The Persistence of American Indian Health Disparities

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Disparities in health status between American Indians and other groups in the United States have persisted throughout the 500 years since Europeans arrived in the Americas. Colonists, traders, missionaries, soldiers, physicians, and government officials have struggled to explain these disparities, invoking a wide range of possible causes. American Indians joined these debates, often suggesting different explanations. Europeans and Americans also struggled to respond to the disparities, sometimes working to relieve them, sometimes taking advantage of the ill health of American Indians.

Economic and political interests have always affected both explanations of health disparities and responses to them, influencing which explanations were emphasized and which interventions were pursued. Tensions also appear in ongoing debates about the contributions of genetic and socioeconomic forces to the pervasive health disparities. Understanding how these economic and political forces have operated historically can explain both the persistence of the health disparities and the controversies that surround them.
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A House-call on the Navajo Reservation. As part of its effort to improve health services for American Indians in the 1950s, the Public Health Service funded a series of innovative health care projects. In one project, based at Many Farms, Arizona, physicians, nurses, anthropologists, and Navajo health workers attempted to bring modern medicine into Navajo homes and lives. *Source.* New York Weill Cornell Medical Center Archives, Photograph Collection, Navajo Project, #2310.

THE INDIAN HEALTH SERVICE (IHS) faced a daunting challenge when it was established in 1955. Indian populations living in rural poverty suffered terribly from disease. Tuberculosis continued to thrive, and infant mortality reached 4 times the national average. During the past 50 years, the IHS has improved health conditions dramatically, but disparities persist—American Indians continue to experience some of the worst health conditions in the United States.

Although this persistence is striking, it is even more striking that the disparities have existed not for 50 years but for 500 years. From the earliest years of colonization, American Indians have suffered more severely whether the prevailing diseases were smallpox, tuberculosis, alcoholism, or other chronic afflictions of modern society.

The history of these disparities provides perspective on many vexing problems of contemporary American Indian health policy. European and American observers have offered a diverse range of causes to explain Indian susceptibility, from the providential theories of Puritan colonists to emphasis on environment, behavior, genetics, or socioeconomic status. How did American Indians and their observers evaluate these long lists of potential causes and determine which were most important or meaningful? Observers have offered a similarly diverse range of responses, from attempts that relieved disparities through health care to efforts that ignored or even exacerbated them. How did political and economic interests shape their choices?

The history also raises questions about the actual causes of the disparities. Health disparities have persisted, even as the underlying disease environment has changed. Do American Indians have intrinsic susceptibilities to

every disease for which disparities have existed? Or does the history of disparity after disparity suggest that social and economic conditions have played a more powerful role in generating Indian vulnerability to disease? Understanding the histories of health disparities may explain the complex reactions they provoke and why efforts with the best intentions have fallen short.

ENCOUNTERS AND EPIDEMICS

American Indians struggled with ill health even before Europeans arrived. Although pre-Columbian populations were spared the ravages of smallpox, measles, influenza, and many other infections, they did not inhabit a disease-free paradise. Careful analyses of skeletal remains have revealed many diseases, including tuberculosis and pneumonia.[1] Whereas some populations, such as those of coastal Georgia or Brazil, enjoyed excellent health, many American Indian groups stretched their environments past the limits of sustainability. From the arid southwest to the crowded urban centers of Mexico and Peru, malnutrition, disease, and violence kept life expectancies below 25 years of age. Health disparities also existed within populations, such as the complex stratified societies of Mesoamerica and the Andes.[2] Moreover, paleoanthropologists have documented widespread evidence of worsening malnutrition and disease during the years before Europeans arrived. Baseline ill health made American Indians vulnerable to European diseases.[3]

Colonization made matters worse. Mortality increased soon after the arrival of Christopher Columbus, and it quickly reached catastrophic proportions. Estimates of pre-contact American populations vary between 8 and 112 million (2 to 12 million for North America), and estimates of total mortality range from 7 to 100 million.[4] Whatever the exact numbers, the mortality was unprecedented and overwhelming. Hispaniola, the first region subjected to Spanish conquest, foretold the fate of other areas: the Arawak population decreased from as many as 400 000 in 1496 to 125 in 1570.[5] Every new encounter brought new epidemics. Smallpox, measles, influenza, and malaria (and possibly hepatitis, plague, chickenpox, and diphtheria) spread into Mexico and Peru during the 16th century, New France and New England during the 17th century, and throughout North America and the Pacific islands during the 18th and 19th centuries. Populations often decreased by more than 90% during the first century after contact. As recently as the 1940s and 1960s, new highways and new missionaries brought pathogens to previously isolated tribes in Alaska and Amazonia.[6]

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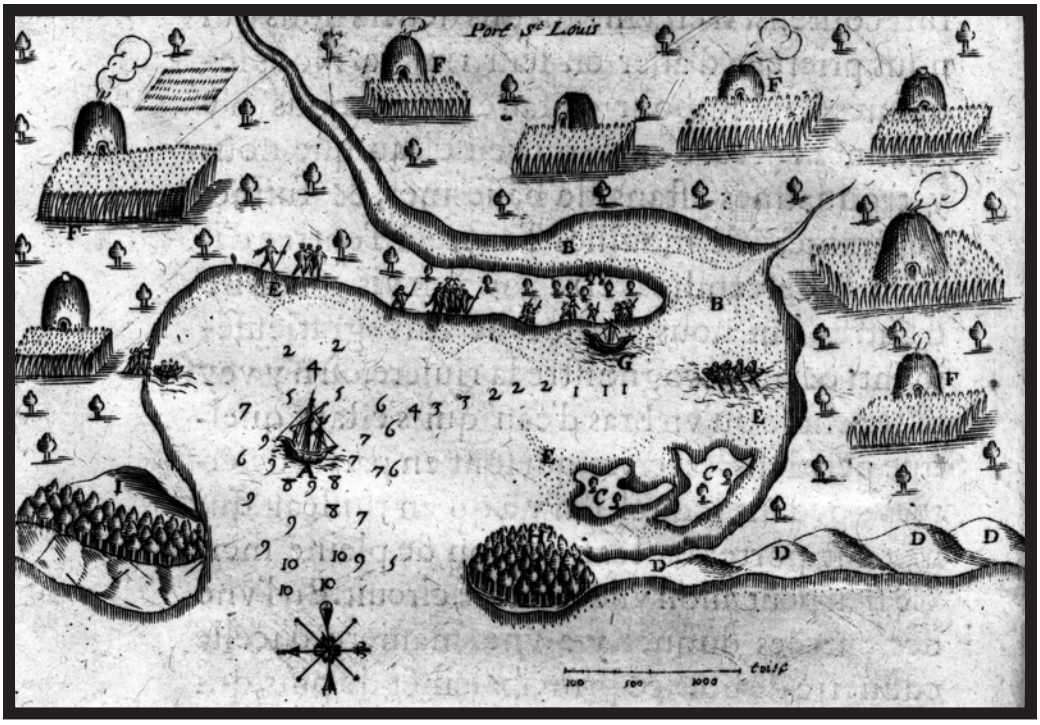
News of the devastation reached Europe rapidly. In 1516, Peter Martyr condemned Spanish brutality but acknowledged that many Indians died from "newe and straunge diseases." The combined impact of abuse and disease was horrifying: "They were once rekened to bee above twelve hundreth thousande heades: But what they are nowe, I abhorre to rehearse."[7] The English first encountered such mortality during their early efforts to colonize North Carolina and Maine. In 1585, Thomas Hariot witnessed epidemics among the Roanok: wherever the English visited, "the people began to die very fast."[8] In 1616, Richard Vines wintered with the Pemaquid in Maine. The local tribes "were sore afflicted with the Plague, for that the Country was in a manner left void of inhabitants."[9] Although its diagnosis remains unclear (smallpox? chicken pox? hepatitis?), the epidemic decimated the coast from Maine to Cape Cod and allowed colonists to move into abandoned Indian villages.[10] Another epidemic, likely smallpox, struck in 1633.[11] Wherever the English went, they saw evidence of mortality. According to William Bradford, the victims "not being able to bury one another, their skulls and bones were found in many places lying still above the ground where their houses and dwellings had been, a very sad spectacle to behold." Bradford estimated overall mortality at 95%.[12] Others guessed it was even higher.[13]

The mortality was not completely one-sided. Half of the Plymouth colonists died during the first winter.[14] Of 6000 colonists sent to Jamestown between 1607 and 1624, only 1200 remained in 1625.[15] Despite their own mortality, explorers and colonists marveled at disparities in disease susceptibility. When they remained healthy while the Roanok succumbed, the English wondered



Accomack [Plymouth Harbor] before the Plague. When Samuel de Champlain explored the coast of Massachusetts in 1613, he found thriving Indian communities, such as Accomack, with its wigwams and fields of corn. Three years later an epidemic devastated the Massachusett and Wampanog tribes. When English colonists arrived in 1620, they found Accomack abandoned. They built their first settlement, Plymouth, on its ruins. *Source.* Sameul de Champlain, *Les Voyages du Sieur de Champlain Xaintongeois* (Paris: 1613). By permission of the Houghton Library, Harvard University.

whether they should credit the odd epidemic to a recent comet, an eclipse, or a "speciall woorke of God for our sakes."[16] Although Vines and his crew shared winter cabins with the dying Pemaquid, "(blessed be GOD for it) not one of them ever felt their heads to ake."[17] When English colonists nursed American Indians suffering from smallpox in Connecticut in 1633, "by the marvelous goodness and providence of God, not one of the English was so much as sick."[18] By the late 17th century, it was clear that Indian and European populations had followed different trajectories. While the English thrived, northeastern Indians declined, victims of disease, displacement, and warfare.[19] As a New York missionary described in 1705, "the English here are a very thriving growing people, and ye Indians quite otherwise, they wast away & have done ever since our first arrival among them (as they themselves say) like Snow agt. ye Sun."[20]

COLONIAL PRECEDENTS

The mortality amazed European colonists. Their responses illustrate many themes that occurred repeatedly as Europeans, and then Americans, witnessed the ongoing health problems among American Indians. As already seen, providential explanations came quickly to Puritan minds. John Winthrop, for example, wrote that "Gods hand hath so pursued them, as for 300 miles space, the greatest parte of them are swept awaye by the small poxe."[21] But providence coexisted with many natural explanations. Although disparities in health status eventually contributed to the formation of modern ideas of racial difference, the colonists did not initially see any intrinsic differences between English and Indian bodies.[22] Philip Vincent, a leader of the English forces during the Pequot War, concluded that "we had the same matter, the same mold. Only art and grace have given us that perfection which yet they want, but may perhaps be as capable thereof as we."[23] Believing that English and Indian bodies shared the same vulnerabilities, colonists often explained Indian epidemics in the same ways that they explained their own diseases. The environment could support both health and disease, with cold winters causing aches and congestions and hot summers bringing fevers and fluxes. Starvation threatened both groups. New foods were just as dangerous. William Wood observed that when the Massachusett changed "their bare Indian commons for the plenty of England's fuller diet, it is so contrary to their stomachs that death or a desperate sickness immediately accrues, which makes so few of them desirous to see England."[24]

During these initial years of encounter between colonists and American Indians, providential and natural explanations appeared side by side. Early modern writers experienced a world in which all events had natural and spiritual causes simultaneously. This synergy of meaning and mechanism provided solace in a bewildering world, reassuring colonists that everything happened according to God's will. However, the different explanations often existed in tension. When fleeing Massachusett conspirators died in 1623, their leader, Ianough, feared that "the God of the English was offended with them, and would destroy them in his anger." Edward Winslow had a more practical explanation: "Through fear they set little or no corn, which is the staff of life, and without which they cannot long preserve health and strength."[25] Daniel Gookin described similar debates about

the deaths of Indian students at Harvard College. Some "attributed it unto the great change upon their bodies, in respect of their diet, lodging, apparel, studies; so much different from what they were inured to among their own countrymen." Others saw the deaths as "severe dispensations of God," either because "God was not pleased yet to make use of any of the Indians to preach the gospel" or because Satan "did use all his strategems and endeavors to impede the spreading of the christian faith."[26] In these cases, the colonists did not find integrated synergy of providence and natural mechanism. Instead, they struggled to choose between them.

These debates make a crucial point: providential explanation was not simply the reflexive response of God-fearing colonists. Rather, colonial writers considered many different explanations: providence, environment, nutrition, behavior, and physical differences. Thus, they could emphasize the most meaningful or useful explanations. Their choices reflected local economic and political pressures. English leaders, for instance, had to justify their right to settle lands already inhabited by American Indians. King James I cited the epidemic-induced depopulation: "Those large and goodly Territoryes, deserted as it were by their naturall Inhabitants, should be possessed and enjoyed by such of our Subjects and People."[27] Many of Winthrop's most forceful statements of providential interpretation occurred when he argued in favor of English colonization. He believed smallpox "cleered our title to this place."[28] After all, "if God were not pleased with our inheriting these parts, why did he drive out the natives before us? And why dothe he still make roome for us, by demi-nishinge them as we increace?"[29] The English used disparities in health status to convince themselves that their mission in America was righteous.

The English were not alone in trying to turn the epidemic disparities to political advantage. Many Indian groups, at least according to their English chroniclers, were quick to see potential benefits. When the English did not succumb to epidemics that devastated the Roanok, Ensenore and other local elders concluded that the English controlled disease. Hoping to exploit this power, they asked the English to unleash the disease against their tribal enemies.[30] Hobbamock, a counselor to Wampanoag Chief Massasoit, made a similar request of the Plymouth colonists: "Being at varience with another Sachem borderinge upon his Territories, he came in solemne manner and intreated the Governour, that he would let out the plague to destroy the Sachem, and his men who were his enemies."[31] Hobbamock and Ensenore hoped that English control over disease would make them powerful allies.

Some Indians also used the disparities in intratribal politics. Squanto, who learned to speak English when he was kidnapped by English explorers in 1614, realized that he could become an influential translator and mediator when the Plymouth colonists arrived in 1620. Believing that his position would be stronger if the Wampanoag feared the English, he manipulated the tribe's fear of disease. He told Hobbamock that the English stored plague in barrels, which they "could send forth to what place or people we would, and destroy them therewith, though we stirred not from home." When Hobbamock confronted the English about this, Squanto's ruse was exposed. Massasoit nearly had him executed.[32]

In some cases, American Indians engaged Europeans in debates about the etiologies of epidemics. The Jesuits, for instance, introduced smallpox and other ill-defined fevers when they arrived in Quebec in 1625. By 1637, 50% of the Huron had died. The Huron asked the Jesuits "why so many of them died, saying that since the coming of the French their nation was going to destruction."[33] The Jesuits, like the English, attributed the epidemics to a range of factors, including the hardship of Huron lives, Huron religious practices, and contagion.

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The Huron, who were suspicious of French intent, feared that the French "had a secret understanding with the disease" and could spread disease by a "crafty demon" concealed in a musket, "bewitched" cloaks, or poisoned water.[34] Although the French denied Huron allegations of deliberate infection, they did admit their culpability for the epidemics. As Hierosme Lalemant wrote, "Where we were most welcome, where we baptized most people, there it was in fact where they died the most."[35] Within this first generation of colonization in North America, both Indians and Europeans struggled to understand the devastation. Their responses echoed their own perspectives and interests.

SMALLPOX AND THE MORAL LIFE

As European settlers moved into the North American interior, each new encounter triggered a new wave of epidemic decimation. Smallpox struck again and again throughout the 17th and 18th centuries. It reached the northwestern plains by the 1780s and the Pacific Northwest by 1802.[36] A particularly virulent outbreak struck the upper Missouri valley in 1837. It afflicted the tribes "with terror never before known, and has converted the extensive hunting grounds, as well as the peaceful settlements of those tribes, into desolate and boundless cemeteries." Between 10 000 and 150 000 Sioux, Mandan, Blackfeet, Arikara, and Assiniboine died. Abandoned villages covered the plains: "No sounds but the croaking of the raven and the howling of the wolf interrupt the fearful silence."[37] Although smallpox dominates the accounts of Indian mortality, observers also described alcoholism, syphilis, and many other fevers and fluxes.

Fur traders, soldiers, missionaries, and settlers followed their ancestors' lead and offered a range of explanations for the American Indians' susceptibility to smallpox. Although less prevalent, providence persisted. In 1764, Thomas Hutchinson abandoned his usual skepticism of Puritan mythology: "Our ancestors supposed an immediate interposition of providence in the great mortality among the Indians to make room for the settlement of the English. I am not inclined to credulity, but should not we go into the contrary extreme if we were to take no notice of the extinction of this people in all parts of the continent."[38] Most observers, however, emphasized destructive Indian behaviors: indifference to cleanliness, foreign diets, reckless use of sweat baths, and the "vicious and dissolute life" caused by alcohol.[39] According to George Catlin, these factors, and not "some extraordinary constitutional susceptibility," explained the smallpox mortality.[40]

Amid the diversity of potential explanations, the emphasis on behavior played a useful role. Although less overtly theological than providential explanations, behavioral theories had clear moral utility: disease became a tool of moral exhortation. According to missionaries, if vice brought disease to American Indians, then acceptance of Christian morality and lifestyles would bring them health. These arguments targeted White audiences as well. It was, after all, Whites who had introduced American Indians to alcohol and other sinful behaviors. Catlin warned his readers that the legacy of White influence on Indian populations, "an unrequited account of sin and injustice," would haunt all Americans on judgment day.[41] American Indians shared this anger. When an Ioway delegation visited London during the 1840s, an English minister demanded that the Ioway acknowledge smallpox as divine punishment. Their war chief had a quick reply: "If the Great Spirit sent the small pox into our country to destroy us, we believe it was to punish us for listening to the false promises of white men. It is a white man's disease, and no doubt it was sent among White people to punish them for their sins."[42]

TUBERCULOSIS, EXTINCTION, AND THE CIVILIZING PROCESS

Into the early 19th century, many European and American observers dismissed Catlin's concerns and argued that American Indians had brought mortality on themselves. This position became increasingly untenable during the 19th century. As contact between White and American Indian societies increased, it became obvious that federal policies adversely affected Indian health. The reservation system, which was imposed between the 1830s and the 1870s, transformed patterns of morbidity and mortality. Smallpox, measles, cholera, malaria, venereal diseases, and alcoholism remained common but were reportedly mitigated by government physicians with vaccination, fumigation, and quarantine.[43]

These problems, however, were dwarfed by tuberculosis. Consumption and scrofula had been present but rare among American Indians for centuries.[44] They quickly became the leading cause of death, especially on the Dakota reservations, where they dominated annual mortality reports, often causing half of all deaths.[45] Physician Z. T. Daniel believed that "it is practically the only disease that causes their large death rate."[46] Although the burden of disease had shifted from acute to chronic infections, the disparities persisted. The surgeon general reported that the consumption hospitalization rate for Indian soldiers in 1892 was more than 10 times the rate for White soldiers.[47] Sioux mortality from tuberculosis alone exceeded the mortality rates from all causes in most major cities.[48]

Observers had little difficulty explaining the prevalence of tuberculosis among the Sioux. Many blamed the reservation system and the terrible living conditions imposed on the confined tribes. Damp, poorly ventilated log cabins and inadequate government rations set the tribes up for disaster. However, as had happened before, they also were quick to blame the Sioux for specific behaviors, from unhygienic cooking to religious dances, pipe smoking, and cigarettes that made bad conditions worse.[49] O. M. Chapman stated these punitive sentiments most clearly: "The excessive mortality is but the sum total of all these influences combined—is the measure of their transgressions."[50]

A broad consensus accepted these problems as the proximate causes of Sioux tuberculosis. The crucial debates of the late 19th century instead confronted the ultimate causes of the disparities in health status, specifically the roles of racial differences and socioeconomic conditions. Ideas of racial hierarchy were firmly entrenched in the national consciousness. Influential works, such as Josiah Nott and George Gliddon's *Types of Mankind*, argued that although American Indians had once thrived in America, they could neither compete nor coexist with "Caucasians": "It is as clear as the sun at noon-day, that in a few generations more the last of these Red men will be numbered with the dead."[51] Some doctors saw these theories as compelling explanations for the disparities in mortality. Daniel believed that Indians could only be saved by mixing with other groups: they will "die everywhere they go, of tuberculosis, until the race is so thoroughly crossed by 'foreign blood' that it will stamp out the tubercle bacillus, and when that is done the Indian race in its original purity will be no more."[52] For those who believed that extinction was inevitable, the reservation system became little more than palliative care for a dying race.[53]

Other observers rejected these pessimistic visions and argued that the outbreak of tuberculosis was not the inevitable result of hereditary inferiority. Rather, it was the contingent product of the difficult transition from primitive life to civilization. Physicians who observed the Sioux before and after their confinement saw how quickly the native health of the Sioux deteriorated. George Bushnell, for example, observed Sioux prisoners who were brought to live among Sioux already settled on a reservation in 1881. He described "scrofulous youths from the Agency, their fleshless limbs fully clad, looking on wistfully at the dances of the warriors in the summer twilight … revealing in many instances a magnificent physique and a boundless vitality, which contrasted cruelly with the listless aspect of some of their spectators."[54]

Although they knew that reservations had fueled tuberculosis, many physicians and officials maintained their faith in the fundamental value of civilization. Tuberculosis existed not because

Ration Day on a Sioux Reservation. Between the 1830s and the 1870s, the federal government confined most American Indian groups onto reservations. The Sioux encountered terrible conditions as the government tried to transform them from nomadic hunters to settled agriculturalists. Many depended completely on government rations for subsistence. These reservations provided ideal conditions for tuberculosis. *Source.* By permission of the National Anthropological Archives, Smithsonian Institution, 56 630.

"The problem was not confined to tuberculosis. Incidence among the Navajo exceeded that of the general population by a factor of 15.8 for tuberculosis, 101.6 for pneumonia, and 1163 for trachoma. The Navajo also had the country's highest infant mortality rate."

the civilizing process was wrong but because it had been implemented badly. Indians were "reduced to the condition of paupers, without food, shelter, clothing, or any of those necessaries of life which came from the buffalo; and without friends, except the harpies, who, under the guise of friendship, feed upon them."[55] The government had to intervene: "We have no right to assume that they are a race given over to God to destruction, and we have less right to doom them ourselves."[56] Health would be restored when the government enabled the Indians to enjoy the full benefits of White civilization.

PERSISTENT DISPARITIES

Faith that civilization would eventually bring health to the American Indians prevailed in the debate about the ultimate causes of tuberculosis. Some government officials committed themselves to improving reservations through education, economic reform, and health care. However, their paternalistic policies, which were based on the assumed superiority of White culture and religion, rarely led to improvement and often made matters worse. Medical campaigns, for example, suffered from inadequate funding. Commissioner of Indian Affairs T.J. Morgan compared the salaries paid to government physicians in the Army, Navy, and IHS and divided these sums by the populations served. He then calculated a crude estimate of how the government valued people: $21.91 per soldier, $48.10 per sailor, and $1.25 per Indian.[57]

The enthusiasm of the Progressive era brought new interest and new funding to the problem of Indian tuberculosis. During the International Congress on Tuberculosis in 1908, Commissioner of Indian Affairs Francis E. Leupp identified tuberculosis as "the greatest single menace to the Indian race."[58] President William Taft committed the government to new action. Congress responded in 1912 with an emergency appropriation of $12 000. The Bureau of Indian Affairs (BIA) organized campaigns against tuberculosis, trachoma, infant mortality, house flies, alcoholism, and tooth decay.[59] Annual appropriations grew steadily and reached $350 000 by 1917. That year, for the first time in more than 50 years, more Indians were born than died. Physician George Kober celebrated the progress: "Thanks to the progress of medical science and the splendid humanitarian efforts of our Government, a noble race of people has been snatched from the very jaws of death."[60]

The 1921 Snyder Act strengthened the mandate for government action, and congressional appropriations continued to grow: $596 000 in 1925, $2 980 000 in 1935, $5 730 000 in 1945, and $17 800 000 in 1955.[61]

Disparities, however, persisted. Tuberculosis mortality in 1925 was 87/100 000 among the general population, 603/100 000 among Indians overall, and 1510/100 000 among Arizona Indians.[62] During World War II, between 10% and 25% of Navajo soldiers and workers had to be returned to the reservation because of active tuberculosis.[63] Postwar surveys confirmed the problem: in 1947, tuberculosis mortality among Arizona Indians (302.4/100 000) dwarfed both the rate among Indians in general (200/100 000) and the national population (30/100 000).[64] The problem was not confined to tuberculosis. Incidence among the Navajo exceeded that of the general population by a factor of 15.8 for tuberculosis, 101.6 for pneumonia, and 1163 for trachoma.[65] The Navajo also had the country's highest infant mortality rate.[66]

Explanations for the persistent tuberculosis disparities followed the framework of the late 19th century. Environmental theories were common; the new challenge was to explain how tuberculosis could thrive in the arid southwest, where the climate was recommended for many convalescing White patients. Physicians who were still critical of American Indian cultures found much to blame in Navajo living conditions: "Benefits to health from an outdoor life are over-balanced by the ill effects of overcrowding, lack of sanitary provisions, and the poverty which leads to a poor, inadequate supply of food."[67] They moved easily from

blaming the conditions of poverty to emphasizing behaviors that the Navajo adopted while living in those conditions. Both the healthy and the sick expectorated freely without disinfecting their sputum. The Navajo ate meals irregularly and prepared food poorly. Intemperance, apathy, indolence, and hopelessness all weakened the people. No one sought proper medical attention. As physician Sydney Tillim complained, they lacked "intelligence in all things medical."[68]

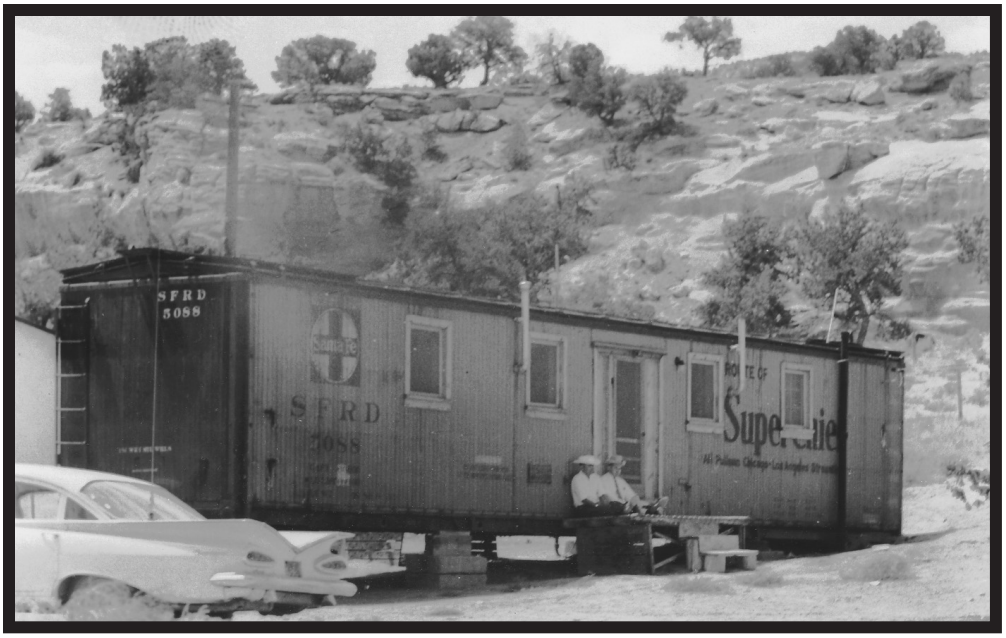
The Navajo expressed both interest and skepticism in these explanations. When Manuelito Begay, a prominent medicine man and a member of the Navajo Tribal Council, saw a microscope slide of the tubercle bacillus, he was impressed but not convinced of its relevance: "They tell me that it is inflicted by a person coughing in your face—that is the way you get tuberculosis in your system. Right away I disagree with it. A person should not be that weak to be susceptible to a man's cough."[69] Other Navajo also scoffed at medical explanations of tuberculosis. One woman argued that if infected sputum sowed tuberculosis within Navajo homes, then chickens, which constantly pecked at the infected dirt floors, should have been devastated by the disease.[70]

White doctors shared Begay's puzzlement about the specific causes of Navajo susceptibility. Ill-defined genetic explanations remained popular. In 1923, the New Mexico State Department of Health went so far as to assert an ongoing process of natural selection: "Resistant race has not been bred as yet. Now undergoing process of weeding out the non-resistant strains."[71] Genetic explanations were used just as easily to explain the surprisingly low incidence of noninfectious diseases among the Navajo, including hypertension, cancer, heart disease, and baldness.[72] Most doctors, however, rejected genetic determinism. The National Tuberculosis Association argued in 1923 that "tuberculosis attacks without any racial preference."[73] Studies found that "the character of tuberculous lesions, as determined roentgenologically, is not significantly different from that observed among the white population."[74] Although the reservations clearly suffered severely from tuberculosis, "identical" epidemics existed among populations "living under like conditions among people of the White and Yellow races."[75] These writers believed that socioeconomic conditions, when severe enough, could destroy the health of any population.

FIGHTING POVERTY WITH MEDICAL TECHNOLOGY

The different explanations had clear implications for American Indian health policy. Whereas New Mexico officials seemed content to allow natural selection to solve the tuberculosis problem, most government officials accepted the causal role of economic nondevelopment and believed that health could only come from improvements in socioeconomic conditions. This became especially clear when a postwar economic recession struck the Navajo and Hopi reservations. Congressional investigators were shocked by what they found: "So long as the Navajos remain on the barren wasteland on which they live, without communities, roads, water, sanitation, or the opportunity to earn a living wage, they must continue to live in squalor and disease."[76] Congress responded in 1950 with a $90 000 000 program for the long-range rehabilitation of the Navajo and Hopi.[77] This intensive program for the Navajo and Hopi reservations paralleled postwar political interest in international economic development. In each case, policymakers believed that the disparities in health status between developed and developing populations arose from disparities in socioeconomic conditions. Improved health could be achieved most fundamentally by economic development.

Although economic development remained the ultimate goal, health officials realized that it could not be achieved easily or quickly enough. They wanted to find ways to improve the health of underdeveloped populations living in rural poverty. One clear problem, which was highlighted in a 1950 American Medical Association report, was the inadequacy of existing health services on the reservations.[78] Annie Wauneka, who led the health committee of the Navajo Tribal Council, agreed during her testimony to Congress: "We think there is no real health program. If there is, we haven't heard about it or seen it. And our sick people are paying for it."[79] Emboldened by postwar optimism and by faith in new technologies, such as penicillin, isoniazid, and DDT, health officials believed that they would be able to improve health conditions, even in the absence of economic changes. Walsh McDermott's "Health Care Experiment at Many Farms" put this question to the test.[80] After choosing a remote area of the Navajo Reservation, McDermott's team of doctors, anthropologists, and social



The Satellite Clinic near Many Farms. Walsh McDermott's team of clinicians and researchers struggled to make best use of the limited resources provided for Indian health. When their initial clinic at Many Farms became overcrowded, they opened up a satellite clinic in the settlement at Rough Rock, 22 miles away. They used a converted refrigerator car, donated by the Santa Fe Railroad: the car, which cooled off at night, remained cool during the hot Arizona days. *Source.* Courtesy of New York Weill Cornell Medical Center Archives, Photograph Collection, Navajo Project, #2302.

scientists worked closely with Wauneka and other Navajo leaders to reduce morbidity and mortality in the absence of socioeconomic reforms. They found that their treatment programs controlled tuberculosis but had little impact on the other leading causes of morbidity and mortality, especially childhood diarrhea and pneumonia. These failures surprised the researchers: "When one considers our pre-experiment expectations, soundly grounded in the conventional wisdom, these results were clearly disappointing."[81] Entrenched disparities in health status did not yield easily to medical technology.

McDermott's work was part of a broader effort to reform health care on the reservations. Frustrated by the continuing failures of the BIA to relieve health disparities, Congress moved the medical services from the BIA to the Public Health Service, thus creating the Indian Health Service in 1955.[82] The IHS conducted an initial health survey and found wide disparities in health status and health services between Indians and the general population. Among American Indians, total mortality was 20% higher, infant mortality was 3 times higher, life expectancy was 10 years lower, and infectious diseases and accidents were more prevalent; however, heart disease and cancer were less common.[83]

Health conditions remained bad into the 1970s: life expectancy was two thirds the national average, and the incidence of infant mortality (1.5 times), diabetes (2 times), suicide (3 times), accidents (4 times), tuberculosis (14 times), gastrointestinal infections (27 times), dysentery (40 times), and rheumatic fever (60 times) also were above the national average. As a result, the Navajo Tribal Council articulated a new vision of Indian health self-determination and attempted to build its own medical school: "The day will arrive when a more effective health-care delivery system utilizing Indian professionals will replace the current system. The day will arrive when the American Indian will determine what his own health standards and services should be."[84] For Wauneka, the "paramount objective" was clear: "The care by Indians of our peoples' health."[85]

The Navajo did not succeed in obtaining funding to establish an independent medical school. However, the IHS steadily increased the participation and the leadership of Indian health professionals within the IHS. It continued to combat health disparities, and by 1989, it claimed great success, arguing that its efforts since 1955 had reduced tuberculosis by 96%, infant mortality by 92%, pulmonary infections by 92%, and gastrointestinal infections by 93%. Although parity with the general population had not been achieved, the gap had been narrowed.[86] However, as they have done for centuries, the disparities survived.

IHS data from the late 1990s showed higher mortality rates among American Indians and Alaskan Natives compared with the general population for most leading causes of mortality: heart disease (1.2 times), accidents (2.8 times), diabetes (4.2 times), alcohol (7.7 times), suicide (1.9 times), and tuberculosis (7.5 times). Only with cancer, the second leading cause of death, was American Indian mortality not greater than that of the general population. Furthermore, these disparities all widened between 1995 and 1998.[87]

Congress and the IHS continue to work to improve conditions on the reservations. The 1975 Indian Self-Determination and Indian Assistance Act (Public Law 93-638) and the 1976 Indian Health Care Improvement Act renewed the government's commitment to Indian health

and gave the tribes more control over their health care services.[88] Working with an annual budget of nearly $3 000 000 000, the IHS now provides services to 1.6 million people in 35 states.[89] However, as has been true since the 19th century, per capita expenditures remain far below those in the general population: $1351 for Indians compared with $3766 for the general population overall.[90] Casinos have brought wealth to a small number of tribes, but Indian gaming could prove to be catastrophic for Indian health if public perception of American Indians as gambling moguls dissolves the obligation felt by Congress to provide care for them.[91]

CONCLUSIONS

Disparities in health status between American Indians and Europeans and Americans have been recognized for 5 centuries. Many observers have felt that the existence of disparities is fundamentally wrong. Such moral outrage has motivated centuries of attempts to relieve them. How have disparities been able to persist? How have they been allowed to persist? Several things are clear.

First, there are striking patterns in attempts to account for the distribution of health and disease. Explanations have spanned a remarkable range of possible etiologies, including religion, diet, living conditions, climate, cultural practices, racial differences, and socioeconomic status. No single explanation has defined the phenomena of disease so clearly that other explanations have been precluded. Many of the explanations have persisted throughout the centuries, although their specific details and meanings have changed. Invocations of providence, for example, gave way to genetic determinism as the most common argument for inevitable disparity. Emphasis has also shifted, with religious explanations dominating initially but then giving way to behavioral, genetic, and socioeconomic explanations. Such a trajectory, however, is only a coarse approximation. Far more striking has been the persistence of the diversity of explanations over time.

Second, the enduring existence of an abundance of possible explanations has allowed observers to emphasize the most meaningful or useful understandings of disease. Needing land, colonists saw Massachusett depopulation as a gift of land. Wanting absolution for the destruction of Indian societies, federal officials saw Sioux tuberculosis as proof of Indians' inevitable demise. These choices could have been constrained by the plausibility of different explanations. Instead, persistent inadequacies in health data for American Indians have often prevented the establishment of clear consensus about the etiology of diseases and disparities. This has allowed observers to exercise considerable discretion in their assessments and has opened a large window for ideology to influence health data, theories, and policies.

Third, choices about explanations have reflected observers' attitudes about a fundamental question: where should responsibility for disparities be assigned? Although some observers blamed personal choices, others argued that Indian diseases were the product of the disrupted social conditions of colonization. Responsibility can fall on the sick (e.g., victims of genetic susceptibility) or the healthy (e.g., misguided architects of the reservation system), or it can be transferred to an outside authority (e.g., God's providence). These assignments have crucial implications for health policy.

Health disparities have been seen as proof of a natural order that can be exploited for observers' benefit, and they have been seen as markers of social injustice that observers must remedy. The shifting balance between these ideological poles contributed to the enormous heterogeneity of past federal Indian health policies. Furthermore, because disparities in health status parallel disparities in wealth and power, responses necessarily involve decisions to deploy or withhold economic and political resources. Policy makers have had to balance Indian health with other priorities and obligations of the federal government, including land acquisition, military needs, resource development, or questions about Indian sovereignty.

The tensions about responsibility and appropriate response appear in current debates about the genetics of health disparities. Researchers have proposed that American Indians have genetic susceptibilities to many diseases, from alcoholism to virgin-soil epidemics or Pima diabetes.[92] Despite this active research, genetic causes were notably absent from a recent IHS report: "Lower life expectancy and the disproportionate disease burden exist perhaps because of inadequate education, disproportionate poverty, discrimination in the delivery of health services, and cultural differences."[93] What generates the controversy surrounding genetic theories of health disparities? By focusing on biological origins, genetic theories naturalize disparities and reduce the shame and stigma associated with behavioral or cultural explanations. But this can be problematic. By introducing an aura of inevitability, genetic arguments reduce the obligation to intervene and prevent or reduce disparities. More practical concerns also contribute. Current interest in molecular genetics makes research into the genetics of disparities a safe bet for researchers in need of grants and publications. In contrast, genetic explanations can be a dead end for policymakers, especially when compared with the many interventions suggested by explanations that emphasize socioeconomic conditions or access to health care.[94]

Debates about the genetic origins of health disparities raise 1 last question. Empowered by the Human Genome Project, researchers hope to find genes for every disease and disparity. However, as more and more genetic links are proposed for American Indian ill health, the overall argument becomes harder to sustain. Disparities among American Indians have existed whether the prevailing diseases were acute infections (e.g., smallpox and measles), chronic infections (e.g., tuberculosis), or the endemic ailments of modern society (e.g., heart disease, diabetes, alcoholism, and depression). Recent trends suggest that disparities in cancer might also emerge. Is it conceivable that American Indians have genetic vulnerabilities to every class of human disease?

The existence of disparities regardless of the underlying disease environment is actually a powerful argument against the belief that disparities reflect inherent susceptibilities of

American Indian populations. Instead, the disparities in health status could arise from the disparities in wealth and power that have endured since colonization.[95] Such awareness must guide ongoing research and interventions if the disparities in health status between American Indians and the general population are ever to be eradicated. ■

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