

Doctors of Tomorrow – A Pipeline Program for Getting a Head Start in Medicine

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ABSTRACT

Purpose: Pipeline programs have long been embraced as a strategy to recruit students from groups underrepresented in medicine into medical careers. Despite the prevalence of these programs, we know little about why students seek out participation and even less about their perceptions of the potential long-term benefits. This study explored the motivations and expectations of pipeline program participants.

Method: Twenty-three high school students participated in the Doctors of Tomorrow (DoT) program, a high school and medical school partnership pipeline program from September 2014 through March 2015. Data for this study included students' application essays, critical incident narratives, focus group discussions and transcripts from individual interviews. Thematic analysis was used to analyze all narrative materials and transcripts.

Results: Our analysis of all program data revealed that DoT participants were motivated to participate in the program to learn about becoming a physician, gain access to individuals in medicine and develop a competitive advantage over other students when applying to college and medical school.

Conclusions: Barriers to careers in medicine for individuals from groups underrepresented in medicine is well documented. These findings suggest that students seek to participate in pipeline programs as a strategy to secure goal-oriented, experiential encounters to help improve access points and mitigate barriers to becoming physicians.

Keywords: minority student, pipeline, K-12, diversity in medicine, underrepresentation in medicine

"[The DoT is] a combination of opportunities. It's exposure, [it's] everything. You get to see what your life would be if you were there." (9th grade high school student)

I. INTRODUCTION

Medicine and medical education in the United States are in the midst of marked transformation, including overhauling curricula and assessment methods, increasing demands for accountability and transparency to the public, and decreasing research dollars.^{1,2} What has not changed is the lack of racial diversity in medicine.³ Due to inequitable educational preparation in elementary and secondary settings, financial demands, and unfamiliar socio-cultural contexts of medical schools, access to elite health professions has been exclusionary for members of many communities and continues to fuel their underrepresentation in medicine (URiM).^{3,4} The term underrepresentation in medicine has been used by the American Association of Medical Colleges (AAMC) since the early 1970s to define minority groups excluded from participation in the medicine profession.⁴ The American Association of Medical Colleges (AAMC) and the National Medical Association (NMA) continue to call for initiatives to address disparities and underrepresentation among physicians.^{5,6} Nonetheless, entry into the profession of medicine remains elusive for youth from certain minority groups.

Pipeline programs that focus on the transition from undergraduate education to medical school have been used as a strategy to increase diversity in medicine and address inequities associated with recruitment, access, and retention of students from groups underrepresented in medical school.⁷⁻⁹ Despite the prevalence of pipeline programs across the United States, minority youth remain under-represented in medical school,¹⁰ perhaps because the pipeline needs to begin earlier in their academic trajectory. In 2015, the AAMC

Matriculating Student Questionnaire conducted with incoming U.S. medical students, found that 19.9% of respondents realized they wanted to become a doctor *before* high school and 30.5% realized *during* high school.¹¹ Their finding that over half of medical students chose to pursue a career in medicine by the end of high school highlights the need for earlier engagement of students interested in careers in medicine.¹²

Focusing on high school students is an important strategy for increasing the pool of qualified minority medical school applicants¹³, yet little is known about why students seek out these programs and their perceptions of the long-term benefits. We sought to better understand the perspectives of underrepresented high school youth in their pursuit of careers in medicine. We were interested in exploring their motivations for participating in a medical career pipeline program and what the students perceived to be the primary benefits of participation in order to build on those defined areas of need.

II. METHODS

Setting

The Doctors of Tomorrow (DoT) program is a partnership between the University of Michigan Medical School and Cass Technical High School (CTHS), the oldest of only three magnet schools in Detroit. CTHS admits students largely based on middle school grades and high school placement test scores, and students must maintain a GPA of at least 2.5 to remain enrolled. The 2300 members of the student body are reflective of the greater Detroit population with 90% of students identifying as African American or Hispanic.^{14,15} The 23 students included in this study were 9th graders at CTHS who were selected to participate in the DoT program during the 2014-2015 academic year. Three students were Asian American and 20 students were African American. Students were chosen based solely upon their written responses to application questions about their interest in medicine. Approximately half of the CTHS students who applied were accepted.

The overarching goal of DoT is to inspire and empower (URiM) students to pursue careers in medicine and thereby improve the diversity of the physician population. The DoT pipeline model is predicated on capturing interest and enabling high school students to pursue careers in medicine. The core components of the program are threefold. First, 9th grade students make monthly visits to the hospital campus for hands on clinical experiences including physician shadowing opportunities and laparoscopic surgery skills teaching in a simulation center. Second, one-on-one mentoring from a medical student provides each participant with a near-peer mentor who can share their knowledge and experience and discuss academic issues, college applications, volunteering opportunities, and requirements for college preparation. Finally, students complete collaborative end-of-year capstone service projects related to locally relevant health issues.

Data Collection

The data for this study included application essays, focus groups transcripts, semi-structured interview transcripts, and critical incident narratives. Data was collected from September 2014 to March 2015. Three members of the research team (LY, JD, GS) facilitated focus groups and face-to-face interviews. Focus groups were approximately 25 minutes in duration, and each interview lasted about 15 minutes. To elicit their motivations for participation, students were asked why they joined DoT, what they hoped to gain from participation in the program, what suggestions they had for improving the program, and ways to further support students. Each student wrote a critical incident narrative^{16,17} reflecting on significant or transformative experiences while participating in DoT. The application essay asked students to explain their interest in the program. All verbal data collection occurred at CTHS. These interactions were audio-recorded and transcribed verbatim.

Data Analysis

Transcripts were read iteratively for relevance to the study's question. Open, line-by-line coding and axial coding were used to analyze events, experiences, and responses.¹⁸ A framework of categories was developed using constant comparison.¹⁹ Consistent with theoretical sampling, analysis of essays and narrative data continued until saturation was achieved. Management of data analysis was maintained using NVIVO 10[®], a qualitative research software program. This study received Not Regulated status from the University of Michigan Institutional Review Board (IRB).

III. RESULTS

Our analysis revealed that high school students were motivated to participate in the DoT program to learn about becoming a physician, gain access to individuals in medicine, and develop a competitive advantage over other students when applying to college and medical school.

Learning About Becoming a Physician

At the foundation of students' motivation to participate in the DoT program was their desire to learn more about becoming a physician. Many students stated their participation was an opportunity to get "hands on" information about what it takes to become a doctor. Many viewed this experience as a unique opportunity to gain an understanding of this trajectory and obtain specific information about physicians' day-to-day responsibilities.

"As far back as I can remember I have wanted to become an orthopedic surgeon. My thought was it would be intense to go through undergrad and make it into medical school. I was sure it was going to be extremely hard to get through 12 years of medical school. All of that changed when I was accepted into the Doctors of Tomorrow Program. I quickly learned what striving to become a doctor looked like. I was exposed to a real life, hands on journey into what it really takes to become a doctor. If I wasn't sure before I am absolutely sure that a career in medicine is for me." (Critical Incident Narrative 009)

Students noted how their exposure to this program expanded their understanding of what it would be like on the journey towards becoming a physician.

"When choosing a career the choice is based on what you *think* [emphasis by the student] the career entails. I have been able to experience firsthand what my life will be like as a medical student and then a surgeon, and I like it...Many have seen the various medical dramas on television and get an unrealistic view of being a doctor. Being in this program will give a good dose of reality on what being a doctor means." (Critical Incident Narrative 012)

Students also recognized that becoming a physician required more than "getting good grades".

"I felt that it would take hard work beginning now, my freshmen year of high school and throughout my educational road to reach my goal. My eyes were opened wide that it not only takes hard work, it also takes dedication, determination, perseverance, and sacrifice. Yes, having good grades is great but you have to have it in your heart to help others. You must be able to reach past all barriers to reach out to help a patient." (Critical Incident Narrative 022)

Prior to entering the program, most of the knowledge students' had about the role of a physician was based on images from popular culture or their experiences as a patient. Students desired to gain a better perspective about the academic requirements and professional responsibilities of a career in medicine. For many, this exposure helped them solidify their interest in medicine and better understand the trajectory from a high school student to a physician. As such, students considered their participation as an opportunity to determine whether medicine was the appropriate career path.

Gaining Access to Individuals in the Field

It has been well documented that URiM youth lack personal experiences with medical professionals—few know or have relatives who are physicians.²⁰ Students indicated that their participation was a way to find out what to expect from those in the field—medical students and physicians.

"I would learn the experiences that I would possibly go through, and get advice from people who went through it themselves. I hope to gain knowledge and insight into the life of a med student and to learn what to expect during those years. My life goal is to become a doctor." (Application Essay 033)

Another student anticipated the taxing nature of pursuing a medical career and had the foresight to establish a support system. "I'm hoping to gain a secure relationship and receive guidance...that will help me throughout this journey that I've chosen to take. Also, with having the opportunity to be able to have someone to talk to with any personal problems or concerns that I may endure in learning about the world of medicine. I feel that having the opportunity with my mentor will benefit both of us. I'll be learning new skills that I will be able to keep with me for the rest of my life." (Application Essay 024)

The medical student mentoring and physician shadowing experiences gave participants the opportunity to situate themselves within the medical context, expand their social networks, and develop experiential capital.

Developing a Competitive Advantage for the Future

Students believed that their participation in the DoT program would provide them an advantage towards becoming a physician through additional skills and knowledge that would make them more competitive when applying to college and medical school.

"If you're in the program, you'll know more than other people when they get to medical school. They'll ask you a question and you'll already know that question that another person wouldn't know. We'll be already a step up of other medical students. So when it comes down to who gets that job, it will be a good thing on your resume. "Oh, she's been in this situation before. He knows what he's doing." (Focus Group 015)

Students also recognized the value of early high school preparation as a foundation necessary for future success.

"I hope to gain more information about health and knowledge about medicine and to have a chance to see the things I need to prepare myself for in the future. I have always dreamed of being a Pediatrician. I know

that being in this program; will equip me with essential knowledge to make me more prepared for this field. I know that preparing to be a doctor will require a lot of college hours and this program will give me a head start.” (Application Essay 023)

Students also indicated that their participation would demonstrate their long-term commitment to a career in medicine.

In one of our focus groups, one student indicated that, “We’re serious about what we really want to do in our futures.” Another student stated, “When it’s time for us to submit to colleges because they can see, starting in ninth grade that you were very serious about becoming a doctor or whatever you want to be and they’ll take us more seriously knowing that we started from a younger age.” (Focus Group 007)

Students recognized the competitiveness of higher education in general, and medicine in particular, and considered their participation in DoT as a strategy for securing targeted experiences that aligned with their long term goal. They recognized that being a physician will require that they meet key benchmarks as well as manage others’ perceptions of their abilities and commitment to medicine.

IV. DISCUSSION

This study explored high school students’ perceived benefits of participation in pipeline programs. The analysis revealed that high school students with desires to become physicians sought experiences with individuals in medicine and in medical environments with the expectation that both will put them on the path toward becoming a physician. That includes meeting the right people and learning what it means to be a physician. DoT participants acknowledged areas where they needed access points and opportunities to foster growth and had informed ideas about how the pipeline program could benefit them.

Most pipeline programs are predicated on addressing academic knowledge gaps among youth from URiM groups.²¹ While previous efforts at increasing the diversity of the medical student population have been aimed at providing under-represented students with academic enrichment,²² our results suggest that students themselves believed that social and experiential capital are also important to entering the field of medicine.^{23,24} These findings demonstrate that students are aware of the multitude of barriers throughout the pathway to becoming a physician even when they are not explicitly stated. Students have a long-term objective and actively seek immediate opportunities that allow them to develop resources and skillsets to meet that goal.

Creating a pipeline from high school to medical school is an effective strategy for increasing the number of individuals from groups underrepresented in medicine matriculates in medical school.¹³ While previous efforts at increasing the diversity of the medical student population have been aimed at providing under-represented students with academic enrichment,²² our results suggest that students themselves believed that social and experiential capital are also important to entering the field of medicine.^{23,24} Students from lower or middle-class backgrounds often have limited access to individuals who can help facilitate their entry into medicine through introductions to influential people, writing letters of recommendation, providing or suggesting internships or summer employment.²⁵ Relationships established through programs such as DoT can increase students’ access and expand their social networks.²⁶

A key component of DoT is the mentoring relationship established between the ninth-graders and first-year medical students. For high school students interested in pursuing careers in medicine, having access to medical students helped maintain their interest in medicine through information about medical education, career development, and provided another source of social support to help facilitate this path.^{27,28}

A limitation of this study is that students may have felt compelled to provide comments they believed would be best received rather than what they truly believed in an effort not to appear disassociated with the group due to social desirability bias.²⁹ The small sample size cannot represent the interest of all URiM students seeking, or entering, pipeline programs. Finally, the scope of this study did not address the long-term career outcomes of this cohort. Hence, we cannot correlate students’ perceptions of the value of pipeline programs with their career outcomes.

Our study provides insight into what students hope to achieve from pipeline programs, information that will be essential in guiding the development of new pipeline programs and enhancing those that already exist. Students participating in DoT indicated that they valued getting to know people involved in medicine (medical students and physicians), gaining a better understanding of the path to becoming a doctor, and feeling that they were one step closer to becoming a physician. Our findings suggest that pipeline programs need to expand their focus beyond academic enrichment to also include opportunities to gain experiential capital. As we continue to develop and support pipeline programs designed to increase diversity in medicine, paying attention to ways to establish relationships between students and those with the capacity to transmit resources and opportunities is critical.

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