Paving the Way — Providing Opportunities for Native American Students

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As a member of the Pauma Band of Luiseño Indians, Dan Calac grew up on the Pauma Indian reservation in southern California. His medical visits during childhood took place at the Indian Health Service clinic that served his tribal community, which included many elders who lived in mountainous areas with no running water or electricity. Encouraged by his mother — a nurse at the clinic — Calac dreamed of becoming a physician, although he had never met a Native American doctor.

Calac encountered many obstacles on his journey toward medical school. He didn't know any physicians who could serve as mentors, and he left college after an academically unsuccessful freshman year. He spent the next four years working odd jobs — gas-station attendant, land surveyor, and carpet cleaner. At 26, he enrolled at San Diego State University, determined to finish his undergraduate degree but knowing little about what was needed for entrance into medical school.

Calac's story is not unusual. Native Americans face enormous obstacles to pursuing careers in medicine. They represent only 0.3 percent of students entering medical school, even though they account for nearly 2 percent of the U.S. population — a rate of matriculation far below those for blacks and Hispanics. In 2004, only 98 Native Americans graduated from the 125 accredited medical schools in the United States.[1]

Nearly 25 percent of Native American students are more than 32 years old when they start medical school, as compared with 5 percent of all other entrants.[1] This delay results in part from a lack of counseling to help students in rural areas in navigating the admissions process. In addition to economic barriers, Native American students may struggle with the desire to remain close to their communities rather than move to a city. They may therefore decide late in the game to apply to medical school or may prepare inadequately for the application process.

Some medical schools have created summer enrichment programs for members of minority groups, but most fail to recruit Native American students effectively. A much smaller proportion of Native American medical students than of black medical students report having participated in such a program (20 percent vs. 42 percent). And once Native American students have entered medical school, they often feel culturally isolated. In 2004, only nine U.S. medical schools had more than two Native American students in their graduating classes.[1]

Seeking additional guidance, Calac applied to and was accepted by the Four Directions Summer Research Program. This 12-year-old program was created and continues to be run by Native American faculty members and students at Harvard Medical School to address challenges faced by Native American undergraduates. We focus on recruiting from regions where promising students might not otherwise have such opportunities. Our selection process is atypical: we forgo academic transcripts in favor of evidence — in recommendation letters and personal statements — of unrealized potential. We also look for applicants with a demonstrated commitment to the Native American community.

Participants spend a summer immersed in the culture of medicine, while remaining connected to Native American cultures by interacting with one another and the program leaders. The program provides four key elements: individual mentoring related to students' work in the laboratory of a senior faculty member; seminars about the admissions processes for medical school, schools of public health, and Ph.D. programs in biomedical science; exposure to faculty members from minority groups and leaders in minority health policy; and mentorship and encouragement from Native American faculty members, residents, and medical students. Participants also "shadow" physicians at affiliated hospitals.

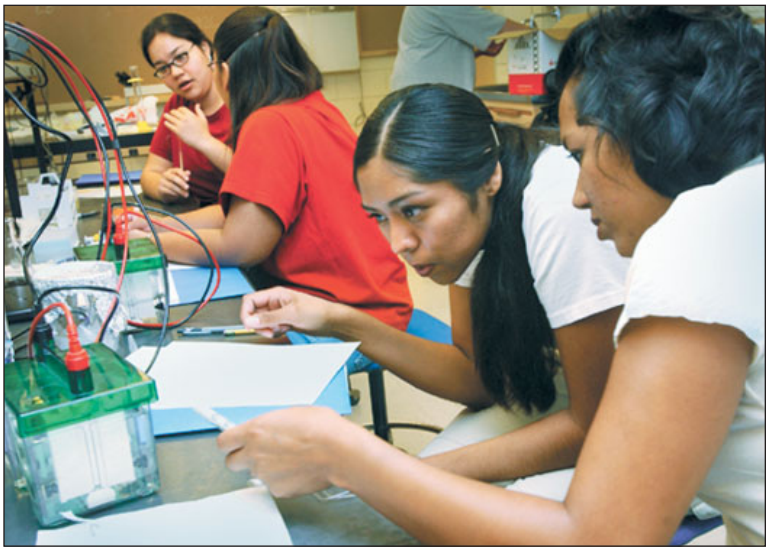
The program's aim is to convince students that they can thrive at a competitive academic medical center. In the process, we create a community of future Native American health care profession-

als with common goals. Alumni of the program represent 50 Native American tribes and nations from throughout the country. Nearly 40 percent have either completed or entered medical school or are in the process of applying; an additional 12 percent are pursuing careers in public health; and 7 percent are seeking graduate degrees in other fields.

Our country needs more clinicians who are willing to care for the underserved Native American population. The Indian Health Service, the single largest provider of health care for Native Americans, reports that only 88 percent of its essential health care positions are filled.[2] Such jobs are hard to fill in part because of the small size and isolated settings of the communities and in part because the clinics receive far less funding than they need. Moreover, this federal agency cares for only some of the Native American population; many Native Americans have no structured health care system.[3]

Increasing the number of Native American medical students is one approach to filling the health care void. Physicians who are members of minority groups are more likely to practice in underserved communities.[1] Nearly half of all Native American medical students plan to work in such communities, and a substantial proportion will probably choose to serve Native Americans. These physicians will be able to deliver care that is needed while offering cultural familiarity that Native American patients will find comforting.

Native American physician–scientists are also needed in academic medical centers. A member of the Taos Pueblo tribe, New Mexico, I am one of only a few Native American faculty members at Harvard Medical School — and one of only 115 nationwide. More faculty members are needed to conduct research that brings the resources of academic institutions to bear on the needs of Native Americans, whose life expectancy is more than five years shorter than that of white Americans. Although research about health disparities has advanced during the past 20 years, information regarding Native American health care has lagged behind.[4] Such research is often limited by the perceived impossibility of identifying substantial numbers of Native Americans accurately with the use of nationally available data sets, which tend not to include the populations of remote areas, and also by an inadequate understanding of the health needs of this subpopulation. Before we can develop interventions to improve the health of Native Americans, we need better information regarding health care delivery in these communities and the health disparities between Native Americans and other members of the U.S. population, as outlined by Roubideaux in this issue of the *Journal* (pages 1881–1883).



Native American Students Learn Laboratory Techniques at Harvard Medical School. Pictured (left to right, faces visible) are Charity Bishop (Pima tribe, Arizona), Gaylene Fred (San Ildefonso Pueblo, New Mexico), and Nazune Menka (Athabascan, Alaska).

After participating in the Four Directions program, Dan Calac went on to Harvard Medical School, completed a combined residency in internal medicine and pediatrics, and became the medical director of the clinic he visited as a child. Our program alone will not change the face of medicine, but it and others like it can slowly begin to address the persistent crisis that Roubideaux describes.

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The Complexity of Microbial Diversity in Bacterial Vaginosis

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From the time that Robert Koch prepared stained smears of biologic samples from humans, scientists have been engaged in describing the microbiologic flora of the human vagina. In 1882, Döderlein described the lactic acid–producing lactobacilli from the vaginas of healthy women, and he was the first to report the treatment of gonococcal infections in women with human-derived strains of lactobacillus. In 1921, Schröder published detailed drawings of vaginal smears from women with the condition now known as bacterial vaginosis, and these drawings portended the incredible microbiologic diversity present in the female reproductive tract.

The microbiologic cause of bacterial vaginosis has long eluded scientists, and newly described vaginal microbes are often considered pathogens. In 1955, *Gardnerella vaginalis* was described by Gardner and Dukes as the primary bacterial agent responsible for bacterial vaginosis, and the syndrome was retermed *G. vaginalis* vaginitis. However, nearly 30 years later, British researchers attached great importance to the presence of anaerobic bacteria and proposed that the syndrome be renamed anaerobic vaginosis. The subsequent "discoveries" of other newly described bacteria in the female reproductive tract resulted in transient consideration of their role as possible etiologic agents of bacterial vaginosis. Examples include mobiluncus in the 1980s and atopobium during the present decade. The ecology of the vaginal microflora is influenced by several forces, such as endogenous and exogenous hormones, sexual intercourse, and douching, all of which complicate the vaginal microenvironment, thus challenging our understanding of the normal diversity of vaginal flora and making elusive the identification of a specific etiologic agent of bacterial vaginosis.

As noted by Fredricks et al. in this issue of the *Journal* (pages 1899–1911), bacterial vaginosis is a common condition among women of reproductive age. In addition to its causing such symptoms as discharge, odor, and irritation, pregnant women with this syndrome have been shown to have an increased risk of preterm delivery. The syndrome has also been linked with the increased acquisition of a variety of sexually transmitted infections, including gonorrhea, herpes simplex virus infection, human papillomavirus infection, and human immunodeficiency virus infection. Recently, subgroups of microorganisms related to bacterial vaginosis, particularly the black-pigmented, anaerobic, gram-negative rods, have been associated with an increased risk of pelvic inflammatory disease. Antimicrobial agents that act against anaerobes are the current treatment for bacterial vaginosis recommended by the Centers for Disease Control and Prevention. However, recurrence is common and there is a poor understanding of how to optimally target treatment against specific pathogens, which is a failure related primarily to our limited understanding of the microbiologic cause of this syndrome according to traditional culture-based techniques.

Fredricks and colleagues have performed a molecular analysis of the microbiota of the vaginal fluid based on the use of broad-range polymerase-chain-reaction (PCR) assays of 16S ribosomal DNA and bacterium-specific PCR testing. These methods permit the detection of microorganisms that are not easily cultured and thus provide a more comprehensive description of the vaginal microflora. The major finding of this study is the description of a cluster of new organisms related to clostridium that were detected