



The Medical Student Summer Research Program in Family Medicine

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BACKGROUND AND OBJECTIVES: A variety of clinical research training programs exist throughout the United States, although little is known about their methods, content, and outcomes. This report describes a model of clinical research training designed to teach medical students research processes in family medicine, while yielding data for research studies. Authors present a description and evaluation of the program, focusing on students' research productivity.

METHODS: Forty medical students participated in a 6-week clinical research training program from 2006–2012. This program was led by an experienced investigator and 10 family medicine faculty mentors. Classroom instruction provided an introduction to research design in Week 1 and research writing and dissemination in Week 6. In between, medical students implemented studies in multiple outpatient clinical settings in the Residency Research Network of Texas (RRNET).

RESULTS: The Medical Student Summer Research Program in Family Medicine was well received by medical students who demonstrated consistent productivity year after year. All students displayed findings during Medical Student Research Day, and one third continued their work beyond that event, producing 22 presentations, two manuscripts, seven published abstracts, and seven research honors.

CONCLUSIONS: Opportunities for medical students to develop research skills should be central to medical school education. Familiarity with the research process improves medical students' ability to understand, critique, and use evidence-based medicine in practice, to explain the latest findings to their patients, and to consider careers as clinician-scientists.

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In the United States, a variety of research training programs¹⁻⁶ allow medical students to study a wide range of topics using a diverse set of research methods. Effective training programs require expert trainers, hands-on application, construct validity in training content, and delivery tailored to the learner.⁷⁻⁹ Effective instructors elicit

learner participation, monitor progress, facilitate self-reflection, develop students' self-efficacy, provide feedback, and create a learning environment.¹⁰⁻¹³ The tasks of research include reviewing and summarizing relevant research literature, obtaining informed consent from patients, collecting and analyzing data, interpreting findings, writing reports, and

presenting results. These tasks promote higher-order learning, addressing all levels of Bloom's taxonomy: remembering, understanding, applying, analyzing, evaluating, and creating new knowledge.¹⁴

Curricular content of research training programs is rarely described, and program evaluation measures vary.^{15,16} Some authors rely on satisfaction measures for evaluation, making it difficult to assess real training effectiveness.^{17,18} Others record numbers of presentations or publications.¹⁹⁻²¹ In this article, we describe one medical student research program, outlining curricular content, program administration, and outcomes related to medical students' research productivity, including local and national research presentations, honors and awards, and manuscripts submitted to professional journals.

Methods

Setting

The Medical Student Summer Research Program in Family Medicine began in 2006 in the Residency Research Network of Texas (RRNeT). RRNET is a collaboration of 10 family medicine residency programs spread across Texas (eight

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in community hospitals, two in university settings), in which approximately 100 family physician faculty and 300 family medicine residents provide care in 300,000 outpatient visits per year. Each year, RRNeT collaborates to conduct one or two research projects. This effort benefits from low-cost research assistance, so RRNeT reaches out to medical students at the University of Texas Health Science Center at San Antonio (UTHSCSA), inviting their involvement.

Participants

The medical dean at UTHSCSA offered a Medical Student Summer Research Program (MSSRP). First-year medical students were eligible for a research stipend (\$250 per week) if they identified a research mentor and submitted a satisfactory research proposal to the dean's office. RRNeT members designed a 6-week summer program that fit the dean's requirements.

Each year, RRNeT recruited medical students through various events and assisted them with applications to the dean's program, focusing on the current RRNeT study. Since 2006, RRNeT recruited 40 UTHSCSA medical students, four to eight per year. Students were 100% successful in obtaining research stipends.

Curriculum

Training. This program was conceived as a hybrid between research assistance and research education. While RRNeT benefitted from the assistance that students brought to each project, they sought to create a rich learning experience as well. Students joined the research team after the primary research aim was articulated, the study designed, and IRB obtained; however, each student selected a unique secondary aim as their personal focus. Some developed their own research questions based on data to be collected; others selected from a list of possible research questions.

The summer program began with 2 days of classroom training. The primary instructor was the RRNeT director, a faculty with 25 years of research and teaching experience. Other instructors provided project-specific clinical content. Day One curricula addressed general research methods, including developing a research question, design, measurement, sampling, and bias.²² On Day Two, instructors thoroughly described the current RRNeT research project, covering background literature, subject recruitment and consent, data collection, data entry, and management of anticipated problems, such as subject attrition and language barriers. To reinforce the classroom instruction, students rehearsed consent procedures, surveys, and data entry.

Project Implementation. On Day Three, each student traveled to a selected RRNeT clinical site for a 30-day stay. Seven RRNeT sites were 75 to 250 miles away. On site, RRNeT faculty provided orientation to clinic routines and supervised students' work. Students recruited, consented, interviewed, and surveyed subjects, abstracted medical records, took field notes, and entered data into a centralized online database. The RRNeT director conferred with students weekly via email or telephone, reviewed data collection progress, answered questions, and resolved problems. Weekly, she distributed informal progress reports to RRNeT students and faculty.

Data Analysis. After 30 days, students returned to the university to design a first-author research poster. In advance, the RRNeT director ran simple statistical comparisons addressing each student's research question. Five days of instruction included:

1. Writing posters, searching the research literature. Homework: identify relevant research articles, write Introduction section.

2. Basic statistical analysis. Homework: review statistical output.

3. Graphing findings. Homework: graph findings, write Results section.

4. Interpreting findings. Homework: write Discussion section.

5. Authorship, acknowledgements, bibliographies, titles. Homework: edit and refine poster.

Dissemination. Students finalized posters for Medical Student Research Day, held in the fall, where posters were judged by university research faculty on content and presentation quality. During medical students' MS2 and MS3 years, the RRNeT director encouraged submissions to professional conferences. The vice dean for Medical Education provided travel funding for students with accepted presentations.

Evaluation

The central outcome measure was medical students' research productivity, including local and national research presentations, honors and awards, and manuscripts submitted to professional journals. The Institutional Review Board of the University of Texas Health Science Center at San Antonio reviewed this project and determined it was "not research."

Results

Since 2006, 40 medical students have gathered data for seven qualitative, longitudinal cohort, and observational studies in RRNeT, providing sample sizes ranging from 42 (for qualitative studies) to 1,171 (for patient surveys). Two thirds of the medical students were women, 42.5% were Latino, and 10% were African American.

Every student developed a poster for Medical Student Research Day. (Table 1) Thirteen students (32.5%) presented posters at 14 professional conferences, for a total of 22 presentations; 18 were at national/international society meetings. Seven presentations were published as abstracts in *Family Medicine*. Six

Table 1: Family Medicine Summer Research Program Outcomes

Summer of:	# of Program Completers	# of Posters at Medical Student Research Day	# of Conference Presentations	# of Honors and Awards	# of Journal Articles Submitted
2006	7	7	3	1	
2007	4	4	—	—	1
2008	5	5	4	2	
2009	4	4	3	2	
2010	8	8	7	1	
2011	7	7	4	1	1
2012	5	5	1	—	—
Total	40	40	22	7	2

medical students won seven research awards from: Texas Academy of Family Physicians, American Academy of Family Physicians, American Geriatric Society, and UTHSCSA Medical Student Research Day. Two students submitted manuscripts to journals. One student fulfilled additional research requirements and graduated “with Research Distinction.”

Discussion

Students in the Medical Student Summer Research Program in Family Medicine demonstrated consistent productivity year after year. Consistent with recommendations for excellent training programs, this summer experience incorporated: expert trainers, carefully crafted training content, hands-on application, frequent tailored feedback, opportunities to showcase one’s work, and support to sustain the effort into the future.^{7,8,14,21,23}

The key marker of success was students’ research presentations to professional audiences. One-hundred percent presented posters in our local event, and one third presented papers at national and regional conferences. While this program was limited by a lack of a control group, our dissemination record

compared favorably with similar research training programs.²⁴⁻²⁶ Seven students earned research honors; however, only two submitted papers for publication (5%). Other authors report 5% to 25% of program completers publishing research results while still in medical school.^{20,24,25}

Medical student research programs can benefit both students and faculty mentors. Early involvement in research increases the likelihood that students will choose careers as clinician-scientists.²⁷ Students’ familiarity with the research process improves their ability to understand, critique, and apply research in practice and to explain study findings to their patients. Faculty benefit from low-cost assistance to underfunded projects and from students’ enthusiastic participation. Students’ energy can infuse new ideas into existing research programs and reinvigorate faculty work.

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This curriculum has been presented previously, but this manuscript includes

additional student participants and updated outcome data. Previously presented: Burge S, Hill J, Bayles B. Training Medical Students on Research Methods in Family Medicine, 2011 Society of Teachers of Family Medicine (STFM) Annual Spring Conference, New Orleans, and Burge S, Bayles B, Hill J, Family Medicine Research Preceptorship Program, 2011 STFM Conference on Medical Student Education, Houston, TX.

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