

# COVID-19 among American Indians and Alaska Natives in the United States: An early look

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**Abstract.** To date the US has experienced the greatest number of cases and deaths due to COVID-19 in the world, but the impact has been even greater for American Indians and Alaska Natives (AIAN). Despite numerous disadvantages related to poor socioeconomic status and preexisting health conditions, Tribal sovereignty, community strength and resiliency have been important factors in limiting the burden of disease on Indigenous Americans. AIAN Tribes have repeatedly chosen to protect lives over Tribal income, choosing to close businesses that are the economic lifeblood of the reservations.

Keywords: COVID-19, American Indian/Alaska Native, socioeconomic status, Tribal communities, Vaccine

## 1. Introduction

As of this writing in mid-December 2020, the United States is in the midst of the largest outbreak of COVID-19 to date. According to COVID Tracking Project at The Atlantic, there are over 17 million cases – an increase of one million Americans in only four days. [Table 1] Over 300,000 Americans have died so far. Recently, over 3,000 Americans died each day from COVID. COVID-19 is now the leading cause of death in the US, surpassing coronary heart disease [1,2].

Although COVID-19 is widespread, American Indians and Alaska Native (AIAN) people have been especially hard-hit. AIAN are Indigenous peoples of the United States (excluding Hawaii, whose Indigenous people are known as Native Hawaiians). According to a study of 23 states from January until July 3, 2020

AIANs were about three and a half times more likely to contract COVID-19 than white Americans and to do so at younger ages [3]. As of mid-December, AIANs contracted COVID at nearly twice (1.93) the rate of whites and 1.41 times more likely to die [1].

This paper describes the extent of the pandemic among Indigenous AIAN people in the US and reasons why their experience is different from other Americans. This paper is about more than health and social disparities and how they increase the likelihood of COVID-19. In addition, Tribal sovereignty and cultural and community strength and resiliency play another more positive role. There was no national response to the COVID-19 outbreak in the US. Instead, responses were left to the states. As sovereign nations, AIAN Tribes enforced their own restrictions. There is growing evidence that serious risk and vulnerability to the impact of COVID cases can be modulated by the agency of communities where there are strong traditions and self-governance. This paper concludes with a discussion on vaccines and what the future holds.

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Table 1  
 COVID-19 cases and deaths by millions: CDC Tracker project

Date	# of cases	Time from last million	Cumulative deaths
January 21	N/A – Start	N/A	N/A
April 28	1 million	119 days	54,761
June 10	2 million	43 days	108,493
July 8	3 million	28 days	124,564
July 23	4 million	15 days	136,364
August 9	5 million	17 days	154,466
August 31	6 million	22 days	175,656
September 25	7 million	26 days	195,768
October 16	8 million	21 days	211,101
October 30	9 million	14 days	221,496
November 9	10 million	11 days	230,487
November 15	11 million	6 days	237,815
November 21	12 million	6 days	247,216
November 27	13 million	6 days	256,132
December 3	14 million	6 days	269,791
December 9	15 million	6 days	280,454
December 13	16 million	4 days	291,017
December 17	17 million	4 days	302,261

Source: The COVID Tracking Project at *The Atlantic*, accessed online December 15, 2020 at <https://covidtracking.com/data/national#reach-skip-nav> and <https://covidtracking.com/race/infection-and-mortality-data>.

## 2. American Indians and Alaska Natives

The AIAN people comprise a small part of the US population. According to the 2010 census, there were 5.2 million (1.6 percent) who reported AIAN as one of their racial groups and 2.9 million (0.9 percent) who reported AIAN as their only race. While the census defines AIAN through self-report, the US government defines AIAN people as belonging to one of 574 federally-recognized Tribes, each with their own culture, and often, language and religion. Tribes are sovereign, with their own governmental structures. Tribes obtained federal recognition largely through treaties with the US, but also through Presidential executive orders and other legal procedures. Tribal lands, generally referred to as reservations, tend to be in remote locations throughout the American West, Southwest and Alaska. Other Tribal lands include pueblos, rancherias, villages in Alaska and historic areas in Oklahoma. Tribal traditions, culture and ways of life depend in large part on the environmental and geographic location of Tribal lands, which range from near tropical to Arctic [4].

Yet, there are similarities. Both American Indian Tribes and villages in Alaska have long histories and traditions. While the US is largely a country of individuals with individual rights, AIAN Tribes and communities are more community-based. This Tribal/community outlook is one of the most important distinctions between Indigenous and non-Indigenous people in the

US. Nowhere was this more evident than how Tribal communities reacted to COVID.

## 3. PAST epidemics

COVID-19 the latest, but far from the first, pandemic to affect AIAN people. Historians have long noted that Europeans brought smallpox, measles and other diseases that were previously unknown in the New World. As a result, millions died. Although no statistics were kept, an estimated to 70 percent died from smallpox alone [5–7]. Two factors were at play here. The first is the introduction of new diseases for which the Native peoples had no immunity, that is, novel viruses like COVID-19. The second is the effects of war and colonization, which led to land loss, cultural upheaval and vastly lowered living conditions. The result is Native peoples have historically been more prone to successive and repetitive waves of infectious diseases like measles, smallpox and tuberculosis [8]. For example, the Blackfoot Tribe of northern Montana endured three smallpox epidemics in 1781/82, 1837/38 and 1870/71 [9]. All three epidemics were devastating, with the last one killing over 70 percent of the population [10]. Mass graves for the last smallpox epidemic on the Blackfoot reservation are a part of the Tribe’s culture and history. When COVID-19 emerged, some in the Blackfoot Tribe referred to it as Smallpox 2020, which illustrated the seriousness with how COVID-19 is viewed.

Epidemics and pandemics did not end with the advent of the 20<sup>th</sup> and 21<sup>st</sup> centuries. The Spanish Flu pandemic in 1918/1919 hit AIAN people harshly at a low point in their history. Centuries of war, disease and starvation, particularly the extermination of the buffalo (the main food of Plains Indians) decreased the number of American Indians in the continental US from 4–12 million to only 237 thousand in 1890 [4]. Mortality statistics for AIAN people were not collected separately for the Spanish Flu, but deaths among the Navajo, the largest Tribe, were estimated at 12 percent of the total population. Some remote Native Alaska villages had mortality rates of 70 to 85 to even 100 percent [11]. The more recent H1N1 virus was milder, but still deadly. An analysis of the twelve states where half of AIAN reside indicated that mortality rates were four times higher for AIAN than for non-Indigenous Americans [12]. Besides pandemics and epidemics, there have been outbreaks of diseases, including tuberculosis, hantavirus and even bubonic plague.

#### 4. COVID-19 outbreak

The disease was first reported in December 2019 in Wuhan, China as a series of pneumonia cases of unknown cause [13]. Transmission of the virus was initially linked to human exposure to animals from the Huanan seafood market; human-to-human transmission was subsequently documented [14]. Although less than half the initial Wuhan cases had underlying conditions, significant proportions developed complications including acute respiratory distress syndrome and acute cardiac injury. The disease was associated with intensive care unit (ICU) admission and high mortality.

Transmission of the infection spread rapidly beyond China in the following weeks. The first case in the United States was identified in mid-January and by January 30, 9,976 cases had been reported in 21 countries [15]. On January 30, WHO declared the outbreak a *Public Health Emergency of International Concern* and on March 11 declared COVID-19 a global pandemic [16,17]. As of December 15, 2020 more than 73 million cases and more than 1.6 million deaths had been reported worldwide [18].

#### 5. COVID-19

COVID-19 is a contagious respiratory illness caused by infection with a new coronavirus (called SARS-CoV-2). Some symptoms of COVID-19 are similar to influenza (fever, cough, sore throat, shortness of breath, fatigue) while others are unique to COVID-19, in particular change in or loss of taste or smell. Unlike influenza, COVID-19 spreads more easily and causes more severe illness in some people. In addition, both the interval between infection and onset of symptoms may be longer and the duration of the contagious period may be longer [19,20]. Because of the similarity in symptoms, testing is required to confirm a case of COVID-19.

COVID-19 cases vary widely in severity. A large-scale study in China found more than 80 percent of patients had mild disease and only 5 percent became critically ill [21]. Rapid transmission of the virus however still results in significant numbers of severe cases. In addition, critical cases are associated with older age as well as with preexisting medical conditions for individuals of any age, including cardiovascular disease, diabetes, obesity and conditions causing a weakened immune system. Severe COVID-19 often presents about one week after appearance of symptoms. The most common symptom of severe COVID-19 is shortness of

breath, with rapid progression to respiratory failure. In the early stages of the epidemic the majority of critically ill patients received prolonged mechanical ventilation, but treatment has evolved with experience in treating severe cases [22].

Most individuals recover from COVID-19 without lasting effect, but some – even those with mild versions of the disease – may continue to suffer from symptoms of the disease after their initial recovery. Others may experience acute injury to major organs including the heart, lungs, kidney and liver [23,24]. Much of this damage is thought to come from very small blood clots that block very small blood vessels in the heart and other major organs [25]. Even in children and adolescents, COVID-19 can cause strokes, seizures and multisystem inflammatory syndrome (symptoms similar to Kawasaki's Disease) [26].

#### 6. Risk factors for infection

A variety of factors can be very important in determining who becomes infected with SARS-CoV-2. Infection risk factors include both socioeconomic determinants of health and some medical conditions. Individuals often contract COVID-19 following close contact (approximately 2 meters or 6 feet) with infected individuals [27]. The virus is transmitted primarily via respiratory droplets produced by sneezing, coughing, sighing or talking; transmission of the virus occurs when another individual inhales the droplets. The droplets remain airborne for a short period of time though longer in cold weather when the air is denser. Under certain conditions, infection can occur at greater distance from an infected individual such as in enclosed spaces with inadequate ventilation: this is known as airborne transmission. To a lesser extent infection can occur through contact with surfaces contaminated with the droplets those individuals then transmit to the mucus membranes of the nose, mouth or eyes. Various socioeconomic, infrastructure and environmental risk factors may increase the likelihood of infection, as discussed below.

*Crowded conditions.* As with all diseases transmitted via aerosol droplets, failure to maintain social distance, whether within the family or outside the home clearly increases the risk of contracting the disease. Although AIANs commonly live in rural or remote areas where social distancing is natural, density in indoor spaces creates conditions that foster droplet transmission. Regular use of an appropriate face mask is an important barrier against infection when social distancing is not pos-

Table 2  
Selected socio-demographic characteristics, AIAN and the US Population: 2016

	American Indians/Alaska Natives	US Population
Median age	32.4*	37.0
Percent aged 65+	9.8%*	15.2%
Percent aged 75+	3.4%*	6.4%
Average Household Size	3.07*	2.65
Average Family Size	3.77*	3.27
Percent with related children under 18	30.0%*	15.9%
Percent with related children under 5	29.7%*	15.1%
Poverty rate for families	21.7%*	10.0%
More than 1 person per room	8.5%*	3.4%
No telephone	6.2%*	3.0%
No motor vehicle	13.4%*	8.7%

\*Statistically significant at 95%.

Source: Connolly, M., Gallagher, M., Hodge, F., Cwik, M., O'Keefe, V., Jacobs, B., Adler, A. Identification in a time of invisibility for American Indians and Alaska Natives in the United States. *Statistical Journal of the IAOS*, 35 (2019) 71-89. DOI 10.3233/SJI-190495. IOS Press.

sible. Examples of crowded conditions include households with a large number of persons per room, nursing homes, prisons, team sports, service jobs that require close contact with the public, and the like. While congregate settings like nursing homes have been the scene of many severe outbreaks, the small proportion of AIANs who live in such settings has been less of a risk factor.

Living conditions among AIAN people in non-congregate settings are more crowded than in the general population. As shown in Table 2, according to the 2016 American Community Survey, both the average household size and family size were significantly higher among AIAN people than for the total US population: 3.07 person to 2.65 and 3.77 persons to 3.27, respectively [4]. A common definition of overcrowding is more than one person per room. In 2016, 8.5 percent of AIAN households and 3.4 percent of US households were overcrowded. AIAN families tend to be more multi-generational: the share of families with children under age 5 and under age 18 is significantly higher and nearly twice that for all of the US: 29.7 percent compared to 15.1 percent and 30.0 percent compared to 15.9 percent, respectively [4].

*Inadequate infrastructure.* Various aspects of infrastructure play an important role in preventing COVID-19 infection. For example, people may use plastic wrap to cover windows in winter months to seal out cold air, thereby impairing ventilation even more. Public health authorities recommend regular hand washing to prevent contracting COVID-19 [28], but this practice becomes particularly challenging with a lack of access to clean water and sanitary facilities. Other types of infrastructure including access to electricity, telephone/mobile phone, and internet are also important for access to

public health information concerning the pandemic and preventive practices. AIAN people are often lacking in these types of basic infrastructure, which are needed in COVID responses of tracking, tracing and education. According to data from the 2013–17 American Community Survey, AIAN people were the least likely to be connected to broadband internet. During that time, 82 percent of the non-AIAN population had a subscription to high-speed internet compared to 67 percent of AIAN overall and only 53 percent of AIAN who lived on reservations [29]. In 2014, about 14 percent of AIAN households on reservations had no electricity: “. . . 10 times higher than average” [30]. Reservations differ in infrastructure: 27 percent of households on the Navajo Nation lacked electricity and 30 percent lacked running water making handwashing difficult [31]. AIAN households were also twice as likely to have no telephone: 6.2 percent versus 3.0 percent in 2016 [4].

*Access to nutrition.* Good nutrition is important in maintaining a health immune system [32]. Accessing nutrition however may require entry to supermarkets or other locations that impede social distancing. The Navajo Nation has the largest land area of any reservation, about the same size as the US state of West Virginia. Yet, while West Virginia has 162 grocery stores, the Navajo have only 13 [31].

*Environment.* Cold weather, in particular severe cold weather, is an important factor in COVID-19 infection. Cold temperatures allow aerosol droplets of the virus to remain airborne for longer, facilitating aerosol transmission of the virus. In addition, cold weather means individuals will spend more time indoors where maintaining social distance will be more difficult. Tribes in the Great Plains, upper Midwest and Alaska have extremely cold weather. In fact, the Blackfoot Tribe of

Montana discussed later, is located in the coldest part of the continental US.

*Access to transportation.* Ownership of a vehicle or access to public transport is important in ensuring several of the factors mentioned above, including travel (and thus, access to) cleaning products and masks, nutrition and health services. Even though AIAN reservations are remote and lack public transportation, 13.4 percent have no motor vehicle, significantly higher than 8.7 percent nationwide [4].

*Access to health services.* Health facilities and staff can help to reduce COVID-19 infections in various ways. Staff can play an important role in educating patients on prevention practices. Health personnel also can assist with contact tracing, alerting individuals to potential exposure, encouraging them to seek COVID-19 testing, and reviewing with them behaviors that may result in exposure to the virus. Tribal education efforts are key to health education. According to Doreen McPaul, the Attorney General for the Navajo Nation, the first order of business was to translate materials on COVID-19 and the name of the disease itself into Navajo [33]. Social distancing measures were also translated from 6 feet (2 meters) into two sheep (on Navajo) and one buffalo (for some Plains Tribes).

## 7. Indian health service

American Indian tribes have had varied agreements for sustenance in exchange for peace and land since early European encounters in the 17<sup>th</sup> century. For most of the time since then these agreements and treaties were violated or ignored. Religious missionaries provided much of the material, education and medical care that happened on reservations. The Bureau of Indian Affairs, originally in the Department of War, officially handled most issues including the granting of citizenship to American Indians in 1924. This is one of the more peculiar, if not preposterous, points of history. The poverty, marginalization and termination efforts subjected American Indians to formidable forces. Resilience prevailed but not without residual effects. US prosperity and modern medicine experienced an explosion in the mid-20<sup>th</sup> century. The Indian Health Service (IHS) was established in 1955, providing AIANs with access to some of these advances. IHS was created to fund Indian Sanitation and Facilities on Indian reservations and to develop a health system that would fulfill this part of the sustenance agreements enshrined in law. Social awareness and obligation were not the pri-

mary factors propelling this act. Insightful Tribal leaders picked up the mantels of history (such as Tecumseh and the Iroquois Confederacy) to formally align in the National Congress of American Indians in 1944 and advocated for IHS. The value of self-determination, inherent to American Indians, was an essential element in the passage of the Indian Self Determination Act of 1975 (PL 93-638). This law recognized that AIANs are entitled to health care and created mechanisms for tribes to directly operate their health systems. The Indian Health Service provides care for members of 574 federally recognized tribes in 37 states in the US. Funding is annually appropriated by Congress but the IHS is notoriously underfunded. The Indian Health Service serves 2.56 million AIAN people. In 2017, while annual per capita medical expenses were \$9,2017 for all Americans, the Indian Health Service spent only \$3,332 per capita [34]. The difference in per capita funding belies the vast resource chasm modulated by the fact that IHS does not perform high-cost services, must deliver care in remote areas in low resource settings and serves a population where serious health disparities challenge good health outcomes. IHS has had operational difficulties including certain vulnerable programs highlighted in 2018, The endurance of the system, however, reflects the devotion of core staff and increased credentialing and employment of AIAN people themselves designing, delivering and directing health services. A small percentage of funds are allocated to Urban Indian centers, where limited services are provided. For those AIANs who do not meet these criteria, they have to rely on private health insurance or public health insurance, such as Medicare for the elderly, Medicaid for those who are economically disadvantaged or the Department of Veterans Affairs if they have served in the military. The remainder have no health insurance.

## 8. Risk factors for severe infection and death

As mentioned earlier, severe infections are associated with older age and chronic medical conditions, including cardiovascular disease, diabetes, and obesity.

*Older Age:* It was obvious early on that COVID-19 adversely affected older persons, those living in congregate settings like nursing homes and those with chronic conditions [6]. At first glance, the younger age distribution of AIAN people was an advantage. As shown in Table 2, the median age of AIAN people in 2016 was nearly 5 years younger than all Americans: 32.4 years compared to 37.0 years [4]. Similar figures were shown

Table 3  
Selected Health Characteristics of American Indians/Alaska Natives (AIAN) and the US Adult Population: National Health Interview Survey 2014–2018

	Total		Rural Population	
	AIAN	US	AIAN	US
Self-Reported Fair/Poor Health Status	20.6%*	12.1%	20.7%*	15.6%
Multiple Chronic Conditions	31.9%*	24.2%	35.5%*	28.9%
Diabetes	15.0%*	8.6%	18.9%*	10.4%
Hypertension	33.7%*	28.7%	35.0%	32.6%
Reported disability	16.3%*	8.9%	12.9%	11.5%
Obesity	38.0%*	31.1%	N/A**	N/A**

\*Statistically significant at 95%.

Sources: Villaruel, M., Clarke, T., Norris, T. Health of American Indian and Alaska Native adults, by urbanization level: United States, 2014–2018. NCHS Data Brief. No. 372. Hyattsville, Maryland. August 2020. \*\* National Center for Health Statistics. Summary Health Statistics National Health Interview Survey, 2018. Table A-15a. Age-adjusted percent distribution of body mass index among adults aged 18 and over, by selected characteristics: United States, 2018.

for those aged 65 or over (9.8 percent versus 15.2 percent) and those aged 75 or over (23.4 percent versus 6.4 percent), respectively [4].

The severity of COVID among elders is a major concern. Elders are revered and a source of cultural knowledge. Often Native speakers of Indigenous languages are elders. Some Tribes put up signs at entrances to Tribal lands asking residents to follow COVID guidelines to “protect our elders”.

*Self-Reported Health Status* Fair or poor health status (as opposed to excellent, very good or good health status) is an indicator of more adverse health outcomes, such as hospitalization, admission to long-term care facilities and death. Those who reported themselves to be in fair or poor health are significantly higher for AIAN, regardless of where they lived. Altogether, 20.6 percent of AIAN reported fair/poor health compared to 12.1 percent of the population. Since the National Health Interview Survey (NHIS) was unable to provide separate estimates for reservations, those who lived in rural areas serves as a proxy. Almost all reservations and other Tribal lands are located in rural areas. For those who lived in rural areas, 20.7 percent of AIAN and 15.6 percent of the population reported themselves to be in fair/poor health.

*Chronic Medical Conditions* According to data from the 2014–2018 National Health Interview Survey (NHIS), shown in Table 3 a significantly higher share of AIAN adults reported multiple chronic conditions (31.9 percent) than all American adults (28.7 percent). Multiple chronic conditions for AIAN in rural areas was significantly higher (35.5 percent) than for other adults in rural areas (28.9 percent) [35].

*Diabetes* Diabetes mellitus, is a driver of severe COVID, is a major chronic condition for AIAN peo-

ple and fourth leading cause of death [36]. The Indian Health Service has a multi-million-dollar initiative on diabetes, called the Special Diabetes Program for Indians enacted in 1997. While prevalence rates are still high, they are decreasing. According to the IHS, A1C levels decreased by 8 percent from 1997 to 2015 [37]. NHIS data indicate that a significantly larger proportion of rural AIAN reported higher rates of diabetes (18.9 percent) compared to 10.4 percent of other rural Americans. Data from the Strong Heart Study, a longitudinal look at coronary heart disease in AIAN people, indicate that diabetes rates vary by region. “. . . [Diabetes rates were] as high as 72 percent of women and 65 percent of men aged 45 to 74 years living in the Southwestern U.S.” [38].

*Obesity* Obesity, defined as having a body mass index of 30 or more, is associated with diabetes. According to the 2018 NHIS, a significantly higher share of AIAN adults were obese (38 percent) compared to the general population (31.1 percent) [39]. Historically, AIAN people had healthy diets and obesity was rare. Although traditional food is still eaten, the preponderance of processed foods and other factors, like more sedentary activities and more childhood trauma and abuse have contributed to higher rates of obesity [4]. Obesity is linked to diabetes, which is associated with coronary heart disease and other conditions, which are linked with severe COVID.

*Coronary Heart Disease* The Strong Heart Study concluded that the high rates of coronary heart disease (CHD) are due to high rates of diabetes, with “nearly all women and half of the men [AIAN] with diabetes have heart disease”. . . [38]. US vital statistics listed “Diseases of the Heart” as the leading cause of death in 2017 for all racial groups (including AIAN), as well

as the entire country [36]. However, analysis found that deaths from heart disease were 20 percent higher for AIAN than for other Americans and that mortality rates for heart disease were higher at younger ages [38].

*Intergenerational Trauma* There are no standard measures for intergenerational trauma. Vivid knowledge of previous pandemics and purposeful assault can contribute to suspicion of outsiders and diminish a sense of hope. AIAN elders are typically engaged in daily life, living and honored among families and their community. While they hold stories about past traumas, they also have respected roles in showing strength and resilience, thus buffering effects from the past. Since COVID preys particularly on the elderly, loss of elders from COVID is detrimental for AIAN communities. This is at odds with mainstream Americans, where elders live more separately and independently.

## 9. Current COVID status

The COVID epidemic in the US is comprised of the sum of all the local epidemics in the country, each with different starting points, peaks and waves. States with the highest populations have the greatest impact on the shape of the national curve. For example, three states have already reached at least one million cases: Texas on November 1, California on November 2 and Florida on December 1 [40–42]. It is likely that few or any communities are following the exact national graph: AIAN communities are no different. One of the earliest Tribes to be hit with COVID was the Navajo, starting in April. At one time, the Navajo Nation had the highest COVID rate in the country – higher even than New York and New Jersey which were just emerging as American and global hotspots. COVID outbreaks on reservations in the Great Plains and Midwest began around September and are starting to level off. Nationwide, the country is in the second wave, compounded by family travel and gatherings for the Thanksgiving holiday. Cases, deaths and hospitalizations are exploding with California, the nation's largest state, surging [1].

The compilation of many local epidemics results in differences in prevalence by state, which, in turn, reflect differences in when these outbreaks occurred. As seen in Table 4, national prevalence and mortality rates for the AIAN and white populations indicate that the overall case rate (prevalence) is nearly double (1.93) and the mortality ratio is 1.41 times higher for AIAN than for Whites. The seven selected states shown have sizable AIAN populations on reservations and Tribal

Table 4  
COVID-19 Cumulative cases and deaths per 100,000 population for American Indians/Alaska Natives compared to whites in selected states: December 15, 2020

	Cases/100,000	Deaths/100,000
US and territories: white	4,978	97
US and territories: White	2,579	69
Ratio AIAN/white	1.93	1.41
Alaska		
AIAN	7,312	59
White	2,531	13
Ratio AIAN/white	2.89	4.54
Arizona		
AIAN	7,707	275
White	3,214	85
Ratio AIAN/white	2.40	3.24
Montana		
AIAN	9,913	*
White	4,677	*
Ratio AIAN/white	2.12	*
New Mexico		
AIAN	11,032	332
White	2,235	70
Ratio AIAN/white	4.94	4.74
North Dakota		
AIAN	8,479	*
White	6,778	*
Ratio AIAN/white	1.25	*
Oklahoma		
AIAN	7,518	60
White	4,768	52
Ratio AIAN/white	1.58	1.15
South Dakota		
AIAN	15,185	211
White	8,641	136
Ratio AIAN/white	1.76	1.55

\*Race data not available for COVID-19 deaths.

Source: COVID Tracking Project, accessed online December 15, 2020 at <https://covidtracking.com/data/national#reach-skip-nav> and <https://covidtracking.com/race/infection-and-mortality-data>.

lands. These states have, to date, higher average prevalence rates than the US. However, regardless of how severe the COVID outbreak in a given state, ratios of AIAN prevalence rates and mortality rates compared to those for whites are higher, with the highest ratios in New Mexico: nearly 5 times higher for both cases and mortality: 4.94 and 4.74, respectively. In Alaska, cases were nearly three times higher (2.89) and mortality nearly 5 times higher (4.54). In Arizona, cases were two and a half times higher (2.4) and mortality rates over 3 times higher (3.24). Montana and North Dakota had case data by race, but not mortality data. Ratios for Montana were over twice as high (2.12) and 1.25 for North Dakota. Oklahoma had a case ratio of 1.58 for cases and 1.15 for mortality. Of all 7 states, South Dakota had the highest case rates for both AIANs

and whites: 15,185 per 100,000 for AIAN and 8,641 for whites, resulting in a ratio of 1.76. Mortality rates in South Dakota were also higher than the national average for both AIANs and whites, with a ratio 1.55 [1].

## 10. Vignettes from three Tribes

As noted earlier, Tribes are diverse culturally and are located in different areas. Since COVID data in the US are a summation of smaller epidemics, the experience of a particular Tribe depends on many factors, including where the Tribe is located and how COVID has affected nearby communities. For the most part, Tribal governments have used their sovereignty to issue restrictions of their own. Often these restrictions were stricter than those enacted by nearby states. The following vignettes illustrate the experience of three Tribes in the US: the Oglala Lakota on the Pine Ridge reservation in South Dakota; the Navajo Nation in Arizona, New Mexico, Utah and Colorado; and, the Blackfeet Tribe in Montana.

The poverty rate for AIAN overall is much higher than for the rest of the country and other racial or ethnic groups. As shown in Table 2, the 2016 American Community Survey found that 21.7 percent of AIAN families lived in poverty compared to 10.0 percent of the general population. Economic conditions are more dire on reservations. Reservations do not have a tax base like other governmental entities, such as the US, states and counties. One way to fill this gap has been the creation of Tribal casinos and hotels, which have generated revenue and decreased unemployment. However, Tribal COVID restrictions have closed these casinos and weakened the economic base. The National Congress for American Indians estimated that \$4.4 billion was lost due to the closing of casinos, of which nearly a billion was in wages [43]. Unable to make up revenue through property taxes, many Tribes decided to close their Tribal borders and lose money from non-casino revenues as well. In effect, this decision put lives over dollars.

*Pine Ridge, South Dakota* The Pine Ridge Indian Reservation, home of the Oglala Lakota, is one of the largest Indian reservations in the US (nearly 3,500 square miles or 8,900 square kilometers) and encompasses three of the poorest counties in the nation. Pine Ridge Reservation is in a remote part of the rural state of South Dakota and residence to just under 20,000 people. It was one of the last reservations created following the final Indian War with US Forces (1890).

The Oglala Lakota are noted for their strength, independence, strong cultural ties and patriotism. In spite of living in a place known for social isolation, households are very dense and because of harsh weather and wood fires are common. Intergeneration homes are typical. There are high rates of smoking, substance abuse, domestic violence and chronic disease. The high-risk characteristics of the community make them vulnerable to surge infections.

With the onset of the first case of COVID in March 2020, Tribal leadership rapidly enforced isolation and shelter in place policies as well as border checks to contain transmission of the virus. Masks, social distancing and virtual learning were almost immediate. Families with confirmed cases were quarantined while voluntary supply delivery systems sprang to life. Roads are bad and distances are far in these circumstances people are accustomed to getting their own supplies. During a fall surge the reservation was locked down for all non-essential travel for a week. The quick compliance with national recommendations made Pine Ridge an outlier in the region where states adhered mostly to individual judgement.

Although Pine Ridge operates the largest Indian Health Service facility in the region, the hospital reached capacity in November, requiring patients to be evacuated. Although this happens periodically due to complexity and overload, a pandemic meant that other hospitals also were full. Fortunately, staff are skilled in working to move very sick patients via long distance transport. At times in the fall season, the regular recipient hospitals were also at capacity for intensive care unit (ICU) beds, requiring transport to major cities much farther away such as Denver, Salt Lake City and Minneapolis. The distance and visitor restrictions meant that families could not travel to be with their very sick or dying loved ones, a hardship that has been characteristic of this pandemic. The cultural competence and credentials of many tribal leaders (Lakota physicians, nurses, lawyers) have enhanced capacity for self-determination. Risk, lack of resources, distance, and communication problems are persistent. Internet access is spotty and, for students, virtual learning is a problem without reliable connectivity, computers, and in crowded conditions. Many hard earned, long terms successes are jeopardized by the nature of the COVID pandemic.

*Navajo Nation, Portions of Arizona, New Mexico, Colorado and Utah* The tribe has reported 20,095 coronavirus cases resulting in 731 deaths out of 173,000 residents [44]. Illnesses in particular came in surges



as quarantine practices and checks at border towns disrupted daily life in the vast spaces of the Reservation. Families live together in small households or compounds, sometimes even traditional housing. This means traveling long distances for basic supplies, including water brought to homes in barrels. Many homes lack water and electricity making hand washing and communication a hardship. Besides the common comorbidities that are risk factors for COVID infection, the Navajo Reservation is a place where occasional exotic infections, such as bubonic plague or hantavirus, occur thus magnifying overall health threats and obstacles to provide health care for all who need it.

As colder winter months are beginning, the prospect of more surges, disrupted supplies and the overall side effects of isolation are areas of great concern. Ceremonies are disturbed. The loss of cultural ways to support the sick and comfort the grieving are issues which have not been examined.

Health personnel on the reservation were among the first to receive the Pfizer-BioNTech vaccine. As the first vaccines were administered to health professionals, Roselyn Tso, director of Navajo Indian Health Service commented on the determination of the community to fight the virus. The Pfizer-BioNTech is reported to be 95 percent effective and is voluntary. Health care personnel as well as community members still awaiting their turn for the vaccine have expressed gratitude to those who sent the vaccine. Local health care providers who have stayed a long course are embedded with the people they serve [45].

*Blackfeet Nation, Montana* The Blackfeet Reservation of northern Montana is home to about 8,000 of the 17,000 members. The Blackfoot Confederacy is composed of three Tribes in Canada and one – the Blackfeet – in the US. The large reservation of about 1.5 million acres (607 thousand hectares), is adjacent to the Blood Reserve in Canada, another member of the Blackfoot Confederacy, on its northern border by the Blood reserve, another member of the Blackfoot Confederacy. The western border is with Glacier National Park, one of the of the most visited national parks in the US. The state of Montana forms the eastern and southern borders. The Blackfeet are ranchers, outfitters and workers in the tourist trade.

Early on in March before any cases appeared, the Blackfeet leadership on the Business Council decided to close the reservation. Although travelers could drive through and get gas, special permits were needed for visitors. The economic impact was immediate. Glacier National Park has entrances on the east side on the

Blackfeet reservation and on the western side in Montana. Since the Blackfeet closed their land, the number of visitors has fallen 48 percent [46]. A map was circulated online of Glacier National Park and adjacent Blackfeet reservation, with the title “The Blackfeet Nation is more important than your vacation”.

In mid-September, after about 105 days with no cases, the outbreak began [47]. As is true for the nature of COVID spread, the number of cases went quickly from a few to 53 to over 400 in mid-October. The Blackfeet COVID-19 Incident Command is in charge of publishing statistics, educating the Tribe and serving as the hub for community support. As of December 16, they reported that there were 20 active cases (including one new case that day), 3 hospitalizations, 1,192 cases since March 15 and 1,147 recoveries during that time. There have been 37 deaths of Tribal members, 30 of whom lived on the reservation. The Blackfeet Covid-19 Incident Command Center has worked with a team from CDC and coordinates delivery of food and firewood to those who are quarantined, have COVID or have no access to transportation. A food truck was also used. Thanksgiving dinners were distributed to homes or through drive in lines. Christmas dinners and toys for children are being distributed now. The sense of community is a less visible, but highly critical role for the Command Center. A memorial service for those who died of COVID was conducted on Facebook Live in November [48]. People who sew have made and donated hundreds of masks and surgical caps to other reservations and nearby communities. The Tribe expects to have Moderna vaccines for healthcare workers and residents of the Tribal nursing home delivered soon after approval. While the Indian Health Service has a small hospital on the reservation, severe cases need to be transferred elsewhere.

Did the early approach to closing before cases appeared work? We may never know, but as Robert DesRosier, the Incident Commander said: “. . . We understood early the compromises that we were putting in place, but we adamantly said it’s life before dollars. The mentality was to protect our elders and our youth – our most vulnerable population that we have responsibility for” [47].

## 11. Vaccination

At the date of this writing, vaccine distribution is beginning in the US. AIAN vaccinations, through the Indian Health Service, will be part of this effort. The

history of vaccination uptake among American Indians and Alaska Natives has been slow because of marginal availability and mistrust about introducing infectious disease in communities. Over decades of campaigns and building culturally sensitive health systems, childhood vaccination rates improved substantially. Participation rates in seasonal flu vaccines during 2010–2019 hovered around 40 percent, significantly below the goal of 70 percent [49]. Health care personnel in IHS came closer to the 90 percent coverage goal in this same period. The emergence of COVID-19 incited uncertainty in the general population and triggered concerns related to historic trauma among many AIANs. Anxiety has accompanied this pandemic for all communities and confidence in health care delivery has been a critical component for AIAN tribes. The proactive position afforded by Tribal sovereignty put tribal leadership in charge of managing COVID transmission on Reservations. Consequently, in spite of enormous challenges, AIAN COVID management has modulated tremendous risk and overcome major obstacles. Many remain as the task for mass vaccination begins.

From the beginning of the pandemic in the US, the hope for an approved vaccine loomed large for communities and health systems. The first distribution has been deployed making this writing a real-time offering on aspiration and planning to deal with COVID-19 since the large-scale restrictions were enacted in March 2020. Under United States governance, states have authority for commerce, licensure as well as delivery of health care. The few national health care delivery systems include the military, veteran's care and Indian Health Service. States and tribal organizations have been engaged in constant cooperative action since the onset of the pandemic. In planning the distribution of COVID vaccines, the Indian Health Service acts much as a state [50]. Health professionals are the first cohort to receive the vaccine. More than 44,000 people work at 338 IHS facilities (health professionals and support staff). The Pfizer-BioNTech vaccine expects 22,425 doses delivered mid-December while 46,000 doses of similar vaccine made by Moderna are expected by the end of 2020. These vaccines are different from traditional vaccines that use weakened or inactivated amounts of a virus; the COVID vaccine contains molecular instructions (mRNA) to make a replica of an antigen spike protein to stimulate the body to create antibodies to resist the virus [51]. This technology initiated in 2017 when the MERS-COV (Middle East respiratory syndrome coronavirus) caused what was called a Middle East respiratory syndrome that year. The ap-

proval process for vaccine approval accelerated under emergency orders. Scaling up the manufacture of nearly six hundred million doses for safe and equitable distribution is a monumental task. Guidance from the Centers for Disease Control has informed discussions and decision making about distribution to states and tribal organizations. The participation of AIAN representatives through planning distribution channels shows the importance of advocacy to address health disparities and how a dismal history associated with safeguarding the health of AIANs must be addressed. In addition, the growth of AIANs in the ranks of health professionals has created a better equipped capacity to respond. Under-representation and under-resourced services are persistent and compelling problems but a path toward workable solutions suggests that investment in AIAN communities is essential.

## 12. Next steps

Eighty percent of deaths from COVID nationwide are among the elderly – a fact which will mediate the number of life years lost due to the pandemic. It is not clear how disproportionate deaths among the elderly compared to younger people will occur among the AIAN population. The loss of loved ones is a universal sorrow marked in all cultures with rituals that have been curtailed due to social distancing. For communal societies, loss of a part affects the whole in ways that require adjustments in activities of daily living. Programs and services for AIAN are often based on specific deficit models and not on shoring up strengths such as close family ties, community identity, language and traditions. A particular concern is the role of elders in AIAN communities as sources of strength and wisdom. Importantly in contemporary days, elders in many Tribes are keepers of language as fewer and fewer Tribal members are fluent in or have native language as their first language. This is not just a problem for the US: when elderly Indigenous people in Brazil died from COVID, they took their languages and a large part of their culture with them [52]. Elders commonly live in the homes of their relatives and are part of the culture of healing needed at this time. This is true worldwide.

In the US, the next part of the pandemic will no doubt deal with the surge of the second wave and the administration of vaccines. Finally, after COVID-19 subsides, we have to assess what we learned for the next pandemic that will, inevitably, occur. While this paper is limited to AIAN people in the US, other In-

Indigenous populations around the world are also experiencing COVID-19, with varying results. Indigenous peoples, having experienced devastating effects from other epidemics are apprehensive [53]. The UN published a report in May 2020 warning that COVID-19 could, like other pandemics and epidemics, worsen the lives of Indigenous people worldwide [54].

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