

## RESEARCH LETTER

## Addressing Geographic Disparities in Dermatology Through Virtual Educational Outreach

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### ABSTRACT

**Background:** Rural areas face significant shortage of dermatologists. Rural origin is a strong indicator of eventual rural practice for physicians, however students of rural background account for less than 5% of all incoming medical students. Increasing representation of students with rural backgrounds is important to increase the supply of dermatologists in rural areas, which have higher skin cancer mortality rates compared to urban populations. We created a virtual educational outreach program for high school students in Maine, a predominately rural state, to create interest amongst high school students in pursuing a career in health care.

**Methods:** We developed a virtual pipeline program called the *Inside Medicine Program* that provides monthly educational workshops to high school students in Maine. For one of the sessions, we conducted a dermatology workshop teaching various topics in Dermatology. Pre- and post-curriculum surveys were sent to 33 students, which used a 10-point Likert scale to rate interest and perceived knowledge levels in these topics.

**Results:** After the workshop, 100% of respondents endorsed a greater understanding of the path to a dermatology career and 94.12% stated that they were interested in learning more about dermatology. Moreover, students endorsed greater interest in pursuing a career in dermatology and reported a significant increase in knowledge about various dermatologic topics.

**Conclusions:** Our results suggest that our program has improved these students' interest and perceived knowledge in dermatology. We hope that this will promote their subsequent entry into the medical field to address shortages in subspecialty care in rural areas.

### INTRODUCTION

The disparity in the geographic distribution of dermatologists between urban and rural areas continues to worsen, with many counties lacking a dermatologist<sup>1</sup>. Rural origin is a strong indicator of eventual rural practice for physicians<sup>2</sup>, however students of rural background account for less than 5% of all incoming medical students<sup>3</sup>. Those with a

rural background who are also from underrepresented racial/ethnic minority groups in medicine (URM) make up less than 0.5% of new medical students<sup>3</sup>.

Increasing representation of both URM and non-URM students with rural backgrounds is important to increase the supply of dermatologists in rural areas, which have higher skin cancer mortality rates compared to urban populations<sup>4</sup>. Moreover,

January 2022 Volume 6 Issue 1

representation of minorities improves patient care because race-concordant visits are associated with greater patient satisfaction<sup>5</sup>. Poor accessibility to mentors has been reported as a major barrier to pursuing dermatology<sup>6</sup>. With recognition of the need to increase diversity within medicine, we developed a virtual educational outreach program for high school students in Maine.

## METHODS

Adapting to the precautions necessitated by the COVID-19 pandemic, we developed a virtual pipeline program called the Inside Medicine Program, led by a combination of medical school students, faculty and staff. The program targeted Maine high school students, with a focus on URM students, to help improve supply of healthcare workers in Maine, a predominately rural state with increasing minority immigrant and refugee populations. Since the COVID-19 outbreak, this monthly program has provided students with mentorship and educational workshops to support their interest in medicine. For one of the sessions, we developed a dermatology workshop to teach students several topics including the path to a dermatology career, acne etiology and treatment, common skin rashes, and the ABCDE's of melanoma. Pre- and post-curriculum surveys were sent electronically to 33 students, which used a 10-point Likert scale to rate interest and perceived knowledge levels in these topics. Moreover, perceived barriers to a dermatology career were assessed. Analysis was performed with GraphPad Prism 9.0.

## RESULTS

The pre-curriculum survey was completed by 25 of 33 high school students (response rate, 75.76%). Twenty-one students attended the

virtual dermatology workshop, and 17 completed the post-curriculum survey (response rate, 80.95%). Among 25 students, 24 (96%) were female. Seventeen (68%) self-identified as White, four (16%) as Asian, two (8%) as African American or Black, and one (4%) as mixed race/ethnicity. Nine students (36%) indicated that they had a physician family member (**Table 1**). Of the nine students with physician family members, seven (77.78%) were White and two (22.2%) were Non-White (Black/African American or mixed race).

After the workshop, 100% of respondents endorsed a greater understanding of the path to a dermatology career and 94.12% stated that they were interested in learning more about dermatology. Moreover, students endorsed greater interest in pursuing a career in dermatology (pre-workshop mean [SD], 3.36 [2.92] vs post-workshop mean [SD], 5 [2.89];  $p < 0.05$ ). Students also reported a significant increase in knowledge about common skin rashes (pre-workshop mean [SD], 3.17 [1.62] vs post-workshop mean [SD], 7 [1.27];  $p < 0.01$ ), identifying melanoma (pre-workshop mean [SD], 2.75 [2] vs post-workshop mean [SD], 8.41 [1.12];  $p < 0.01$ ), and acne development and treatment (pre-workshop mean [SD], 5.21 [2.10] vs post-workshop mean [SD], 8.63 [1.20];  $p < 0.01$ ).

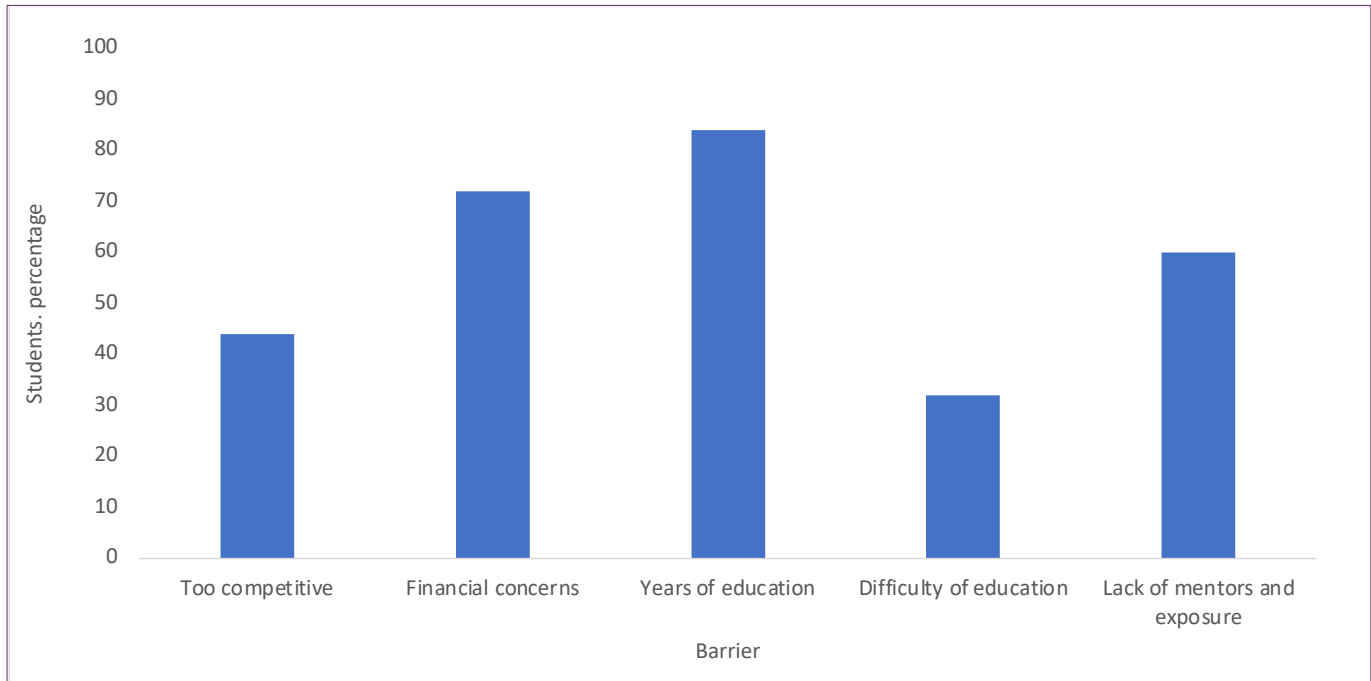
When asked about barriers toward pursuit of a career in dermatology, students cited concerns about the large financial burden of schooling, competitiveness of the field, inadequate accessibility to mentors, and the rigor and duration of the required education (**Figure 1**). Out of the 16 students with no physician family members, 14 (87.5%) reported financial burden of as a main barrier toward pursuit of a career in dermatology,

compared to four out of nine students (44.44%) with physician family

**Table 1: Student Demographics**

Gender	Number of students, (%)
<b>Female</b>	<b>24 (96)</b>
<b>Male</b>	<b>1 (4)</b>
Race/Ethnicity	
<b>White</b>	<b>17 (68)</b>
<b>Black or African American</b>	<b>2 (8)</b>
<b>Hispanic</b>	<b>1 (4)</b>
<b>Asian</b>	<b>4 (16)</b>
<b>Mixed</b>	<b>1 (4)</b>
High School Grade Level	
<b>Freshman</b>	<b>8 (32)</b>
<b>Sophomore</b>	<b>4 (16)</b>
<b>Junior</b>	<b>8 (32)</b>
<b>Senior</b>	<b>5 (20)</b>
Physician in family?	
<b>Yes</b>	<b>9 (36)</b>
<b>No</b>	<b>16 (64)</b>
Prior knowledge in dermatology?	
<b>Yes</b>	<b>1 (4)</b>
<b>No</b>	<b>24 (96)</b>
Prior visit to a dermatologist?	
<b>Yes</b>	<b>5 (20)</b>
<b>No</b>	<b>20 (80)</b>
Do you know any dermatologists in the community?	
<b>Yes</b>	<b>10 (40)</b>

No 15 (60)



**Figure 1.** High School Students' Perceived Barriers to Pursuit of a Dermatology Career

members. Financial burden of schooling was therefore more commonly reported in students who did not have physician family members compared to students who had physician family members ( $p < 0.05$ ).

## DISCUSSION

Students in predominately rural states have fewer role models in medicine and our program aims to help them envision pursuit of a health care career. Our results suggest that our program has improved these students' interest and perceived knowledge in dermatology.

It is notable that most participants in our program were female and White. Although we had not advertised the program towards a specific gender, females have been shown in

prior studies to be more likely to participate in extracurricular activities than boys, with the exception of athletics<sup>7</sup>. Our gender difference is also consistent with the predominance of females observed in other pipeline programs<sup>8,9</sup>. Additionally, many facets of dermatology make it an attractive specialty for women, resulting in a significant influx of women entering dermatology in recent years. While white students were the largest of all racial/ethnic groups in our program, URM students represent a larger percentage in our program than is seen in Maine as a whole. Our program aims to continue operating in the coming years and is working further increase URM student representation through more aggressive recruitment efforts.

Limitations of the study include the small sample size. In addition, four of 21 students

(19.05%) who completed the workshop were lost to follow-up, so it is possible that our reported outcomes may under or overestimate the effectiveness of our program. Despite these limitations, our findings lend support to pipeline efforts that broaden access to mentorship and resources in a virtual age. A follow-up study that assesses matriculation into medical school and pursuit of dermatology residency will be a valuable determinant of the long-term success of the program.

## CONCLUSION

It is our hope that our experience and reported outcomes will serve as a model for other programs to engage high school students from underrepresented groups and to eventually expand care in underserved non-urban areas.

**Conflict of Interest Disclosures:** None

**Funding:** None

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