

SMASH-Med: Implementation of an Outreach Program to Teens from Low Income High Schools

I. Specific Education Aims:

Starting July 2018, the Stanford Department of Surgery and S-SPIRE began collaborating with SMASH (Summer Math and Science Honors) Academy to supplement their 5-week residential STEM-intensive summer program for low-income high school students of color. We aimed to engage students in hands-on learning, such as lessons in anatomy labs and taking vital signs, and in networking opportunities with healthcare professionals from diverse backgrounds. After developing the curriculum (SMASH-Med <http://med.stanford.edu/s-spire/outreach-programs.html>), the Department of Surgery and S-SPIRE recruited faculty and staff from departments throughout Stanford School of Medicine to volunteer as panelists and small group leaders. In July 2019, the SMASH-Med program will expand the curriculum to include clinical simulations and CPR training and certification through a partnership with a local health safety company. To evaluate these efforts, we propose a mixed methods implementation project with the following specific aims:

Aim 1. To implement and evaluate the 2019 SMASH-Med curriculum using pre/post surveys focused on domains of self-efficacy and healthcare career interest.

Aim 2. To identify and discuss students' perceived facilitators and barriers to a healthcare career as well as strategies for their management through participant focus groups.

Aim 3. To integrate survey and focus group findings for refinement of the SMASH-Med 2020 curriculum.

The objective of SMASH-Med is to build high school students' self-efficacy, interest, and knowledge about pursuing a healthcare career, with the ultimate goal of contributing to a healthcare workforce that appropriately represents the diversity of our population.

II. Project Rationale:

Racial/ethnic minority students continue to be under-represented among medical school applicants, matriculates, and graduates, resulting in a healthcare workforce that lacks representation of the diverse population served.^{1,2} In response, some medical schools have developed programs for underrepresented in medicine (URM) college students who are interested in medical and science-related careers.²⁻⁶ While most existing programs engage URM students at the undergraduate level, efforts to promote diversity in the medical workforce may be more effective during the K-12 educational years.⁷⁻⁹

Although many students enrolled in existing high school pipeline programs have gone on to succeed in science-related careers,¹⁰⁻¹² these programs tend to have high enrollment costs, to be short-term, and/or to include only students who have already expressed an interest in healthcare. We developed a five-week summer program of healthcare-related workshops with a surgical focus (SMASH-Med) and invited URM high school students who were already enrolled in a free, longitudinal STEM program to participate. Our specific emphasis on surgery was intended to address the exceedingly low proportion of URM physicians in procedural specialties.¹³⁻¹⁸

In 2017, we conducted a needs assessment which directed the 2018 curriculum development. Following participation in SMASH-Med 2018, we found significant increases in student self-efficacy and knowledge about healthcare careers, but students also expressed several perceived barriers and we noted differences in healthcare career interest by sex and ethnicity.¹⁹ The current project builds on our preliminary findings to better understand differences by demographic group, teen participants' perceived barriers (and facilitators), and then to engage teens in strategies to manage these concerns with practical solutions and future curriculum adjustments.

III. Approach:

We propose a convergent mixed methods approach to this project. The SMASH Academy will supply demographic data on current participants and maintains a longitudinal database.

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In partnership with SMASH, we will deploy pre/post SMASH-Med on-line surveys (2018 response rate=85% and 77%; n=88) to evaluate specific program elements, measure interest, and understand self-efficacy toward a health care career based on existing validated measures. Additionally, the post surveys will evaluate learner satisfaction with the curriculum and allow for open-ended feedback toward program improvement. Pre/post data will be analyzed using paired t-tests.

Separately, we will conduct 6 focus groups of 6-8 participants over 45 minutes in dedicated meeting rooms during post-meal evening free time. Trained moderators will use a guide to query students regarding their approaches, management of barriers and recognition of facilitators to goal achievement. Focus groups will be audio-recorded; transcribed verbatim; coded, discussed, and thematically analyzed by the study team. We will establish validity of themes through triangulation among independent study team members, search for disconfirming data, and member-checking among ongoing focus groups. Quantitative and qualitative data will be triangulated and integrated through a joint display.²⁰

We have built on the first year of SMASH-Med (2018) to better understand high school student perspectives when considering healthcare as a career option. As we review feedback from the 2019 curriculum, we will continue to adjust the program, develop a plan for sustainability, and continue creating partnerships to better serve the needs of the high school students in the 2020 curriculum.

IV. Timeline and Plan for Implementation:

July 2019: SMASH-Med 2019 takes place (see curriculum here: <http://med.stanford.edu/spire/outreach-programs/smash-summer-2018-high-school-outreach-program.html>); conduct pre/post surveys and focus groups.

August – December 2019: Complete data collection; analyze and integrate quantitative and qualitative data; Revise the program based on findings; Re-establish partnerships and begin preparation for SMASH-Med 2020 workshops (e.g., Goodman Surgical Education Center, Clinical Anatomy, Center for Immersive and Simulation-based Learning)

January – March 2020: Submit abstracts to conferences; Draft manuscripts; Further develop 2020 curriculum; Develop 2020 research questions and complete supporting documents (IRB, surveys, etc.)

April – June 2020: Present findings at conferences; Submit manuscripts; Recruit med students, residents, and faculty to lead SMASH-Med workshops; Finalize workshop activities and purchase supplies.

July 2020: SMASH-Med 2020 takes place.

V. Anticipated Work Product:

The work products will include (1) mixed methods evaluation of the 2019 program, with a focus on barriers and facilitators to pursuing healthcare careers; (2) conference presentations and manuscripts related to the 2019 program findings; (3) implementation of the 2020 SMASH-Med program; (4) development of a sustainable plan to continue SMASH-Med and collaborate with like-minded groups.

VI. Evaluation Plan:

In addition to the post-program evaluation survey described above, we will partner with SMASH Academy to review their longitudinal database of annual survey results pertaining to academic and career achievements. In this way, we can follow long-term outcomes of SMASH-Med participants.

VII. Dissemination of Results:

We will disseminate results through (1) manuscript and abstract submissions; (2) communication with the SMASH program, the Stanford Department of Surgery media, and with the Stanford School of Medicine diversity and inclusion networks; (3) a planned meeting of like-minded Bay Area groups.

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VIII. Budget and Justification:

In this proposal, we request funds to help cover Dr Yelorda's salary related to the program. We are actively seeking funds to cover other expenses detailed below.

Arden Morris, MD, MPH (Professor of Surgery, Vice Chair of Research) has extensive experience in mixed methods and implementation research. She is PI and will be responsible for all aspects of the program as well as data collection, analysis, and ultimately communication of findings. As Director of S-SPIRE Center, she has .3FTE dedicated to research efforts and mentorship and will provide mentorship, research space and support, and sponsorship for Dr. Yelorda's participation in the S-SPIRE Mixed Methods Workshop (<http://med.stanford.edu/s-spire/mixed-methods-course.html>).

Kirbi Yelorda, MD (General Surgery resident) has targeted workforce diversity as the primary topic for her Professional Development time (July 2019-June 2020). She will spend .3FTE over the next year specifically working on this project, learning research design and quantitative and qualitative methods. She will lead logistics and operations for SMASH-Med 2019, will moderate focus groups, and will collect and analyze data, and prepare presentations and manuscripts. Dr. Yelorda is entering a Master's Program in Health Services Research and will take a qualitative data analysis course in Fall 2019 and the S-SPIRE Mixed Methods Workshop to facilitate research skill development.

Sylvia Bereknyei Merrell, DrPH, MS (Research Scholar, Department of Surgery) is staff in S-SPIRE Center and has extensive experience in mixed methods, education and implementation research. Although she currently on leave, we anticipate her return in July. At that time, she will participate in all aspects of planning, data collection, analysis and writing for the project.

Serena Bidwell, MPH (Social Science Researcher, Department of Surgery) is staff in S-SPIRE Center and was the operations lead on development and implementation of the inception of SMASH-Med 2018. She will participate in all aspects of the project, assist with logistics, and facilitate communication with the SMASH program as well as Stanford School of Medicine volunteers.

APPENDIX

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