International Journal of Translational Medical Research and Public Health (2021), Volume 5, Issue 2, 227-253

IJTMRPH

Available online at www.ijtmrph.org

INTERNATIONAL JOURNAL OF TRANSLATIONAL MEDICAL RESEARCH AND PUBLIC HEALTH
ISSN 2576-9499 (Online)
ISSN 2576-9502 (Print)
DOI: 10.21106/ijtmrph.404

ORIGINAL ARTICLE | HEALTH DISPARITIES

Trends in Physical and Mental Health, Mortality, Life Expectancy, and Social Inequalities Among American Indians and Alaska Natives, 1990-2019

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ABSTRACT

Objective: To address the continuing gap in data and research on health and socioeconomic inequities characterizing Native Americans in the United States, this study examines major health and social inequality trends for the American Indian and Alaska Native (AIAN) populations covering several broad areas, including infant and child health, life expectancy and leading causes of death, physical and mental health, chronic disease prevalence, disability, health-risk behaviors, and health care access and quality.

Methods: We used trend data from the 1990-2019 National Vital Statistics System, 2014-2018 National Health Interview Survey, and 2014-2018 American Community Survey to examine health, health care, mortality, and disease patterns for AIANs in relation to other racial/ethnic groups and the general population. Life tables, age-adjusted rates, risk ratios, and logistic regression were used to examine health inequalities.

Results: In 2019, life expectancy of AIANs was 76.9 years, 11.3 years shorter than that for Asian/Pacific Islanders. The infant mortality rate for AIANs was 8.7 per 1,000 live births, 79% higher than the rate for non-Hispanic Whites. Risks of infant mortality from birth defects, low birthweight/prematurity, maternal complications, SIDS, and unintentional injury were significantly greater among AIANs compared with non-Hispanic Whites. Excess mortality among AIANs, particularly in rural areas, was found for working ages, diabetes, liver cirrhosis, alcohol-related causes, youth suicide, and unintentional injuries. About 18% of AIANs assessed their overall health as fair or poor, at twice the rate of non-Hispanic Whites or the general population. About 10% of AIAN adults experienced serious psychological distress, 2-to-5 times higher than the prevalence for other racial/ethnic groups. AIANs had the highest overall disability, mental and ambulatory disability, health uninsurance, unemployment, and poverty rates in the US, with differences in these indicators varying markedly across the AIAN tribes.

Conclusion and Implications for Translation: AIANs remain a disadvantaged segment of the US population in a number of key health indicators and in socioeconomic and living conditions, with poverty rates in some tribal groups approaching or exceeding 40%.

Keywords: • American Indians and Alaska Natives • Tribes • Social Determinants • Race/Ethnicity • Health Disparities • Life Expectancy • Infant Mortality • Leading Causes of Death • Chronic Disease

1. Introduction

The current social, emotional, and physical health status of American Indian and Alaska Native (AIAN) people in the United States exemplifies the enduring legacy and long-term consequences of a people who were historically forcibly displaced from their ancestral lands.[1] Today, AIAN descendants of physically displaced ancestors who were pushed to the margins of their ancestral lands continue to experience disproportionately poor nutritional status, decreased access to safe drinking water, decreased educational and economic opportunities, poor health and access to care, and increased exposure to disease, illegal/illicit tobacco, drugs, alcohol, and violence.[2–4]

Decades and multiple generations after the historical displacement, AIANs—specifically those who live in rural areas—are more likely, when compared with other racial/ethnic groups, to experience poor mental and physical health, lack higher levels of education and be chronically unemployed.[5,6] Generations of AIAN women and girls have experienced increased rates of low-birthweight babies, premature births, and infant mortality, and increased exposure to violence when compared to other racial/ethnic and social groups in the US.[7] AIAN children are more likely to be hungry, overweight and obese, and experience these adverse events at an earlier age.[8,9] AIAN adults experience high rates of obesity and deaths from cardiovascular disease, stroke, cancer, diabetes, and liver disease.[10–13] AIANs also are more likely to initiate early and subsequently abuse tobacco,[14] alcohol and illicit/illegal drugs, die prematurely from drug overdoses and from acute and chronic illnesses/disease.[2] AIANs are at increased risk of committing suicide and of dying a victim of homicide.[10,13] Furthermore, rural AIANs and Black/African Americans have the lowest life expectancy of all racial and ethnic populations in the US.[15,16]

High-quality health data on AIANs are limited in the federal data systems because of their relatively small population size, and because they are sometimes incorrectly classified as another race leading to an underestimation of their morbidity and mortality rates. Although AIANs represent a culturally heterogeneous population consisting of 574 federally recognized tribes, tribal-specific health and socioeconomic data are generally lacking except for those that are numerically large enough to be identified in decennial censuses and the American Community Survey.[13,17] Additionally, to our knowledge, there are no prior studies that have examined in depth myriad health and socioeconomic challenges facing the Native American population across the life course using contemporary and time trend data within the scope of a single paper. Availability of such a comprehensive analysis is urgently needed to develop effective policy responses to reducing marked health inequities among the AIAN population and other racial/ethnic groups.

In this paper, we attempt to fill some of these data and research gaps by analyzing major health and social inequality trends for AIANs. Our analysis covers several broad areas, including infant and child health, life expectancy and leading causes of death, physical and mental health, chronic disease prevalence, disability, health-risk behaviors, and health care access and quality. We use recent census data to analyze social and economic conditions, disability, and health insurance coverage among AIANs by tribe. Additionally, we analyze data from two Health Resources and Services Administration (HRSA) programs, the Health Center Program and the Ryan White HIV/AIDS Program (RWHAP) that are aimed at reducing health, health care and social inequalities among ethnic-minority and socially-disadvantaged populations in the US, including AIANs.[18–20] Analysis of the Health Center Program and RWHAP data on three important clinical performance indicators, hypertension control, diabetes control, and HIV viral suppression, illustrates the effectiveness of intervention programs at the national and local levels in addressing and reducing racial and ethnic inequities in health care outcomes.

2. Methods

2.1. US National Databases

Temporal data from the 1990-2019 National Vital Statistics System (NVSS), 2014-2018 National Health Interview Survey (NHIS), the 2014-2018 American

Community Survey (ACS), the Health Center Program's 2019 Uniform Data System (UDS), and 2010-2019 RWHAP data were used to examine health, health care, mortality, and disease patterns for AIANs in relation to the other racial/ethnic groups and the general population.[10,17,19–24] The time periods for these datasets that were available at the time of this study, varied as described below.

The NVSS has been the primary source for mortality analyses in the US by age, sex, race/ethnicity, cause of death, geographic area, and time period for over a century.[10,13,25] The NVSS consists of both mortality and natality data systems. While the US Standard Certificate of Death, revised most recently in 2003, is the basis for the national mortality data, the natality component of the NVSS includes birth certificate data for approximately 4 million births that occur in the United States each year.[10,13,25] We used the 2015-2018 linked birth/infant death data file[26] and the 2015-2018 national natality file[27] to examine racial/ethnic disparities in age- and cause-specific infant mortality and associated maternal and infant risk factors and birth outcomes.

The ACS is the primary census database for producing socioeconomic, demographic, housing, and labor force characteristics of various population groups at the national, state, county, and local levels.[17,28,29] The unique advantage of the ACS is that it is conducted annually with a sample size of over 3 million records.[17,28,29] The ACS uses a complex, multistage probability design and is representative of the civilian non-institutionalized population, covering all communities in the US.[17,28,29] The household response rate for the ACS exceeds 98%.[17,29] In this study, we used the 2014-2018 ACS Microdata Sample to analyze socioeconomic, health insurance, and disability data.[29] All ACS data are based on self-reports and obtained via mail-back questionnaire, telephone, and in-home personal interviews.[17,28,29] Substantive and methodological details of the ACS are available in census and previous publications.[17,28,29]

The NHIS is a national sample household survey in which data on socioeconomic, demographic, behavioral, morbidity, health, and health care characteristics are collected via personal household interviews.[13,24,30] All information collected in the survey are based on self-reports. The NHIS uses a complex, multistage probability design and is representative of the civilian non-institutionalized population of the United States. The NHIS, one of the longest running federal health surveys, has been conducted annually since 1957 by the National Center for Health Statistics.[24,30] Response rate for an annual NHIS generally exceeds 87%. Data are obtained via in-home person interviews. Substantive and methodological details of the NHIS are described elsewhere.[24,30]

HRSA's Health Center Program aims to improve the health of the nation's underserved communities and vulnerable populations by assuring access to comprehensive, culturally competent, quality primary health care services.[31] Nearly 30 million people nationwide receive primary medical, dental, and/or behavioral health care from approximately 1,500 HRSA-funded or supported health centers.[18,31] The UDS is the main data system of the Health Center Program, which collects data on patient demographic characteristics, clinical processes and outcomes, and a number of clinical quality measures, including low birthweight, access to prenatal care, preventive health screenings and services, and chronic disease management including blood pressure control and uncontrolled diabetes.[31]

The RWHAP program works with states, counties, cities, and community-based organizations to provide HIV care and treatment services to more than half a million people with diagnosed HIV in the US.[18,31] The program reaches more than 50% of all people diagnosed with HIV in the US and the majority of program clients are from low-income and racial/ethnic minority groups.[31] One of the RWHAP health outcomes is viral suppression, which is a widely accepted outcome in HIV care and treatment. People with HIV who are virally suppressed have significantly lower risk of morbidity and mortality from HIV and have virtually no risk of sexually transmitting the disease to other.[31]

2.2. Health Indicators and Outcomes

We considered the following health indicators from NVSS: life expectancy at birth; infant mortality rates

by age and cause of death; child and adolescent mortality; age-adjusted mortality rates from all-causes combined and from leading causes of death such as cardiovascular disease (CVD), cancer, unintentional injuries, chronic liver disease and cirrhosis, diabetes, chronic obstructive pulmonary disease (COPD), suicide, kidney disease, and influenza and pneumonia, Alzheimer's disease, septicemia, viral hepatitis, drug overdose, alcohol-related causes, and firearm injuries. We analyzed the following measures from NHIS and HRSA program databases: self-assessed health, serious psychological distress (SPD), heart disease, diabetes, hypertension, disability, obesity, smoking, hospital admission, emergency room (ER) visits, health insurance, and delayed or forgone medical care due to cost; HIV viral suppression, controlled diabetes and hypertension. SPD is measured by a 6-item scale (K6) that asks respondents how often they experienced each of 6 symptoms of psychological distress in the past 30 days (feelings of sadness, nervousness, restlessness, hopelessness, everything an effort, worthlessness). The K6 varies from 0 to 24, with a score of 13 or more used to define SPD.[13,32] From the ACS, we considered the measures of overall disability status, cognitive and ambulatory disability, and health insurance.[17,28,29]

2.3. Race/Ethnicity Definitions

Race/ethnicity is defined differently in each of the major databases analyzed in terms of racial and ethnic detail. In the national mortality database from the NVSS, we considered the following major racial/ethnic groups: Non-Hispanic Whites, Black/African Americans, AIANs, APIs, and Hispanics. For the linked birth/infant death dataset and the national natality file, we considered the five major racial/ethnic groups as described above as well as API subgroups (Chinese, Japanese, Filipino, Asian Indian, Korean, Vietnamese, Hawaiians, and other Asian/Pacific islanders) and Hispanic subgroups (Mexican, Puerto Rican, Cuban, Central/South American, and other Hispanics). For the NHIS, we considered the five major racial/ethnic groups plus a residual category consisting of other and multiple-race groups. For the ACS, In addition to the five major racial/ethnic groups, we considered 35 AIAN tribes that were identified in the public-use microdata sample.[28]

2.4. Statistical Methods

Life tables, age-adjusted rates, prevalence, risk ratios, and logistic regression were used to examine health inequalities.[6] We used the latest available county-level 2013 rural-urban continuum codes linked to the national mortality database to analyze rural-urban disparities in mortality among AIANs and other racial/ethnic groups.[6,16] All-cause and cause-specific mortality rates were age-adjusted by the direct method using the age composition of the 2000 US population as the standard.[10] The latest available area-based deprivation index based on the 2008-2012 ACS was linked to individual-level mortality data at the county level to derive working-age premature mortality rates according to levels of socioeconomic deprivation.[6,33–35] Twenty-one indicators of education, occupation, wealth, income distribution, unemployment, rate, poverty rate, housing quality, and transportation were used to construct the index.[33–35]

Health, disease, and mortality patterns for AIANs were compared with those for non-Hispanic Whites, the total US population, and other major racial and ethnic minority groups where possible. Multivariable logistic regression was used to examine racial/ethnic disparities in health, disease, health behaviors, and health care factors including infant mortality, self-assessed health, serious psychological distress (SPD), heart disease, diabetes, hypertension, disability, obesity, smoking, hospital admission, emergency room (ER) visits, health insurance, and delayed or forgone medical care due to cost. Adjusted prevalence estimates were derived from the fitted logistic regression models. Infant mortality analyses based on linked birth/infant death data and disability, health insurance, and sociodemographic analyses based on ACS data were conducted by using SAS 9.4.[36] To account for the complex sample design of the NHIS, SUDAAN software was used to conduct all statistical analyses of the NHIS data.[37] The Chi-square statistic was used to test the overall association between each covariate and health and health care measures, while the t-test was used to test the difference in prevalence, incidence, or mortality rates between any two groups or time periods.[6,35] Since multiple outcomes and comparisons were used, statistical

tests of significance were carried out at the 0.05, 0.01, or 0.001 level when appropriate, although 95% confidence intervals of the estimates are presented throughout.[35]

3. Results

3.1. Disparities in Life Expectancy

In 2019, life expectancy at birth was 76.9 years for AIANs, significantly lower than that for Asian/Pacific Islanders (88.2), Hispanics (83.7), non-Hispanic Whites (79.1), and slightly higher than the life expectancy of African Americans (76.2) (Figure 1). Life expectancy for males ranged from a low of 72.6 years for African Americans and 74.2 years for AIANs to a high of 85.9 years for Asian/Pacific Islanders (APIs). Life expectancy for females ranged from a low of 79.5 years for African Americans and 79.6 years for AIANs to a high of 90.2 years for APIs (Figure 1).

The life table-based survival function indicates lower survival rates for AIANs compared to non-Hispanic Whites, APIs, and Hispanics (Table 1). For example, AIANs had a 78.3% probability of surviving from age 20 to age 65 years, while APIs had a 93.1% probability of surviving from age 20 to age 65 years (Table 1).

3.2. Disparities in Infant, Child, and Maternal Health

During 2015-2018, the IMR (derived from the linked birth/infant death file) for AIANs was 8.71 per 1,000 live births, significantly higher than the rate for non-Hispanic Whites (4.87), APIs (4.07), Hispanics (4.97), and the total population (5.81), and lower than the rate of 11.05 for African Americans (Table 2). Indeed, the IMR for AIANs was 3.6 times higher than the rate for Chinese, and the postneonatal mortality rate for AIANs was the highest of all the major racial/ethnic groups. During 2015-2018, AIAN infants experienced higher risks of mortality from three leading causes of death, birth defects, sudden infant death syndrome (SIDS), and unintentional injuries compared to other racial/ethnic groups (Table 2). AIAN infants also experienced significantly higher risks of mortality from maternal complications and perinatal conditions compared to non-Hispanic Whites, Hispanics, and APIs.

With respect to several of the risk factors for infant mortality, AIAN mothers were generally worse off than the other racial/ethnic groups as they had some of the highest rates of teen birth, smoking before and during pregnancy, gestational hypertension, gestational diabetes, pre-pregnancy

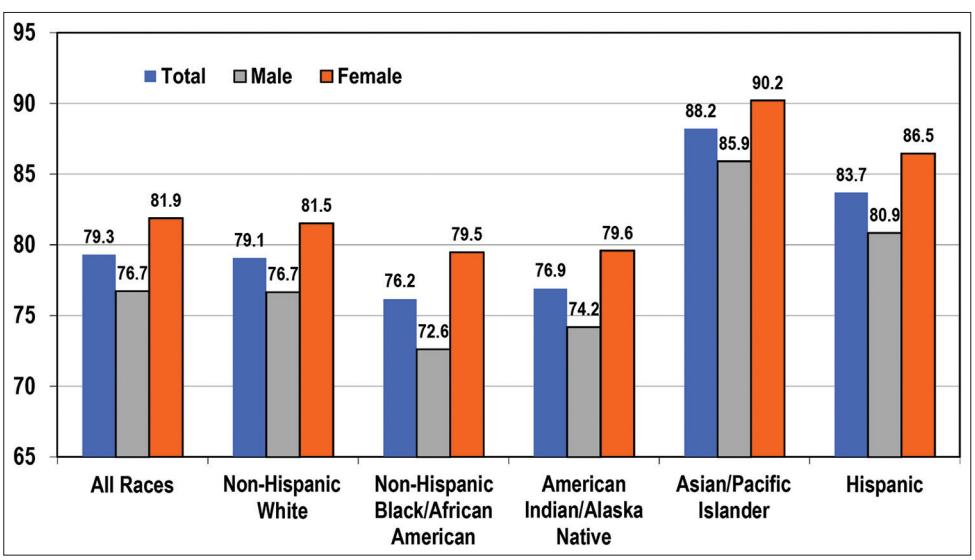

Figure 1: Life Expectancy at Birth (Years) by Race/Ethnicity and Sex, United States, 2019
Source: Data derived from the National Vital Statistics System

Table1: Conditional probability of survival (%) by sex and race/ethnicity, United States, 2019

Race/ethnicity	Survival from birth to age 20 years[1]	Survival from age 20 to 65 years[2]	Survival from age 65 to 85 years[3]
Both Sexes Combined			
American Indian/Alaska Native	98.25	78.33	54.71
Non-Hispanic White	99.14	84.54	51.99
Black/African American	98.23	78.86	47.25
Asian/Pacific Islander	99.33	93.10	70.15
Hispanic	99.13	88.93	62.03
All races (total population)	98.98	84.75	52.88
Male			
American Indian/Alaska Native	98.02	74.33	49.16
Non-Hispanic White	99.00	80.91	45.92
Black/African American	97.91	73.45	38.93
Asian/Pacific Islander	99.22	90.90	64.84
Hispanic	98.97	85.60	55.79
All races (total population)	98.81	80.97	46.58
Female			
American Indian/Alaska Native	98.49	82.40	59.38
Non-Hispanic White	99.29	88.27	57.57
Black/African American	98.56	83.96	53.77
Asian/Pacific Islander	99.44	95.06	74.57
Hispanic	99.30	92.37	67.17
All races (total population)	98.81	80.97	46.58

Source: Based on data from the US National Vital Statistics System, 2019.

Derivations based on life tables for each racial/ethnic group. [1]Obtained by dividing the number of survivors at age 20 to the size of birth cohort (radix) in the corresponding life table. [2]Obtained by dividing the number of survivors at age 65 to those at age 25 years in the corresponding life table. [3]Obtained by dividing the number of survivors at age 85 to those at age 55 years in the corresponding life table.

obesity, and delayed or no prenatal care (Table 3). Controlling for several sociodemographic risk factors, smoking during pregnancy, and prenatal care reduced excess risk of mortality among AIAN infants. However, compared to non-Hispanic White infants, AIANs continued to experience 36% higher adjusted odds of infant mortality, 22% higher adjusted odds of neonatal mortality, and 49% higher adjusted odds of postneonatal mortality (Table 4). When compared with Chinese infants, AIANs had 79% higher adjusted odds of infant mortality, 72% higher adjusted odds of neonatal mortality, and 60% higher adjusted odds of postneonatal mortality (Table 4). After controlling for risk factors, compared to non-Hispanic Whites, AIAN infants had 17% higher odds of birth defects mortality, 31% higher odds of mortality from low birthweight and prematurity, and 38% higher odds of SIDS mortality (Table 5).

During 2015-2019, the overall mortality rate for AIAN children and adolescents aged 1-17 years was significantly higher than the rates for non-Hispanic Whites, Hispanics, and the total population substantially and lower than the rate for African Americans (Table 6). Rural AIAN children had the highest all-cause child and adolescent mortality rates of all major racial/ethnic groups. Rural AIAN children and adolescents had the highest mortality from unintentional injuries and suicide. Suicide mortality among AIAN children aged 5-17 was 5.18 per 100,000 population, compared with 3.78 for non-Hispanic Whites, 1.94 for African Americans, 2.29 for APIs, and 2.02 for Hispanics. Suicide mortality among AIAN children in rural areas was twice as high as the overall AIAN rate (Table 6).

The analysis of the 2014-2018 ACS data revealed that AIAN children had significantly higher disability

Table 2: Number of infant deaths and infant mortality rates (IMR) by infant age at death, cause of death, and detailed race/ethnicity, United States, 2015-2018 (N = 15,571,584 live births)

Race/ ethnicity	Number of Infant Deaths	Infant Mortality Rate	Neonatal Mortality Rate	Postneonatal Mortality Rate	Perinatal Conditions IMR	Birth Defects IMR	LBW and Prematurity IMR	SIDS IMR	Maternal Complications IMR	Un-intentional Injury IMR
All Races (US total)	90,454	5.81	3.86	1.95	286.48	120.52	99.24	36.96	36.87	32.03
American Indian/AN	1,243	8.71	4.53	4.18	314.23	167.53	94.16	95.44	35.14	79.28
Non-Hispanic White	40,654	4.87	3.17	1.70	218.09	112.61	67.94	36.03	26.21	30.97
Non-Hispanic Black	26,058	11.05	7.26	3.79	611.55	151.54	248.26	74.22	79.49	64.59
Asian/ Pacific Islander	4,475	4.07	2.92	1.15	222.40	85.54	69.25	13.14	32.62	11.94
Chinese	569	2.42	1.73	0.69	141.44	43.19	42.04	6.82	13.29	8.51
Japanese	77	2.89	1.79	1.10	126.05	79.84	34.45	11.39	23.09	11.37
Hawaiian	30	9.07	4.24	4.83	363.33	151.17	60.30	60.35	30.12	30.12
Filipino	614	5.03	3.68	1.35	263.33	123.68	71.12	15.62	45.42	15.59
Asian Indian	1,161	3.90	3.10	0.80	256.91	63.55	83.20	3.73	40.47	5.40
Korean	172	2.90	1.90	1.00	134.18	69.71	42.55	13.52	23.72	15.19
Vietnamese	324	3.97	2.73	1.24	185.58	104.83	58.01	14.75	32.37	11.04
Samoan	75	8.75	4.67	4.08	408.73	81.74	140.05	128.25	93.33	58.38
Other API	1,452	5.47	3.73	1.74	269.53	127.66	87.61	23.42	36.14	18.49
Hispanic	18,024	4.97	3.51	1.46	250.72	127.31	83.60	19.79	35.02	17.51
Mexican	10,329	4.94	3.45	1.50	240.65	133.83	79.46	19.08	34.07	18.20
Puerto Rican	1,749	6.16	4.37	1.79	348.75	101.83	124.61	33.15	49.89	27.88
Cuban	358	3.95	2.91	1.04	233.08	61.30	73.40	14.40	37.78	17.70
Central/ South American	2,444	4.22	3.08	1.14	217.97	124.04	76.23	11.95	28.74	9.00
Other Hispanic	3,144	5.39	3.84	1.54	274.30	129.86	87.36	24.44	37.03	18.40

Source: Data derived from the 2015-2018 Linked Birth/Infant Death Period Files
AN = Alaska Native. LBW = Low Birthweight. SIDS = Sudden Infant Death Syndrome. Infant, neonatal, and postneonatal mortality rates are per1,000 live births, whereas cause-specific infant mortality rates are per 100,000 live births

rates (5.51%) than non-Hispanic Whites (4.22%), APIs (2.17%), and Hispanics (4.07%), and African-Americans (5.14%) (Table 7). Cognitive disability rates were also significantly higher among AIAN children than other children from racial/ethnic groups except African Americans. Approximately 13.01% of AIAN children lacked health insurance, compared with 3.94% of non-Hispanic Whites, 4.19% of African Americans, 4.08% of APIs, and 7.85% of Hispanics.

Child disability and health insurance coverage varied substantially across various AIAN tribes. Overall disability rates ranged between 7% and 10%

Table 3: Racial/ethnic variation in selected social and medical risk factors (%) for infant mortality, United States, 2015-2018 (N=15,571,584)

Race/ Ethnicity	Maternal age <20 Years	Maternal age ≥35 Years	Maternal education <12 Years	Maternal education ≥16 Years	Unmarried mother	Foreign-born	Parity ≥3	3rd Trimester or no prenatal care	Pre-pregnancy obesity (BMI≥30)	Smoking in pregnancy	Smoking Before pregnancy	Maternal hyper-tension	Gestational diabetes	Preterm birth (<37 weeks)	Low birth weight (<2500 g)
All Races	5.28	17.28	13.59	32.07	37.65	22.91	12.62	6.15	26.68	7.09	9.24	8.31	7.05	11.51	8.20
American Indian/AN	9.79	11.09	21.14	9.69	65.11	1.26	22.76	11.94	37.75	16.76	20.92	10.62	10.90	14.20	8.01
Non-Hispanic White	3.83	17.55	7.44	41.20	28.10	6.91	10.53	4.45	24.57	10.32	13.19	8.56	6.27	10.23	7.00
Non-Hispanic Black	7.79	14.13	14.36	17.09	68.22	16.10	16.95	9.86	36.52	6.14	8.03	11.61	6.11	16.66	13.61
Asian/ Pacific Islander	1.09	25.20	7.67	60.38	12.62	77.86	6.40	5.67	10.96	0.91	1.48	5.12	12.23	9.97	8.47
Chinese	0.22	31.81	5.82	70.17	8.26	86.61	2.30	6.71	3.18	0.21	0.43	2.83	10.85	7.23	5.93
Japanese	0.17	49.68	1.46	68.41	6.48	72.42	3.52	3.76	5.34	0.92	1.77	4.38	7.58	8.77	8.45
Filipino	1.01	34.04	2.58	54.65	16.33	72.31	7.38	4.01	13.13	0.97	1.94	9.37	13.24	12.51	9.93
Asian Indian	0.32	20.65	4.15	79.70	2.66	89.79	2.78	4.32	10.96	0.14	0.27	4.84	14.68	9.85	10.46
Korean	0.24	40.95	0.68	79.16	6.16	76.63	3.23	4.27	5.67	1.18	2.20	4.58	9.10	8.06	6.25
Vietnamese	0.77	29.70	9.38	42.21	16.51	79.04	5.30	4.47	4.35	0.42	0.74	3.55	12.89	10.50	7.95
Hawaiian	5.63	16.93	14.63	17.90	46.96	6.90	22.35	9.78	38.06	9.24	11.58	9.64	9.19	14.47	9.10
Samoan	4.56	12.57	12.37	7.40	35.16	47.96	29.00	13.76	66.57	6.64	8.60	10.23	11.37	13.92	6.21
Other API	2.95	20.62	17.01	35.50	25.65	61.52	14.06	7.60	18.63	2.20	3.25	5.96	11.28	11.57	8.55
Hispanic	8.08	26.91	28.76	13.22	53.73	48.32	16.10	7.64	29.56	1.78	2.82	6.49	7.72	11.46	7.36
Mexican	8.53	15.36	30.63	10.25	43.13	45.97	18.38	7.81	31.41	1.43	2.32	6.28	8.28	10.98	6.96
Puerto Rican	8.65	12.97	17.53	16.04	63.08	27.96	13.19	5.95	32.20	5.86	8.91	8.04	7.51	12.91	9.49
Cuban	3.44	16.84	8.20	28.44	50.80	54.91	5.38	3.90	21.29	2.02	3.02	7.35	6.20	12.07	7.20
Central/ South American	6.02	21.88	38.68	18.22	47.50	83.10	13.81	9.16	22.02	0.52	1.05	5.62	7.06	11.94	6.95
Other Hispanic	8.95	14.05	20.93	15.27	47.39	31.08	13.32	6.90	30.16	2.27	3.46	7.19	6.69	11.88	8.21

Source: Data derived from the 2015-2018 Linked Birth/Infant Death Period files. AN=Alaska Native. API=Asian/Pacific Islander

Table 4: Logistic regressions showing unadjusted and covariate-adjusted differentials in infant, neonatal, and postneonatal mortality among major racial/ethnic groups, United States, 2015-2018 (N=15,571,584)

Race/ethnicity	Infant Mortality			Infant Mortality			Neonatal Mortality			Neonatal Mortality			Postneonatal Mortality			Postneonatal Mortality		
	Model 1[1]			Model 2[2]			Model 1[1]			Model 2[2]			Model 1[1]			Model 2[2]		
	OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI	
Non-Hispanic White	1.00	Reference		1.00	Reference		1.00	Reference		1.00	Reference		1.00	Reference		1.00	Reference	
American Indian/Alaska Native	1.79	1.69	1.90	1.36	1.28	1.44	1.43	1.32	1.55	1.22	1.13	1.32	2.45	2.26	2.66	1.49	1.37	1.62
Non-Hispanic Black	2.28	2.25	2.32	1.84	1.80	1.87	2.30	2.26	2.35	1.92	1.88	1.96	2.22	2.17	2.28	1.67	1.62	1.72
Chinese	0.50	0.46	0.54	0.76	0.70	0.83	0.55	0.49	0.60	0.71	0.64	0.78	0.41	0.35	0.47	0.93	0.80	1.09
Japanese	0.59	0.47	0.74	0.87	0.69	1.09	0.57	0.43	0.75	0.70	0.53	0.93	0.65	0.45	0.93	1.39	0.96	2.00
Hawaiian	1.87	1.30	2.67	1.63	1.13	2.33	1.34	0.79	2.26	1.21	0.72	2.05	2.84	1.74	4.64	2.25	1.38	3.69
Filipino	1.03	0.95	1.12	1.48	1.36	1.60	1.16	1.06	1.28	1.49	1.36	1.64	0.79	0.68	0.92	1.44	1.23	1.69
Asian Indian	0.80	0.76	0.85	1.31	1.23	1.39	0.98	0.92	1.05	1.35	1.26	1.44	0.47	0.41	0.53	1.16	1.02	1.33
Korean	0.59	0.51	0.69	0.87	0.75	1.02	0.60	0.50	0.72	0.73	0.61	0.88	0.59	0.45	0.76	1.36	1.05	1.76
Vietnamese	0.82	0.73	0.91	1.07	0.96	1.20	0.86	0.76	0.98	1.02	0.89	1.17	0.73	0.60	0.89	1.23	1.01	1.50
Samoan	1.80	1.44	2.26	1.80	1.43	2.26	1.47	1.08	2.01	1.51	1.11	2.07	2.40	1.72	3.34	2.29	1.64	3.20
Other Asian/ Pacific Islander	1.12	1.07	1.18	1.30	1.24	1.38	1.18	1.11	1.26	1.30	1.22	1.39	1.02	0.93	1.12	1.33	1.21	1.46
Mexican	1.01	0.99	1.04	1.03	1.00	1.05	1.09	1.06	1.12	1.15	1.12	1.19	0.88	0.85	0.91	0.82	0.79	0.86
Puerto Rican	1.27	1.21	1.33	1.18	1.13	1.24	1.38	1.31	1.46	1.31	1.24	1.39	1.05	0.96	1.15	0.97	0.89	1.06
Cuban	0.81	0.73	0.90	0.86	0.77	0.96	0.92	0.81	1.04	0.93	0.82	1.05	0.61	0.50	0.75	0.72	0.59	0.89
Central & South American	0.87	0.83	0.90	0.92	0.88	0.96	0.97	0.93	1.02	1.01	0.96	1.06	0.67	0.62	0.72	0.76	0.70	0.83
Other Hispanic	1.11	1.07	1.15	1.13	1.09	1.17	1.21	1.16	1.27	1.28	1.23	1.34	0.91	0.85	0.97	0.86	0.80	0.92

Source: Data derived from the 2015-2018 Linked Birth/Infant Death Period Files

OR=odds ratio; CI=confidence interval; [1]Unadjusted for other covariates [2]Adjusted for maternal age, parity, marital status, nativity, plurality, infant sex, maternal education, place and region of residence, smoking during pregnancy, and prenatal care

for children from Blackfeet, Chicksaw, Iroquois, and Choctaw tribes (Table 7), while children from Crow, Yup'ik, and Seminole tribes had the lowest disability rates (<3%). Children from Blackfeet (12.30%), Iroquois (8.72%), and Chippewa (7.46%) had the highest mental disability rates, while those from Crow (1.45%), Yup'ik (1.63%), and Hopi (2.02%) had the lowest mental disability rates (Table 7).

The tribes for which child health uninsurance rates exceeded 20% included Pima (20.09%), Puget Sound Salish (21.04%), Blackfeet (21.66%), Comanche (22.29), Crow (29.66%), and Seminole (32.44%). Lumbee (2.76%) and South American Indian (2.96%) had the lowest child health uninsurance rates (Table 7).

Socioeconomic conditions under which children of various ethnicities live vary greatly. Poverty among AIAN children is a major social problem. During 2014-2018, 32.99% AIAN children lived below the poverty line, compared with 34.78% of African American children, 11.92% of API children, 11.83% of non-Hispanic White children, and 28.50% of Hispanic children. Some of the tribes with the highest child poverty rates include Tohono O'Odham (51.62%),

Table 5: Logistic regressions showing unadjusted and covariate-adjusted differentials in infant mortality from major causes of death among major racial/ethnic groups, United States, 2015-2018 (N=15,571,584)

Race/ethnicity	Birth Defects			Birth Defects			LBW and Prematurity			LBW and Prematurity			SIDS			SIDS		
	Model 1[1]			Model 2[2]			Model 1[1]			Model 2[2]			Model 1[1]			Model 2[2]		
	OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI	
Non-Hispanic White	1.00	Reference		1.00	Reference		1.00	Reference		1.00	Reference		1.00	Reference		1.00	Reference	
American Indian/Alaska Native	1.49	1.31	1.69	1.17	1.03	1.34	1.39	1.17	1.64	1.31	1.10	1.56	2.65	2.23	3.14	1.38	1.15	1.64
Non-Hispanic Black	1.35	1.29	1.40	1.17	1.12	1.22	3.66	3.53	3.79	2.85	2.73	2.97	2.06	1.94	2.18	1.46	1.37	1.56
Chinese	0.38	0.32	0.47	0.45	0.37	0.55	0.62	0.51	0.76	0.89	0.73	1.09	0.19	0.12	0.31	0.73	0.44	1.21
Japanese	0.71	0.46	1.09	0.79	0.51	1.21	0.51	0.27	0.97	0.71	0.37	1.36	0.32	0.10	0.98	1.03	0.33	3.19
Hawaiian	1.34	0.56	3.22	1.17	0.49	2.82	0.89	0.22	3.54	0.89	0.22	3.55	1.67	0.42	6.69	1.12	0.28	4.50
Filipino	1.10	0.94	1.29	1.21	1.03	1.43	1.05	0.85	1.29	1.55	1.25	1.93	0.43	0.28	0.68	1.02	0.65	1.61
Asian Indian	0.56	0.49	0.65	0.69	0.60	0.81	1.23	1.08	1.39	1.74	1.53	2.00	0.10	0.06	0.19	0.48	0.26	0.86
Korean	0.62	0.46	0.84	0.71	0.52	0.96	0.63	0.42	0.93	0.82	0.55	1.21	0.38	0.19	0.75	1.48	0.74	2.98
Vietnamese	0.93	0.75	1.15	0.94	0.75	1.16	0.85	0.64	1.14	1.12	0.84	1.49	0.41	0.23	0.72	0.97	0.55	1.71
Samoan	0.73	0.35	1.52	0.65	0.31	1.35	2.06	1.17	3.63	2.61	1.48	4.60	3.56	1.97	6.43	3.09	1.70	5.60
Other Asian/ Pacific Islander	1.13	1.02	1.26	1.09	0.97	1.22	1.29	1.13	1.47	1.53	1.34	1.75	0.65	0.51	0.84	0.95	0.73	1.23
Mexican	1.19	1.14	1.24	1.02	0.97	1.07	1.17	1.11	1.24	1.41	1.33	1.50	0.53	0.48	0.59	0.50	0.45	0.56
Puerto Rican	0.90	0.80	1.02	0.95	0.85	1.07	1.84	1.65	2.04	1.63	1.46	1.83	0.92	0.75	1.13	0.88	0.71	1.09
Cuban	0.54	0.42	0.71	0.55	0.42	0.72	1.08	0.85	1.38	1.06	0.83	1.36	0.40	0.23	0.69	0.56	0.33	0.97
Central & South American	1.10	1.02	1.19	0.96	0.88	1.04	1.12	1.02	1.24	1.22	1.10	1.35	0.33	0.26	0.42	0.51	0.39	0.65
Other Hispanic	1.15	1.07	1.24	1.12	1.03	1.21	1.29	1.18	1.41	1.48	1.34	1.62	0.68	0.57	0.80	0.61	0.51	0.73

Source: Data derived from the 2015-2018 Linked Birth/Infant Death Period Files

OR=odds ratio; CI=confidence interval; LBW=low birthweight. SIDS=sudden infant death syndrome. [1]Unadjusted for other covariates. [2]Adjusted for maternal age, parity, marital status, nativity, plurality, infant sex, maternal education, place and region of residence, smoking during pregnancy, and prenatal care

Sioux (49.73%), Pima (45.12%), Apache (44.11%), Yaqui (42.13%), Navajo (41.92%), Comanche (38.61%), Crow (38.20%), and Blackfeet (35.37%). Chicksaw (13.84%) and Tlingit-Haida (14.17%) tribes had the lowest child poverty rates.

3.3. Disparities in Mortality from Leading Causes of Death, 2019

CVD, cancer, unintentional injuries, chronic liver disease and cirrhosis, diabetes, COPD, suicide, kidney disease, and influenza and pneumonia, and Alzheimer's disease were the top 10 leading causes of death among AIANs and accounted for 74.28% of all deaths among them in 2019 (Table 8). All-cause mortality and mortality from CVD and cancer were significantly lower among AIANs compared with non-Hispanic Whites and the total US population. Unintentional-injury mortality among AIANs was similar to that for Whites but was 11% higher than the rate for the total population. The risk of diabetes

Table 6: Mortality rates per 100,000 population among children and adolescents aged 1-17 years by race/ethnicity and cause of death, United States, 2015-2019

All-Cause Mortality	Deaths	Death Rate (95% CI)	SE (Death Rate)
American Indian/Alaska Native	1,466	22.46 (21.31-23.61)	0.59
Asian/Pacific Islander	2,846	12.93 (12.46-13.41)	0.24
Black/African American	17,198	29.56 (29.12-30.00)	0.23
Non-Hispanic White	35,145	19.09 (18.89-19.29)	0.10
Hispanic/Latino	14,377	16.45 (16.18-16.72)	0.14
All Races	70,253	20.20 (20.05-20.34)	0.08
All-Cause Mortality, Rural/Non-Metro Areas Only			
American Indian/Alaska Native	790	40.69 (37.85-43.53)	1.45
Asian/Pacific Islander	152	19.28 (16.22-22.35)	1.56
Black/African American	1,718	33.87 (32.27-35.47)	0.82
Non-Hispanic White	9,057	26.18 (25.64-26.72)	0.28
Hispanic/Latino	1,381	21.07 (19.96-22.18)	0.57
All Races	13,020	27.05 (26.59-27.52)	0.24
Unintentional-Injury Mortality			
American Indian/Alaska Native	511	7.83 (7.15-8.51)	0.35
American Indian/Alaska Native (Rural)	289	14.89 (13.17-16.60)	0.88
Asian/Pacific Islander	639	2.90 (2.68-3.13)	0.11
Black/African American	4,595	7.90 (7.67-8.13)	0.12
Non-Hispanic White	11,588	6.29 (6.18-6.41)	0.06
Hispanic/Latino	4,281	4.90 (4.75-5.04)	0.07
All Races	21,359	6.14 (6.06-6.22)	0.04
Suicide Mortality[1]			
American Indian/Alaska Native	259	5.18 (4.55-5.81)	0.32
American Indian/Alaska Native (Rural)	147	10.05 (8.43-11.68)	0.83
Asian or Pacific Islander	387	2.29 (2.06-2.52)	0.12
Black/African American	864	1.94 (1.81-2.07)	0.07
Non-Hispanic White	5,393	3.78 (3.68-3.88)	0.05
Hispanic/Latino	1,349	2.02 (1.91-2.13)	0.06
All Races	8,192	3.05 (2.99-3.12)	0.03

Source: Data derived from the National Vital Statistics System. CI=confidence interval. SE=Standard error. [1]Suicide rates are computed for children and adolescents aged 5-17 years

mortality among AIANs was 62% higher than that for non-Hispanic Whites and 43% higher than the rate for the total population. Liver cirrhosis mortality among AIANs was at least 2.32 times higher than that for non-Hispanic Whites and the total population. Although drug overdose mortality was 26% lower among AIANs than non-Hispanic Whites, alcohol-related mortality was approximately three times higher among AIANs compared with non-Hispanic Whites and the total US population. The homicide rate for AIANs was 2.70 times higher than the rate for non-Hispanic Whites and 1.21 times higher than the rate for the total population. The risk of firearm-injury mortality was significantly lower for AIANs than for non-Hispanic Whites and the general population (Table 8).

3.4. Trends and Disparities in Mortality from Selected Causes of Death, 1990-2019

Working-age mortality between ages 15 and 64 years is sensitive to social and economic fluctuations and is greatly influenced by deaths due to suicide, homicide,

Table 7: Racial/ethnic and American Indian and Alaska Native tribe-specific differences in disability, health uninsurance, and poverty rates (%), US children aged under 18 years, 2014-2018

Race/Ethnicity and American Indian & Alaska Native Tribe	Total Disability Rate	Cognitive Disability Rate	Health Uninsurance Rate	Poverty Rate
Total population	4.25	4.27	5.01	19.60
Non-Hispanic White	4.22	4.30	3.94	11.83
Black/African American	5.14	5.24	4.19	34.78
Asian and Pacific Islander	2.17	1.79	4.08	11.92
Hispanic	4.07	3.86	7.85	28.50
American Indian and Alaska Native (AIAN)	5.51	5.27	13.01	32.99
Apache	4.64	5.00	10.70	44.11
Blackfeet	9.86	12.30	21.66	35.37
Cherokee	6.65	5.95	14.08	25.97
Cheyenne	4.23	5.34	14.18	32.14
Chicksaw	8.51	6.94	18.45	13.84
Chippewa	6.54	7.46	13.27	30.00
Choctaw	7.29	6.36	15.98	20.68
Comanche	4.30	2.52	22.29	38.61
Creek	5.40	4.94	12.39	26.08
Crow	1.26	1.45	29.66	38.20
Hopi	3.29	2.02	8.41	33.33
Iroquois	7.77	8.72	12.35	27.75
Lumbee	4.03	3.60	2.76	33.82
Mexican American Indian	4.42	4.11	8.03	29.30
Navajo	3.41	3.00	14.28	41.92
Pima	6.14	5.69	20.09	45.12
Potawatomi	5.74	5.02	13.10	19.41
Pueblo	4.82	4.40	15.42	30.88
Puget Sound Salish	4.86	4.05	21.04	19.26
Seminole	2.75	2.44	32.44	21.69
Sioux	5.56	5.70	14.31	49.73
South American Indian	5.15	6.04	2.96	30.00
Tohono O'Odham	5.66	4.62	16.35	51.62
Yaqui	5.69	5.58	11.39	42.13
Other specified AI tribes alone	5.66	5.25	13.31	31.89
All other specified AI tribe combinations	5.92	5.71	12.98	31.59
American Indian, tribe not specified	5.18	4.63	10.06	22.43
Alaskan Athabascan	5.44	4.34	14.28	28.98
Tlingit-Haida	5.48	3.65	14.59	14.17
Inupiat	3.17	3.08	13.22	29.90
Yup'ik	2.13	1.63	13.08	30.08
Aleut	4.21	3.49	14.60	28.86
Other Alaska Native	10.41	13.37	30.83	23.19
Other AIAN specified	8.35	8.39	14.05	30.20
AIAN, not specified	6.35	6.11	9.48	33.51

Source: Data derived from the 2014-2018 American Community Survey. Cognitive difficulty is defined for children aged 5-17 years

Table 8: Age-adjusted death rates from selecting leading causes of death among American Indians/ Alaska Natives (AIAN), Non-Hispanic Whites (NHW), and the total population, United States, 2019

	AIAN	AIAN	NHW		Total Population		AIAN	NHW	US
	Deaths	Death rate	Deaths	Death rate	Deaths	Death rate	Percent	Percent	Percent
All Causes of Death	21,118	561.22	2,189,567	736.76	2,854,838	715.25	100.0	100.0	100.0
Major Cardiovascular Diseases (CVD)	4,912	141.10	668,570	215.46	869,883	213.42	23.3	30.5	30.5
Heart Disease	3,756	106.49	513,673	165.77	659,041	161.52	17.8	23.5	23.1
Stroke	817	24.55	111,060	35.59	150,005	36.96	3.9	5.1	5.3
All Cancers Combined	3,557	94.37	462,064	151.37	599,601	146.15	16.8	21.1	21.0
Lung Cancer	823	21.95	114,068	36.5	139,682	33.43	3.9	5.2	4.9
Colorectal Cancer	358	9.45	39,227	13.17	52,986	13.10	1.7	1.8	1.9
Breast Cancer	241	11.8	30,717	19.38	42,281	19.42	1.1	1.4	1.5
Prostate Cancer	167	11.89	23,310	17.41	31,638	18.32	0.8	1.1	1.1
Cervical Cancer	36	1.53	2,563	1.99	4,152	2.13	0.2	0.1	0.1
Liver & IBD Cancer	280	7.00	18,515	5.91	27,959	6.59	1.3	0.8	1.0
Stomach Cancer	115	3.02	6,209	2.06	11,092	2.76	0.5	0.3	0.4
Accidents and Adverse Effects	2,415	54.71	125,755	54.63	173,040	49.29	11.4	5.7	6.1
Diabetes Mellitus	1,150	30.85	57,325	19.03	87,647	21.58	5.4	2.6	3.1
Chronic Liver Disease and Cirrhosis	1,210	27.49	31,976	11.83	44,358	11.34	5.7	1.5	1.6
COPD	911	26.28	136,454	43.53	156,979	38.18	4.3	6.2	5.5
Suicide	658	13.58	37,672	17.56	47,511	13.94	3.1	1.7	1.7
Pneumonia and Influenza	410	11.56	38,150	12.48	49,783	12.32	1.9	1.7	1.7
Alzheimer's disease	381	14.13	100,532	31.44	121,499	29.85	1.8	4.6	4.3
Nephritis and Kidney Diseases	422	12.10	35,153	11.35	51,565	12.71	2.0	1.6	1.8
Septicemia	298	7.90	28,195	9.32	38,431	9.51	1.4	1.3	1.3
Homicide	350	7.31	5,264	2.71	19,141	6.03	1.7	0.2	0.7
Viral Hepatitis	77	1.66	2,728	0.95	4,285	1.03	0.4	0.1	0.2
Drug Overdose Mortality	897	19.21	50,347	25.93	70,630	21.65	4.2	2.3	2.5
Alcohol-Related Causes	1,450	31.90	28,061	11.14	39,043	10.38	6.9	1.3	1.4
Firearm Injuries	432	9.03	24,151	11.04	39,707	11.86	2.0	1.1	1.4
Firearm Injuries (Rural)	189	15.02	5,791	15.07	7,229	15.41	0.9	0.3	0.3

Source: CDC/NCHS. National Vital Statistics System. 2019 Mortality Detail File. Death rates are directly standardized to the 2000 US standard population. IBD= Intrahepatic bile duct. COPD=Chronic obstructive pulmonary diseases

injuries, drug overdoses, alcohol-related causes, CVD, and cancer.[34] While working-age mortality rates declined consistently between 1990 and 2010, there has been an upward trend in mortality since 2010 for all AIANs and rural AIANs as well as for non-Hispanic Whites and the total US population (Figure 2A). The

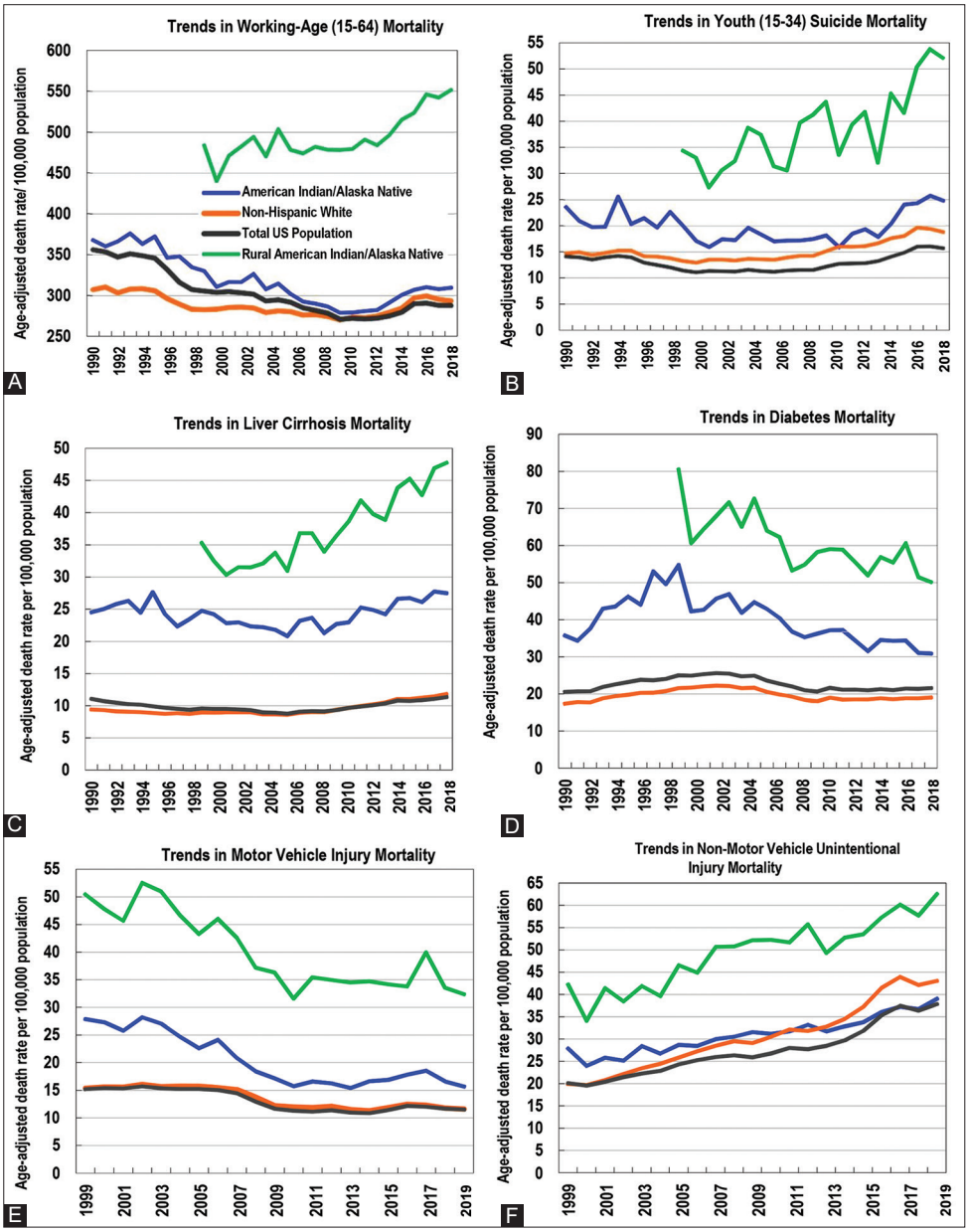

Figure 2 (A-F): Trends in Working-Age Mortality and Cause-Specific Mortality among American Indians and Alaska Natives, Non-Hispanic Whites, and the total US Population, 1990-2019
Source: Data derived from the 1990-2019 National Vital Statistics System

increases in working-age mortality between 2010 and 2019 were more rapid for rural AIANs and for all AIANs than for non-Hispanic Whites and the total population. In 2019, rural AIANs were almost twice as likely to die prematurely in working ages as the total population.

Youth suicide rates have risen since 2001 for all groups, but the rate of increase has been particularly high for AIAN youth (Figure 2B). Suicide rates increased by 56% for all AIAN youth and by 91% for AIAN youth in rural areas. In 2019, compared to the national average, suicide rates were 58% higher among all AIAN youth and 232% higher among AIAN youth in rural areas.

Cirrhosis mortality, for which heavy alcohol consumption is the most important risk factor, has historically been higher among AIANs than among non-Hispanic Whites or the national average. Cirrhosis mortality rates have been rising since 2006, and the rates are currently 4.2 times higher among rural AIANs than the national average (Figure 2C). Diabetes mortality, which is the highest among African Americans and AIANs, increased between 1990 and 2005, but declined between 2006 and 2019 for all groups, with AIANs experiencing a 23% decrease in their mortality rates (Figure 2D). In 2019, compared with the total population, the risk of diabetes mortality was 43% greater for all AIANs and 133% greater for rural AIANs.

Motor vehicle injuries are a prominent cause of death in the US, with AIANs having the highest risk of mortality of all racial/ethnic groups. Although motor-vehicle-related mortality declined significantly during 1999-2010, it showed a relatively stable trend for all groups between 2010 and 2019 (Figure 2E). In 2019, the risk of motor-vehicle-related mortality was 36% greater for all AIANs and 182% greater for rural AIANs compared with the total population.

Non-motor vehicle unintentional injury mortality rates doubled for the total population and non-Hispanic Whites and increased by 63% for AIANs between 2000 and 2019, with steep increases in drug overdose deaths contributing greatly to the rising trend. Increases in drug-overdose mortality have been more rapid for non-Hispanic Whites and the total population compared to AIANs (data not shown). Nonetheless, in 2019, AIANs in rural areas had 65% higher non-motor vehicle unintentional injury mortality than the national average (Figure 2F).

Working-age mortality varies greatly in relation to area socioeconomic deprivation levels (Figure 3). AIANs living in more deprived communities have 2.62 times higher premature mortality than those in more affluent communities (428 deaths vs. 163 deaths per 100,000 population). Similar socioeconomic patterns in premature mortality can be seen for other racial/ethnic groups, including rural AIANs (Figure 3).

3.5. Disparities in Disability, Chronic Conditions, Health Insurance, and Risk Factors

The overall disability rate was highest among AIANs (Table 9). Approximately 17.55% of the AIAN population reported a disability during 2014-2018, compared with 14.49% of non-Hispanic Whites, 14.57% of African Americans, 7.20% of APIs, 9.12% of Hispanics, and 13.10% of the total US population. AIANs also reported significantly higher mental and ambulatory disability rates than other racial/ethnic groups.

Disability rates varied among AIAN tribes. Cherokee (24.15%), Blackfeet (21.73%), and Iroquois (20.85%) had the highest disability rates, while Crow (10.45%), Mexican American Indians (10.73%) and Yup'ik (11.94%) had the lowest disability rates. Blackfeet (10.93%), Cheyenne (10.93%), and Cherokee (10.12%) had the highest mental disability rates, while Yup'ik (4.25%), Puget Sound Salish (4.62%), and Potawatomi (4.99%) had the lowest mental disability rates. Cherokee (14.85%), Blackfeet (13.61%), and Iroquois (12.68%) had the highest ambulatory disability rates, while Mexican American Indians (5.34%), Yup'ik (5.73%), and Crow (6.47%) had the lowest ambulatory disability rates (Table 9).

During 2014-2018, AIANs had the highest rate of uninsurance. Approximately 21.14% of AIANS lacked health insurance, compared with 5.81% of non-Hispanic Whites, 11.71% of African Americans, 6.76% of APIs, and 17.47% of Hispanics. Among the AIAN tribes, Seminole (38.88%), Crow (36.23), Comanche (29.69%), Pima (28.25%), and Cheyenne (28.18%) had the highest rates of uninsurance, while South American Indians (11.99%), Lumbee (13.86%), and Iroquois (14.14%) had the lowest rates of uninsurance (Table 9).

Most racial/ethnic minorities in the US have historically been disadvantaged in terms of social

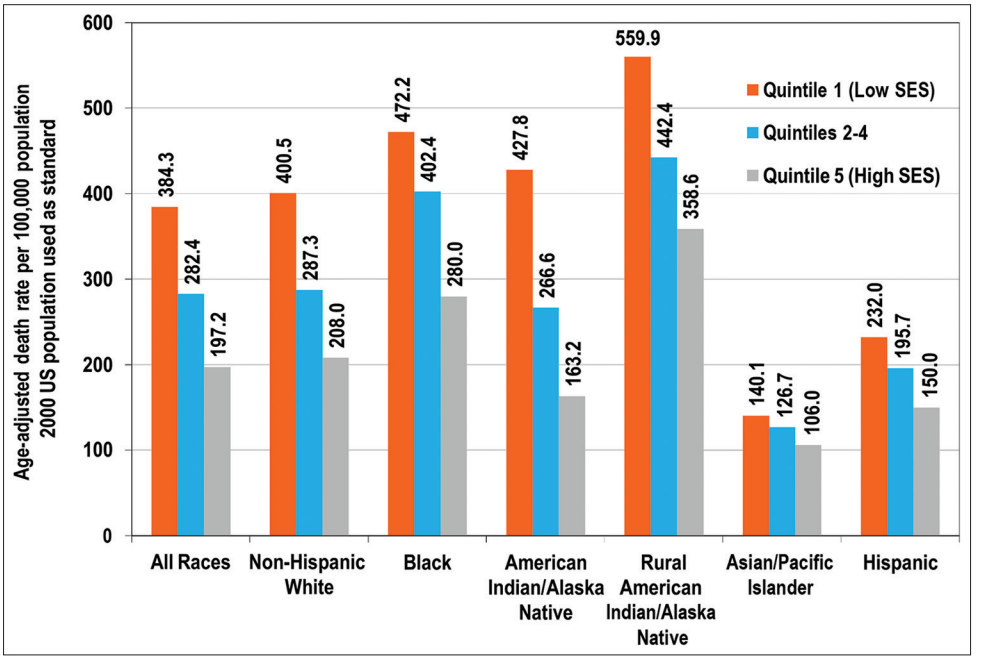

Figure 3: Working-Age (15-64) Mortality by Race/Ethnicity and Socioeconomic Deprivation Level, United States, 2014-2018
Source: Data derived from the National Vital Statistics System

Table 9: Racial/ethnic and American Indian and Alaska Native tribe-specific differences in disability, health uninsurance, education, poverty, and unemployment rates (%), United States, 2014-2018

Race/Ethnicity and American Indian & Alaska Native Tribe	Total Disability Rate	Cognitive Disability Rate	Ambulatory Disability Rate	Health Uninsurance Rate	Poverty Rate	Unemp-loyment Rate	Without High School Diploma	With At Least Bechelor's Degree
Total population	13.10	5.44	7.35	8.32	14.11	5.81	29.73	23.13
Non-Hispanic White	14.49	5.61	8.09	5.81	10.03	4.66	22.90	27.36
Black/African American	14.57	6.82	8.92	11.71	24.20	10.41	33.54	14.59
Asian and Pacific Islander	7.20	2.88	3.87	6.76	11.79	4.68	27.65	40.14
Hispanic	9.12	4.36	4.77	17.47	21.12	6.73	49.55	9.99
American Indian and Alaska Native (AIAN)	17.55	7.90	9.99	21.14	25.82	11.08	39.21	9.92
Apache	19.49	8.21	11.90	15.75	32.22	16.94	39.22	7.46
Blackfeet	21.73	10.93	13.61	26.01	31.55	12.68	35.07	12.85
Cherokee	24.15	10.12	14.85	19.24	21.16	8.53	31.68	13.91
Cheyenne	17.84	10.63	11.55	28.18	32.13	15.74	40.34	10.26
Chicksaw	17.15	7.51	8.99	21.23	12.25	5.62	32.77	15.26
Chippewa	17.87	8.67	9.40	17.98	24.93	11.22	35.88	9.46
Choctaw	18.85	7.61	10.46	22.31	17.50	6.93	37.05	14.32
Comanche	17.85	5.54	9.45	29.69	26.56	11.04	29.01	14.52

(Contd...)

Table 9: ***(Continued)***

Race/Ethnicity and American Indian & Alaska Native Tribe	Total Disability Rate	Cognitive Disability Rate	Ambulatory Disability Rate	Health Uninsurance Rate	Poverty Rate	Unemp-loyment Rate	Without High School Diploma	With At Least Bechelor's Degree
Creek	17.55	6.36	10.53	20.28	18.82	7.73	31.86	14.07
Crow	10.45	5.03	6.47	36.23	32.21	15.10	41.94	8.77
Hopi	12.58	6.16	6.63	16.20	27.55	7.05	31.81	7.36
Iroquois	20.85	8.45	12.68	14.14	21.31	11.86	27.95	14.36
Lumbee	16.60	7.10	10.95	13.86	24.35	7.37	40.81	11.18
Mexican American Indian	10.73	5.35	5.34	25.96	21.00	7.41	57.01	7.71
Navajo	13.72	6.03	7.11	22.34	33.19	13.04	40.61	6.75
Pima	15.25	6.41	8.75	28.25	36.10	13.75	49.39	6.28
Potawatomi	15.95	4.99	9.57	18.07	16.17	8.05	33.79	14.2
Pueblo	14.34	5.97	7.00	25.14	25.83	13.40	36.37	10.26
Puget Sound Salish	13.34	4.62	7.51	20.60	18.07	11.01	40.96	8.52
Seminole	15.85	6.96	10.37	38.88	23.85	12.78	39.1	9.12
Sioux	16.30	8.29	9.13	26.84	41.92	15.43	44.85	7.57
South American Indian	14.87	7.22	7.93	11.99	19.77	8.71	31.31	20.29
Tohono O'Odham	14.88	6.16	8.11	22.05	42.18	20.98	51.67	2.98
Yaqui	17.60	9.43	10.17	20.20	28.05	12.62	42.68	6.78
Other specified AI tribes alone	16.70	6.94	9.35	20.42	24.55	11.26	38.22	10
All other specified AI tribe combinations	17.47	8.00	9.79	19.12	24.15	11.74	36.10	9.92
American Indian, tribe not specified	17.24	8.01	10.20	17.68	19.67	7.02	38.55	12.66
Alaskan Athabascan	19.79	8.70	10.95	25.56	23.37	17.32	34.06	10.05
Tlingit-Haida	18.67	7.91	10.54	23.56	18.98	12.78	25.62	10.93
Inupiat	14.23	5.48	6.73	26.59	26.83	18.96	43.33	6.87
Yup'ik	11.94	4.25	5.73	23.60	27.96	22.30	47.16	2.75
Aleut	17.87	8.61	9.32	24.96	21.29	13.33	36.39	11.82
Other Alaska Native	17.14	9.09	8.24	27.56	22.20	12.23	39.80	6.67
Other AIAN specified	24.93	13.65	13.73	20.76	24.86	15.35	38.65	8.17
AIAN, not specified	18.94	9.03	10.99	18.14	25.53	9.66	43.28	9.05

Source: Data derived from the 2014-2018 American Community Survey

and economic attainment and living conditions.[6,31] Current data on poverty, unemployment, and education continue to reflect these patterns (Table 9). During 2014-2018, AIANs had the highest poverty rate (25.82%), followed by Black/African Americans (24.20%), Hispanics (21.12%), APIs (11.79%), and non-Hispanic Whites (10.03%). Unemployment rates were more than two times higher among AIANs (11.08%) and Blacks (10.41%) compared with non-Hispanic Whites (4.66%). With respect to educational attainment, AIANs were least likely to have a college degree. About 9.92% of AIANs had a college degree, compared with 27.36% of non-Hispanic Whites, 14.6% of Blacks, 9.99% of Hispanics, and 40.14% APIs. These social determinants varied greatly across the AIAN tribes. The poverty rate was highest among Tohono O'Odham (42.18%), followed by Sioux (41.92%), Pima (36.10%), Navajo (33.19%), Apache

(32.22%), Crow (32.21%), Cheyenne (32.13%), and Blackfeet (31.55%). Chickasaw (12.25%) and Potawatomi (16.17%) had the lowest poverty rates. Several tribes reported high rates of unemployment, such as Yup'ik (22.30%), Tohono O'Odham (20.98%), Inupiat (18.96%), Alaskan Athabascan (17.32%), and Apache (16.94%). Chicksaw (5.62%) and Choctaw (6.93%) had the lowest unemployment rates (Table 9).

Table 10 shows racial/ethnic disparities in selected leading health indicators and health-risk factors. During 2014-2018, the prevalence of heart disease among AIANs (18.26%) was 45% higher than that for non-Hispanic Whites (12.59%) and 160% higher than the prevalence for APIs (7.01%). After controlling for socioeconomic and demographic factors, AIANs had 38% higher odds of heart disease than non-Hispanic Whites and 176% higher odds of

Table 10: Age-adjusted[1] and covariate-adjusted[2] prevalence and odds of selected health outcomes and health-risk factors by race/ethnicity, United States, 2014-2018 (N=461,901)

	Age-Adjusted		Odds	95% CI		Covariate-Adjusted		Odds	95% CI	
	Prevalence (%)	SE	Ratio			Prevalence (%)	SE	Ratio		
Race/ethnicity	Self-Assessed Fair/Poor Health (p<.001)					Self-Assessed Fair/Poor Health (p<.001)				
Non-Hispanic White	8.50	0.10	1.00	Reference		9.67	0.11	1.00	Reference	
Non-Hispanic Black	14.94	0.26	1.99	1.90	2.09	11.53	0.19	1.25	1.20	1.31
American Indian/ Alaska Native	18.00	0.95	2.55	2.21	2.95	13.56	0.70	1.56	1.36	1.79
Asian/Pacific Islander	7.98	0.25	0.93	0.86	1.00	8.23	0.25	0.82	0.76	0.88
Hispanic	13.32	0.25	1.72	1.63	1.81	10.06	0.19	1.05	1.00	1.11
Multiple race	12.86	1.33	1.64	1.27	2.12	12.37	1.22	1.38	1.06	1.78
Race/ethnicity	Serious Psychological Distress (p<.001)					Serious Psychological Distress (p<.001)				
Non-Hispanic White	3.46	0.10	1.00	Reference		4.08	0.12	1.00	Reference	
Non-Hispanic Black	3.75	0.23	1.09	0.95	1.24	2.84	0.18	0.68	0.59	0.78
American Indian/ Alaska Native	10.01	1.77	3.11	2.11	4.58	6.84	1.28	1.77	1.16	2.68
Asian/Pacific Islander	1.80	0.21	0.51	0.40	0.65	1.86	0.22	0.44	0.34	0.56
Hispanic	4.06	0.20	1.18	1.05	1.32	2.97	0.15	0.71	0.63	0.81
Multiple race	6.76	1.86	2.02	1.13	3.62	6.50	1.78	1.67	0.91	3.06
Race/ethnicity	Heart Disease (p<.001)					Heart Disease (p<.001)				
Non-Hispanic White	12.59	0.16	1.00	Reference		12.95	0.17	1.00	Reference	
Non-Hispanic Black	11.13	0.32	0.86	0.80	0.92	10.13	0.30	0.74	0.68	0.80
American Indian/ Alaska Native	18.26	1.49	1.63	1.30	2.03	16.53	1.39	1.38	1.10	1.73
Asian/Pacific Islander	7.01	0.39	0.50	0.44	0.57	7.33	0.42	0.50	0.44	0.57
Hispanic	8.72	0.32	0.64	0.59	0.70	8.04	0.30	0.56	0.51	0.61
Multiple race	22.48	3.73	2.19	1.35	3.54	23.05	3.82	2.21	1.35	3.62

(Contd...)

Table 10: ***(Continued)***

	Age-Adjusted		Odds	95% CI		Covariate-Adjusted		Odds	95% CI	
	Prevalence (%)	SE	Ratio			Prevalence (%)	SE	Ratio		
Race/ethnicity	Diabetes (p<.001)					Diabetes (p<.001)				
Non-Hispanic White	8.13	0.12	1.00	Reference		8.46	0.13	1.00	Reference	
Non-Hispanic Black	14.07	0.34	1.95	1.82	2.09	12.50	0.32	1.61	1.5	1.73
American Indian/ Alaska Native	20.45	2.02	3.26	2.44	4.35	18.07	1.88	2.64	1.97	3.55
Asian/Pacific Islander	9.52	0.47	1.20	1.07	1.36	9.96	0.50	1.21	1.07	1.37
Hispanic	13.32	0.37	1.82	1.68	1.97	11.97	0.35	1.53	1.41	1.65
Multiple race	14.40	3.17	2.01	1.14	3.53	14.40	3.14	1.94	1.1	3.42
Race/ethnicity	Smoking (p<.001)					Smoking (p<.001)				
Non-Hispanic White	17.03	0.23	1.06	1.00	Reference	18.53	0.24	1.00	Reference	
Non-Hispanic Black	16.01	0.43	0.93	0.87	0.99	12.85	0.35	0.63	0.59	0.67
American Indian/ Alaska Native	27.88	2.36	1.90	1.50	2.41	23.46	1.95	1.38	1.09	1.75
Asian/Pacific Islander	8.17	0.43	0.43	0.38	0.48	9.14	0.49	0.42	0.37	0.48
Hispanic	9.85	0.30	0.53	0.49	0.57	8.23	0.26	0.37	0.35	0.40
Multiple race	19.68	3.21	1.20	0.80	1.80	20.38	3.10	1.14	0.75	1.71
Race/ethnicity	Obesity (p<.01)					Obesity (p<.001)				
Non-Hispanic White	29.14	0.25	1.00	Reference		29.52	0.25	1.00	Reference	
Non-Hispanic Black	40.14	0.57	1.64	1.56	1.73	38.40	0.58	1.50	1.43	1.58
American Indian/ Alaska Native	45.57	2.67	2.06	1.66	2.55	43.86	2.67	1.89	1.52	2.36
Asian/Pacific Islander	11.67	0.54	0.32	0.29	0.35	12.40	0.57	0.33	0.30	0.37
Hispanic	33.37	0.51	1.22	1.16	1.28	32.57	0.52	1.16	1.10	1.22
Multiple race	30.38	3.89	1.06	0.74	1.53	30.96	3.86	1.07	0.75	1.54
Race/ethnicity	Hypertension (p<.001)					Hypertension (p<.001)				
Non-Hispanic White	29.99	0.23	1.00	Reference		30.53	0.23	1.00	Reference	
Non-Hispanic Black	41.86	0.48	1.94	1.84	2.04	39.75	0.49	1.68	1.6	1.78
American Indian/ Alaska Native	35.22	1.56	1.35	1.14	1.60	33.27	1.54	1.17	0.98	1.4
Asian/Pacific Islander	26.81	0.63	0.82	0.76	0.89	27.97	0.65	0.86	0.79	0.93
Hispanic	29.71	0.46	0.98	0.93	1.04	28.35	0.47	0.88	0.83	0.93
Multiple race	33.87	3.44	1.25	0.85	1.83	34.70	3.49	1.27	0.86	1.88

Source: Data derived from the 2014-2018 National Health Interview Survey SE=Standard error; CI=Confidence interval.

[1]Adjusted by logistic regression for age only. [2]Adjusted for age, survey year, gender, geographic region, income/poverty level, and housing tenure

Self-assessed health is for the entire population, including children and adults. Prevalence of serious psychological distress, heart disease, diabetes, smoking, obesity, and hypertension is for adults aged 18 years and older.

heart disease than APIs. The prevalence of physician-diagnosed diabetes was highest among AIANs (20.45%), 151% higher than the prevalence for non-Hispanic White adults (8.13%) and 115% higher than the prevalence for API (9.52%) (Table 10). Controlling for sociodemographic factors, AIANs experienced 164% higher odds of diabetes than non-Hispanic Whites and 64% higher odds than Blacks. About 18.00% of AIANs assessed their health as fair or poor, a significantly higher percentage than any other major/racial ethnic group. The corresponding prevalence of self-reported health as fair or poor was 8.50% for non-Hispanic Whites and 7.98% for APIs. Controlling for sociodemographic factors, AIANs had 56% higher odds of reporting fair or poor health than non-Hispanic Whites and 1.90 times higher odds than APIs.

Regarding mental health problems, 10.01% of AIAN adults during 2014-2018 experienced serious psychological distress during the past one month, compared with 3.46% of non-Hispanic Whites and 1.80% of APIs (Table 10). Controlling for sociodemographic factors, AIANs experienced 77% higher odds of serious psychological distress than non-Hispanic Whites and 302% higher odds than APIs.

Smoking, obesity, and hypertension are major risk factors that are associated with increased risk of mortality and morbidity from several chronic diseases such as CVD, cancer, diabetes, and COPD. AIANs have one of the highest rates of adult smoking, obesity, and hypertension, significantly higher than the rates for non-Hispanic Whites, APIs, and Hispanics (Table 10). During 2014-2018, 27.88% of AIAN adults were current smokers, 45.57% were obese, and 35.22% were diagnosed with hypertension. Controlling for sociodemographic factors, AIAN adults had 38% higher odds of smoking than non-Hispanic Whites, 229% higher odds than APIs, 273% higher odds than Hispanics, and 119% higher odds of smoking than Blacks. Controlling for sociodemographic factors, AIANs had 89% higher odds of obesity than non-Hispanic Whites and 473% higher odds of obesity than APIs. Controlling for sociodemographic factors reduced excess risk of hypertension of hypertension among AIANs. However, they still had 33% to 36% higher adjusted odds of hypertension than their API and Hispanic counterparts (Table 10).

Figure 4 shows gradients in health outcomes and behavioral-risk factors among AIANs according to poverty/income level, an important social determinant. Although AIANs living below the poverty line had significantly higher risk of each negative health outcome than their high-income counterparts, income gradients in self-assessed fair/poor health and serious psychological distress were particularly large and consistent. For example, AIANs living below the poverty line were 4.39 times more likely to assess their overall health as fair/poor than AIANs with family incomes at or above 400% of the poverty threshold (27.58% vs. 6.28%). AIANs living below the poverty line were 13.35 times more likely to experience serious psychological distress than AIANs with family incomes at or above 400% of the poverty threshold (16.82% vs. 1.26%).

3.6. Disparities in Health Care Access, Quality, and Clinical Outcomes

An important measure of access to quality health care is affordability.[6,31] There were marked racial/ethnic disparities in unmet medical need. During 2014-2018, 8.53% of AIAN adults and 7.98% of African-American adults reported not receiving medical care because they could not afford it, compared with 5.29% of non-Hispanic Whites, 6.53% of Hispanics, and 3.01% of APIs. Additionally, 10.22% of AIAN adults and 9.05% of African-American adults forwent or delayed seeking medical care because of the worry about the cost, compared with 4.34% of APIs and 8.00% of non-Hispanic Whites. After adjusting for sociodemographic differences, AIANs did not differ from non-Hispanic Whites in delayed medical care due to cost but had 46% higher odds of delayed medical care compared to APIs. After adjusting for sociodemographic differences, AIANs did not differ from non-Hispanic Whites in the non-receipt of needed medical care but had 54% higher odds of not receiving care compared to APIs (Table 11).

Emergency room (ER) visits are associated with substantially increased health care costs.[6,31] During 2014-2018, the likelihood of one or more ER visits in the past 12 months was greatest among AIAN

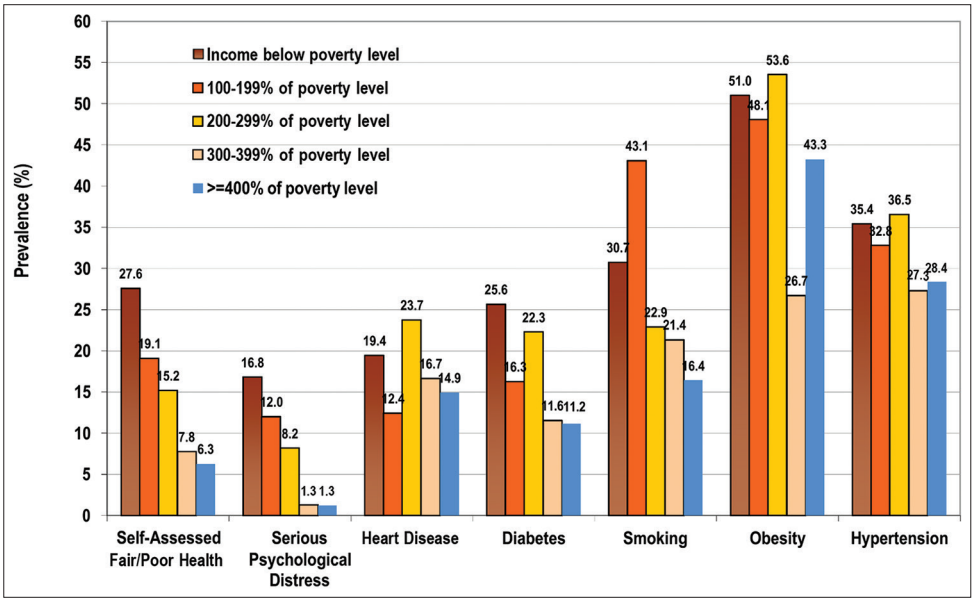

Figure 4: Age-Adjusted Prevalence of Selected Health Indicators and Health-Risk Behaviors among American Indians and Alaska Natives by Family Income/Poverty Level, United States, 2014-2018
Source: Data derived from the 2014-2018 National Health Interview Survey
Notes: Income/poverty gradients were statistically significant at p<.05 for all outcomes except heart disease (p=.055). Self-assessed health is for the entire population, including children and adults. Prevalence of serious psychological distress, heart disease, diabetes, smoking, obesity, and hypertension is for adults aged 18 years and older

adults (32.30%), followed by African Americans (26.30%), non-Hispanic Whites (19.02%), Hispanics (17.95%), and APIs (11.40%). After controlling for sociodemographic factors, AIANs had 67% higher odds of ≥1 ER visits than non-Hispanic Whites and 117% higher odds than APIs. The likelihood of two or more ER visits in the past 12 months among AIANs was 16.95%, 157% higher than non-Hispanic Whites and 406% higher than APIs. Controlling for sociodemographic factors, AIANs had 109% higher odds of ≥2 ER visits than non-Hispanic Whites and 179% higher odds than APIs (Table 11).

Hospital admission is an important health care outcome measure.[31] During 2014-2018, the hospital admission rate for AIANs was 8.95%, not significantly different from the rate of 8.40% for non-Hispanic Whites but 86% higher than the rate of 4.81% for APIs and 35% higher than the rate of 6.63% for Hispanics. After adjustment for sociodemographic factors no statistically significant differences in hospital admission were found between AIANs and other racial/ethnic groups (Table 11).

The 2019 UDS data indicate the lowest rates of controlled blood pressure among African Americans (57.00%), AIANs (58.61%), and Native Hawaiians (60.31%) and highest among Asians (69.85%), non-Hispanic Whites (67.33%), and Hispanics (67.08%) (Figure 5). In 2019, 37.70% of AIAN diabetic patients had uncontrolled diabetes, compared with 30.58% of Hispanic patients, 33.73% of African Americans, 29.18% of non-Hispanic Whites, and 20.32% of Asian-American patients (Figure 5).

HIV viral suppression among the RWHAP patients improved markedly between 2010 and 2019 for all racial/ethnic groups. For AIAN patients, the viral suppression rate increased from 70.4% in 2010 to 87.8% in 2019; for the total population, the viral suppression rate increased from 69.5% in 2010 to 88.1% in 2019 (Figure 6). Viral suppression rates in 2019 were significantly lower among AIANs (87.8%) compared with non-Hispanic Whites (91.8%), Asians (94.7%), and the general RWHAP patient population (88.1%).

Table 11: Unadjusted[1] and Covariate-Adjusted[2] Prevalence and Odds of Emergency Room (ER) Visits, Hospital Admission, and Unmet Medical Needs by Race/Ethnicity, Adults Aged≥18 Years, United States, 2014-2018

	Unadjusted		Odds	95% CI		Covariate-Adjusted		Odds	95% CI	
	Prevalence (%)	SE	Ratio			Prevalence (%)	SE	Ratio		
Race/ethnicity	1+ER visits in past year (N=153,586; p<.001)					1+ER visits in past year (p<.001)				
Non-Hispanic White	19.02	0.19	1.00	Reference		19.11	0.21	1.00	Reference	
Non-Hispanic Black	26.30	0.50	1.52	1.44	1.60	23.11	0.46	1.28	1.21	1.36
American Indian/Alaska Native	32.30	1.73	2.03	1.74	2.37	27.84	1.62	1.67	1.41	1.97
Asian/Pacific Islander	11.40	0.49	0.55	0.50	0.60	15.46	0.71	0.77	0.68	0.86
Hispanic	17.95	0.36	0.93	0.88	0.98	17.62	0.42	0.90	0.84	0.97
Multiple race	20.19	2.74	1.08	0.77	1.51	21.67	2.69	1.18	0.85	1.63
Race/ethnicity	2+ER visits in past year (N=153,586; p<.001)					2+ER visits in past year (p<.001)				
Non-Hispanic White	6.57	0.12	1.00	Reference		6.69	0.13	1.00	Reference	
Non-Hispanic Black	11.26	0.33	1.81	1.68	1.94	8.63	0.27	1.33	1.23	1.43
American Indian/Alaska Native	16.95	1.59	2.90	2.32	3.63	12.69	1.28	2.09	1.64	2.66
Asian/Pacific Islander	3.35	0.25	0.49	0.42	0.58	5.16	0.44	0.75	0.62	0.91
Hispanic	6.56	0.24	1.00	0.92	1.09	6.32	0.28	0.94	0.84	1.05
Multiple race	6.93	1.45	1.06	0.68	1.65	7.30	1.48	1.10	0.71	1.72
Race/ethnicity	Hospital admission in past year (N=345,532; p<.001)					Hospital admission in past year (p<.001)				
Non-Hispanic White	8.40	0.08	1.00	Reference		8.31	0.09	1.00	Reference	
Non-Hispanic Black	9.34	0.17	1.12	1.08	1.17	8.36	0.16	1.01	0.96	1.06
American Indian/Alaska Native	8.95	0.64	1.07	0.92	1.25	7.70	0.60	0.92	0.78	1.09
Asian/Pacific Islander	4.81	0.18	0.55	0.51	0.60	6.41	0.26	0.75	0.69	0.82
Hispanic	6.63	0.14	0.77	0.74	0.81	7.09	0.16	0.84	0.79	0.89
Multiple race	7.66	1.11	0.90	0.67	1.23	9.24	1.25	1.13	0.83	1.52
Race/ethnicity	Delayed medical care due to cost in past year (N=350,683; p<.001)					Delayed medical care due to cost in past year (p<.001)				
Non-Hispanic White	8.00	0.1	1.00	Reference		9.07	0.12	1.00	Reference	
Non-Hispanic Black	9.05	0.21	1.14	1.09	1.21	6.49	0.15	0.68	0.65	0.72
American Indian/Alaska Native	10.22	1.09	1.31	1.04	1.65	7.40	0.85	0.79	0.61	1.02
Asian/Pacific Islander	4.34	0.19	0.52	0.48	0.57	5.22	0.23	0.54	0.49	0.59
Hispanic	8.25	0.2	1.03	0.98	1.09	6.74	0.17	0.71	0.67	0.76
Multiple race	12.26	1.56	1.61	1.21	2.14	11.69	1.36	1.35	1.02	1.79
Race/ethnicity	Did not get needed medical care due to cost in past year (N=350,633; p<.001)					Did not get needed medical care due to cost in past year (p<.001)				
Non-Hispanic White	5.29	0.08	1.00	Reference		6.26	0.10	1.00	Reference	
Non-Hispanic Black	7.98	0.20	1.55	1.47	1.64	5.35	0.14	0.84	0.79	0.89

(Contd...)

Table 11: ***(Continued)***

	Unadjusted		Odds	95% CI		Covariate-Adjusted		Odds	95% CI	
	Prevalence (%)	SE	Ratio			Prevalence (%)	SE	Ratio		
American Indian/Alaska Native	8.53	0.86	1.67	1.35	2.07	5.78	0.62	0.91	0.72	1.16
Asian/Pacific Islander	3.01	0.16	0.56	0.50	0.62	3.87	0.21	0.59	0.52	0.66
Hispanic	6.53	0.17	1.25	1.18	1.33	4.97	0.14	0.77	0.72	0.83
Multiple race	9.18	1.24	1.81	1.36	2.42	9.03	1.10	1.53	1.15	2.03

Source: Data derived from the 2014-2018 National Health Interview Survey SE=Standard error; CI=Confidence interval.
[1]Unadjusted for covariates. [2]Adjusted for age, survey year, gender, geographic region, marital status, nativity/immigrant status, educational attainment, income/poverty level, occupation, and housing tenure

4. Discussion

In this paper, we have analyzed major health and social inequality trends among AIANs. Documenting long-term trends in mortality from various leading causes of death among AIANs and analyzing tribal-specific data on disability, health insurance, and socioeconomic conditions is a particularly novel contribution of this study.

Striking disparities are found in a number of health indicators, with AIANs experiencing lower life expectancy compared to other racial/ethnic groups except African Americans, high rates of infant mortality, premature mortality, diabetes, liver cirrhosis, alcohol-related mortality, youth suicides, and unintentional injuries than the general population and the other major racial/ethnic groups. The excess mortality among AIANs from many of these causes would be even greater if not for a significant racial misclassification and an underreporting of AIAN ethnicity on death certificates.[10,13]

Inequalities in mental and physical health and access to healthcare services are also very marked. Compared to any other major racial/ethnic group, AIANs are significantly more likely to rate their physical and mental health as poor. About 18% of AIANs assess their overall health as fair or poor, at twice the rate of non-Hispanic whites or the general population. About 14% of AIAN adults experience serious psychological distress, which is at least 4 times higher than the prevalence for the general population or any other major racial/ethnic group. AIANs have the highest disability and health uninsurance rates of all major racial/ethnic groups in the US. Nearly 18% of AIANs report a disability and 20% are without health insurance. Differences in disability and health insurance across the Native American tribes are even more startling. In certain tribal communities such as Seminole, Alaskan Athabascan, and Comanche, more than 33% of the population lacks health insurance.

Compatible with their health deficits, AIANs are disadvantaged in their behavioral-risk profile relative to other groups. Of all the major racial/ethnic groups, AIANs have either the highest or one of the highest rates of child and adult obesity, smoking, heavy alcohol consumption, and physical inactivity and the lowest rates of breast, cervical and colorectal cancer screening.[13,24,35] Socioeconomic and material living conditions of AIANs are also less favorable compared to other groups. AIANs have the highest poverty rates of any major racial/ethnic group, with 27% of the overall AIAN population and 34% of AIAN children living in poverty. Poverty rates among many of the tribal communities are astonishingly high. For Aleut, Crow, and Sioux, more than half of children live in poverty, whereas the overall poverty rate approaches or exceeds 40% for Sioux, Tohono O'Odham, and Inupiat.

Our study findings are consistent with previous studies showing generally poorer health status and socioeconomic conditions among AIANs compared to other racial/ethnic groups in the US.[6,13,25,31–33,35] In a recent study, life expectancy among AIANs in 2017 was the lowest among the five major racial/ethnic groups and 4.5 years shorter than that for

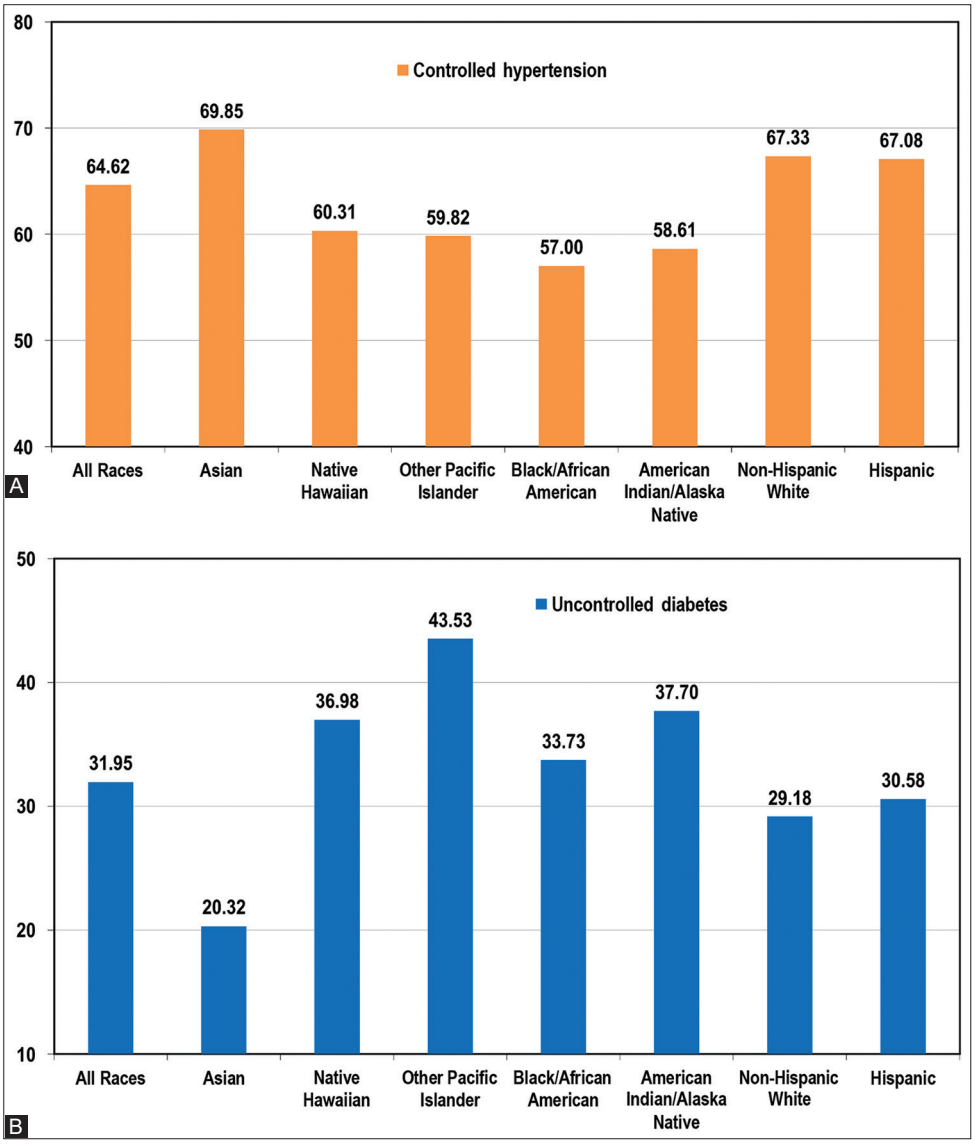

Figure 5: (A, B) Racial/Ethnic Differences in Hypertension and Diabetes Control (%), United States, 2019 Health Center Patients Source: Health Resources and Services Administration (HRSA). Bureau of Primary Health Care. 2019 Uniform Data System (UDS). https://data.hrsa.gov/tools/data-reporting/program-data/national

non-Hispanic Whites.[31] In our study, life expectancy of AIANs was 2.2 years shorter than that for non-Hispanic Whites. Evidence from the 1979-2011 US National Longitudinal Mortality Study, in which race/ethnicity is self-reported in the population cohorts subject to mortality follow-up, indicates a 15-to-20% higher age-adjusted mortality among AIANs than non-Hispanic Whites for population aged ≥18 and a higher mortality risk among AIANs aged 25-64 years, the latter finding being consistent with our study.[29,31,38] Analysis of the 1997-2014 National Health Interview Survey-National Death Index Record Linkage Study showed higher age-adjusted risks of all-cause and heart disease mortality among AIANs compared with non-Hispanic Whites.[32,39] Previous studies have reported higher rates of self-assessed fair/poor health,

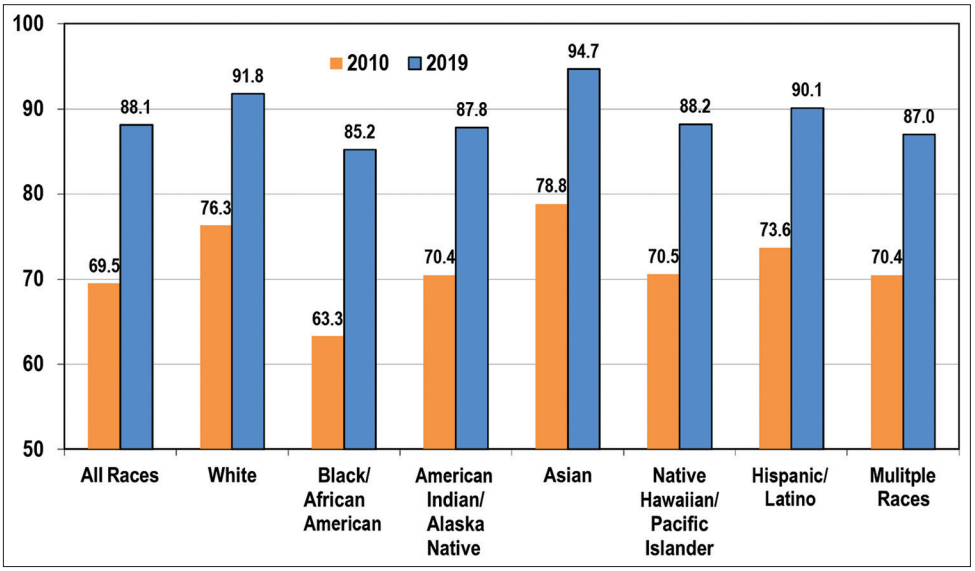

Figure 6: Viral Suppression Rates (%) among Ryan White HIV/AIDS Program Clients (non-ADAP), by Race/ethnicity, 2010 and 2019, United States and Territories of Guam, Puerto Rico, and US Virgin Islands
Source: HRSA. Ryan White HIV/AIDS Program Annual Client-Level Data Report, December 2020

SPD, disability, uninsurance, smoking, hypertension, and obesity among AIANs relative to non-Hispanic Whites, a pattern consistent with our study.[13,25,29,31]

Despite these health and health care deficits among AIANs relative to other racial/ethnic groups, the gap in health status and life expectancy between AIANs and US Whites is not as large as those seen in New Zealand, Australia, and Canada between the indigenous groups such as Maoris or Aboriginals and the majority White population.[40,41] For example, the gap in life expectancy between indigenous (First Nations) and non-indigenous populations in Canada is at least 6 years; between Maoris and non-Maoris in New Zealand is 7.1 years; and between indigenous and non-indigenous populations in Australia is about 10 years.[41]

5. Conclusions and Implications for Translational Research

American Indians and Alaska Natives remain a disadvantaged segment of the US population in a number of key health indicators and in socioeconomic and living conditions, with poverty rates in some tribal groups approaching or exceeding 40%. Although reduced smoking, greater physical activity, lower obesity, healthy diet, higher seatbelt use, avoiding substance use, and improved access to and use of quality health care services can lead to improvements in the health of AIANs, these factors are themselves primarily influenced by broader, more upstream social determinants such as education, income, social and welfare services, affordable housing, job creation, labor market opportunities, and transportation.[6,16,35] Addressing inequities in these social determinants should be an important policy focus for tackling health inequalities among AIANs and those between AIANs and other racial/ethnic groups in the United States.

Compliance with Ethical Standards

Conflicts of Interest: *The authors declare that they have no conflict of interest.* ***Ethical approval:*** *No IRB approval was required for this study, which is based on the secondary analysis of public-use federal databases.* ***Funding source:*** *Hyunjung Lee was supported in part by an appointment to the Research Participation Program at the Health Resources & Services Administration - Office of Health Equity (HRSA-OHE), administered by the Oak Ridge Institute for Science and Education (ORISE) through an interagency agreement between the US Department of Energy and HRSA.* ***Financial Disclosure:*** *None to report.* ***Acknowledgments:*** *None.* ***Disclaimer:*** *The views expressed in this article are the authors' and not necessarily those of the Health Resources and Services Administration or the US Department of Health and Human Services.*

Key Messages

- In 2019, life expectancy at birth was 76.9 years for AIANs, significantly lower than that for Asian/Pacific Islanders (88.2), Hispanics (83.7), non-Hispanic Whites (79.1), and slightly higher than the life expectancy of African Americans (76.2).
- The infant mortality rate for AIANs was 8.7 per 1,000 live births, 79% higher than the rate for non-Hispanic Whites and 114% higher than the rate for Asian/Pacific Islanders.
- High rates of mortality among AIANs, particularly in rural areas, were found for working ages, diabetes, liver cirrhosis, alcohol-related causes, youth suicide, and unintentional injuries.
- About 10% of AIAN adults experienced serious psychological distress, at a two-to-five times higher rate than other racial and ethnic groups in the US.
- AIANs had the highest overall disability, mental and ambulatory disability, health uninsurance, unemployment, and poverty rates in the US, with poverty rates for some AIAN tribes approaching or exceeding 40%.

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