

# Providing Premedical Students with Quality Clinical and Research Experience: The Tobacco Science Scholars Program

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## ABSTRACT

Undergraduate premedical students face a formidable decision as they work to determine whether to pursue a profession in medicine. Exposure to clinical medicine and research is essential to inform students what it might be like to be a physician. Undergraduates, however, face a number of obstacles to obtaining the kind of quality clinical and research experience needed to make an informed decision. Growing regulations designed to protect patient confidentiality, though undeniably important, pose a barrier to students seeking patient contact. Traditional passive physician shadowing often does not provide ample opportunities for one-on-one patient interaction or problem solving. Finally, research opportunities available to students typically are not associated with clinical work and therefore do not provide an experiential model of how empirical evidence informs medical practice. This report describes the University of Wisconsin School of Medicine and Public Health's Tobacco Science Scholars Program, a pilot program designed to address some of these barriers. While fulfilling institutional requirements for patient contact, the program provides students with an active model of clinical patient interaction and problem solving, with a research experience integrated into these clinical experiences so that undergraduates better understand how research informs clinical medicine.

## INTRODUCTION

The education of physicians has been the subject of debate for over a century,<sup>1</sup> and as Jeffery Gross notes, “begins long before the first day in medical school.”<sup>2</sup> While considerable attention has been given to designing quality premedical academic curricula,<sup>3-8</sup> less attention has been given to designing opportunities for premedical clinical and research experience.<sup>2</sup> Medicine is a clinical profession based in research, but undergraduates often apply to medical school with limited understanding of clinical

experience and only minimal exposure to clinically relevant research.<sup>9,10</sup> It is common that students starting medical school are unfamiliar with the experience of human suffering found in medicine and have little understanding of the patient-healer relationship.<sup>11-15</sup> Premedical students today face several obstacles to gaining quality clinical and research experience: (1) they face restrictions to patient access in clinical settings due to regulations necessary to protect patient confidentiality;<sup>16</sup> (2) they gain clinical experience primarily through passive physician shadowing,<sup>17,18</sup> while evidence now supports active forms of patient interaction;<sup>9,19</sup> and (3) undergraduate research is typically conducted in separate arenas from clinical experience, resulting in a poor understanding of how research informs clinical practice.<sup>17</sup>

### Patient Confidentiality

In the last 10 years, there has been a substantial evolution in the protection of patient confidentiality, resulting in substantial limitations to patient exposure for premedical students. National guidelines, such as those of the Health Insurance Portability and Accountability Act (HIPAA),<sup>20</sup> and local guidelines on patient confidentiality, are of undisputed importance in the evolution of medical practice. Today, patient access is limited for undergraduates who obtain clinical experience through shadowing.<sup>12,13,19</sup> Shadowing is a venerable tradition in which a student follows a physician through patient rounds and observes patient interactions.<sup>13</sup> Often students will find a physician to shadow through a family member or friend, but these informal relationships comply only loosely with HIPAA or local confidentiality regulations.<sup>18</sup> Recognizing the need for regulation of undergraduate clinical experience,<sup>16</sup> many universities have cre-

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**Table.** Tobacco Science Scholars (TSS) Program Introductory Training.

1. Proof of immunizations to Rubella, Hepatitis B, Rubeola, Mumps, Varicella, and TB test.
2. Permission from the University of Wisconsin School of Medicine and Public Health to enroll in the course.
3. Letter from undergraduate advisor stating that student is enrolled and in good standing.
4. Letter from TSS Program to the local hospital indicating the activities of the student.
5. Letter from the supervising physician stating they accept the student into the clinical program.
6. Waiver of Liability and Pledge of Confidentiality to local hospital.
7. HIPAA certification through the Institutional Review Board.
8. Human Subjects Research Training Certification through the Institutional Review Board.
9. Institutional Review Board approval of student as key personnel on the research project.
10. Training in TSS program guidelines for clinical patient interaction.

ated shadowing programs for premedical students that ensure compliance with federal and local regulations. When available, these programs are prized and highly utilized by premedical students.<sup>13,21</sup>

### Active vs Passive Clinical Experience

Although shadowing experiences vary widely, the role of the shadowing student is typically passive and is not designed to provide one-on-one patient interaction or engage the student in problem solving.<sup>17</sup> There are a small but growing number of institutions that have recognized the limitations of passive clinical experience and are providing more active clinical programs for premedical students.<sup>13,17,22</sup> Programs that emphasize active clinical learning for undergraduates include the Patient Perspectives Program (Charlotte, North Carolina), the Minneapolis Heart Institute Foundation Summer Research Internship Program (Minneapolis, Minnesota), the Stewart F. Alexander Premedical Program (Westwood, New Jersey), the Dartmouth Health Experience Learning Program (Hanover, New Hampshire), and the St. Jude's Pediatric Oncology Education Program (Memphis, Tennessee). These programs have demonstrated that active learning experience greatly enhances student decision making when considering a medical career and provides deeper sense of purpose and motivation with regard to other coursework.<sup>13,19,21,23,24</sup>

### Research Experience

Today, essentially all medical schools require or recommend that applicants have research experience.<sup>25</sup> Understanding the nature of evidenced-based medicine (EBM) requires an understanding of empirical methodology, not only through reading textbooks, but through active participation in research.<sup>26-28</sup> EBM is a philosophy of providing therapies based on empirical results instead of tradition or opinion<sup>29</sup> and today is considered the foundation of quality medical care.<sup>30-32,33</sup> An ideal way to facilitate an understanding of EBM would be to involve the student in clinical research that directly applies to the patients he or she encounters in clinical rounds. If a program provides an integrated research and clinical experience, a student can participate in the research required to develop a therapy, and then observe the clinical uti-

lization of this therapy, thereby gaining an experiential understanding of evidence-based practice.

### Program Description and Objectives

The University of Wisconsin School of Medicine and Public Health, Center for Tobacco Research and Intervention (UW-CTRI) is in its second year piloting the UW-Tobacco Science Scholars Program (TSS). TSS is a 1-credit, 1-semester program designed to shepherd students

through required HIPAA and local institutional regulations, provide active-model clinical experience, and provide a fully integrated research experience. Because the program is sponsored by volunteer faculty, there are no costs or funding required. The curriculum contains 4 components—introductory training, clinical experience, research experience, and a capstone presentation. Research and clinical rotations focus on tobacco-related illness to promote an experiential understanding of EBM. TSS course objectives are to (1) provide the student with access to patients in an active learning model, (2) provide the student with access to research that will help the student understand the connection between research and clinical medicine, and (3) provide the student with a better understanding of the medical field as a possible future profession.

### TSS Introductory Training

Introductory training in TSS is a week-long process whereby an administrator will provide a student with necessary forms and instructions to meet requirements for patient contact and research outlined by HIPAA, the University of Wisconsin Institutional Review Board, and a local community hospital (Table). Without guidance, completion of these multiple steps is often prohibitive to most undergraduates. An additional component of introductory training is comprehensive TSS training on hospital dress code, restrictions on physical contact with patients, inappropriate patient questions, and guidelines for interactions with physicians and staff during rounds. Once introductory training is complete, students not only satisfy required institutional regulations but gain a somewhat nuanced understanding of clinical etiquette.

### TSS Clinical Experience

The TSS clinical experience involves rounding with a volunteer physician of any specialty encountering tobacco-related illness during their clinical rotations at a local community hospital. Rounds last for 4 hours, take place every 2 weeks throughout the semester, and typically involve 3 to 4 patient encounters. The physician first selects a patient with a reasonable disposition and requests permission of the patient for a student encounter. If the patient agrees to speak to the student, then the student goes into

the patient's room and asks rehearsed open-ended questions and takes notes while the patient speaks. After the student has seen each patient, she or he provides a brief verbal history to the physician. At the end of each rounding day, the student reads about the pathophysiology and treatment on 1 of the patient diagnoses, with preference given to smoking-related illnesses. The student then writes a rudimentary patient history with discussion of relevant pathophysiology and treatment and provides a brief presentation to the attending physician. In this way, the student engages in patient interaction and problem solving. The total time spent in rounds for each student or faculty is approximately 40 hours per semester. Several physicians have volunteered to participate in the TSS program and have provided positive feedback on students in areas of clinical etiquette and presentation.

### **TSS Research Experience**

The TSS research experience is conducted at UW-CTRI. The research experience is 1 semester and provides students with regular access to the study's principal investigator and a limited de-identified data set (for example, data on a self-report questionnaire). Students are asked to conduct a simple data analysis and are given instruction on how to find means, standard deviations, *t* tests and ANOVAs. After analyses are complete, the student meets with one of the UW-CTRI doctoral-level research faculty, who spends an hour advising the student on how to refine their analysis and better understand clinical implications of the research. Five members of the research faculty at UW-CTRI have volunteered to help guide TSS students in analyzing and understanding data.

### **TSS Presentation**

At the end of the semester, students are required to provide a presentation to staff at UW-CTRI containing 2 components. The first component is a clinical presentation of a patient history with a relevant pathophysiology and treatment plan; the second component is a presentation of data from smoking-related research. The 2 parts of the presentation typically share a theme. For example, the clinical component might provide a description of a smoker with anxiety, and the research component might provide a description of data from an anxiety scale taken by smokers who are trying to quit. Evaluation of the student is based on faculty assessment of a student's clinical work, research understanding, and final presentation.

### **TSS Program Response**

The TSS program is available to undergraduates with strong academic standing and interest in becoming a physician. As a volunteer program, TSS initially was piloted with only 1 available position, although 3 positions currently are available and larger numbers are expected in the future. When the TSS program was first offered, 49 students applied, and in its second semester 71

students applied, representing a significant portion of the UW premedical class. A survey was provided to students approximately 1 year after the TSS experience, while some were in medical school. The questions included Likert scale 1-10 responses and written answers reflecting course objectives. The following are mean (*m*) responses to scale questions and examples of written responses:

*Objective 1) Provide the student with access to patients in an active learning model.* Questions: Did TSS provide you with direct access to patients: *m* = 9.33, *SD* = .58; Did TSS provide an active rather than passive clinical experience: *m* = 8.67, *SD* = 2.31. Written response:

My role with patients was one close to that of an actual medical student. I learned history taking skills that I am currently learning in medical school and received more real-life patient contact than most of my peers.

*Objective 2) Provide the student with access to research that will help the student understand the connection between research and clinical medicine.* Questions: Did TSS provide you with a hands-on research experience: *m* = 9.00, *SD* = 1.00. Did TSS help you understand the connection between research and clinical practice: *m* = 10.00, *SD* = 0.00. Written responses:

The most useful research skill gained was being able to extrapolate data findings from different areas of the project to develop one central conclusion.

I feel that the experience gave great insight into the way physicians utilize medical resources to solve medical dilemmas and gain further insight into specific medical conditions.

*Objective 3) Provide the student with a better understanding of the medical field as a possible future profession.* Question: Did TSS provide you with a deeper understanding of the medical field: *m* = 9.67, *SD* = .58. Written responses:

I would leave my shift with a smile. I talked about my experience for months after completion of the program. Being a Tobacco Science Scholar made me confident in my decision to become a doctor.

I strongly believe that the TSS program allowed me to excel in my first year of medical school. I have a leg up on other students in terms of having confident patient interactions and it was second nature to me already to be presented with a disease and instantly look for the relevant research on the topic.

## **CONCLUSION**

The undergraduate who is considering the medical profession faces a decision of considerable complexity with limited opportunities for exposure to the profession. Presently, shadowing is the primary method through which students gain clinical experience necessary to approach this decision. The University of Wisconsin

Tobacco Science Scholars Program is one of a number of programs attempting to meet these goals. TSS is in its infancy, but strong student response to the program shows there is demand for this type of experience. Feedback among program completers has been positive, and survey responses suggest that TSS is meeting its intended objectives. Additional study is warranted to better understand the effect of this program on communication skills with patients, and ability to apply research skills, and understand EBM principals. Most universities that conduct clinically relevant research potentially could develop a similar program. We hope that our experience with this pilot program might be helpful to those with a desire to develop quality premedical education.

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