

Engaging Medical Students in Research: Reaching Out to the Next Generation of Physician-Scientists

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Abstract

Objective The authors describe a multifaceted educational training approach aimed at increasing medical student involvement in psychiatric research.

Method A description of the initiative is provided, including the rationale and expected impact of each component.

Results Medical student involvement in research projects has increased steadily since implementation. This applies to summer research projects as well as elective research rotations for senior medical students. Furthermore, a substantial proportion of students who participate in research continue to engage in research activities following completion of the program (e.g., through additional research participation, conference presentations).

Conclusion A proactive and well-organized approach to encouraging medical student participation in research can increase the number of students who choose to engage in a research and may ultimately help increase the number of physician-scientists.

Keywords Medical student education · Research

The number of physician-scientists has declined significantly over the past decade, especially in the field of psychiatry [1]. Physicians with formal training in areas critical to conducting research have been described as an “endangered species.” This downward trend is thought to be due to a reduction in the number of physicians pursuing careers that involve research, as well as declining success in obtaining and sustaining funding leading to significant attrition [2]. A number of obstacles have been identified as contributing factors to the decline in the number of physician-scientists. For example,

with the exception of MD/PhD programs, formal research training programs within medical schools or residency programs are scarce [3]. In addition, mentoring by faculty members has become a low priority due to increasing pressures to maintain revenue-generating clinical and research activities.

The Institute of Medicine (IOM) issued a report on research training in psychiatry residency and highlighted several strategies for reform. In particular, the IOM emphasized the critical need to extend recruitment efforts across various stages of education through innovative and sustained efforts [4, 5]. Although residency is one potential stage of education to target recruitment and research training efforts [6], a recent study indicated that most trainees decide whether or not to pursue research training *before* entering residency [7]. Hence, creating opportunities to increase research involvement during earlier educational stages (e.g., medical school, undergraduate) may have significant benefits in ultimately increasing the availability of well-trained physician-scientists capable of addressing the mental health needs of our nation [8, 9]. A number of national programs have been developed to engage medical students in research. For example, the Stanley Scholars program and the American Academy of Child & Adolescent Psychiatry’s Summer Medical Student Fellowship support mentored-research experiences for medical students. However, these programs are available to a very limited number of motivated individuals and do not include resources to create an environment supportive of student research. How then could student research experiences be made more accessible and meaningful given the competing demands and constraints inherent to medical school [10, 11]?

In response to this question, we developed a multi-tiered initiative to engage medical students in research. The initiative components, described in the next section, include the following: (1) identifying a research liaison, (2) creating a short-term summer research fellowship, (3) enhancing the elective research course for medical students, and (4) developing a web-

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based portal to increase students' access to research opportunities.

Methods

Research Liaison

The first component of the initiative was to identify a research liaison to serve as a point of contact for medical students interested in research participation. The liaison is a faculty member in the department of psychiatry who is actively engaged in federally funded research and well informed about ongoing research investigations in the department. Prior to the creation of this role, medical students who wanted to enroll in a research elective were required to have already identified a mentor. The research liaison helps students to navigate various research opportunities and find a research mentor overcoming a major obstacle to research participation for medical students. In addition to the research liaison, students are given a secondary point of contact (director of medical student education) who works closely with the research liaison to ensure that medical students who express an interest in research are connected with a mentor, a research project, and the appropriate elective rotation or summer research fellowship. Note that students are not prohibited from directly contacting potential research mentors. Historically, however, few students have been successful in engaging research mentors directly, and the development of a formal research initiative to facilitate the matching of medical students and research mentors was needed.

Finally, we established research mentor criteria including the following: (1) a strong track record of conducting research, (2) a strong track record of mentoring, (3) ongoing involvement in a research project, and (4) a strong commitment to mentoring student research (e.g., individual weekly supervision, allowing the student to attend weekly study team meetings). By ensuring that the mentors are qualified and willing to dedicate the necessary time, the likelihood that students will have a productive research training experience is greatly enhanced. Junior investigators with less research and mentoring experience are able to serve as co-mentors alongside a more senior mentor, thereby enhancing the pipeline of future research mentors. In addition, in order to participate in the program, students must (1) be in good academic standing and (2) have sufficient protected time to engage in research each week.

Summer Research Fellowship

The DART Summer Research Fellowship (<http://www.musc.edu/psychiatry/research/cns/DART/Summer%20Fellowship%20Program>), supported by a grant from the

National Institute on Drug Abuse (R25 DA020537; PIs: Back & Brady), provides students with the opportunity to work closely with a research mentor and investigative team. During the program, students assist with a specific, identified research project and gain experience in research-related activities, including conducting literature searches, working collaboratively with a multidisciplinary team of investigators, data collection, data entry, and statistics. Students participate in a weekly seminar series that includes topics, such as human subjects protection and research ethics, how to critique a journal article, poster preparation and presentation, commonly used statistical tests, and database management. In addition, an informal luncheon is held weekly to encourage information exchange among students and foster networking and future collaborations. During the luncheon, students provide updates on their projects and share with the group what they are learning. At the end of the summer, students give a formal poster presentation of their research, and all faculty and trainees in the department are invited to attend. Students receive a nominal stipend for their research work.

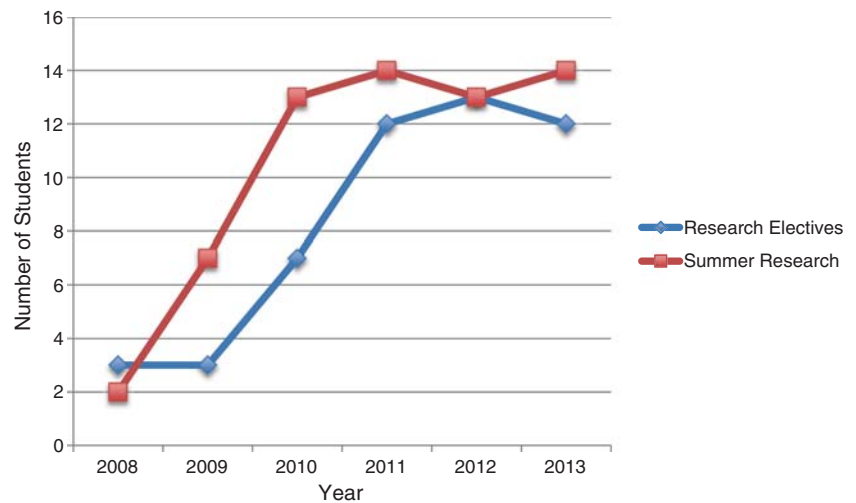
Elective Research Course

While it has long been an option for medical students at our institution to complete a longitudinal or 1-month research elective, historically, very few students have completed such electives. In order to facilitate the process of identifying a research mentor and project, interested students contact the research liaison or director of medical student education. These two points of contact then work together to identify an appropriate research mentor for the specified time. Students are encouraged to identify a general area of interest but, otherwise, are not required to make direct contact or arrangements. If a student has a pre-existing relationship with a research mentor and wants to utilize a research elective to continue work on an existing project, this is encouraged. Routing requests through the research liaison and director of medical student education is done in an effort to make the process less daunting for students and decrease the number of steps needed to establish a mentor and engage in a research elective.

Research Portal

The final phase of the research initiative involved the creation of an online research portal to ensure that all medical students can easily access up-to-date information about potential research opportunities. Currently, we have a section of our departmental website that is dedicated to this purpose (http://academicdepartments.musc.edu/psychiatry/education/summer_prog/summerprograms.htm). The website includes a list of research opportunities and faculty members who are particularly interested in serving as research mentors to

Fig. 1 Student participation in psychiatric research. For research electives, the *year* indicates the end of the corresponding academic year. For example, 2012 is from July 1, 2011 to June 30, 2012. For summer research, a total of 20 students were included in the 2011 program; however, this was due to one-time funding from the dean's office for six additional slots; thus, only program-funded students are included in the figure



medical students. The listing of research opportunities includes local, as well as national opportunities. Students can link to the portal from numerous locations on the departmental website, and the web address is provided to the students during lectures and other teaching activities. By making the research portal available as a clearinghouse of opportunities, it provides interested medical students with an efficient and comprehensive resource to identify a mentor with a feasible research project. With an easily accessible portal, faculty can direct the student to the website, which also includes the contact information for the research liaison.

Results

The medical student research initiative was first implemented in 2008. Over the past 5 years, we have observed a significant and steady increase in the number of students engaged in summer and elective research projects (Fig. 1). Subjective

feedback from students and mentors has been very favorable. Medical students who have recently contacted faculty in pursuit of a summer research project or elective indicate that they were anxious about how to identify a research opportunity until they learned about the ease of the process and accessibility of research opportunities. Similarly, faculty have expressed satisfaction with being able to provide interested students with contact information for the research liaison and the web address for the research portal.

In order to track research engagement after completing a research elective or the DART Summer Research Fellowship, a web-based survey was developed and sent to participants who have completed these experiences over the past 5 years. Surveys were sent to the participants for whom contact information was available (Table 1).

Surveys were sent to 44 out of the 63 recent participants who completed the summer research program over the past 5 years. Sixty-six percent (29/44) completed the survey. The findings revealed that 58.6 % had been engaged in research

Table 1 Survey data from research elective and summer research participants, 2008–13

	Research elective	Summer research
Total number (2008–2013)	50	63
Females	23 (46 %)	41 (64.8 %)
Underrepresented minorities	6 (12 %)	13 (20.1 %)
Number surveyed ^a	26	44
Number responded to survey	26	29
Have you been involved in research since completion (%)	77	58.6
Have you given a research presentation (%)	38.5	34.5
Have you co-authored papers/manuscripts (%)	30.7	44.8
Do your career goals involve research (%)	38.5	65.5
Have you received any awards for research (%)	23.1	13.8

^a Contact information was not available for all former participants in research electives and the summer research program

since participating in the summer research program, 34.5 % had presented at a local or national research conference, and 44.8 % had been a co-author on a paper. Also, 65.5 % reported that their career goals involved research, and 13.8 % have received awards for their research.

The same web-based survey was sent to former students who completed research electives during their fourth year of medical school. The survey was sent to 26 out of the 50 former students, and 100 % (26/26) completed the survey. The findings revealed that 77 % had been engaged in research since completing the elective, 38.5 % had presented at a local or national research conference, and 30.7 % had been a co-author on a paper. Additionally, 38.5 % reported that their career goals involved research, and 23.1 % have received awards for their research.

Discussion

There is a growing shortage of well-trained physician-scientists, and multiple barriers to reversing this trend exist. The rigorous requirements of residency training and perceived financial disincentives of pursuing a research career make early intervention and exposure to research a priority. At our institution, we developed an initiative designed to improve communication about, and access to, research opportunities throughout the course of medical school. Since the inception of the program, a significant increase in the number of students engaged in research projects at our institution has been observed. We believe that ease of access and readily available information have served to increase the likelihood that students will pursue a research opportunity. An early exposure to research may help to demystify the process of conducting research and make it more likely that research activities will be pursued during residency and potentially as a career. There could also be benefits with regard to recruitment to the field of psychiatry in general. Traditionally, most students are exposed to psychiatry in the clinical setting. While many careers are chosen based on students' interest in the clinical aspects of the field, there may be a subset of students who would be drawn to psychiatry based on the innovative clinical and basic science research being conducted in the field. Early exposure to such research may ultimately increase the number of students who pursue psychiatry. Psychiatric research should be seen as a recruitment tool and not just as something to pursue with students who have already stated an interest in psychiatry.

While the initiatives developed at our institution over the past 5 years have clearly impacted the number of students engaged in psychiatric research, it is yet to be determined whether this will have the long-term impact of increasing the

number of students who go on to pursue research as residents, post-doctoral positions, and as faculty. The survey data reported above suggests that there is at least a positive short-term impact in terms of continued interest and involvement in research. The data also suggests that experiences that occur early in the curriculum (i.e., summer research after the first year of medical school vs. research electives during the fourth year of medical school) may have a more positive impact on students' interest in research as an aspect of their career. Of note, while there is a higher percentage of former summer research participants (65.5 %), compared to research elective students (38.5 %), who indicated that their career goals involved research, a lower percentage of summer research participants (58.6 %) indicated that they have been involved in research since completion of the program when compared to the research elective group (77 %). This could be accounted for by the fact that many of the summer research respondents were still in medical school and may have had limited opportunities to engage in research projects, especially during the second and third years of the curriculum.

We will continue to track students who have participated in our research programs in order to monitor their level of research activity. As we work to revitalize the pipeline of well-trained psychiatric physician-scientists, we will also strive to achieve and maintain diversity among the next generation of researchers. Thus, another goal of this program is to continue to increase the number of underrepresented minorities and women who participate in the research fellowships and electives.

A limitation of our findings is that we cannot account for the impact of any recent national trends in interest among medical students pursuing research experiences during medical school. Another potential limitation to the generalizability of this project is the variability in the number of accessible and active research faculty across institutions, as well as the potential impact of declining research funding and resources to support summer fellowships for students. Our institution has made extensive use of the grant funding and infrastructure provided by the NIDA funded DART research training program [12], though this is not the only mechanism by which we have been able to engage students in research fellowships and electives. Many institutions have limited resources, including a limited pool of research mentors, which would limit the number of students who can engage in research projects. Due to the success of the initiative described above, we continue to have an increased demand for the summer fellowship program. Not all students who apply are able to participate, due to finite stipend and research mentor availability. Local and national efforts should be dedicated to identifying and pooling available resources to maximize student research opportunities. Finally, in an era of increasingly limited funding and extremely competitive grant cycles, academic

medicine must make it a continued priority to advocate for research support at the institutional, local, and national levels.

Implications for Educators

- Creating an organized and centralized pathway for medical students to learn about and access research opportunities can facilitate interest and participation in psychiatric research.
 - Students can engage in meaningful research projects at various stages of their education.
 - The impact of completing a research project during medical school on specialty choice and career focus is an area that requires further study.
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Implications for Academic Leaders

- A relatively modest amount of monetary support can allow students to participate in research.
 - Providing monetary support to allow students to participate in research is an investment in the future of psychiatric research.
 - Engaging medical students in research projects early in their educational pathway may lead to more students being interested in psychiatry and psychiatric research.
 - The impact of completing a research project during medical school on specialty choice and career focus is an area that requires further study.
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