for enrollment, due to the educational aspect of this project, we are not capping enrollment at the numbers above. We hope to enroll AT LEAST the number of individuals above, however, individuals will continue to be allowed to use the tool regardless of the number of enrollments we have in the survey.

Participant Withdrawal

Participants may withdraw from the study at any point until surveys have been fully completed. Because responses are anonymous, there is no way for us to remove data after it has been submitted.

Patient Health Information

No identifiable data is being collected as part of the survey.

Participants will be asked at the end of the survey to provide an email address. This email address will be used to follow-up with them at a later date about participating in a follow-up survey related to this tool. This will be optional and will not impact their responses or their standing at any institution.

Informed Consent

Prior to the survey, participants will review a one page document which will explain their participation in the study, and that their completion of the survey will serve as their consent to participate.

Limitations

There are several limitations that must be addressed. First, although there are enough applicants to ensure adequate sample size, response rate may vary, limiting participation. Additionally applicants may receive multiple survey requests as there may be overlap between the listserv being used and this could lead to duplicative responses.

Research Risk and Benefits

No unusual risks are anticipated for this study. Participants may experience discomfort answering questions about their own specifics in application and may choose to skip a question or withdraw from the study through opt-out mechanisms previously outlined.

Participants may benefit from the study in many ways. First, they may attain improved understanding of their competitiveness by undertaking the tool; this may result in a less costly and more effective application cycle. Throughout the tool applicants are provided with expert advising tools to further assist them in their applications.

Data Safety

Data will be anonymous directly entered into REDCap Tufts, a secure, encrypted online server. No identifiable data is being collected. Participants may choose to leave their email at the end of the survey to be contacted for future research concerning the EMATCH tool only. This will be optional and not required for their participation.

E. References

¹ Preliminary ERAS data (2019). *November Residency Data - Avg. Applications per Applicant by Specialty*. Retrieved from

<https://www.aamc.org/services/eras/stats/359278/stats.html>

² Van Dermark JT, Wald DA, Corker JR, Reid DG. Financial Implications of the Emergency Medicine Interview Process. *AEM Educ Train*. 2017;1(1):60-69. Published 2017 Jan 19. doi:10.1002/aet2.10011

³ AAMC. Apply smart in emergency medicine: New data to consider. <https://www.aamc.org/cim/478994/applysmartem.html>

⁴ National Resident Matching Program, Data Release and Research Committee. Results of the 2018 NRMP Program Director Survey. <https://www.nrmp.org/wp-content/uploads/2018/07/NRMP-2018-Program-Director-Survey-for-WWW.pdf>.