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Research Article

The Time is Now: Transforming Recruitment and Retention of American Indian and Alaska Native Medical Students Using the Medicine Wheel Model

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Abstract

American Indians and Alaskan Natives (AI/ANs) face some of the most striking health inequities in the United States and are still disproportionally under-represented as healthcare professionals and in U.S. medical schools, despite evidence suggesting improved quality of care from AI/AN physicians for this population. While efforts to increase the number of AI/AN medical students training at U.S. medical schools have generated some improvements in the number of AI/ANs applying nationwide, this has made little to no difference for their actual matriculation and graduation. Specific approaches for recruitment and retention of this population are critically needed at more medical schools to increase the number of AI/AN physicians. To address this, AI/AN faculty at four U.S. medical schools established innovative programs to successfully recruit AI/AN medical students and retain them through graduation. This generally occurred through formal collaboration with tribal members using a Community-Based Participatory Education (CBPE) approach. Each medical school's approach to increase matriculation and graduation of more AI/AN medical students emphasized a different quadrant in the Medicine Wheel model (an Indigenous metaphor for the various components of a person) whereby Mental = Academic; Spiritual = Cultural; Physical = Financial; and Emotional = Social. This paper describes the diverse approaches at these four medical schools from an Indigenous worldview perspective. Recruitment of more AI/AN medical students must be a priority of medical schools around the nation to improve health equity for all. We present a culturally rooted framework for medical schools to build upon and emulate.

Keywords: AI/ANs Recruitment, Indigenous, CBPE, Medical Schools, Medicine Wheel

Introduction

Increasing the American Indian and Alaskan Native (AI/AN) physician workforce in the U.S. has considerable potential to advance health equity for AI/AN people [1,2]. The benefits of having a racially diverse medical workforce are indisputable3,4. Despite being the only population in the United States with a birthright to healthcare, AI/ANs often lack access to health care, even though they experience some of the highest rates of heart, lung, and blood disease and die younger than any other racial or ethnic group [5-9]. More physicians in clinical and administrative roles who can meet the healthcare needs of underserved AI/AN are needed to reverse these trends and amend broken promises [10,11]. AI/AN physicians are more likely to serve AI/ANs than their non-AI/AN peers through direct patient care, community-academic research partnerships, and leadership initiatives [3,12]. Therefore, increasing recruitment and retention of these medical students is essential to address the striking health inequities among AI/AN communities.

In 2018, the Association of American Indian Physicians (AAIP) and the Association of American Medical Colleges (AAMC) jointly published Reshaping the Journey, which called upon U.S. medical schools to "revisit their missions, re-examine their admission criteria and selection and screening processes" specific to AI/AN applicants due to the severe lack of AI/AN medical students [1]. Since 1980, the numbers of under-represented minority medical students have increased for all racial/ethnic groups with the exception of AI/ANs. The overall percentage of U.S. medical school matriculants who identify as AI/AN alone has decreased from 0.4% (63 of 16,587) in 1980 to 0.2% (39 of 21,614) in 2016. In fact, during the 2016/2017 academic years, 43% of U.S. medical schools had no AI/AN students enrolled in their entire student body, with 90% of medical schools enrolling three or fewer AI/ANs [1]. The only time when significant increases in AI/AN applicants and matriculates occurred was between the years of 1992 and 1998, when more Native American Centers of Excellence existed. It is critical that AI/AN students with an interest in health careers be identified early, provided mentorship, and offered academic enhancement opportunities within a culturally relevant framework to improve their chances of entering medical school and successfully completing it [13].

Enrichment programs aimed at inspiring interest in science while fostering Indigenous cultural experiences appear to be some of the most effective tools in the recruitment of AI/AN youth [14,15]. However, published literature that details the path of AI/AN students entering U.S. medical schools and/or AI/AN-specific programming is now more than 10 years old and outdated [16]. Ballejos and colleagues describe an AI/AN-specific pre-admissions workshop in the Southwest region; however, insufficient evaluation was conducted to demonstrate the workshop's impact on matriculation of participants into medical school [17]. Overall, there is a lack of research around the recruitment and retention of Indigenous students, and those articles that have been published predominately focus on international Indigenous medical students [12,18,20].

AI/AN students have fewer physician role models, face significant financial barriers that constrain participation in medical school, and prioritize spirituality in their pursuit of a medical career [16,21,22]. One possible solution is to integrate Indigenous knowledge and practices into medical education, student recruitment, and to the student experience including barriers to success. Theories that have aimed to incorporate Indigenous voices are noted more prevalently in the areas of research [23,24] but also in the field of education [25,26]. A Community Based Participatory Education (CBPE) approach whereby there exist community participation and input could enhance the recruitment process and education for AI/AN students, thereby creating stronger relationships between universities, learners, and tribal communities [27]. Scholars have noted the meaningful contribution of using a CBPE approach to inform education curriculum development, especially in cancer disparities [22,23,27], but none to our knowledge have utilized this framework to document recruitment practices for Indigenous medical students in the United States. Tribal communities have a historically negative relationship with universities and medical schools due to unethical and racist treatments and research practices [28]. While there is a growing trend of increasing Community Based Participatory Research (CBPR: community voices in the research process) [27,29] in American Indian and Alaska Native Communities [30], there is room for improvement in engaging with tribal communities to design programs for recruitment and retention of AI/AN medical students aligning with CBPE and thus expanding beyond CBPR.

This paper examines four medical schools' approaches to designing and implementing these programs from an Indigenous worldview. We contextualize these diverse programs utilizing the "Medicine Wheel," which is an Indigenous metaphor with many variants used by some tribal nations to impart teachings and lifeways [31]. The fundamental understanding of the Medicine Wheel model consists of a circle, a symbol of sacredness, and four equal quadrants representing the Mental, Spiritual, Emotional, and Physical components of a person [32,33]. The Medicine Wheel sometimes known as the Sacred Hoop has been used by generations of various Native American Tribes for health and healing. Drawing from Indigenous knowledge systems, movement is circular and typically in a clockwise or "sun-wise" direction, depicting times for reflection, transformation, and renewal [34]. We are not the first to apply the Medicine Wheel to higher education [34,35], such models have been applied with university students in both counselling and instructional contexts. Additionally, this model has been utilized within the field of medicine as a healing framework [36,37] and among researchers to study a wide range of health outcomes including palliative care and pain management [38,39]. However, this is the first paper to our knowledge that examines the Medicine Wheel's application within the boundaries of medical school recruitment and retention. The dual purposes of this paper are to: 1) describe innovative approaches to recruit and retain AI/AN medical students in a culturally relevant manner highlighting the Medicine Wheel model, and 2) provide insights into diverse Community Based Participatory Education (CBPE) approaches for other medical schools to emulate and build upon. The authors aim to

catalyze discussions for improvements in recruiting and retaining AI/ANs among all U.S. medical schools.

Materials and Methods

AI/AN faculty holding key leadership positions from these four schools met at the Association of American Indian Physicians Annual Meeting in 2017. The majority of them were actively hired into leadership roles to develop programs to increase the matriculation and graduation of AI/AN medical students. A sub-group convened again at the 2018 American Medical Colleges Annual Meeting in Austin, TX. This subgroup has maintained close communication and engaged in ongoing in-depth conversations about best practices to recruit and retain AI/AN medical students over the past several years.

The four AI/AN-led programs included are: 1) the University of Minnesota's Medical School (UMMS) (Duluth Campus) Center for American Indian and Minority Health; 2) the University of Wisconsin's School of Medicine and Public Health's (UW-SMPH) Native American Center for Health Professions; 3) the University Of North Dakota's (UND) Indians into Medicine Program; and 4) Oregon Health & Science University's (OHSU) Northwest Native American Center of Excellence. The AI/ANs programs at UMMS & UND are well established since the 1980s and 1970s whereas UW-SMPH & OHSU started in 2012 & 2017 respectively. The overall averages of the number of AI/AN applicants, matriculants, and graduates at each of these four schools were calculated and compared to the U.S. average of AI/AN applicants, matriculants, and graduates using AAMC data. The success of these four schools and their AI/AN medical students is exemplary and calls for sharing insights behind their results.

Over the span of two years, each of the medical schools were asked to reflect upon and evaluate three topics: 1) the origins of their innovative program targeting AI/ANs medical students, 2) the manner in which they promote culturally relevant approaches, and 3) the process by which they engaged community tribal members. Reflections were centered on success, process, and what axis of the Medicine Wheel their program leverages and expressed between authors in conversations. Iterative discussions among the four AI/AN faculty authors of this paper at in-person conferences, during phone calls, and email correspondence provided additional clarification and nuance to their approaches.

Results

Figure 1 and Figure 2 demonstrate that between 1996 and 2018, these four schools received nearly 56% of all AI/AN medical school applications, matriculated 13.3% of all AI/ANs, and graduated 12% of all AI/ANs. UMMS is consistently above average whereas the other three schools vary year by year, but on average, they are still higher compared to the U.S. average. The averages for applicants, matriculants, and graduates at each of the schools are reported in Table 1.

An overview of each of the four U.S. medical schools and their respective AI/AN engagement initiative highlights how each school's culturally informed programmatic activity aligns with one of the four Medicine Wheel quadrants. AI/AN faculty at all four U.S. medical schools described collaboration with tribal members utilizing a CBPE approach [22]. Each of the four schools emphasizes one of the four quadrants of the Medicine Wheel model and concludes with their status of AI/AN educational outcomes.

One critical point is that the Medicine Wheel model was re-conceptualized from a person-level to a student-level orientation. A medical student recruitment lens was used to translate this model to correspond with the AI/AN medical student trajectory, whereby the *Mental* domain corresponded with academics; the *Spiritual* domain was linked with cultural activities and beliefs; the *Physical* domain translated into the financial arena; and the *Emotional* domain captured the social aspect (Figure 3).

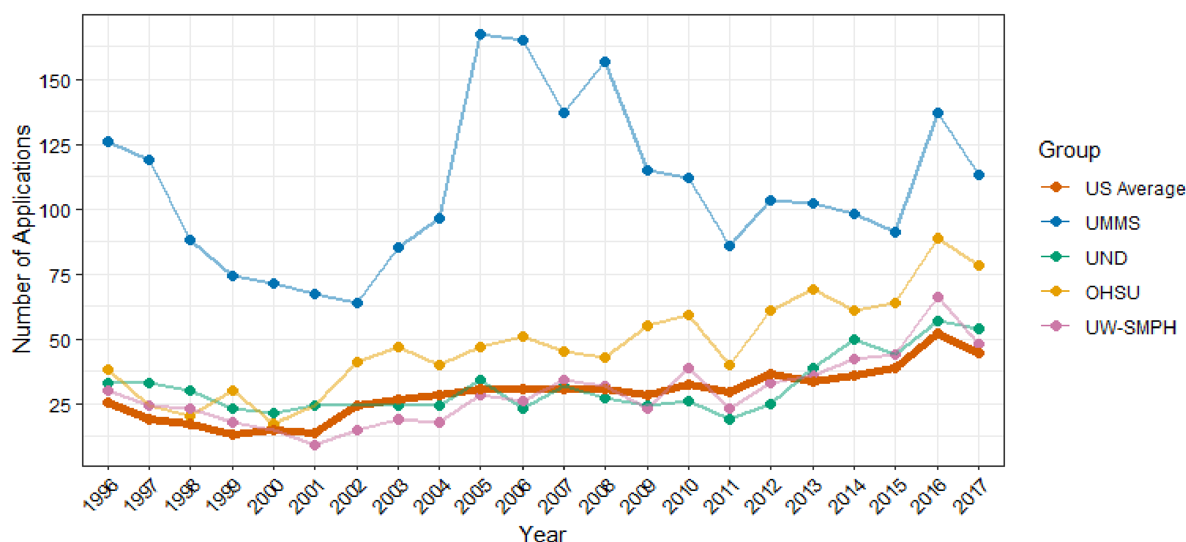

Figure 1: Applicants of AI/ANs at Four Medical Schools compared to the U.S. National Average between 1996-2018.

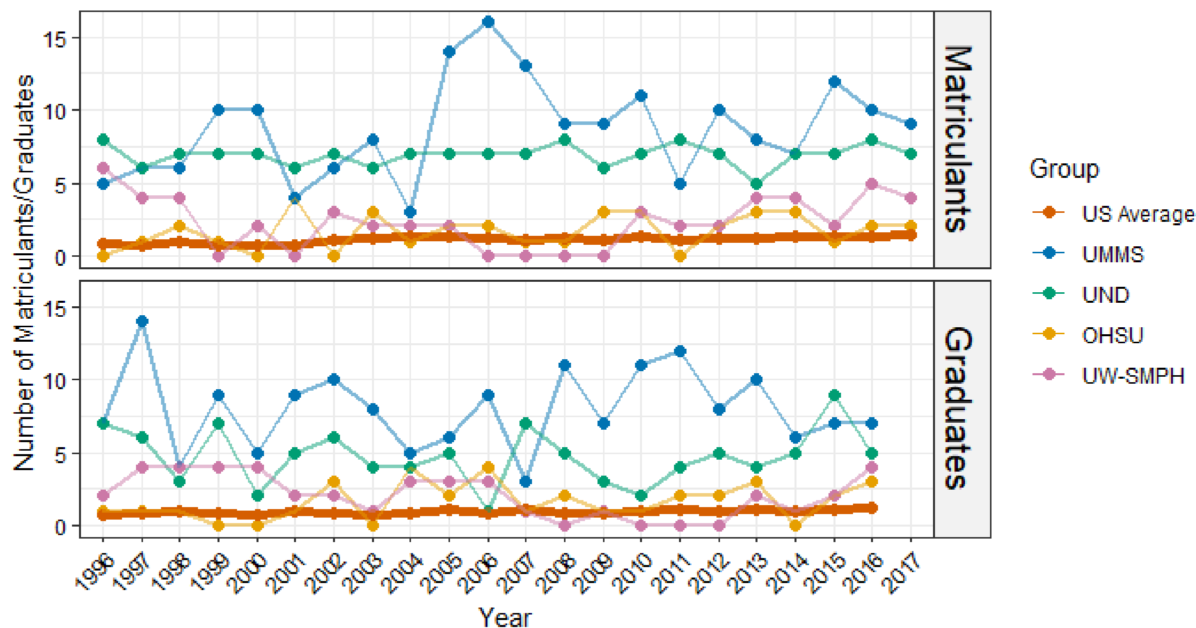

Figure 2: Matriculates and Graduates of AI/ANs at Four Medical Schools compared to the U.S. National Average for 1996-2018.

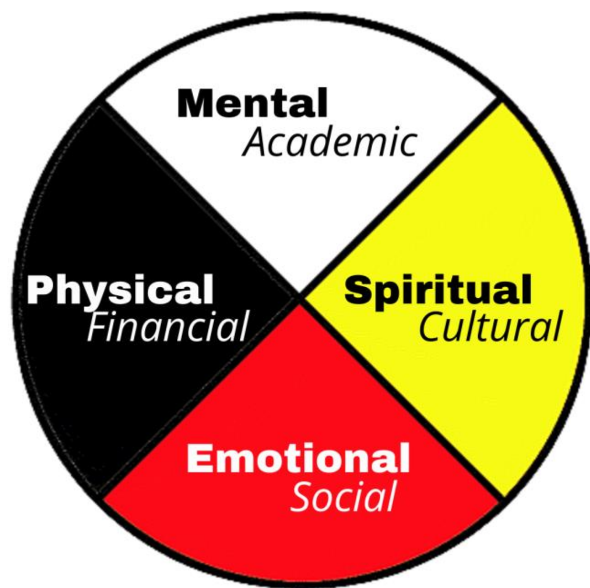

Figure 3: Recruitment and Retention of AI/ANs Medical Students using the Medicine Wheel.

	UMMS	OHSU	UND	UW-SMPH	U.S. Average
Applicants	107.9	47.4	31.4	29.3	28.9
Matriculants	8.7	1.7	6.9	2.3	1.1
Graduates	8.0	1.6	4.7	2.0	0.9

Table 1: Average AI/AN Applicants, Matriculants, and Graduate at Four U.S. Medical Schools Compared to the U.S. Average, 1996-2008.

University of Minnesota Medical School Duluth Campus (UMMSD)

Center Description: UMMSD's Center for American Indian and Minority Health is based at a regional campus (Duluth) at the University of Minnesota, and for over 40 years has worked with first- and second-year medical students, primarily from rural Minnesotans and/or American Indian backgrounds [40]. The educational pathway programs for AI/ANs began in 1973 with a Native American into Medicine Program and grew into the Center of American Indian and Minority Health (CAIMH), which was established in 1987. CAIMH operates K-16 health careers enrichment programming and the UMMS has graduated the second largest number of AI/ANs physicians nationally [41].

Medicine Wheel Quadrant: UMMSD emphasizes the mental quadrant through its academic curriculum that provides students with opportunities for didactic learning about Indigenous health and populations; therefore, Mental = Academic. In 2013, an elective course on American Indian health was developed and offered to all medical students and was required for all AI/AN students. Between 2015 and 2018, a series of Indigenous health lectures, which consisted of seven hours of content delivered within a two-week period, was required for all first-year medical students [42]. This curriculum was designed to give all medical students foundational and regional information about Indigenous people and health. To determine the content of the curriculum, faculty, students and local tribal community members met to determine what future physicians should be taught based on what local AI/AN patients want their physicians to know about them. This curriculum has been in effect now for three years and was created through a CBPE process described in detail elsewhere [43].

Status of Educational Outcomes: Mandatory Indigenous health curriculum for medical students at UMMSD has resulted in improved Indigenous health knowledge and beliefs [44]. Medical students were surveyed before and after they received the Indigenous health lectures and again at a six-month follow-up period. Students' didactic knowledge about AI/AN people of their region had statistically significantly improved following the lecture and six months later. Students also demonstrated improvements in the area of cultural intelligence and ethno-cultural empathy at the completion of the lectures. Other domains that were measured such as social justice and cultural humility were marginally improved yet there was no statistically significant difference [43].

University of Wisconsin School of Medicine and Public Health (UW-SMPH)

Center Description: The Native American Center for Health Professions (NACHP) [44] at the UW-SMPH was established in 2012 to improve the recruitment, retention, and graduation rates of Native American health professional students and to promote health education, research, and community-academic based partnerships with AI/AN communities [45]. NACHP has a wide range of programming, including unique cultural activities designed to ensure a lived connection with tribal communities.

Medicine Wheel Quadrant: NACHP emphasizes the spiritual quadrant with explicit programming on traditional foods; therefore, Spiritual = Cultural. Cultural programming for AI/AN medical students may foster cultural connections and a sense of belonging, thereby improving recruitment efforts by dispelling the myth that they need to "give up" their culture to become physicians [46,47]. NACHP provides three primary opportunities for students to experience traditional food practices through Indigenous learning methods, which encourages community building, student well-being, and acknowledges the value of traditional foods to overall health. All NACHP traditional foods and cultural programming activities are conducted in partnership with tribal communities, allowing a holistic approach to increase knowledge of local traditions.

The Three Sisters (corn, beans, and squash) Garden is rooted in Haudenosaunee (Iroquois) traditions and teachings, where students learn the essentials of traditional garden models, cultural teachings, and how to integrate a healthy Indigenous diet into daily life. NACHP received heirloom seeds from the Oneida and White Earth Nations. Using regional Indigenous seeds generates a deeper connection, given most students are from regional Tribes and the seeds are in direct lineage of foods their ancestors relied upon for thousands of years. Each spring, graduates prepare and plant the Three Sisters Garden and continue to participate in its care over the growing season. At harvest, a meal is prepared from the garden, which can then be reproduced at home. All of the traditional health and food-related activities are as a delegation with multi-generational and -directional mentoring between tribal youth, medical students, and tribal community members.

Status of Educational Outcomes: A survey of NACHP students in 2018 indicated 69% of students think these cultural programming opportunities are "very valuable", and 31% indicated "somewhat valuable" [45]. These findings reinforce the value and impact such programming brings to students' medical training and overall experience academically, socially and culturally. The immersive experiences connect students with Tribal communities where they are able to spend time learning more about the community itself. In their 2018 report, 100% of students surveyed indicated it is "very important" (75%) or "somewhat important (25%) to work with American Indian communities once their training is complete. Further evaluation and outcomes are forthcoming in a future manuscript.

University of North Dakota (UND)

Center Description: The Indians into Medicine (INMED) Program at UND offers a comprehensive education program assisting AI/AN students who are preparing for health careers [48]. UND INMED was established in 1973 to address the need for health professionals to serve reservation populations. Health professions students receive holistic student support, and INMED programs include engaging students beginning as early as middle school. The INMED program provides seven slots in each UND medical school class for members of federally recognized Tribes and offers in-state tuition even if they are from out-of-state.

Medicine Wheel Quadrant: INMED emphasizes the physical quadrant by ensuring access to financial support; therefore, Physical = Financial. Faculty and practitioners who advise Native pre-medical and medical students recognize that there is a significant need to increase scholarship opportunities on the national level. Financial barriers have been well documented in the literature to be of a significant challenge for AI/AN medical students [16,49]. The INMED program offers multiple scholarships, as well as in-state tuition, to their Native medical students. In-state tuition is a milestone that has opened doors of opportunity for AI/AN medical students. They also have a Stan Guardipee Memorial Student Loan Fund for emergency loans to help students through financial crises. This fund has supported many students to stay in school during difficult times. Financial support through in- state tuition, scholarships, and the Stan Guardipee Memorial Student Loan Fund has helped make medical education a possibility for AI/ANs at UND.

Status of Educational Outcomes: The INMED program marked a milestone in 2020 as a total of 250 members of federally recognized Tribes had graduated with MD degrees from UND since 1973. UND has reserved approximately 9% of the medical school class for INMED slots, with this year eight Native students matriculating.

Oregon Health & Science University (OHSU)

Center Description: The Northwest Native American Center of Excellence (NNACoE) at OHSU was launched in 2017 to improve the health and wellness of all people by increasing the number of AI/AN physicians in the U.S. health workforce [50]. NNACoE represents a partnership between the 43 federally recognized Tribes in the Pacific Northwest throughout the Northwest Portland Area Indian Health Board, Portland State University, and Oregon Health & Science University's School of Medicine.

Medicine Wheel Quadrant: NNACoE's Applicant Workshop [51] emphasizes the emotional quadrant through frequent communication and relationship building; therefore, Emotional = Social. Evidence suggests that family and community engagement is an important factor for the success of Indigenous students [35]. One key cohort model at OHSU is the Pacific Northwest AI/AN Medical School Applicant Workshop. Intentionally organizing AI/AN students in educational learning community cohorts may provide a deepened sense of community and foster these students' success. The concept of a medical school applicant workshop is not new [18,20]. The Applicant Workshop is a collaboration between the medical schools of OHSU, Washington State University, University of California-Davis, and the University of Washington. The workshop is designed for AI/ANs who are within 24 months of applying to medical school and focuses on de-mystifying the medical school application process, while providing content to improve application and interviewing skills. The Applicant Workshop is a two-day session and continues to function as a unique social networking experience, where participants may be meeting other AI/AN pre-meds and faculty for the first time in their lives.

Status of Educational Outcomes: Preliminary analysis suggests effective recruitment, enrichment, and social networking activities. Three AW cohorts consisting of 40 AI/AN participants have completed the workshop. The impacts of the PNW-AW cohorts are currently under rigorous evaluation given its relatively recent adoption and a publication is forthcoming.

Discussion

The U.S. healthcare system, including our medical schools, is failing the original inhabitants of this land given the growing health inequities that continue to persist [6,7]. Medical schools must do more to promote the health and well-being of AI/AN peoples. There is no doubt that the U.S. medical education system must do better given 90% of medical schools have three or fewer AI/AN medical students [1]. The weight of recruiting and training AI/AN medical students can no longer be shouldered by the few medical schools committed to these efforts. We presented four medical school programs that target recruitment of AI/AN students designed to maximize opportunity while simultaneously fostering continued connection with tribal communities and culture [12].

This paper proposed the Medicine Wheel model [34] as a tool for medical schools to conceptualize successful AI/AN recruitment and retention (Mental = Academic; Spiritual = Cultural; Emotional = Social; and Physical = Financial) and provided an example from four different universities on how to better meet the needs of AI/AN students. Each of the four schools provided core techniques needed to successfully recruit and retain AI/AN students by leveraging their resources and institutional support around one of the four Medicine Wheel quadrants. It would be ideal for all four quadrants to be leveraged within one medical school institution; however, doing so may require a complete transformation of an existing medical school system and composition.

These four medical schools had institutional infrastructure in place to advance their initiatives for AI/AN medical students. As medical schools continue to re-imagine the architecture of their system and seek to dismantle structural racism, it is imperative that they closely examine their efforts to recruit, support, and retain AI/AN faculty. More research is needed to understand the exact impact of AI/AN faculty at U.S. medical schools, but so far it does not appear to be a coincidence that medical schools with robust AI/AN initiatives have a critical mass of AI/AN faculty and leaders. The diversity at the faculty level is essential for transformation. Recruitment and retention of AI/AN students is more successful when there is content and faculty that are also AI/AN [43]. Unfortunately, the likelihood of an AI/AN student encountering an AI/AN faculty member is low. Of 174,570 total full-time faculty at MD-granting institutions in 2017, 0.10% (167) were reported as AI-AN (alone) and 0.38% (669) were reported as AI-AN in combination with another race or ethnicity [1]. Additionally, a mentor or professor that is Indigenous gives students an opportunity to see that someone like them has 'made it.' More AI/AN faculty should be intentionally recruited into leadership roles to develop not only recruitment programs, but also medical education curriculum in a CBPE manner [22].

All four case studies utilized a Community Based Participatory Education (CBPE) approach, meaning they co-developed their programs alongside tribal stakeholders. Local tribal community members expressed concerns about the lack of knowledge physicians had regarding basic history, culture, and health beliefs of their community [52,53]. However, few schools of medicine make the effort to reach out and create positive relationships with local tribal communities, creating an even larger divide and lack of trust [54]. In part due to the leadership and social network of the AI/AN faculty, each of the four medical schools formed strong partnerships with local organizations and Tribes. Meaningful partnerships between tribal nations and medical schools ensure the chance for shared dialog about creation of new opportunities, opening access for the next generation of learners, AI/ANs and otherwise. Sharing and co-creating initiatives to boost diversity among medical students and graduates is essential to push medical schools to move beyond the walls of the academic institution and into the community to better meet the health care needs of all people. Partnerships need to occur with a long-term investment and perspective on the relationships. Over time, such partnerships in tribal health and education may stand to improve the inclusion of AI/ANs' voice in the U.S. health system. We found meaningful representation requires partnerships between academia, communities, organizations, government agencies, and tribal nations. Medical school leadership should embrace key stakeholders beyond academia, namely tribal organizations and nations, as they look to increase AI/AN voice in their institution.

Furthermore, more systematic evaluation of current efforts to increase AI/ANs' representation and dissemination of best practices in these efforts is needed. The AAIP-AAMC report provides some examples of well-established successful medical school programs. However, most studies are descriptive rather than evaluative [1,17] and many of currently

available papers focus on international Indigenous health professional students [18,55].

This is a call to action for U.S. medical schools that are successful at graduating AI/ANs to disseminate their models and respective efficacy to expand the number of schools training AI/ANs. There is innovation emerging across our nation [56-58]. Through Indigenous approaches it is possible to emphasize social justice at the heart of medical education and medical schools [59-61]. Launching new initiatives and dedicating resources may be agreed upon in principle; however, limitations and budget constraints may hinder such development. A better option may be to create consortia among medical schools to emulate and operate programs to increase AI/ANs in medicine. As we reported, each of the four schools are doing excellent work to recruit and retain AI/AN medical students that we know make a difference once they enter the workforce [62]. Rather than recreate what may already exist at one medical school, perhaps expanding upon successful programming with a partner school will have the desired effect, while making more efficient use of resources.

This study does have limitations. Our quantitative data primarily comes from the AAMC. The status of educational outcomes is limited because of the lack of support around evaluation efforts and intellectual propriety around the publications process. Collectively we look forward to future publications and ongoing collaborations in this area.

To our knowledge, this article is the first publication to discuss best practices in AI/AN recruitment and support efforts in U.S. medical education from an Indigenous perspective. Taken together, we offer a wide range of examples and opportunities for U.S. medical schools to explore within the Medicine Wheel framework – regardless of their location, size, or purposes for engagement. To make advancements in recruiting, retaining, and graduating AI/ANs, more U.S. medical schools may need to make additional investments, which are specific to ensuring long-term success by equipping faculty, staff, and students with the necessary resources to operate AI/AN programming, conduct robust evaluation, and disseminate their efforts.

Conclusion

More U.S. medical schools need to intentionally invest in training AI/AN students if we are to collectively reverse the chronic under-representation of AI/ANs in healthcare professions and the inequitable health outcomes among tribal communities. Through iterative discussions and ongoing reflection concerning the recruitment and retention of AI/AN medical students, the themes that emerged map onto the Medicine Wheel Model and emphasized a CBPE approach that was salient across these four medical schools. We assert that a support and recruitment model balanced in all quadrants will better meet the needs of AI/AN medical students. The purpose was to provide more medical schools with tangible examples of programs, which may inspire expansion of their AI/AN-specific initiatives. We hope this will catalyze changes to increase the number of AI/AN medical students and medical schools who train them. This paper provides a culturally-rooted, evidence-based framework for other medical schools to build from and emulate by implementing the Medicine Wheel.

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