

CONNECTING PIPELINES TO PATHWAYS FOR HEALTH EQUITY

Immersive Research Experiences Aimed at Promoting Diversity and Visibility in the Pharmacy Education Pipeline

UNIVERSITY OF NORTH CAROLINA ESHELMAN SCHOOL OF PHARMACY

KEY POINTS

- ✓ The Young Innovators Program (YIP) is an eight-week, non-residential, paid summer internship that immerses high school students in cutting-edge research in science, technology, engineering, and mathematics (STEM) disciplines related to the pharmaceutical sciences.
- ✓ The program promotes STEM interest, awareness, and self-efficacy by engaging students in a hands-on immersive experience based in a research laboratory or team.
- ✓ Interns are selected by a committee that first reviews a written application and then selects 30 for interviews.
- ✓ YIP interns work directly under the mentorship of faculty members and graduate students who challenge them to become valuable contributors on research teams.
- ✓ It is critical to ensure that pipeline programs are aligned with institutional priorities and have the support of key stakeholders.
- ✓ Institutional policies and guidelines will influence how a pipeline program is designed and implemented.
- ✓ The recruitment and selection process is central to the success of any pipeline program.

ISSUES AND CHALLENGE

Prospective students who identify as racial and ethnic minorities are exposed to various career paths, affording them opportunities to gain skills through real-life experiences and informing their career decisions, regardless of the profession they choose. Pipeline programs can also increase the rates of students pursuing higher education and STEM disciplines.

THE UNIVERSITY OF NORTH CAROLINA ESHELMAN SCHOOL OF PHARMACY APPROACH

The Young Innovators Program (YIP) emphasizes healthcare practice through research-intensive immersive experiences that strategically target underrepresented high school students and serves as a



promising avenue to meet some of the unmet diversification and public outreach needs for schools of pharmacy.

Efforts often fall short of meeting the longstanding ideal of developing a workforce that reflects the diversity of the populations it serves; health professions schools must accordingly be strategic in their efforts to attract and prepare students. Pipeline programs play a key role in exposing prospective students identifying as racial and ethnic minorities to various career paths, affording them opportunities to gain skills through real-life experiences, and informing their career decisions, regardless of the profession they choose. They can also increase the rates of students pursuing higher education and STEM disciplines.

Launched in 2016, the Young Innovators Program (YIP) aims to:

- promote STEM interest, awareness, and self-efficacy by engaging students in a hands-on immersive experience based in a research laboratory or team;
- identify strategies that can be used to immerse secondary students in STEM-based research in the pharmaceutical sciences and pharmacy practice; and
- demonstrate that schools of pharmacy can provide meaningful experiences to STEM secondary student recruitment during brief, experiential-based programming.

How the Program Works

YIP participants (also called “interns”) are recruited from North Carolina high schools. Science faculty and career counselors are contacted to advertise the program and host webinars to share information about YIP. Interns are selected by a committee that first reviews a written application and then selects 30 for interviews.

YIP interns work directly under the mentorship of faculty members and graduate students who challenge them to become valuable contributors on research teams. Interns spend most of their time in laboratories across the school, learning and developing experimental skills and research methods. They also participate in career panel discussions, tour biotechnology companies and medical center facilities, and engage with the

undergraduate admissions office at the university.

All interns are asked to complete a pre-survey at the start of the program and a post-survey after the program. The survey contains items from surveys on STEM interest, self-efficacy, and career awareness. Survey participation is voluntary, consent is obtained, and no incentives are provided.

Lessons Learned to Successfully Develop a Pipeline Program

Implementing an immersive research program like YIP for high school students is not without substantial challenges: first, there must be faculty commitment and buy-in of the program goal; second, institutional investments are required; third, school leadership must support the initiative through both the allocation of resources and a steadfast emphasis on equity, diversity, and inclusion; fourth, stipends might be needed to support program participants.

Program personnel should be equipped with tools to engage in conversations about the current and historical challenges faced by minoritized and underserved groups; program leadership should recognize that there can be palpable sociopolitical tensions prevalent across the campus and/or in communities that may lead to contentious conversations about equity, diversity, and inclusion.

The purpose, recruitment process, selection criteria, and curriculum should be aligned with one another and with the mission of the program. When encompassing equity, diversity, and inclusion as a core mission, sustained success in recruiting and admitting racially diverse participants will require intentional focus on diversity. Pharmacy educators and leadership should be prepared, considering this challenge, to highlight the alignment and benefits of the program for the institution, school/college, profession, and most importantly, the STEM and healthcare community.

Program personnel should also consider strategically targeting, engaging, and forming partnerships with select high schools and key stakeholders who serve, advocate for, and understand the experiences of diverse students.

Positive Program Outcomes

The YIP program has successfully engaged ~100 interns in the breadth of research that occurs in a modern school of pharmacy. The YIP program has successfully developed career exploration activities and wet lab skills bootcamp for the interns.

The YIP applicant pool has increased ~10-fold, with students applying from across the state, U.S., and even outside the country. This underscores the importance of immersive research experience programs as a tool for raising public awareness about schools of pharmacy.

CHALLENGES IN IMPLEMENTING PROGRAM

Challenges include placing YIP interns in laboratories and maintaining connection with YIP interns after the program. YIP mentors and YIP interns are invited to maintain a connection around the research project, but this has resulted in only a modest level of longitudinal engagement.

Another challenge is increasing the diversity of the interns. Initially, the way intern payments were disbursed appeared to preclude an intentional effort to use diversity as a criterion for acceptance into the program. The admissions process in 2021 was changed, and this did seem to help. The goal is to have a more diverse YIP cohort and to have a greater impact on overcoming the issues with underrepresentation in STEM careers.

RESULTS/OUTCOMES

- To date, approximately 100 students have completed the program.
- Recent evaluations and surveys results: YIP participants were challenged intellectually (100 percent agreed) and highly valued what they learned (96 percent agreed). More specifically, underrepresented minority (URM) participants indicated that their experience in YIP improved their knowledge in STEM (100 percent) and positively influenced their desire to pursue a STEM career (89 percent).
- Students' comments included: "My main goal is trying to find out exactly what I want to do, and I think that coming here I've learned so much about careers, and the options that are available," and "I loved the tours and the discussion panels, as we got to explore the career options in pharmacy."
- All participants indicated that they would recommend a friend or family member to participate in YIP (100 percent agreed).
- Many interns, having been introduced to the pharmacy and pharmaceutical sciences professions for the first time during YIP, have gone on to pursue pharmacy-related disciplines, including pre-pharmacy tracks at UNC.
- Many interns have gone on to be co-authors on publications stemming from their work during the program. This underscores the impact and contributions made by the interns.

RELEVANT MATERIALS

Website: <https://unceii.org/programs/young-innovators-program/>

Manuscript: <https://www.ajpe.org/content/ajpe/84/3/ajpe7589.full.pdf>

Manuscript: <https://stemeducationjournal.springeropen.com/articles/10.1186/s40594-017-0081-4>

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The AAHC Case Studies in *Connecting Pipelines to Pathways for Health Equity* are an initiative of the AAHC Chief Academic Officers executive leadership group in partnership with the AAHC Sullivan Alliance.