



HHS Public Access

Author manuscript

Clin Transl Sci. Author manuscript; available in PMC 2016 April 01.

Published in final edited form as:

Clin Transl Sci. 2015 April ; 8(2): 87–90. doi:10.1111/cts.12258.

Increasing Diversity of the Biomedical Workforce Through Community Engagement: The University of Utah Native American Summer Research Internship

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Introduction

An engaged diverse biomedical workforce is essential for the health of a nation. Diversity fosters a more creative work environment and is associated with a more accomplished workforce and higher scientific impact. These attributes are particularly important in the fields of biomedical research and healthcare that rely on innovation. Our nation faces unprecedented challenges and opportunities to develop and translate new knowledge into improved health for all individuals through better understanding of disease mechanisms, improved diagnostics and therapeutics, prevention strategies, and evidence-based health policy that can contribute to sustainable models for healthcare delivery and eliminate health disparities.

Reaching these ambitious goals will require the identification, recruitment, education, and training of the most talented scientists in the US. Unfortunately, data indicate that we are not currently benefitting from the talents of all citizens.¹⁻⁴ This is particularly true for the American Indian/Alaska Native (AI/AN) population.¹ AI/ANs represent only 0.6% of the biomedical work force; 0.3% of physicians and medical school faculty and 0.3% of the science and engineering workforce are AI/AN.¹⁻⁴

Barriers for AI/ANs choosing biomedical careers include poorly funded tribal schools, lack of mentorship, culture barriers, or rural geography. For example, the University of Utah School of Medicine has had active summer research programs for undergraduates for more than 30 years, but has failed to recruit a single AI/AN student. This failure may have been due to cultural differences between majority and minority populations that were not recognized during program development. Our objective was to create a culturally relevant research experience that attracts and nurtures AI/AN students interested in pursuing biomedical careers. We have created the Native American Research Internship (NARI), which is an NIH-funded program that has been recognized with the University of Utah “Beacons of Excellence Award” in 2012, and the “Diversity Award” in 2013. These awards recognize excellence in creating and offering a transformational experience to undergraduate

students and the enhancement of diversity on campus. We provide a description of the development and outcomes of the NARI program.

Community Engagement

To address the disparity of AI/AN students' inclusion in undergraduate research programs, the University of Utah Department of Pediatrics and the Utah Center for Clinical and Translational Science (CCTS) proposed developing an undergraduate research experience to support AI/AN students based on the principles of community engagement (Table 1). The principal investigators began a dialogue with AI/AN elders and eventually formed partnerships with the AI/AN community. Partners included tribal elders from the Navajo Nation, Community Faces of Utah that is a CCTS organization that supports diverse communities, the Urban Indian Center of Salt Lake City, and Primary Children's Hospital. These groups helped to develop the Native American Summer Research Internship (NARI) program and have provided guidance over the last 5 years that has enhanced and supported the programs.

Development of a Culturally Relevant Summer Research and Career Development Experience

The NARI summer programs include a number of **cultural adaptations** designed to promote trust, recruitment of students, and retention in scientific disciplines. Tribal elders felt that the most effective way to eliminate health disparities among AI/AN people was to increase their representation in the biomedical workforce. Elders stated that the Native communities wanted access to AI/AN health care providers and wanted to participate in clinical research conducted by AI/AN scientists. They believed AI/AN undergraduates could benefit from exposure the biomedical professions by participating in summer research and career development experiences that respected the Native heritage of the students.

In response, tribal elders, AI/AN community and faculty members, other faculty, staff, and students built a trusting partnership and participated in the design and development of a 10-week NARI Program for undergraduate AI/AN students interested in pursuing a biomedical career. The NARI program provides a residential experience on the University of Utah campus and students receive a stipend, meal plans, and access to campus amenities. Students are housed together to avoid social isolation and participate in an orientation that includes both training and social events that provide opportunities for the creation of supportive peer and mentored relationships. Students are then assigned to scientific mentors and participate in rigorous hands-on research. Research experiences span the translational spectrum from basic laboratory science through clinical trials and health services research. Students are able to select the type of research project that they would like to experience. The program directors work to identify investigators working in scientific areas that are of related to the health priorities of AI/AN communities such as diabetes, heart disease, lung disease, and cancer. All research experiences support AI/AN cultural values. Students, mentors, and program directors engage in dialogue about the selection of a research project and include topics such as participation in research that involves animals and the sacred nature of animals in the Native communities.

Critical and unique to the NARI program is the continued role of community partners during the summer experience and in the months between. This includes employing a member of the Diné (Navajo) community who serves as the program coordinator. The placement of a member of the AI community in this role facilitates the recruitment of students through trusted individuals from tribes, tribal colleges, and AI programs at institutions outside of the University of Utah and the state. The AI/AN community is also involved in the selection of students for the program. Another unique element of the NARI program is the assignment of an AI/AN cultural mentor to each student. These mentors come from the campus and local community and most work in scientific disciplines. The cultural mentors are available for continued support of the student's cultural identity in and out of the classroom and they serve as an important translator for students as they immerse themselves in the new culture of biomedical research.

During the summer experience, we host weekly “talking circles” at the lunch hour. Talking circles consist of research presentations, discussion of AI/AN health issues, and topics related to professional development. Scientific and cultural mentors attend and support students as they reflect on their academic, career, and personal development. Students share their experiences and challenges. Scientific, cultural, and peer mentors presence enables students to grow in confidence in many domains.

Research mentors, cultural mentors, and program staff also meet individually with NARI students during the internship. Students complete a self-assessment, which then serves as a framework and structure to identify interests, opportunities, and gaps early in the internship.

NARI students are able to participate in the internship for two summer sessions and we offer the ability to serve as a teaching assistant for experienced students. The program also extends support beyond the internship. Mentors and program staff assist students throughout the year and provide advising, letters of recommendation, notices of research and academic opportunities, networking, and job references. We use social media and maintain a NARI Facebook page to enhance our communication with interns and to foster communication between former interns and mentors.

Student Recruitment, Selection, and Enrollment

We market the NARI program extensively at college campuses, AI/AN meetings/conferences and have developed of a website and social media help to recruit AI/AN students from all over the country. We have developed relationships with academic advisors and counselors at many undergraduate institutions that serve AI/AN students.

Student applicants provide the selection committee with demographic information including AI/AN tribal affiliation, a personal statement, transcript, and a letter of recommendation. Five members of the selection committee, including three AI/AN individuals, evaluate and rank applicants. Telephone interviews are then conducted with all selected students prior to beginning the program to ensure their research placement aligns with their research interests and cultural values, and to identify personal and career development needs.

Curriculum

Expectations are provided to the students during the orientation (see Table 2 for a summary of the NARI educational requirements and opportunities). Students spend 30 hours a week performing research and 10 hours a week attending educational and professional activities. Students have opportunities to present their research findings during our weekly “talking circles”, at a University of Utah Summer Research Symposium, and at national meetings. All students are encouraged to submit an abstract to the annual meeting of the Society for Advancement of Hispanics/Chicanos and Native Americans in Science (SACNAS). Students also apply for travel scholarships to attend professional conferences. Financial assistance is available for AI/AN students who are not awarded travel scholarships. All students attend at least one national conference during their internship. Students leave the internship with materials describing their research experience including a power point presentation, an abstract, and a poster that can also be presented at their respective home institutions. Many students receive academic credit at their home institution for participation in the NARI program, enhancing their ability to graduate.

Other educational opportunities provided during the NARI program are provided to build student skills, expose them to academic and career opportunities across the biomedical sciences, and to foster their involvement in the AI/AN communities. We offer workshops that teach test taking and writing skills and students have the opportunity to take GRE or MCAT preparation classes. We also teach students how to attend a national conference. Students learn how research is presented, learn about student opportunities in professional societies, and network with leaders in their community. Three NARI students have received the best abstract award for medicine, neuroscience, or environmental engineering at the annual SACNAS conference.

Students can participate in health-related community outreach and physician shadowing through our partner organizations. The students also have the opportunity to mentor younger AI/AN students through the Urban Indian Center. All of the NARI students invite AI/AN junior high and high school students who attend summer programs at the Urban Indian Center of Salt Lake to their research sites and share their experiences, struggles, and successes.

Student Outcomes

Although the program has been in place only since 2010, we have seen several positive short-term benefits (Table 3). We are able to recruit nationally for the program and have on average two applicants for each position. To date, 46 students, representing 22 tribal nations, 28 colleges/universities, and 13 home states, have participated in the NARI program. All have successfully completed the summer internship and its requirements. Twelve students (26%) have worked in the biomedical sciences as research assistants following the NARI program.

NARI students have been extremely successful at their home institutions (Table 3). No student has dropped out of college. Of the 46 NARI participants, 16 (35%) are current undergraduate students and 30 (65%) have completed their undergraduate degrees. Of the

graduates, 97% received a science degree and 50% have gone on to graduate programs in science or medical school.

Conclusion

The NARI program is an example of effective community engagement leading to full partnership. Cultural adaptations to engage AI/AN students and mentors have been critical for the development and success of the NARI program. NARI students have not only gained research experience, they have been able to build their professional networks and have benefitted from peer and mentor support. These students have gained valuable life experiences essential to career development in any biomedical field. We believe the NARI graduates will contribute in significant ways to the US biomedical workforce. A quote from a summer 2011 student expresses the greatest strength of the program: "...NARI has fostered and strengthened our self-identity as future physicians and scientists. The fires ignited here can bring light to our tribes for generations."

Acknowledgements

This work was supported by NIH/NHLBI 5R25HL108828 (MH, SH, KB, and CLB), NIH/NIMHD 5R25MD006781 (MH, SH, KB, and CLB) and NIH/NCATS 1UL1TR001067.

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Table 1

Principles of Community Engagement and Development of the NARI Program

Principles of Community Engagement*	Application to NARI Program
1. Understand the Goals of the Engagement and the Populations to be engaged	Goal: Creation of a AI/AN Summer Research Internship Population: AI/AN and University of Utah
2. Become knowledgeable about the community's history culture, norms, values	Dialogue through face to face meetings with AI/AN tribal leaders and "Community Faces of Utah"
3. Seek commitment from leaders	Engage leaders as research and cultural mentors in the AI/AN community and the University of Utah
4. Collective Self-Determination is right of all in community	Representative governance structure
5. Partnering is necessary for change	Engage multiple partners and stakeholders (research and cultural mentors) in the planning period and in the evaluation of the internship
6. Respect the diversity of the community	Foundational value of NARI
7. Identify and mobilize community assets and strengths	The Urban Indian Center of Salt Lake City and "Community Faces of Utah" provide assests and mentorship for the NARI program
8. Allow flexibility for changing needs	Embrace the student variation in development and career goals
9. Long-term commitment	Sustainability through development of underrepresented students to graduate school and leaders who will sustain culture

* Adapted from Principles of Community Engagement, 2nd edition, Publication No. 11-7782, June 2011.

Table 2

Summary of the Native American Research Internship (NARI) Program

Curriculum	<ul style="list-style-type: none"> • Faculty Presentations • Student Research Presentations • AI/AN Health Presentations • Abstract Preparation/Submission • Conference & Faculty Poster Presentations • Writing Personal Statements
Research Mentorship	<ul style="list-style-type: none"> • Students receive mentorship in their lab or clinical settings from the Research Mentors as well as lab/research staff including fellows, post-docs, research assistants, etc.
Physician Shadowing	<ul style="list-style-type: none"> • Students shadow their Research Mentor and/or physicians in fields of interest
Courses	<ul style="list-style-type: none"> • MCAT/GRE Preparatory courses • 4 Hrs Credit for Undergraduate Course • Research Administration Training Series (RATS) Courses
Friday Talking Circles	<ul style="list-style-type: none"> • Cultural Mentor presentations on AI/AN issues in Health Sciences • Opportunities to connect with Research and Cultural Mentors • Students present their research • Peer and Self Evaluation of student research presentations
National Conferences	<ul style="list-style-type: none"> • Native Research Network (NRN) Conference • Society for the Advancement of Chicanos and Native Americans in Sciences (SACNAS) Conference
Post Internship Support	<ul style="list-style-type: none"> • Letters of Recommendation • Academic Advising by Research/Cultural Mentors • Facebook Page/Networking

Table 3

Accomplishments of NARI Participants

Year (2010-14)	Number
Total Internships	70
Total Students	46
Students who attended 2 summers	24
Demographics	
Tribal Nations Represented	22
Colleges/Universities Represented	28
States Represented	13
Conferences attended	
Attended Native Research Network National Conference	45
Attended a Health Disparities Conference	20
Scientific Accomplishments	
Oral Research Presentation during the NARI program	66
Presented Poster at University of Utah Research Symposium	66
Abstracts accepted for a poster presentation at SACNAS	63
Research Presented at Another National Conference	13
Education and Employment	
Current Undergraduate Student	16
Received an Undergraduate Degree	30
Received an Undergraduate Degree in Science	29
Obtained a paid Research Assistant Position	12
Accepted to a Masters Program	10
Completed a Masters Program	2
Accepted to Medical School	5

* Society Advancing Chicanos and Native Americans in Science conference

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