

**Building an Equitable Surgical Training Pipeline: Leadership Exposure for the Advancement
of Gender and Underrepresented Minority Equity in Surgery (LEAGUES)**

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Abstract

Objective: Underrepresented minority (URM) medical students face many educational challenges.

Barriers include lack of equitable representation, scarce mentorship, and the effects of systemic racism. For students interested in diversity and health equity, perceptions of surgical culture may discourage pursuing surgical specialties. We describe a national pilot for a novel surgical pipeline program, Leadership Exposure for the Advancement of Gender and Underrepresented Minority Equity in Surgery (LEAGUES), which utilizes early exposure, mentorship, and community building to empower URM students in pursuit of academic surgical careers.

Design: A 4-week virtual program included pairing students with faculty research mentors, virtual skills sessions, and seminars on leadership, advocacy, and career development. Participants underwent semi-structured interviews before and after participation, assessing experiences with mentorship and research, interest in surgery, career aspirations, and perceived barriers to career goals.

Setting: Department of Surgery, Michigan Medicine, Ann Arbor, Michigan.

Participants: Rising second-year medical students.

Results: All 3 participants were Latinx; two were first-generation college students. Participants had no surgical mentorship and limited research exposure, citing a desire to learn research methodology, connect with mentors, and build towards a career working with underserved communities as

motivating factors for participation. Perceived barriers to a surgical career included surgical culture, burnout, and lack of research expertise or academic network necessary for success. At completion of the program, participants described several themes: 1) new positive perspective on academic surgical culture, 2) interest and confidence in research, 3) hope for improving health disparities, 4) networking and longitudinal mentorship connections contributing to a sense of surgical community, and 5) eagerness to share resources with colleagues at their home institutions.

Conclusions: LEAGUES program participants acquired tools and motivation to pursue careers in surgery, and established valuable longitudinal network and mentor relationships. LEAGUES is a novel model for national surgical pipeline programs.

Keywords: Mentoring; Surgery; Underrepresented Minority; Women; Diversity

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Introduction

Women and underrepresented minorities (URM) are poorly represented in surgical specialties, with disparities increased at each stage of training and career development.¹⁻³ Contributing factors include systemic racism, biased metrics of evaluation, stereotypical surgical culture, and limited access to mentorship.³⁻⁵ Provider diversity is critical for patient care, surgical access, and surgical education.^{6,7} There is great need for creative and intentional approaches to improving the URM surgical training pipeline.^{3,8,9} We describe a novel pipeline program for trainees who are passionate about increasing URM representation in academic surgery.

Program Overview

The Leadership Exposure for the Advancement of Gender and Underrepresented Minority Equity in Surgery (LEAGUES) fellowship is a national surgical pipeline program piloted at a large academic institution. Conducted virtually due to COVID-19, LEAGUES provided exposure, mentorship, and community for preclinical students interested in surgery who have demonstrated passion for increasing diversity, health equity, and social activism. Lectures on career development, advocacy, networking opportunities, and virtual skills sessions supplemented a mentored surgical research experience. Participants received a stipend to offset opportunity costs.

Recruitment

A call for applications was distributed via social media and national URM societies. Seventeen applications were received and underwent a standardized evaluation and review process.

Essay prompts assessed commitment to health equity, belief in the importance of diversity on teams and increasing representation, and interest in surgery and research. Three fellowship positions were available for the pilot of LEAGUES due to limitations in funding.

Seminars and Workshops

Daily videoconference seminars featured faculty, residents, and senior medical students covering leadership, advocacy, academic development, application strategies, research, and career paths in surgery (**Figure 1**). Participation consisted of LEAGUES fellows and program leadership to facilitate socialization between attendees and speakers. Primary lecture components were recorded and distributed through the host surgery department's YouTube channel and shared on social media.

Academic Productivity

Interest-matched faculty research mentors were recruited for each fellow. Fellows worked with their faculty mentor to review literature, brainstorm ideas, define a research question, and meet at least weekly. Additional research support and coaching occurred during videoconference seminars and workshops. Fellows greatly benefited from peer mentoring by host institution senior medical students. A goal was set for fellows to produce research abstracts and works-in-progress presentations upon culmination of the program.

Skills

Fellows received surgical suturing and knot tying materials, with one-on-one coaching and feedback through a virtual skills curriculum. Videoconferencing enabled a skills didactic paradigm similar to in-person skills teaching (**Figure 2**).

Community

Daily seminars included unstructured, informal interactions with faculty, residents, and senior medical students, facilitating immersion into academic surgical culture. Dedicated social interactions included “virtual social hours” featuring host URM student groups, surgical residents, and faculty. Research mentors invested in fellows personally and committed to meeting weekly to develop close relationships and build community within research teams.

Program Assessment and Impact

Semi-structured interviews of accepted fellows assessed baseline experience with mentorship, surgery, career interest, research, working with underserved populations, and perceived barriers to success in academic surgery. Post program interviews evaluated the impact of the LEAGUES fellowship. Interview guides were developed through focus groups with local URM students applying into surgery. The University of Michigan Institutional Review Board deemed this investigation exempt from regulation.

Host Institution Participation

Throughout the program, over 30 local faculty, residents, and senior medical students taught and mentored fellows and participated in academic productivity. The host institution benefitted

from early recruitment investment in students interested in improving the URM surgical training pipeline and surgical disparities.

Participants

LEAGUES fellows' were from institutions across the United States and territories. All 3 identified as Latinx, two as first-generation college students. Each selected fellow's application described an interest in surgery, working with URM populations to improve health equity, and improving URM representation within academic medicine. Semi-structured interviews revealed fellows had little to no previous surgical mentorship, research exposure, or connections with surgical academic communities. Two fellows came from institutions without surgery departments. Fellows described negative stereotypes of surgical culture, potential for burnout, lack of confidence in research skills, and insufficient networking and mentorship as significant barriers to careers in academic surgery (**Table 1**).

All fellows gave final research presentations to the host surgical department's research seminar, two fellows submitted abstracts to national conferences, and all continued longitudinal research and mentorship with their research faculty. Research interests led to projects related to health equity in surgery for all fellows. In post-program interviews, fellows described a new positive perspective on academic surgical culture, increased interest and confidence in research, renewed hope for improving health disparities within surgical careers, a greater surgical network and sense of community, confidence with acquiring surgical skills, and excitement to share resources and expertise with peers. Fellows expressed high satisfaction with the program, and advocated for in-person formatting in future iterations of the program.

Discussion

LEAGUES fellows completing this 4-week virtual pilot program described improved perceptions of academic surgical culture, increased research interest and a greater sense of surgical community through networking and mentorship relationships. Planned longitudinal research with mentors, and a desire to share their experience to build surgical community at home institutions highlights the potential for lasting impact.

Pipeline programs for students in surgery have been described previously.¹⁰ Focusing on students with demonstrated interest in equity (a surrogate of potential for pursuing diversity, equity, and inclusion [DEI] work in the future) is unique. Mentored introduction to academic surgery, combined with research and advocacy education, provided a rich experience for participants and facilitators alike. Virtual formatting allowed for broader impact with an online medical community. Twitter was the program's main social media platform and disseminated free access to recorded lecture series. The published playlist of lecture videos has over five-hundred views at manuscript submission.

This pilot program faces several challenges for sustainability. Virtual versus in-person programming each has benefits and limitations. While remote programming allows for lower operational costs and increased fellow positions, it limits what research projects are feasible, the ability for fellows to engage with in-person activities (clinic, operating room), and may limit a sense of community. Although operational costs of the virtual experience were minimal, opportunity cost for fellows is high. Underserved medical students face many financial challenges. The "last summer" of medical school between M1 and M2 has no financial aid, and students often

supplement income with temporary employment. Given the time investment required to participate in LEAGUES, continued funding for a stipend is critical. Timing the fellowship early in medical training is necessary to foster interest in surgery prior to students developing other clinical interests, while visiting sub-internships exists for students pursuing surgery.

Conclusion

Novel mechanisms increasing women and URM representation within academic surgery are critical for improving patient care, access to surgery, and surgical education. The LEAGUES fellowship approach utilizes intentional mentorship, research, and community building amongst learners with high potential for addressing these issues as trainees and future academic surgeons. By investing in change agents with passion for improving health disparities and diversity in surgery, we aim to support a generation of learners with a strong interest in surgery as a specialty and DEI as a social mission. Building off initial success, LEAGUES alumni will continue with longitudinal-structured mentorship to develop a national network of support. The LEAGUES program has been approved for a second installment in 2021.

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References

1. Richter KP, Clark L, Wick JA, et al. Women Physicians and Promotion in Academic Medicine. *N Engl J Med*. 2020;383(22):2148-2157. doi:10.1056/NEJMsa1916935
2. Bingmer K, Ofshteyn A, Bliggenstorfer JT, Steinhagen E, Stein SL. Where is the leak in the surgeon pipeline? *Am J Surg*. Published online July 1, 2020.
doi:10.1016/j.amjsurg.2020.06.048
3. Ulloa JG, Viramontes O, Ryan G, Wells K, Maggard-Gibbons M, Moreno G. Perceptual and Structural Facilitators and Barriers to Becoming a Surgeon: A Qualitative Study of African American and Latino Surgeons. *Acad Med J Assoc Am Med Coll*. 2018;93(9):1326-1334.
doi:10.1097/ACM.0000000000002282
4. Evans MK, Rosenbaum L, Malina D, Morrissey S, Rubin EJ. Diagnosing and Treating Systemic Racism. *N Engl J Med*. 2020;383(3):274-276. doi:10.1056/NEJMe2021693
5. Nwora C, Allred DB, Verduzco-Gutierrez M. Mitigating Bias in Virtual Interviews for Applicants Who are Underrepresented in Medicine [published online ahead of print, 2020 Aug 4]. *J Natl Med Assoc*. 2020;S0027-9684(20)30151-6. doi:10.1016/j.jnma.2020.07.011
6. Reede JY. A recurring theme: the need for minority physicians. *Health Aff Proj Hope*. 2003;22(4):91-93. doi:10.1377/hlthaff.22.4.91
7. Komaromy M, Grumbach K, Drake M, et al. The role of black and Hispanic physicians in providing health care for underserved populations. *N Engl J Med*. 1996;334(20):1305-1310.
doi:10.1056/NEJM199605163342006

8. Keshinro A, Frangos S, Berman R, et al. Underrepresented Minorities in Surgical Residencies: Where are They? A Call to Action to Increase the Pipeline. *Ann Surg.* 2020;272(3):512-520. doi:10.1097/SLA.0000000000004209
9. West MA, Hwang S, Maier RV, et al. Ensuring Equity, Diversity, and Inclusion in Academic Surgery: An American Surgical Association White Paper. *Ann Surg.* 2018;268(3):403-407. doi:10.1097/SLA.0000000000002937
10. Mason BS, Ross W, Chambers MC, Grant R, Parks M. Pipeline program recruits and retains women and underrepresented minorities in procedure based specialties: A brief report. *Am J Surg.* 2017;213(4):662-665. doi:10.1016/j.amjsurg.2016.11.022

Figure 1. LEAGUES 2020 lecture schedule

2020 Lecture Schedule:

- **7/6/20:** How to Be Productive: Transforming Your Interests Into Impact with [Dr. Ryan Howard](#)
- **7/7/20:** Posters and Presentations with Jessica Santos-Parker
- **7/8/20:** Meet the Specialist with [Dr. Seth Waits](#) (Transplant Surgery)
- **7/9/20:** Basic and Translational Research 101 with [Dr. Brooke Bredbeck](#)
- **7/14/20:** Peer Mentorship/Leading at Every Stage with the LEAGUES Team
- **7/16/20:** Why Academic Surgery with [Dr. Justin Dimick](#)
- **7/16/20:** Meet the Specialist with [Dr. Christina Angeles](#) (Surgical Oncology)
- **7/20/20:** How to Write a Paper in 10 steps/Visual Abstracts with [Dr. Andrew Ibrahim](#)
- **7/21/20:** Global Surgery Partnerships - Rwanda with [Dr. John Scott](#)
- **7/23/20:** Trainee Level Advocacy & Policy with Maria Santos
- **7/27/20:** Global Surgery Partnerships - Ghana with [Dr. Gifty Kwakye](#)
- **7/28/20:** Using Social Media for Professional Networking with [Dr. Valeria Valbuena](#)
- **7/29/20:** Meet the Specialist with [Dr. Brian George](#) (Trauma Critical Care)

Recorded LEAGUES lectures available online at YouTube: LEAGUES Lecture Series

Figure 2. LEAGUES leadership teaching surgical skills virtually



Table 1. LEAGUES fellows' representative quotes on impact of the program

<p>'I got what I wanted and more – networking, knowing other specialties that I maybe hadn't thought of before, learning about how to do a proper presentation, having [LEAGUES leadership] as future mentors, having a connection with [host institution], getting to know the faculty and residents, hearing a lot of different stories of how people got there, knowledge through lectures, and skills. It's really an overall approach which is very useful' – ID2</p>
<p>'Going through the process of writing the proposal, doing the literature review, the data collection, making the abstract and presenting. So, I feel like I know a little bit of almost every step of the [research] process of creating a presentation, creating an abstract for publication. Now I have more confidence, and I can approach someone in the future and actually tell them the specific skills I can do. So, I feel like my toolbox has definitely got more diverse' – ID3</p>
<p>'Having total ownership over the study from start to end and having someone kind of guide you through what you want to do in the research has been really valuable. I think that it's really made me see myself more as a researcher than other experiences I've had in the past' – ID1</p>
<p>'I didn't realize how many people do health services and disparities research [in surgery]. It was really helpful to have a lot of those presentations showing me that there's so many different ways to do research and ways to get engaged. And you should do what you care about and not so much what you think you need to do' – ID 1</p>
<p>'I feel super lucky to have the [LEAGUES] mentors and [research mentors], who are just so excited to be my mentor and help in any way that they can. It makes me really want to do the same for others' – ID1</p>
<p>'I realized the importance of culture. And I think maybe before I wasn't that excited about the idea of doing academic surgery, but in a place like [this institution], I certainly would be having seen and interacted with everyone that I've interacted with this past month. So collaborative, so energetic, they really care about their students, residents, fellows and people are so happy to talk to you and I think it's such a unique experience that is, unique and special to [the institution]. That's been really impactful and will certainly drive the quality and the types of things I look for in programs and when it comes time applying to residency' – ID1</p>
<p>'I think that was one of the biggest positives is I got to meet [the other LEAGUES fellows] who are from other parts of the world. I got to meet everyone from [the institution], the LEAGUES team, and my [research mentor], who has been super beneficial. I would definitely say I have a sense of community at the end of this program' – ID3</p>