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Fostering Diversity in Healthcare: The UDOC Summer Enrichment Experience

Celeste Coler

University of Washington School of Medicine, USA

A. J. Balatico

University of Washington College of Education, USA

Jasmine Gault

Baylor College of Medicine Department of Emergency Medicine, USA

Nicole Hinds

*Keck School of Medicine of the University of Southern California
Department of Psychiatry, USA*

Nora Coronado

University of Washington School of Medicine, USA

Estell Williams

University of Washington Department of Surgery, USA

ABSTRACT

A more diverse healthcare workforce is critical to improving the quality of care offered to diverse populations. Residential enrichment programs represent a promising strategy for diversifying the healthcare workforce. UDOC is a 6-week residential summer enrichment program hosted by the University of Washington that aims to nurture underrepresented high school students' interest in healthcare professions by exposing them to various health-related topics and skills. Through interviews with fourteen

program alumni, this study explores the impact of UDOC on students' personal and professional growth, as well as their subsequent academic and career choices. Reporting the long-term outcomes of UDOC alumni provides valuable insights that underscore the importance of such programs in fostering diversity within health professions.

Keywords: high school, medical school, pre-medical education, summer program, underrepresented in medicine (UIM).

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INTRODUCTION

Currently, the nation's health-professions workforce does not nearly reflect the diversity of the general population (Lett et al., 2019). Despite the growing body of research showing that greater diversity among healthcare professionals is linked to improved delivery of culturally competent care (Jetty et al., 2022; Ma et al., 2019; Traylor et al., 2010), students who identify as Black, Indigenous, and people of color (BIPOC), first-generation college students, and students from low-income backgrounds remain grossly underrepresented in the healthcare workforce (Lett et al., 2019). Several studies point to factors such as institutional racism, lack of race-concordant mentors, inadequate or biased career advising, high educational costs, and limited access to necessary coursework as contributing to these disparities (Sandino & Rowe, 2014; Joseph et al., 2021; Rao & Flores, 2007; Barr et al., 2008).

Enrichment programs represent an established strategy for diversifying the healthcare workforce (Merolla et al., 2013; Sellami et al., 2021). These programs provide early exposure to a collegiate environment through on-campus residential experiences, along with academic enrichment in science, mathematics, and healthcare careers, to encourage students' interest and support their personal and professional development. Additionally, such programs can inspire personal identity formation by encouraging near-peer relationships, creativity, critical thinking, and leadership skills, empowering students to pursue their goals and succeed in whichever field they choose (Kohut et al., 2023; Marriott et al., 2022; Merolla et al., 2013; Prince et al., 2023; Shortlidge et al., 2024). Enrichment programs can be particularly valuable for students who are underrepresented in the healthcare workforce, as they can bridge gaps in resources, provide valuable networking opportunities, and improve self-efficacy (Coler et al., 2025).

The University of Washington hosts numerous outreach programs that aim to increase diversity in healthcare, including Doctor for a Day, the Summer Health Professions Education Program, and UDOC. This study focuses specifically on UDOC, a 6-week summer residential program for high school students that took place at the University of Washington from 1994 to 2012. The primary purpose of this study is to explore the immediate and long-term impact of UDOC on participants' personal, academic, and professional development using interviews with fourteen UDOC alumni. These interviews provide an opportunity to explore how enrichment programs, specifically residential enrichment programs, may influence participants' interest and readiness to pursue careers in healthcare, as well as their ultimate matriculation into healthcare careers. Examining the long-term outcomes of UDOC alumni provides valuable insight into the effectiveness of enrichment programs in promoting diversity within health professions.

LITERATURE REVIEW

A review of physician pipeline and pathway programs by Parsons et al. demonstrates the broad variation among enrichment programs nationwide; enrichment programs differ in the age of their participants, instructional methods (problem-based learning, role-playing, hands-on didactics, etc.), the skills they aim to develop, and their time commitment. For example, some programs offer short-term workshops (e.g., mock interviews, application workshops, financial literacy seminars, sample lectures), while others require longitudinal engagement (e.g., standardized test preparation, residential summer programs) (Parsons et al., 2022).

Previous studies have shown that enrichment programs improve grade point averages, academic and research knowledge, self-efficacy, and interest in healthcare careers (Parsons et al., 2022; Bradford et al., 2021; Hill et al., 2021; Fritz et al., 2016; Patel et al., 2015). However, very few of these studies have reported their impact on participants' long-term personal and professional development, such as the number of participants who eventually enroll in healthcare-related graduate programs or enter healthcare careers (Kitchen et al., 2018). This lack of longitudinal data represents a significant gap in our understanding of the effectiveness of enrichment programs on the diversity of the healthcare workforce.

RESEARCH METHOD

Program description

The UDOC High School Summer Program was established at the University of Washington in 1994 under funding received from the Health

Careers Opportunity Program. The goal of the program was to foster, affirm, and encourage high school students' interest in healthcare professions by introducing students to various topics and skills related to health careers.

UDOC participants included students finishing their junior and senior year of high school who came from backgrounds underrepresented in healthcare careers (i.e. low socioeconomic status, rural regions, racial/ethnic minorities, LGBTQIA+). Applications were distributed to every private and public high school in Washington, as well as multiple schools in Alaska and Idaho. Application requirements included a personal statement, official transcripts, and two letters of recommendation. Once admitted, students chose whether to participate in the six-week program on the University of Washington Seattle Campus or the University of Alaska Anchorage Campus. Each student received a \$1,600 stipend for travel expenses and on-campus costs they accrued throughout their participation in the program.

The UDOC curriculum was guided by five primary goals: 1) To provide information that would assist students in their transition between high school and college, 2) To make students aware of the different healthcare issues present in various communities, particularly communities of color, 3) To increase students' awareness of the career opportunities in medicine and allied health, 4) To provide an academic introduction and overview of the curriculum for pre-med students, and 5) To provide students exposure to the medical school environment (Table 1). To address these five primary goals, students took lessons in chemistry, anatomy, and mathematics and attended workshops related to research, financial aid, graduate program prerequisites, study skills, and stress management. Additionally, students shadowed providers in multiple healthcare settings. Importantly, UDOC students were taught by and received mentoring from medical students, residents, and physicians who shared similar identities to them.

Participants

Between 1994 and 2012, UDOC had a total of 901 participants. Of the total participants, 244 were identified using medical school matriculation data provided by the Association of American Medical Colleges, Google searches, and previous program staff who maintained communication with former participants. Of the 244 participants tracked, 108 (44%) went into clinical allied health professions (e.g. Doctor of Medicine/ Doctor of Osteopathic Medicine, Nursing, Doctor of Nursing Practice, etc.).

Table 1*A Summary of the Primary Goals of UDOC and the UDOC Curriculum*

Primary Goals	Curricular Examples
To provide information that will assist students in the transition between high school and college	<ul style="list-style-type: none">• Tour of the University of Washington campus including programs, facilities, services, and available courses• College application personal statement workshop• Resume workshop• Financial aid and financial management workshop• Study skills and test-taking workshop• Stress management workshop
To make students aware of the different health care issues present in various communities, particularly communities of color	<ul style="list-style-type: none">• Field trips to the Mt Vernon Migrant Clinic and multiple urban community clinics• Medical literature comprehension workshop• Multiple guest speaker presentations on cross-cultural and ethical issues in medicine
To increase students' awareness of the career opportunities in medicine and allied health	<ul style="list-style-type: none">• Shadowing of various health care professions• Surgery observation• Tour of the University of Washington Husky team training facilities• Guest speaker presentation on planning for a healthcare career
To provide an academic introduction and overview of the curriculum for pre-med students	<ul style="list-style-type: none">• Lectures on concepts in biology, chemistry, physics, anatomy, and research methodology.
To provide students exposure to the medical school environment	<ul style="list-style-type: none">• Tour of the health science campus• Lecture on medical terminology• Workshop on professional conduct

Note. These five primary goals have been the same since UDOC's inception, but curricular examples and opportunities may vary based on student feedback.

Among those who did not pursue a career in healthcare, 45 (18%) went on to pursue additional degrees in other fields including 31 who pursued master's degrees, 11 who pursued a Doctor of Philosophy (Ph.D.), and 3 who obtained a Juris Doctor (J.D).

Table 2
Demographic Information of UDOC Alumni Who Participated in Standardized Interviews

Identifier	Race & Ethnicity	Gender	Career	UDOC Summer
P1	Black/African American	Male	Physician	1994
P2	Black/African American	Female	Physician	1997
P3	Native American	Female	Physician	1997
P4	Black/African American	Female	Physician	1999
P5	Latinx/Hispanic	Female	Higher Education Administration	1999
P6	Black/African American	Female	Entrepreneur	2005
P7	Black/African American	Male	Physician	2005
P8	Latinx/Hispanic	Male	Public Health	2005
P9	Black/African American	Female	Public Health	2005
P10	Latinx/Hispanic	Male	Physician	2006
P11	Latinx/Hispanic	Male	Dentist	2006
P12	Latinx/Hispanic	Female	Public Health	2007
P13	Latinx/Hispanic	Female	Public Health	2009
P14	Native American	Female	Molecular Biologist	2010

Note. Participant identifiers were ordered based on the year they participated in UDOC, then by their real names.

In the summer of 2020, researchers conducted hour-long semi-structured interviews over Zoom with 14 alumni of the UDOC program (Table 2). Using purposeful maximum variation sampling, the research team recruited alumni from a range of UDOC cohorts who differ in their personal and professional backgrounds. Of the 14 interviewed, nine participants were female and five were male. Additionally, six identified as Black/African American, six as Latinx/Hispanic, and two as Native

American. Lastly, seven of the participants pursued a professional doctorate in medicine or dentistry.

Interviews and analysis

A standardized interview protocol (see Appendix 1) comprised of ten questions elicited vivid accounts of the participants' experiences in UDOC and its influence on their careers. Interviews with participants lasted between 45 minutes to an hour, and video recordings were machine transcribed into transcripts that were 30 to 40 pages. The research team summarized these interviews into memos, coding for themes based on the interview protocol. These summaries were analyzed through a priori themes based on the interview protocol, such as key program takeaways and improvement opportunities (Pope et al, 2000). Since participants were from different cohorts, emerging themes independently arose, and the research team determined that this sample reached thematic saturation for responses to the interview protocol.

Research team positionality

We include this positionality statement to not only describe the research team's background and proximity to the participants of this study, but to provide framing for our interpretations and recommendations (Boveda and Annamma, 2023). The research team includes a doctoral student in education, a current medical student, a program director and executive director of the Center of Workforce Inclusion and Healthcare System Equity at the University of Washington School of Medicine, and a surgeon at the University of Washington. They are from backgrounds considered by the American Association of Medical Colleges to be underrepresented in medicine (Clay et al., 2021). All members of the research team are committed to improving representation in medicine and allied health careers, as demonstrated by their involvement in UDOC, Doctor for a Day, and the Summer Health Professions Education Program, and their leadership within the Center for Workforce Inclusion and Healthcare Systems Equity at the University of Washington. Our analysis recognizes the intersectional identities of participants, honoring their experiences, successes, and struggles as they navigated higher education and healthcare systems.

RESULTS

Themes that emerged from the analysis of transcripts included the 1) Development of academic knowledge and skills, 2) Professional development, mentorship, and networking, and 3) Preparation for the

transition to college. Reflections from UDOC alumni also provided insight into opportunities for program improvement.

Development of academic knowledge and skills

UDOC coursework included biology, chemistry, physics, and pre-calculus. Additionally, topics including health equity and bioethics were explored through workshops and lectures from guest speakers. For most participants, these courses helped them calibrate the level of difficulty for upcoming science, technology, engineering, and mathematics (STEM) classes. Many participants noted that the primary benefit of the UDOC coursework was an improvement in their confidence as students; P4, P5, P10, and P13 described approaching advanced science courses in high school with more confidence after UDOC. One student appreciated the workshops that focused on study skills and test taking: “What I appreciated most was that they taught you how to study for classes” (P5).

Students attended workshops hosted by physicians about health equity and innovation in medicine, which were new topics for most participants:

We talked to doctors who were doing a lot of telemedicine to try and reach underserved communities, which was also pretty cool. And I didn't even know that that was something that existed at the time. So, I enjoyed learning about that (P14).

Interacting with physicians through these workshops, in addition to shadowing them in the clinical setting, provided participants with exposure to a variety of medical careers. This was particularly poignant for P4 and P5, who had limited exposure to careers in medicine as first-generation students.

Participants who didn't ultimately pursue a healthcare career expressed that they still benefited from the STEM-oriented curriculum. One participant mentioned that her first exposure to ethics was through a UDOC workshop, and that she ultimately pursued a graduate degree in ethics. Another student who ultimately became a molecular biologist said, “Even though I didn't become a physician, I think it very much still reinforced the idea that I was interested in learning about human biology and that I wanted to do like something that contributed to human health” (P14). For these students, the UDOC coursework and workshops still enhanced their academic knowledge and skills, prepared them for future STEM coursework, and fostered greater confidence in their abilities to explore various fields within STEM and beyond.

Mentorship and community

UDOC offered valuable mentorship to participants through shadowing opportunities and meaningful one-on-one interactions with physicians and medical student volunteers. For many, this was their first experience in a mentor-mentee relationship, and several participants highlighted that it was the first time they had a mentor who shared their racial, ethnic, or socioeconomic background:

But for the first-generation college students, the students that don't have mentors like that in their daily lives, that's particularly poignant for those students to say, 'I know someone that did that', and therefore I can see myself being able to achieve those goals as well (P5).

P5, P6, P8, P10, and P11 all spoke about the profound impact of working with medical students and physicians they could relate to. P11 said that he also felt that the mentors were particularly invested in participants' success since they had overcome similar barriers.

P2 expressed a similar view on the mentorship she received during UDOC, noting that the guidance she received not only helped her grow as a mentee but also inspired her to seek out opportunities to mentor others in the future. P14, on the other hand, had a different experience. During her interview, P14 remembered being paired with a physician during UDOC whose teaching style was not aligned with her learning style and how that affected her interest in the material. P14's experience underscores the importance of aligning mentorship with a student's unique learning style and interests for the most effective guidance.

Many of the participants spoke about the long-term impacts of the mentorship they received. Some participants shared how they maintained connections with specific mentors from UDOC for many years after they completed the program. P4 said that she received a letter of recommendation from one of the physicians in the UDOC program that was influential in her getting selected for the Meyerhoff Scholar Program. P10 said that the mentorship he received during UDOC inspired him to look for mentors within his high school after he completed the program.

In addition to mentorship, many participants commented on the sense of community that was cultivated among their peers during UDOC. P1, P3, P10, and P13 said that UDOC was the first time in their lives that they were surrounded by peers who had experienced similar adversities and shared similar goals, which made them feel less isolated:

I saw people who grew up like me, who also worked in the fields, whose parents also immigrated from Mexico, who crossed the

border, got lost in the desert, and were found by immigration and got sent back and like, I could relate to them, they could relate to me and we had these goals together (P10).

P8, P11, and P14 shared that UDOC also exposed them to people from backgrounds and cultures that they were unfamiliar with. P11 shared that UDOC created a safe environment for him to teach others about his Mexican American heritage and also learn about other students' backgrounds.

Preparation for the transition to college

Many participants felt that UDOC prepared them for the transition to college by exposing them to more challenging coursework, allowing them to live in dormitories on the University campus, and participating in campus tours. In their interviews, P7, P9, P10, P14 all said that UDOC allowed them to better understand what college would be like, how they could best prepare for college, and what challenges they may face when transitioning to college. P5 said that this exposure to college life was particularly impactful for her as a first-generation student:

And I think for me, it showed me that I have the ability to be successful in an undergraduate environment. It came at the right kind of timing for me to build the confidence that I needed to be successful in an undergraduate program (P5).

Several participants mentioned that attending UDOC influenced their college application choices. Before UDOC, they didn't believe they were well-suited for large universities and did not intend to apply to the University of Washington. However, after attending UDOC, many of them decided to apply to several large universities, including the University of Washington.

Additionally, when applying for college, all participants mentioned their UDOC experiences in college application essays, and some included it in their graduate school application essays to demonstrate their continued interest in healthcare. For many students, UDOC also gave students a better understanding of what was required for different healthcare careers. P2 said that UDOC clarified which college courses she would need to take to apply for medical school, which standardized exams were required for different programs, and how to build a competitive graduate school application.

Recommendations

The interviews with participants provided many recommendations for enrichment programs based on the strengths and weaknesses of the UDOC program relating to recruitment, community building, accessibility, longitudinal follow-up, and ecosystem development.

Longitudinal follow-up and ecosystem development

Many participants said that the network they created during UDOC ended shortly after completing the program. P5 emphasized that enrichment programs, such as UDOC, often fail to provide longitudinal support:

We have to help build the bridge towards their undergraduate education and help them build the bridge within their undergraduate education and continue to feed that through to have it truly be a pipeline program and not a cliff that students are looking across saying I don't know how to get from where I'm at to the next phase space (P5).

Many programs are designed to address the “leaky pipeline” into medical education (Barr et al., 2008; Freeman et al., 2016), but these programs are often offered in isolation of each other. While it is a considerable institutional investment to provide long-term programs for a cohort of students, especially when programs face financial and capacity constraints, connecting programs at a campus and affiliated institutions offers students consistent support, learning, and mentorship.

Accessibility

Accessibility is an important consideration for enrichment programs, which predominantly serve individuals with multiple social and economic barriers. This is particularly important for residential enrichment programs that may be inaccessible to many students due to transportation and housing costs. P13 described UDOC as accessible and said that she felt financially well-supported by the program’s stipend. She also expressed that her parents would not have been able to financially support alternative summer opportunities. This is an important consideration when allocating funding for enrichment programs.

Recruitment

Most participants learned about UDOC through their teachers, librarians, and academic or career counselors at schools or community centers. In other words, they did not discover the program through independent online searches. As a result, recruitment was limited to

students who met regularly with their counselors and whose guidance counselors were familiar with the program. Additionally, most participants also reported having no guidance in creating their application, and for many students, it was the first time they were writing a personal statement.

Recommendations to improve the recruitment process include expanding program outreach beyond educators and counselors. This expanded outreach may include utilizing digital advertising, alumni networks, social media, and collaborations with community organizations to reach a wider audience. The information shared about the program may also include resources on writing a personal statement and opportunities to have personal statement drafts revised by a peer or mentor.

Community building

While the UDOC curriculum was structured to maximize time in the classroom and clinical setting, multiple participants, particularly P7, said that they learned a lot from their peers and mentors outside of the classroom while doing community service and attending social events in the residence halls. Enrichment programs should include opportunities for participants to socialize and learn in informal settings, as these interactions can foster a sense of community, belonging, and collaboration among students. Informal settings, such as social events, study groups, or team-building activities, allow participants to build relationships with peers and mentors outside of structured academic environments. This not only strengthens their network but also creates a supportive atmosphere where students can share experiences, exchange ideas, and develop interpersonal skills.

DISCUSSION AND CONCLUSIONS

Students from low-income, first-generation households and those who identify as underrepresented in medicine can benefit from support while pursuing medicine and other healthcare fields. Summer-long residential outreach programs, like UDOC, are conducted at a time in adolescence when students' career aspirations are still malleable (Kitchen et al., 2018). The guidance, encouragement, and structure offered to students who are not typically encouraged to pursue STEM fields can be life-changing, even if it leads to other professional careers outside of medicine.

The responses from UDOC alumni demonstrate that UDOC contributed significantly to the development of valuable academic knowledge and skills, provided meaningful mentorship opportunities, and prepared students academically and emotionally for the transition to college. In terms of academic knowledge and skills, alumni described

feeling more confident in their ability to tackle challenging STEM courses, better able to anticipate academic challenges, and develop lifelong study skills. For many participants, mentorship was a significant benefit of the program, as these mentors continued to mentor them after they completed the program, wrote letters of recommendation on their behalf, and provided guidance on how to become a mentor for others. This is particularly relevant as very few enrichment programs provide longitudinal mentorship after participants complete their programs (Parsons et al., 2022), and multiple studies have established that students with access to engaged mentors are more likely to persist in STEM programs and develop a stronger professional identity (Romney & Grosovsky, 2023; Atkins et al., 2020). Finally, the interviews demonstrated that the program helped to prepare some students for the transition to college, providing opportunities to live on a college campus and positively reinforcing the belief that the students could be successful in the college environment. These findings are consistent with the Comprehensive STEM Program, a 6-week residential pre-health enrichment program similar to UDOC. The Comprehensive STEM program found that students graduated from the program more prepared to approach challenging courses, with a better understanding of the pre-medical prerequisites, and new peer and mentor relationships that combated feelings of isolation (Lane, 2016).

In their interviews, participants provided recommendations and key considerations for UDOC and other enrichment programs, including additional longitudinal follow-up, wider outreach and recruitment efforts, and more unstructured social activities. Interestingly, these recommendations differ from the recommendations provided by participants of the Lang Youth Medical Program, a 6-year longitudinal enrichment program, which included additional recruitment of students interested in non-healthcare-related careers, additional time spent outdoors, and more relevant outreach efforts with messages targeted at younger students (Kohut et al., 2023). The variation in recommendations between programs may reflect differences in the enrichment programs' strengths and weaknesses.

Strengths and limitations

This study addresses a critical knowledge gap in the long-term outcomes of enrichment programming on personal and professional development and the influence of enrichment programming on the diversity of the healthcare workforce. The use of qualitative methods provides a nuanced exploration of the factors influencing participants' experiences, motivations, challenges, and perceptions. Still, a few limitations should be considered. First, the interview tool used was novel,

unvalidated, and was not designed to test any specific construct. As the questions have not been pre-tested or validated in prior research, their ability to capture key themes and elicit meaningful responses can vary, potentially impacting the reliability and validity of the findings. Second, the alumni who participated in the interviews completed the program several years ago, which may contribute to recall bias. Lastly, only 14 of the 901 UDOC participants were interviewed. Although the participants were diverse in terms of their backgrounds, program year, and professions, selection bias may be present and result in biased perspectives. Together, these limitations may limit the generalizability of the findings to the broader population of program alumni or the public.

Future Directions

UDOC restarted in 2022 and has been redesigned as a hybrid program with 3 weeks of synchronous online learning and 3 weeks of on-campus experience. The UDOC summer program has evolved since its initial implementation in terms of staffing, cohort size, program duration, and sequencing of the program's academic, research, and clinical experiences for students.

A primary concern about the sustainability of summer programs such as UDOC includes the capacity constraints caused by budget, especially for stipends and living expenses for participants, and the number of community partners available. With online learning made more widely available, programs may be redesigned to reach a wider geographic area, supplement on-campus activity, and overcome challenges caused by budgeting constraints.

Future research on UDOC programming may include surveys conducted at the beginning and end of UDOC participation that measure self-efficacy, interest in healthcare careers, or academic preparedness for future STEM courses. Collecting quantitative and qualitative data may provide a more comprehensive understanding of the immediate and long-term impacts of this program.

Conclusion and implications

This qualitative review of UDOC adds to the growing literature on the impact of enrichment programming on the personal and professional development of individuals underrepresented in healthcare careers and underscores how programs like UDOC can support the matriculation of diverse individuals into healthcare careers. By detailing UDOC's curriculum and structure, this study provides a sustainable, replicable model that other summer enrichment programs can follow. The reflections of alumni not only call attention to the programs' most influential elements but also offer actionable recommendations for

improvement. These findings can inform the development of similar initiatives, helping educators and program developers create more effective, equitable, and lasting enrichment experiences.

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Appendix 1

Interview Protocol Used with Program Alumni

1. What do you remember about the program?
2. Why did you apply to UDOC?
3. What was your career goal at the time?
4. What did you pursue after the program?
5. How has your identity changed since the program? How did this program affect your cultural identity development?
6. Was it helpful having other POC aiming for the same goals as you in the program? How did this influence you?
7. Did participating in U-DOC change the way you approached your STEM courses and did you notice a difference in your confidence or perceived ability?
 - a. Did this program change your confidence or ability to speak with instructors or faculty?
 - b. Did this program change your confidence or ability to navigate your time as an undergraduate?
8. Do you have any vividly memorable moments from your time in UDOC?
9. If you were to co-develop another UDOC program, what would you want to see? What would you change about the program you participated in?
10. Did you mention the program when you applied for college or medical school/grad school? How much do you attribute this program to where you are now?