Advancing Wellbeing in Northern Arizona:

A Regional Health Equity Assessment

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This report was prepared by the Northern Arizona University Center for Health Equity Research

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Executive Summary

Northern Arizona's health challenges are complex. The geographical, cultural, political, and socioeconomic conditions in this region require an assessment process that considers health indicator data in the context of dynamic social and environmental influences that affect population health and individual wellbeing. This assessment was designed to provide updates to critical information on outcomes from this vital context.

Why Health Equity?

As defined by the National Academies of Sciences, Engineering, and Medicine, health equity is: "the state in which everyone has the chance to attain their full health potential and no one is disadvantaged from achieving this potential because of social position or any other defined circumstance."[1] Targeted solutions designed to address health equity needs and challenges in northern Arizona can improve health status indicators, reduce costs in medical care, and promote vibrant community development with benefits across the social and economic spectrum.

Scope of Study

The NARBHA Institute and Health Choice Arizona/Blue Cross Blue Shield of Arizona commissioned the NAU Center for Health Equity Research (CHER) to update a regional health equity assessment titled, "Advancing Wellbeing in Northern Arizona: A Regional Health Equity Assessment," originally published in 2017.[2] This updated report summarizes findings from secondary datasets covering health factors and health outcomes across the northern Arizona region. This report redefined the original report's definition of the northern Arizona region, removing Gila County to make a five-county area spanning Apache, Coconino, Mohave, Navajo, and Yavapai counties. This area covers over 61,000 square miles, and is ethnically diverse and largely rural, with a mix of tribal, public, and privately owned lands. Ten of the 22 federally recognized American Indian tribes in Arizona live in this region. In some sections of this report, comparisons were made between the data from the previous report and the current report. These comparisons were made when appropriate, and the years of data being compared were specified each time. Since the original report included Gila County, comparisons between data averaged across the counties overall cannot be made. Additional comparisons can be made, where available and appropriate, by examining the original report linked above.

We also want to acknowledge that some of the data used in this report were collected during the COVID-19 pandemic. While COVID-19 was not the focus of this report and the data used did not intend to capture COVID's health-related consequences, it is important to acknowledge that COVID-19 did impact health and well-being through many pathways since its start. We cannot extract COVID's influence on these data and cannot infer how COVID might impact data averaged across multiple years, particularly when trying to compare averaged, multi-year data from the previous report.

Methods

This report will only update certain quantitative data from the original report. Since 2017, when the original report was published, some data sources have changed slightly in content or have stopped updating completely and therefore, are not able to be updated. However, a majority of these sources have remained consistent and will be found here. The updated quantitative data includes:

- Primary data analysis of the Arizona Department of Health Services Hospital Discharge, Centers for Disease Control and Prevention (CDC WONDER), and the Behavioral Risk Factor Surveillance System (BRFSS) datasets; and
- Secondary data analysis of county-level information in diverse sectors (e.g. health, employment, poverty, food security, education, crime, youth behavior and neighborhood environment). These sources will be discussed in further detail below.

Result Highlights

Higher mortality rates

When comparing the 2016-2020 data in northern Arizona to Arizona overall and the United States on age-adjusted causes of death, the northern Arizona counties had significantly higher mortality rates from chronic lower respiratory disease, accidents, COVID-19, chronic liver disease, and suicide. These leading causes of death varied by county and community, with the top three causes of death overall for the region being diseases of the heart, cancer, and chronic lower respiratory disease. Compared to 2011-2015 in the five-county region, mortality due to diseases of the heart and cancer saw significant decreases, while Alzheimer's disease and chronic liver disease saw the significant increases. Among the northern Arizona counties in 2016-2020, American Indians in general had higher mortality due to accidents, diabetes, and chronic liver disease. Non-Hispanic whites in general had higher diseases of the heart, cancer, and chronic lower respiratory diseases.

Increased Rates of Injury and Suicide

Healthy People 2030 leading health indicator: Reducing the suicide rate. Similar to data from 2011-2015, accidents and suicide remained noteworthy for northern Arizona. All counties had a higher age-adjusted rate of suicide mortality than Arizona overall and the United States overall, but Navajo County had the highest rate, followed by Apache County. Unfortunately, suicide rates increased in 2016-2019 compared to 2011-2015 among the state overall, as well as in three of the five northern Arizona counties. In the current data, non-Hispanic whites and American Indians in northern Arizona had significantly higher rates of suicide than Hispanics but were not significantly different from each other. Unintentional injuries increased in Arizona overall in 2016-2019 compared to 2011-2015, as well as in four of the five northern Arizona counties. American Indians had a significantly higher rate of mortality due to unintentional injuries than all other groups in the current data, at almost double the rate of the northern Arizona region overall.

Burden of Chronic Disease

Four Behavioral Risk Factor Surveillance System (BRFSS) health indicators were summarized across the northern Arizona counties and for the subgroups race/ethnicity, income, and education. The indicators were self-rated health, functional limitations, mentally unhealthy days, and average number of cardiovascular risk factors, which is the sum of diabetes, smoking, hypertension, and high cholesterol. Despite a decrease in good or better self-rated health in Arizona overall in 2016-2019 compared to 2011-2015, good self-rated health increased in Apache and Yavapai counties. Percent of those with any cardiovascular risk factors decreased or stayed the same from 2011-2015 to 2016-2019 in four of the five northern Arizona counties, as well as in Arizona overall. In the current data, income had the strongest relationship to each of the selected indicators, except number of cardiovascular risk factors. Education and self-rated health and education and functional limitations similarly had a strong relationship, where lower education corresponded to lower percent of people with good self-rated health and a greater percent of people with at least one functional limitation.

Behavioral Health and Substance Use

Adults

Among adults, Coconino, Mohave, Navajo, and Yavapai counties had higher rates of liquor law violations, DUI, and marijuana possession than the state overall. However, all counties except one either decreased their percentage of binge drinking or stayed the same in 2016-2019 compared to 2011-2015, and only one county in the current data had a higher percentage of binge drinking in the last 30 days than the state average (15.3%). While data on behavioral health is limited, BRFSS data from 2016-2019 demonstrates that, for those who reported 14 or more mentally unhealthy days in the last 30 days, each of the northern Arizona counties and the state overall either increased or stayed the same in 2016-2019 compared to 2011-2015. Mohave County had the highest percent of mentally unhealthy days in the region (14.8%) in the current data.

Adolescents

Healthy People 2030 objective: Reduce the proportion of adolescents reporting use of any illicit drugs during the past 30 days. Past 30-day substance use by twelfth graders in the northern Arizona counties have consistently decreased since 2010. However, many of the substance metrics are still higher than the state average, except for alcohol use in Apache, Coconino, and Navajo counties. All northern Arizona counties had a higher percent past 30-day use of marijuana among 12th graders than the state average. All counties except for Coconino County had higher rates of past 30 days poly drug use (using multiple drugs at the same time) among 12th graders than the state average. Yavapai had the highest percent at just over 8%. Past 30-day prescription opioid use, prescription tranquilizer use, and over the counter drug use among 12th graders was higher in Mohave, Navajo, and Yavapai counties than the state average. Prescription opioids were the most used, with almost 2.5% in Mohave County and over 2% in Navajo County.

Social Determinants of Health (SDOH) Quantitative Findings

Access to Healthcare

- Compared to the state average, 64% of Primary Care Areas (PCAs) in northern Arizona had a worse population to primary care provider ratio.
- Compared to the state average (72%), Apache, Coconino, and Navajo counties had a lower percent of residents reporting they have a usual source of care. However, all northern Arizona counties saw an increase in those with a usual source of care from 2011-2015 to 2016-2019, even though Arizona overall did not change.
- All counties, except Coconino, had a higher percent of residents reporting they saw a doctor in the last 12 months compared to the state average (70%). However, all northern Arizona counties saw an increase in those who saw a doctor in the last 12 months from 2011-2015 to 2016-2019.
- All five northern AZ counties were just at or below the state average (62%) for seeing a dentist in the last 12 months. However, Coconino, Mohave, and Navajo counties saw an increase in those who saw a dentist in the last 12 months from 2011-2015 to 2016-2019.
- Five northern Arizona PCAs have no dentists in their area. Thirteen of the 17 remaining northern Arizona PCAs have a worse population to dentist ratio than the state average.
- Each of the four tribal PCAs in northern Arizona have a minimum 25-mile distance to the nearest provider.
- **Healthy People 2030 leading health indicator: Increase the proportion of persons with medical insurance.** According to BRFSS data, every northern Arizona county has a higher percentage of those who are insured than the state average, although all are below Healthy People 2030's target. Further, every northern Arizona county saw an increase in those who are insured from 2011-2015 to 2016-2019. The rates reported for the individual Native nations are lower than each county's average and the state average.
- Despite widespread insurance coverage in the region, 12–16% of northern Arizona adults reported that they could not afford to see a doctor when they needed one. Apache, Coconino, and Mohave counties had higher percentages unable to see a doctor than the state average, but every county, except for Coconino, saw a decrease in those who couldn't afford to see a doctor when they needed one from 2011-2015 to 2016-2019.

Economic Stability

- Apache, Mohave, and Navajo counties had higher percentages of overall population living in poverty, children living in poverty, and those 65+ living in poverty than the national average and the state average in 2021. However, all counties saw a decrease in overall population living in poverty in 2021 compared to 2015.
- Apache County has by far had the highest unemployment rate among the northern Arizona counties and the state average from 2016-2023, as well as 2011-2016. Yavapai has continuously had the lowest unemployment rate, even compared to Arizona since 2014.
- Rates of poverty and unemployment were higher for those living on Native nations. Tribal poverty rates were on average 6% higher than county levels and unemployment rates were almost twice as high on Native nations from 2018-2022. However, unemployment numbers were lower for every tribal nation compared to 2015.
- **Healthy People 2030 objective: Reduce the proportion of families that spend more than 30% of income on housing.** Coconino County is the only northern Arizona county above the state and national average for high housing costs, but Apache, Coconino, and Navajo counties have very high rates of housing stress compared to the state and national averages. In Apache County, 12.1% of households had no plumbing and 7.7% had no kitchen. Navajo County had 9% of households with no plumbing and 7.3% of households with no kitchen. However, all counties had lower rates of people with high housing costs and people with housing stress in 2021 compared to 2012.
- **Healthy People 2030 leading health indicator: Reduce household food insecurity and in doing so reduce hunger.** All northern Arizona counties had higher rates than the state average for percent of food insecure residents and percent with limited access to healthy foods. Apache County and Navajo County had the highest percentages of those who were food insecure. However, every county had a decrease in percent of food insecure residents in 2021 compared to 2015.

Education

- More than 50% of residents had a high school degree or less in Apache, Mohave, and Navajo counties from 2016-2019. The percent who had more than a high school degree increased in three of the five counties in 2016-2019 compared to 2011-2015, indicating an increase in overall education level of residents in those counties. However, this can be due to migration in/out of each county rather than continued education of residents from 2011-2015.
- All counties saw an increase in dropout rate from 2011-2015 to 2017-2022. Apache and Navajo counties had the highest percent of 7-12 graders who dropped out in 2022 (8.3% and 6%, respectively), with a staggering increase in dropout rate in 2022 for Apache County (5.5% to 8.3%).
- American Indian students had the lowest 4-year high school graduation rates compared to the state overall and to the northern Arizona counties, followed by Hispanic, then white students. This race-specific pattern has persisted since 2015. Arizona's overall graduation rate for 2022 was 77%, while Arizona's American Indian student graduation rate was 65%. In the northern Arizona counties, the graduation rate for American Indian students was lowest in Mohave County (54%) and highest in Coconino County (81%) but was always lower than the graduate rate for non-Hispanic white students.

Neighborhood & Built Environment

- **Healthy People 2030 Leading Health Indicator: Adults meeting aerobic and muscle-strengthening physical activity recommendations.** Mohave County was lower than the state average for “sufficiently active” and “meets physical activity goals,” while Yavapai County was lower than the state average for just the “meets physical activity” goals. All northern Arizona counties saw a decrease in those “sufficiently active” and three out of the five saw a decrease in those who “meet physical activity goals” in 2016-2019 compared to 2011-2015.
- Apache, Mohave, and Navajo counties have much lower percent of those with adequate access to parks or recreation facilities compared to the other two northern Arizona counties and the state overall. Navajo was the only county to see an increase in percent of the population with adequate access to parks or rec facilities from 2017 to 2022, indicating fewer opportunities for exercise over time for a majority of the northern Arizona counties. All counties saw an increase in percent of adults reporting no leisure time for physical activity from 2017 to 2022.
- The violent crime rate is lower than the state average in every northern Arizona county compared to the state overall. Further, Apache and Navajo counties saw a decrease in their violent crime rate from 2017 to 2022.
- **Healthy People 2030 Leading Health Indicator: Exposure to unhealthy air.** Coconino, Mohave, and Yavapai counties have the highest air pollution rates in the region, and each are above the state average. Three out of the five counties saw an increase in air pollution from 2017 to 2022. All counties except for Apache County have reported a drinking water violation.

Assessment Limitations

Gaps in data available to inform this assessment update included:

- Limited COVID-19-specific data within the social determinants of health-related data. COVID took a toll on our regions' health and well-being outside of sickness, but currently there are limited data that capture COVID's direct influence on social determinants of health.
- Hospital discharge data for IHS and Tribal 638 facilities. These facilities are not required to report such information to the Arizona Department of Health Services.
- Data on outpatient healthcare and mental health-related encounters. Such data sources are not easily available for integrated analysis.
- Data sources specific to the health status of members of the LGBTQ community.
- Linked data sets, to help identify patterns of individual utilization/needs over time and further population-specific needs for priority populations otherwise identified by the assessment.
- Qualitative data were not collected for this report.

The intent of this assessment was to update and summarize quantitative data related to health equity across a wide, five-county geography. Information regarding innovative, best practice programs that are underway across the region were not systematically gathered. In addition, the assessment was not designed to specify the priority in which interventions might be collaboratively developed and implemented to address issues identified in the assessment. Such prioritization should occur as part of future activities within and among organizations serving this region.

Introduction

The “Advancing Wellbeing in Northern Arizona – 2023 Update” project was generously funded and commissioned by the NARBHA Institute and BCBSAZ Health Choice as an update to a previously published assessment titled, “Advancing Wellbeing in Northern Arizona: A Regional Health Equity Assessment.” Our intention as a research team was to update the quantitative data summarized in the previous assessment to provide current insight into important indicators of health and well-being and the factors that influence them.

Northern Arizona Regional Overview

In this report, the northern Arizona region comprises five counties: Apache, Coconino, Mohave, Navajo, and Yavapai (Figure 1). This region covers 61,219 square miles of land in Arizona and is home to 10 federally recognized American Indian tribes. This region is largely rural and quite culturally, economically, and geographically diverse. This diversity makes it important to consider health issues as well as community assets and challenges in a locally specific context. Counties and communities vary greatly in demographics such as ethnicity and age and also in degrees of access to all types of services, opportunities, and utilities necessary for healthy people and communities.

Reporting data only at the county level obscures many important elements of the social and physical environments that impact health differently for different populations. For example, reporting data at the county level can skew averages toward wealthier urban populations and obscure conditions and realities in rural and underserved populations. This is a necessary and important consideration when developing strategic plans to improve health and increase health equity across the region. Although it is incredibly diverse, the region also shares some important features that contribute to common health issues and challenges, making regional trends an important topic for analysis and collaborative strategies vital to facilitating improvements in the health of the region.

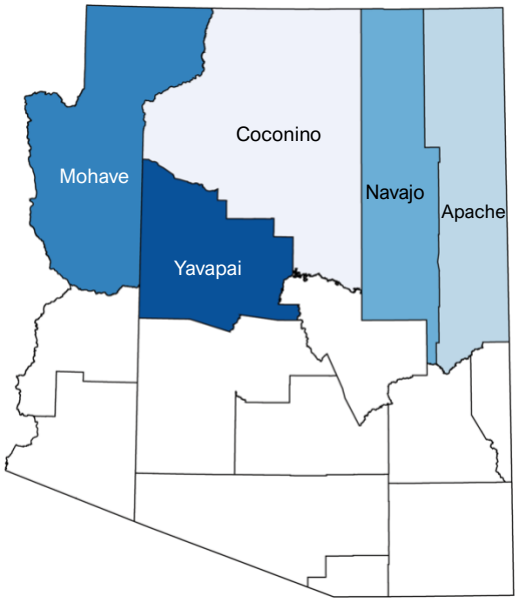


Figure 1. Map of the northern Arizona region.

Geographic Overview

Most of the northern Arizona region sits atop the Colorado Plateau and is home to a variety of climates and natural features including sparsely vegetated plateaus and mesas, deep canyons, barren deserts, and dense pine forests. The highest elevations are in Coconino County at 12,633 feet, and the lowest are in Mohave County at 1,112

feet.[3] Although Coconino County is the largest county in the region geographically, Yavapai and Mohave have much larger populations; Yavapai is the most populous county in the region, but it covers only 12% of the land geographically.

Most of the land in northern Arizona (47%) is publicly owned and is maintained by either the U.S. Forest Service or the Bureau of Land Management. The second largest sector (33%) is owned by American Indian tribal governments. Only 20% of the total land in the region is privately owned. Although 66% of the land in Apache County is tribally owned, tribal lands make up less than 1% of Yavapai County.[4] See Figures 2 and 3.

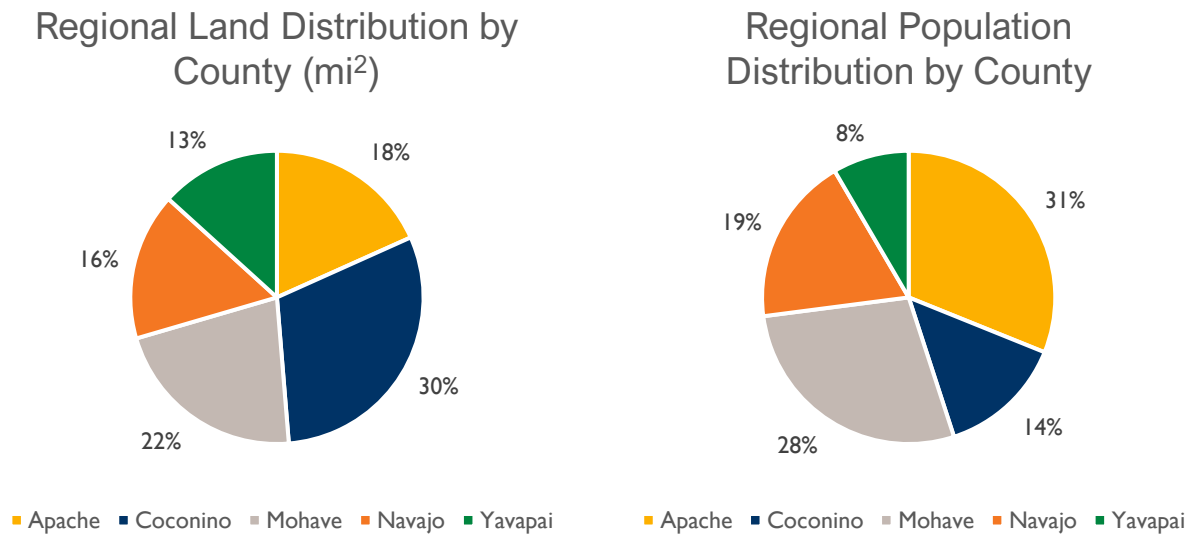


Figure 2. Regional land and population distribution by county.[5]

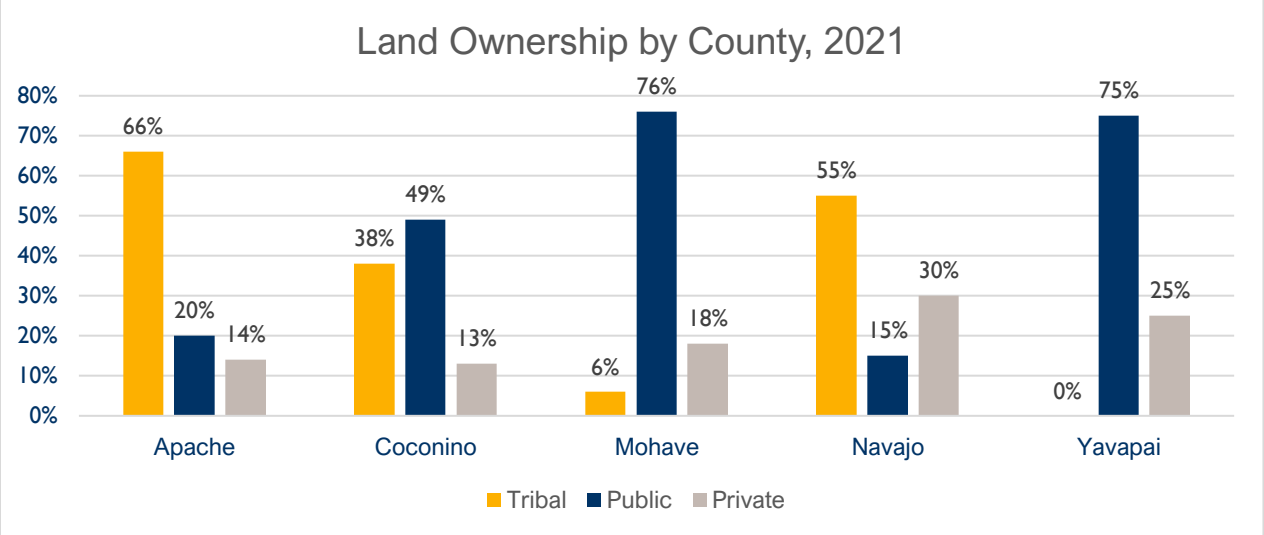


Figure 3. Regional land ownership by county, 2021.[4]

Demographic Overview

County Health Rankings by the University of Wisconsin Population Health Institute provides county-level health rankings for each state based on a multitude of factors that influence health (Figures 4 and 5).[6] Arizona has 15 counties overall and only one of the five northern Arizona counties is in the top half of those rankings, demonstrating that northern Arizona's health overall is generally below average in the state. Yavapai is ranked highest of the northern Arizona counties at third in the state. Coconino is ranked next at ninth, followed by Mohave at tenth. Navajo County and Apache County are ranked worst in the state overall at 14th and 15th out of 15 counties, respectively.

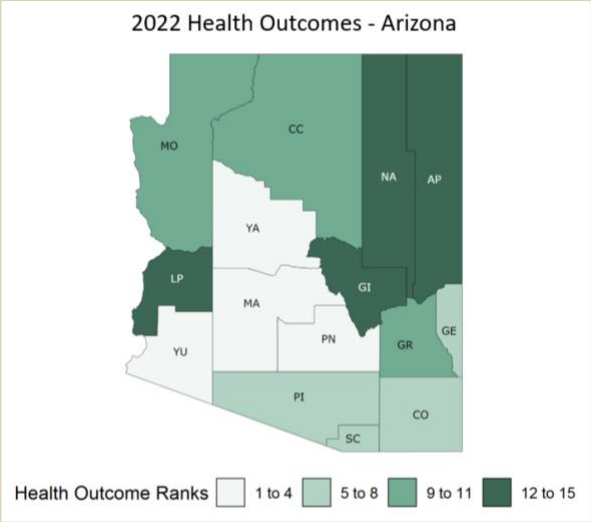


Figure 4. Arizona county health outcomes rankings, 2022.[6]

These represent how healthy a county is right now, in terms of length of life and quality of life. Health goes down as ranks go up.

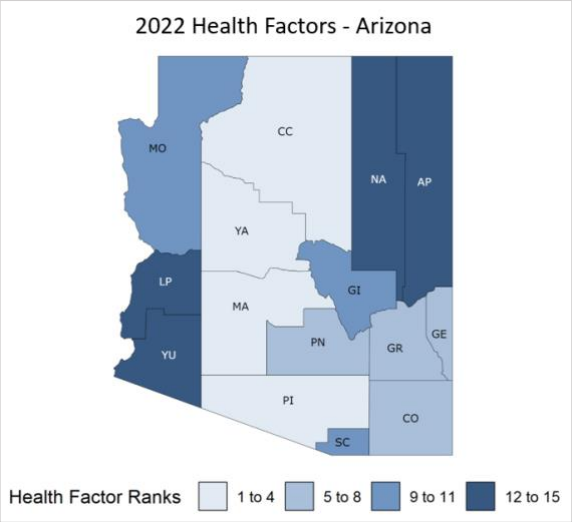


Figure 5. Arizona county health factors rankings, 2022.[6]

These represent the things that can be modified to improve the length and quality of life for residents. Health goes down as ranks go up.

Figures 6-10 present the population demographics of each county in the region. Yavapai County has the largest population across the five northern Arizona counties, with Mohave County close behind.[5] Yavapai and Mohave counties also have the greatest percentages of aging adult populations (both over 30%) and have the highest percentages of veteran populations (12% and 11%, respectively). However, Apache County and Navajo County's percentage of adults over 65 have both increased roughly 5% while their <5-year-old and 18–64-year-old populations have both decreased from 2015 to 2021,[5] indicating a trend toward more aging adults.

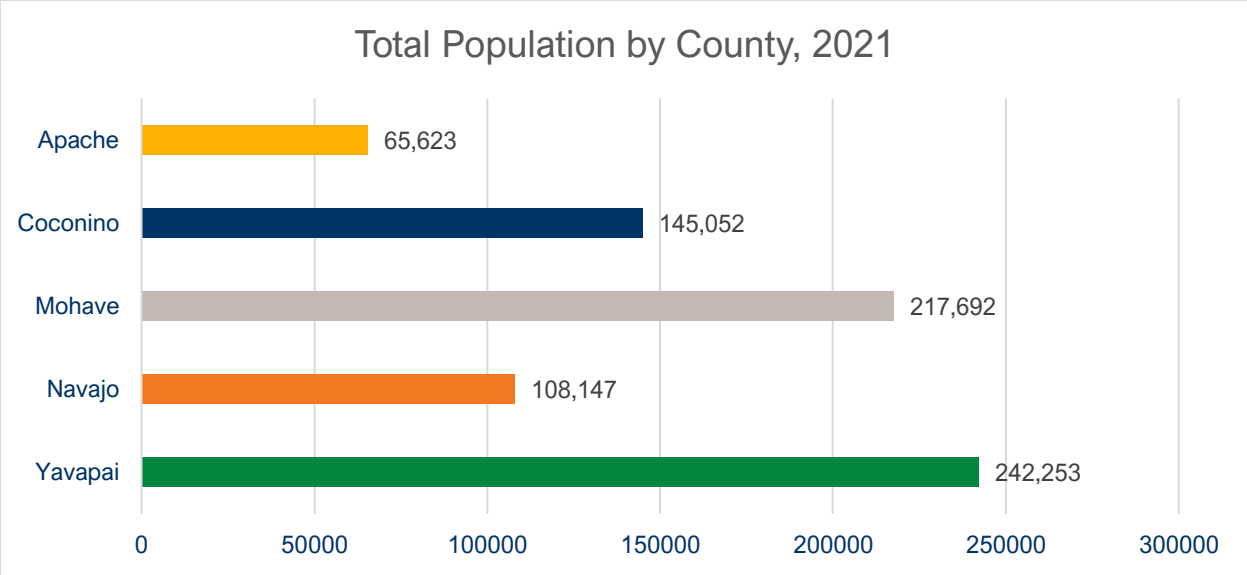


Figure 6. County population totals, ACS 2021 1-year estimate. [5]

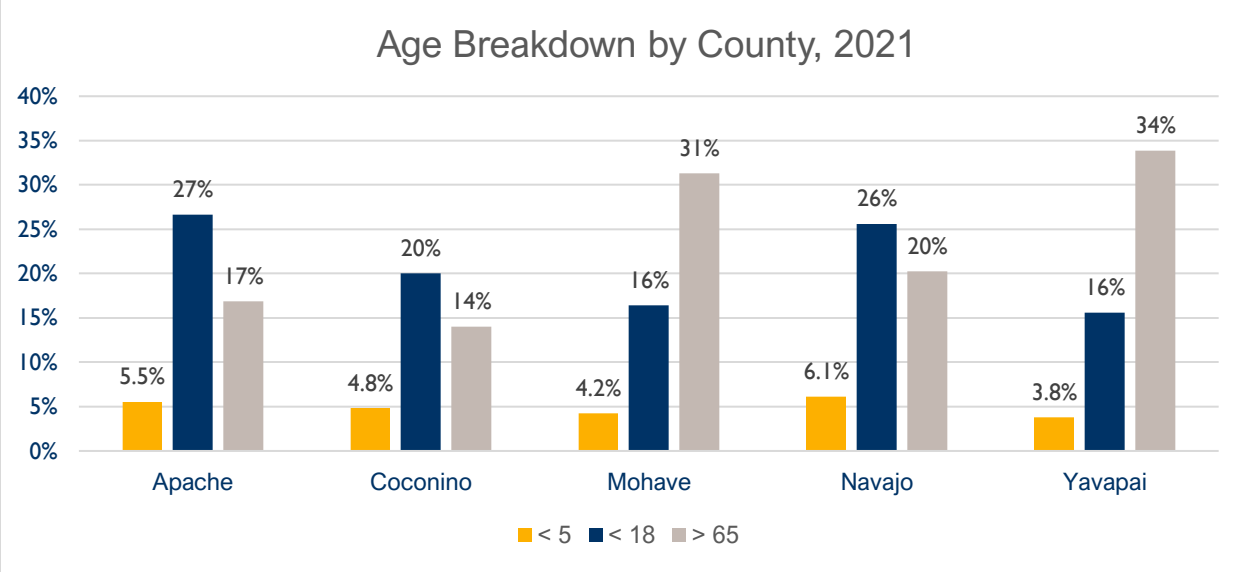


Figure 7. Age breakdown by county, ACS 2021 1-year estimate.[5]

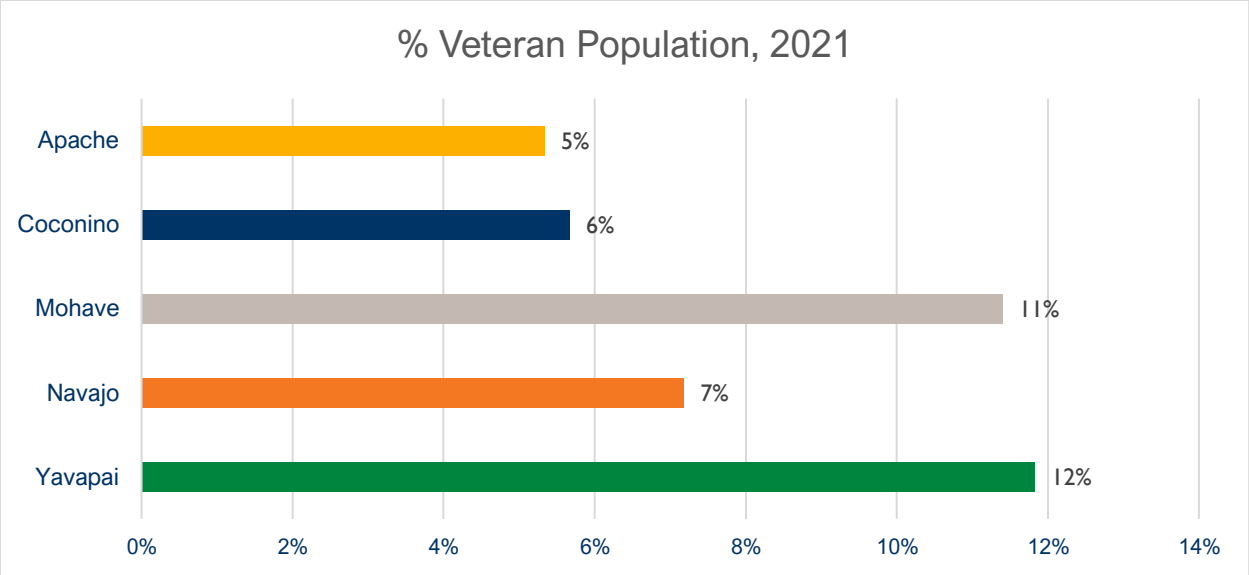


Figure 8. Regional veteran population by county, ACS 2021 1-year estimate.[5]

Yavapai and Mohave counties are the least ethnically diverse, with roughly 80% of both populations being non-Hispanic White.[5] Apache, Coconino, and Navajo counties have the largest percent of Tribal land within their counties (Figure 3) and a larger percentage of non-Hispanic American Indians than Hispanics, and Apache County has more American Indians (70.9%) than any other race/ethnicity.[5] Apache County also has the highest percent of residents whose primary language is not English (70%), followed by Navajo County (43%), while both have the lowest percentages of residents who are foreign born among all northern Arizona counties (Figure 10).[5]

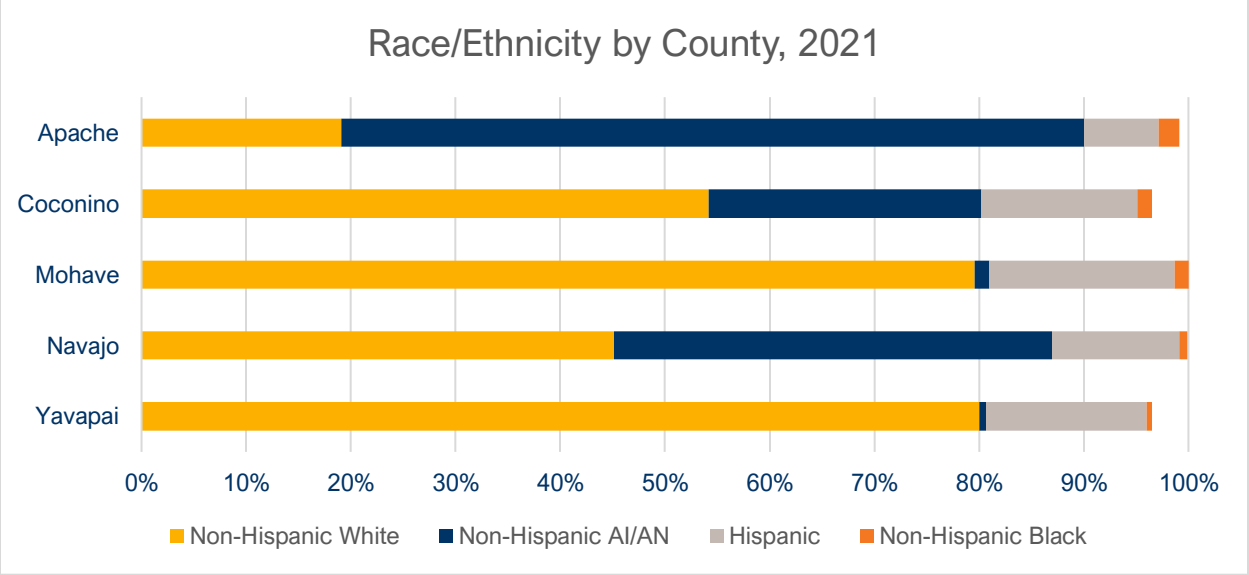


Figure 9. Race/ethnicity characteristics by county, ACS 2021 1-year estimate.[5]

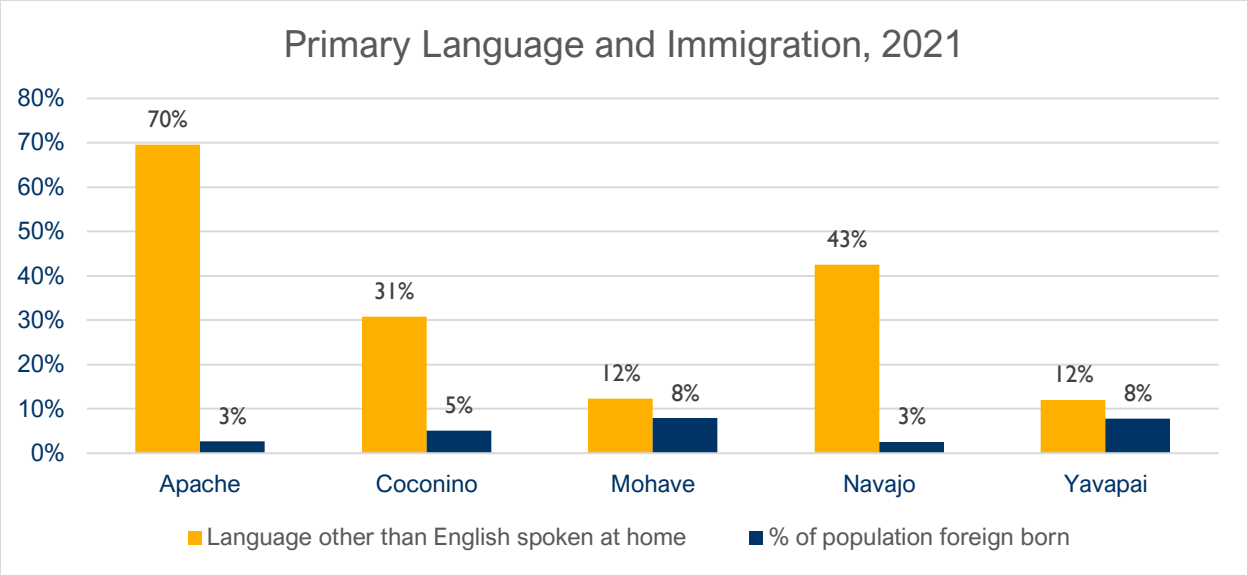


Figure 10. Regional primary language and immigration by county, ACS 2021 1-year estimate.[5]

Figure 11 shows the Native nation boundaries within Arizona counties. Apache County land is mostly Tribal land (66%) and includes parts of the Navajo Nation and White Mountain Apache Tribe boundaries. Navajo County land is also mostly Tribal land (55%) and includes parts of the Navajo Nation and Hopi Tribe boundaries. Coconino County land is 38% Tribal land and includes parts of the Navajo Nation, Hopi Tribe, Hualapai Indian Tribe, and Kaibab Paiute Tribe boundaries, as well as the entire Havasupai Tribe boundaries. American Indians have unique challenges, as well as social, economic, and political contexts, that affect health factors and health outcomes discussed in this update.

Ten of 22 federally recognized American Indian tribes live in northern Arizona. Many people of American Indian descent live on Native nations, but many also live in border towns, urban centers, and rural areas outside of Native nations The history, economy, culture, and language of each tribe is unique, as is the geography and physical environment of each Native nation. The level and quality of social, economic, and health care resources and infrastructure available to tribal members also varies between tribes. Despite their uniqueness, there are also many commonalities regarding health issues, assets, and barriers that tribal communities share regardless of tribal affiliation.

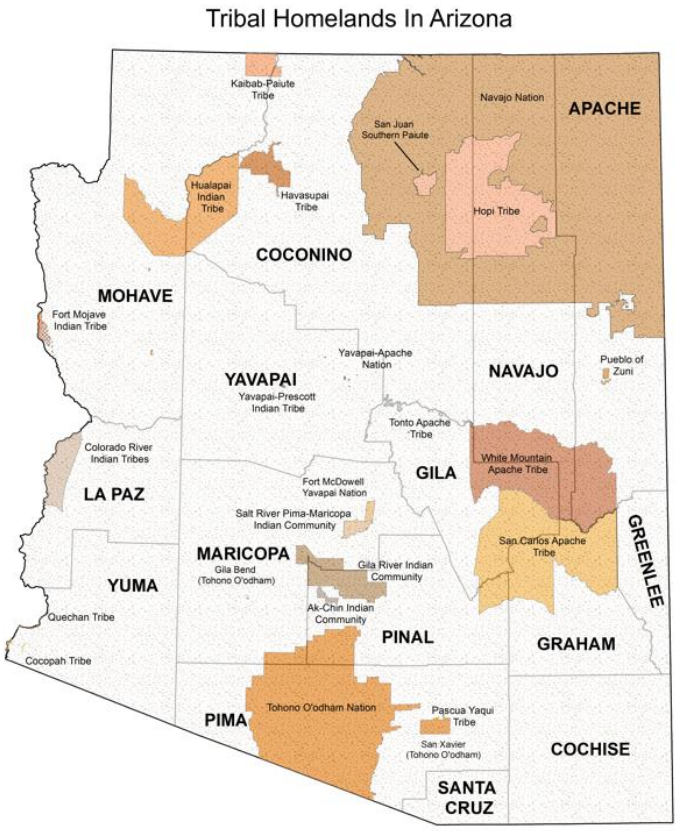


Figure 11. Tribal nation areas within Arizona counties.
Created by Inter Tribal Council of Arizona.[7]

The relative sizes of each tribe based on percentage of population and percentage land ownership relative to the regional totals are shown in Figures 12 and 13. Only the largest tribes in the region, those comprising more than 1% of the total tribal population in the region, are shown in Figure 12. The five smaller tribes in the region comprise a combined total of 3% of the regional tribal population. These smaller tribes are shown in Figure 13 according to their proportion of the remaining 3% of the total tribal population. The Navajo Nation, which covers parts of Arizona, Utah, and New Mexico, has more than 160,000 members.[8] According to the 2010 Census, more than 94,000 members of the Navajo Nation are living in the Arizona portion of the nation, making it the largest tribe in the region in terms of population and nation size, which totals over 18 million acres.[9] The smallest tribe in the region is the Tonto Apache, who number 137 and occupy a nation of just 85 acres.[7]

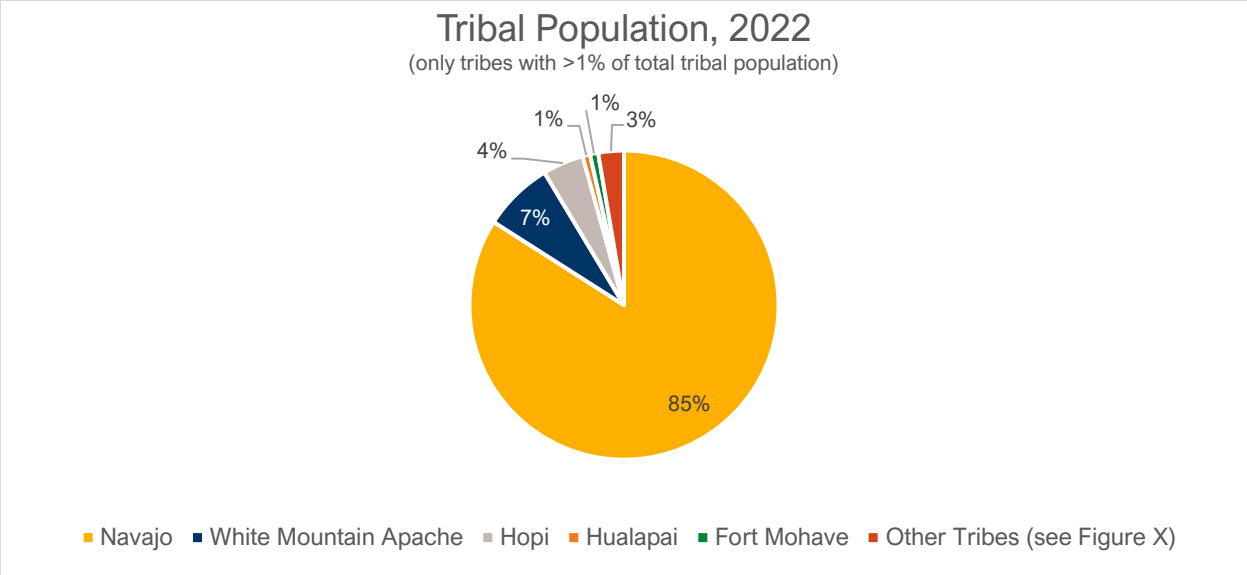


Figure 12. Regional tribal population relative to all northern Arizona tribes, 2022.[8]

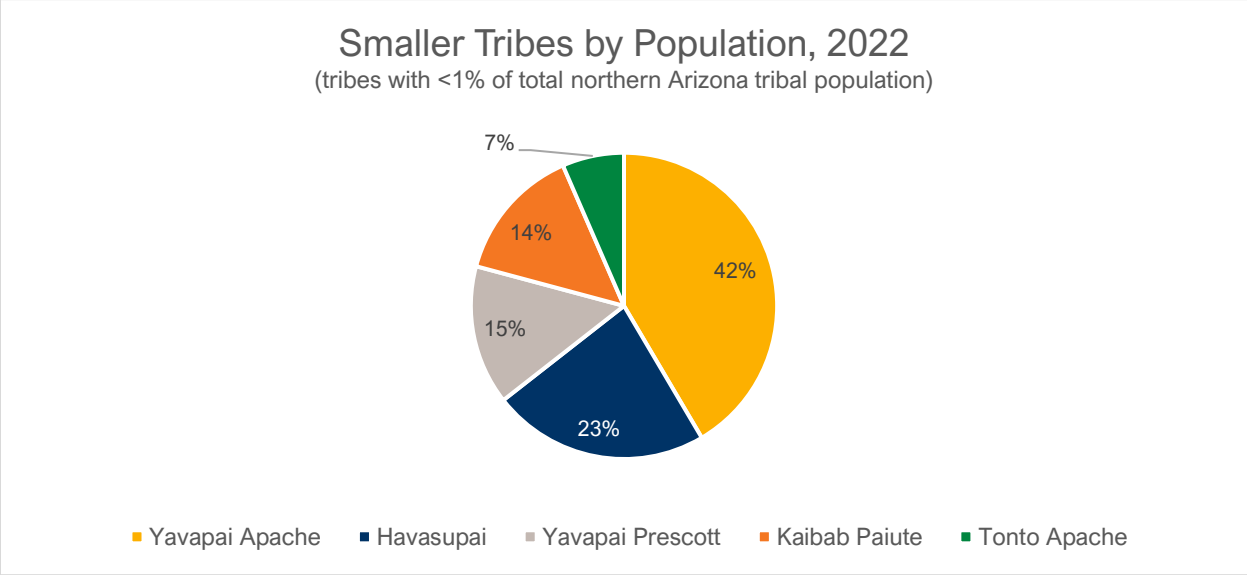


Figure 13. Regional tribal population of the smallest tribes, 2022.[8]

Rural populations experience significant health disparities when compared to more urban populations. [10] Risk factors for these disparities include social and geographic isolation, higher rates of risk behaviors, lower incomes and job opportunities, and fewer opportunities for constructive entertainment and engagement. All of these factors contribute to higher rates of chronic illness and lower rates of overall good health in rural communities. [10] Although there are some major urban centers in the northern Arizona region, almost half of the land area in square miles consists of rural areas. [11]

These data are from the U.S. Department of Agriculture (USDA) Economic Research Service's Rural Urban Commuting Area (RUCA) codes data from 2010 and is census tract level. The codes, numbers 1-10, classify census tracts using measures of population density, urbanization, and daily commuting, and delineate metropolitan, micropolitan, small town, and rural commuting areas based on the size and direction of the primary commuting flows. [11] These codes are useful because they not only highlight the population density of areas in which residents live, but their access to larger areas with more resources. Using the population categories of these codes, we summarized in Figure 14 three designations of urban areas (population greater than 50,000), urban clusters (population greater than 2,500), and rural areas (population less than 2,500). In the northern Arizona counties, 82% of the population lives in urban areas or urban clusters and 18% live in rural areas. [11] The proportion of those living in rural areas in northern Arizona counties compared to Arizona overall is significantly larger (18% versus 3%, respectively).

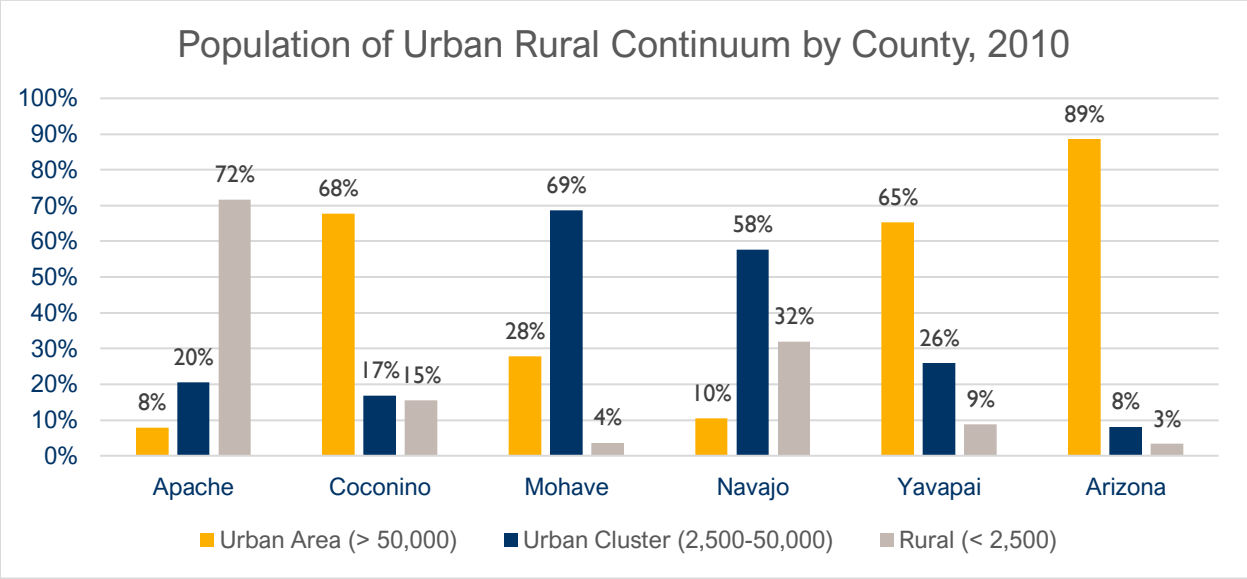


Figure 14. Regional population characteristics in the urban rural continuum by county, 2010. [11]

Significant numbers of residents in Coconino, Mohave, and Yavapai counties live in highly developed urban areas, whereas Apache and Navajo counties have 10% or less of their population living in urban areas. Since the RUCA codes are based on Census tract and factor in proximity to other urban areas, we included a figure that shows the population of the major cities and towns in each northern Arizona county (Figure 15).[4] Navajo County has three towns with a population over 6,000, but Apache County has none. Apache and Navajo counties have the highest populations living in rural areas whereas most of the people in Coconino and Yavapai counties live in an urban area.

As shown, therefore, northern Arizona has significantly more people living in a rural area than the state of Arizona, and has a mix of land ownership between private, public, and tribal groups. Strategic planning to address these diverse environmental and structural issues is challenging. The concentration of the population living in urban versus rural areas has important implications for levels of access to health services and other resources that are important for strong health outcomes.

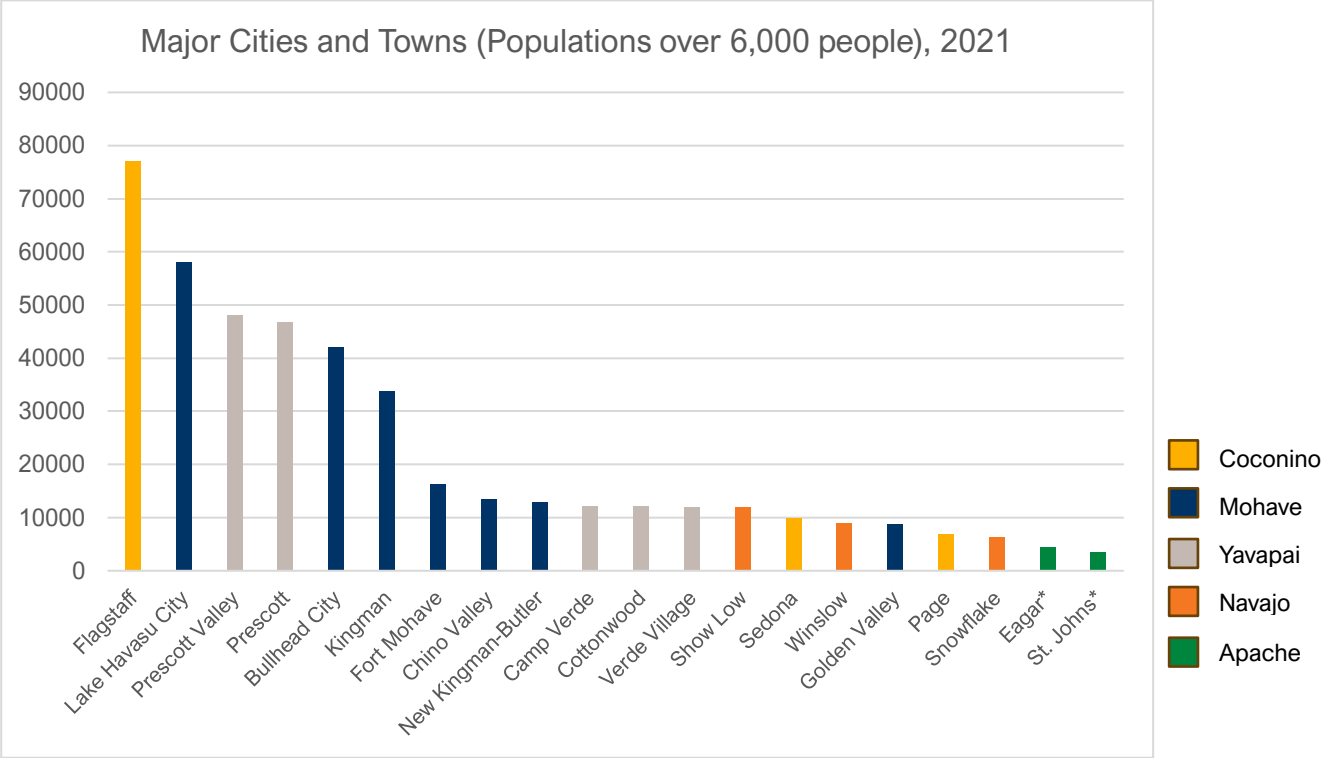


Figure 15. Regional population centers by county.[4]

**No towns in Apache County have populations over 6,000 people but are included for reference.*

Theoretical Framework and Research Design

Due to the comprehensive nature of this updated needs assessment and the expansive size of the region, we used the Social Determinants of Health Model (SDOH) as an overarching theoretical framework. The SDOH serves as a guide for exploring the complex intersections between social, cultural, economic, political, and systems level influences on mental and physical health among diverse populations throughout the region. [12]

The World Health Organization defines the SDOH as encompassing "the conditions in which people are born, grow, live, work, and age … circumstances shaped by the distribution of money, power, and resources at global, national, and local levels." [12] It is important to explore the social and physical environments in which people live as we strive to see health in terms of holistic wellbeing instead of merely as the absence of disease or illness. Issues such as access to health care, neighborhood safety, economic stability, and many other conditional influences affect individual and population health. It is also important to understand the context in which people make decisions that affect their health. Accordingly, the SDOH is now widely recognized as a critical model that attempts to explain and mitigate health disparities and inequities worldwide. As such, Healthy People 2030 has an increased and overarching focus on SDOH and features many objectives related to SDOH. [12] Healthy People 2030 created Figure 16 to outline the broad factors that many of their objectives fall under. [12]

Figure 16. Healthy People 2030 Social Determinants of Health Graphic. [12]

Quantitative Methods

This report is an update of the original report and aims to provide new versions of the primary and secondary data compiled in the original report. Different quantitative data sources are again used in this update and the latest year of data sometimes varies between data sources. Similar to the original report, this update includes both top-down and bottom-up approaches based on the data sets used. The top-down approach fits existing variables into the Social Determinants of Health Model (SDOH), the overarching

theoretical framework for the original report, whereas the bottom-up approach combines variables into relevant constructs that would fit into the SDOH model. Updated data sets representing rates of disease, illness, prevention behaviors, and rates of hospital utilization are used to show where the disparities exist and where the current priorities in health outcomes are.

Negotiation of Data Use Agreements

As part of this needs assessment process, the quantitative team worked to secure critical database sharing agreements with the majority of our stakeholder groups, in order to conduct deep data-dives on all of the key public health, epidemiological, and health care metrics that have been identified in both the qualitative and the quantitative elements of the needs assessment. Some publicly available data sets on key health needs are valuable for assessing overall health priorities and disparities, but the team discovered that state- and even county-level data do not provide the granularity needed to address some of the unique health disparities found in northern Arizona, because some of those needs and affected populations are overshadowed by the aggregate data from the broader region and state.

The team successfully negotiated a full public health data use agreement with the Arizona Department of Health Services (ADHS) and Northern Arizona University and is now an accredited repository for all of the ADHS data sets, including birth, death, hospitalization and discharge, infectious disease, and immunization records for the entire state. The data use agreement includes the opportunity to work with third-party groups (such as hospitals, community clinics, etc.) to conduct analyses of all state health data. These data include both PHI (Personal Health Information) and PII (Personally Identifiable Information) which over time will allow us to, with appropriate IRB and HIPAA oversight, significantly refine our broader analysis of the public data sets and to identify the variability of needs across our geographical region, as well as identify the common needs that cut across the region. Access to these data will be extremely useful in many future health research endeavors at the university and with our community partners.

The quantitative team identified several data sources that helped to create a more robust picture of health disparities and areas of greatest health need in northern Arizona. The data sources that we used in our analysis are summarized below.

Data Sources

The **Behavioral Risk Factor Surveillance System (BRFSS)** is an annual phone survey conducted nationally through state health departments with technological and methodological assistance from the Centers of Disease Control and Prevention (CDC). [13] It is designed to assess health-related risk behaviors, chronic health conditions, and use of preventive services. It includes all 50 states and is large enough to provide state-specific estimates for key health risks and health resources.

A key strength of the BRFSS is that it uses probability sampling and thus is representative of the non-institutionalized (i.e., not in a group home, in the military, or incarcerated) adult population of Arizona. Interviews are conducted using both landline and cellular telephones. For landlines, respondents are randomly selected from all adults living in the household. Cellular telephone respondents are treated as single households. Approximately 20% of completed interviews were cell phone respondents. This sampling approach provides a less biased assessment of several health indicators relative to other data sources such as those from health care institutions or health care contacts (e.g., primary care records). Persons under 18 are excluded from the survey and data on health conditions and chronic disease diagnoses are self-reported. [13]

We used publicly available codebooks to select key health assessments corresponding to the most relevant Healthy People 2020 health indicators from the original report, the most relevant Healthy People 2030 health indicators, and other national health benchmarks. [12,13] We were given access to BRFSS data from 2016–2019, including county identifiers. We used these data to illustrate county-specific patterns for the key BRFSS variables within Arizona. The BRFSS data fit nicely into the SDOH framework because several of the leading health indicators for Healthy People 2020 and Healthy People 2030 are assessed in the BRFSS. The relevant factors from Healthy People 2020 and Healthy People 2030 include insurance coverage, having a usual source of care, having unmet care needs, breast cancer and colorectal cancer screening, hypertension screening, obesity, health-related quality of life, smoking, and binge drinking. [12,13]

We chose four key determinants available in the BRFSS data set to provide further analysis to highlight patterns and correlations between social determinants of health and priority health outcomes. These four key determinants are self-rated health, functional limitations, mentally unhealthy days, and comorbid cardiovascular risk factors, which is the sum of diabetes, smoking, hypertension, and high cholesterol. These domains represent a broad set of health indicators and address stakeholder interest in comorbidity, i.e., the presence of multiple risk factors within individuals.

The **Arizona Department of Health Services (ADHS) Hospital Discharge** database is a primary data source that includes records for all inpatient and emergency department (ED) visits from all Arizona licensed hospitals.

The **Centers for Disease Control and Prevention Wide-Ranging Online Data for Epidemiologic Research** (CDC WONDER) is a publicly available web application that manages 20 data sources including U.S. births, deaths, cancer diagnoses, Tuberculosis, cases, vaccinations, environmental exposures, and population estimates. Understanding the leading causes of death within a geographically defined population can lend insight into health problems that are more specific to that population. To update the causes of mortality that are unique to the five counties of northern Arizona, together and individually, we accessed the 15 Leading Causes of Death database that is part of CDC

WONDER.[14] The data are aggregated from the 57 different Vital Statistics jurisdictions in the United States over 5 years (2016–2020).

Additional Secondary Data Sources
A number of additional sources provided data at the county level, which helped highlight differences between counties in the northern Arizona region and comparing the regional averages with statewide trends and U.S. trends. Many of these databases are compiled from other federally funded primary sources, including the U.S. Census Bureau, the American Community Survey (ACS), and several others.

The **American Community Survey (ACS)** is conducted every 5 years by the U.S. Census Bureau. The 2020 U.S. Census Decennial Survey data is not fully available yet, so ACS data was used for basic descriptives at the county level, such as population, age, poverty, unemployment, and veteran population. This report used ACS data from 2021.[5] Surveys are mailed to 295,000 addresses each month. It is important to note that people are not selected, but rather addresses are selected to ensure geographic coverage. If forms are not returned, second forms are mailed, followed by telephone calls and personal visits to a subsample of non-responders and group residences. The resulting data from this ongoing survey are distributed to federal, state, and local agencies to assist in the decision-making process for allocation of nearly $400 billion in funding per year. The indicators included in this survey include population, housing, and social and economic characteristics of communities that are comparable across the country. This data set allows us to compare previous and current data and to establish a benchmark with which to compare future data and to highlight trends.

My Tribal Area is a product of the U.S. Census Bureau to provide quick and easy access to selected statistics from the American Community Survey specific to American Indian and Alaska Native tribes. The data funneled to this product fit under five categories: people, jobs, housing, economy, and education.[8]

The **County Health Rankings** database is created and maintained by the University of Wisconsin Population Health Institute, supported by the Robert Wood Johnson Foundation. This database includes over 50 health indicators from a variety of sources, and the indicators correspond to a variety of focus areas including health outcomes, quality of life, health behaviors, clinical care, social and economic factors, and physical environment. The data are only available at the county level but are important for describing some key health issues in the region. The data were last updated in 2022.[6]

The **Arizona Department of Health Services (ADHS)** publishes statistical profiles on each primary care area (PCA) in the state of Arizona. Statistical profiles of PCAs include information on demographics, health resources, and health status indicators. These profiles are updated annually. The most recent published PCA profiles used in this report are from 2021.[15]

The **Arizona Youth Survey (AYS)** is administered by the Arizona Criminal Justice Commission Statistical Analysis Center every two years to a statewide sample of eighth, tenth, and twelfth grade students. This report summarized data from the 2022 county profiles. The survey uses the Risk and Protective Factor model to assess the prevalence and frequency of youth behaviors. The questions cover topics such as substance use, gang involvement, attitudes towards family and community, safety, and prosocial behaviors. [16]

The **Kids Count Data Center**, created and maintained by the Annie E. Casey Foundation, contains a variety of indicators related to child and family wellbeing. Depending on the indicator, data are available at the national, state, and county level. [17] Dropout rates and 4-year graduation rates at the county level were used for this report.

The **Arizona Commerce Authority (ACA)** publishes statistical profiles on each county from a tool called Arizona Assets that uses data from the Office of Economic Opportunity, the Arizona Department of Revenue, and the Arizona Tax Research Association, among others. The Arizona Assets map is an interactive tool that identifies infrastructure, land ownership, educational resources, community profiles, and more. These profiles include information on basic demographics, geographic area, and financial indicators. [4]

Results

The results of our quantitative update are presented first via an overview of the health of the region, which includes leading causes of mortality, hospital inpatient and emergency department (ED) visits, priority health outcomes, and patterns of disparities among populations. Issues related to access to health care are followed by discussion of economic stability, education, and the neighborhood and built environment.

Regional Health Overview

Health-related quality of life (HRQOL), which refers to mental and physical wellbeing as well as an individual's general health perceptions, is central to this update because HRQOL mirrors known racial and ethnic disparities and predict important outcomes such as health care utilization and mortality. [18] The BRFSS has continued to include HRQOL measures that provide an overall picture of the health status and resources of northern Arizona. The most global indicator of HRQOL—self-rated health—is assessed by asking respondents to rate their health as poor, fair, good, very good or excellent. This single item provides an integrative summary of health status and is particularly noteworthy because it predicts mortality independent of age, sex, smoking, existing disease, etc. and is more strongly related to mortality than a large number of clinical biological measures. [18] Figure 17 shows responses aggregated at the county level for participants who rated their health as good, very good, or excellent.

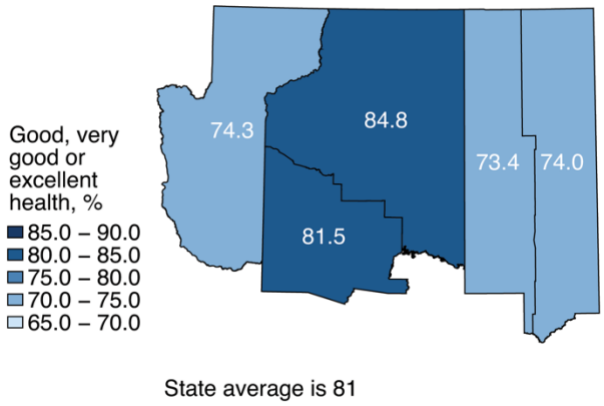


Figure 17. AZ BRFSS self-rated health by county, 2016-2019.

A majority of Arizona residents report good or better health status overall, defined as self-reported good, very good, or excellent health status. Apache (74%) and Mohave (74.3%) counties have lower percentages of self-reported good health than the state average. Contrary to AZ BRFSS data from 2015, Navajo County (73.4%) now has the lowest percentage of self-reported good health of the five northern Arizona counties. Coconino County (84.8%) continues to have the highest percentage of self-rated good health among the northern Arizona counties.

Figures 18 and 19 demonstrate the extent to which people feel physically or mentally unhealthy. Respondents were asked, "how many days in the last 30 days was your physical/mental health not good?" When rating physical health, Coconino County (10.4%) was the only northern Arizona county with a lower percentage of adults who reported 14 or more days of poor physical health (a standard definition of poor health) in northern Arizona compared to the state average. There was a high burden of physically unhealthy days in Mohave County (19%) where, along with Apache County (15.7%), a higher burden of the number of mentally unhealthy days was also observed (days when people were sad, blue, or depressed) (14.8% and 14.7%, respectively).

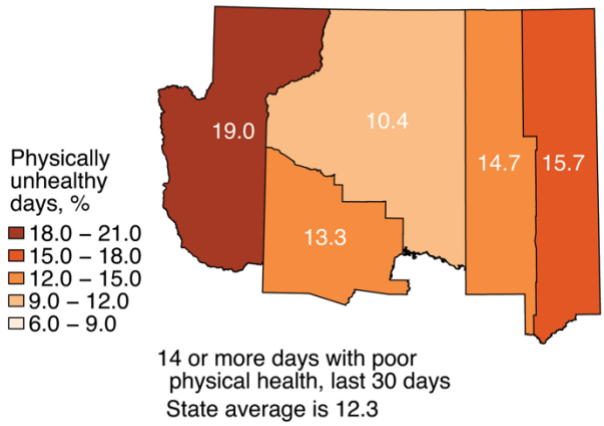


Figure 18. AZ BRFSS physically unhealthy days by county, 2016-2019.

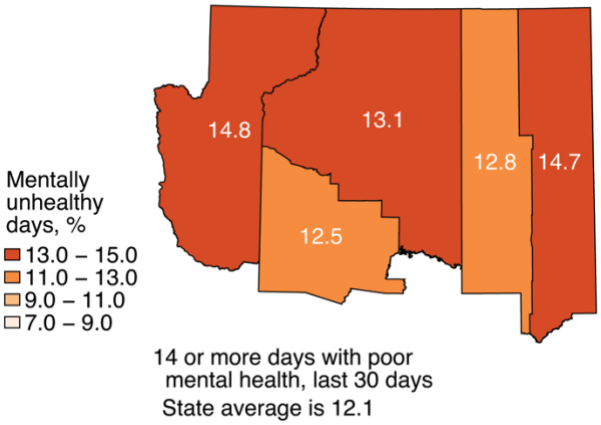


Figure 19. AZ BRFSS mentally unhealthy days by county, 2016-2019.

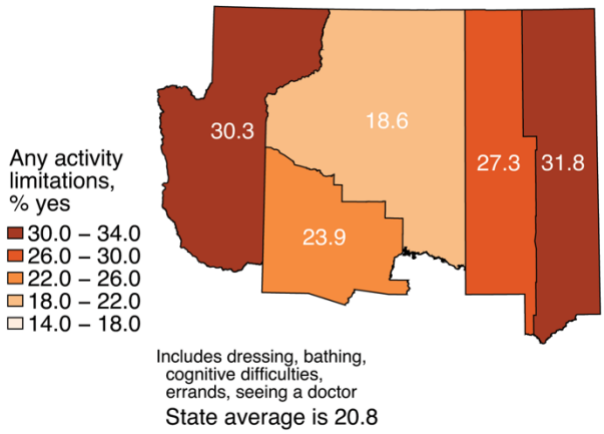


Figure 20. AZ BRFSS activity limitations by county, 2016-2019.

Leading Causes of Mortality

Regional Trends

Understanding the leading causes of death within a geographically defined population can lend insight into health problems that are more specific to that population. To better understand causes of mortality that are unique to the six counties of northern Arizona, together and individually, we accessed the 15 Leading Causes of Death database that is part of CDC WONDER.[14] The data are aggregated from the 57 different vital statistics jurisdictions in the United States over 5 years (2016–2020).[14] It is important to note that the COVID-19 pandemic hit Arizona communities in early 2020 and will be present in this data, even though the 2016-2019 data do not include the diagnosis since it did not exist. Table 1 presents the leading causes of death for the northern Arizona region.

When comparing northern Arizona to the entire United States population, 14 of 15 leading causes of death are the same. In the entire United States population, septicemia was the 13th leading cause of death, whereas Arizona overall included nutritional deficiencies. Figure 21 shows the causes of mortality (age-adjusted per 100,000) that were highest in northern Arizona compared to the state and nation.[14] Northern Arizona has higher rates in the top 15 causes of mortality in every category except five: cerebrovascular diseases (lower than US), Alzheimer's disease (lower than Arizona) nephritis, nephrotic syndrome and nephrosis (lower than US), essential hypertension (lower than both), and Parkinson disease (lower than both). See Appendix A for a complete list of leading causes of mortality at the national, state, and county level. When comparing mortality data from 2011-2015, there were two significant decreases and two significant increases in age adjusted mortality rates in 2016-2020 for the five-county region. Diseases of the heart and malignant neoplasms significantly decreased and Alzheimer disease and chronic liver disease and cirrhosis significantly increased in 2016-2020.

Table 1. Leading Causes of Mortality Across Northern Arizona: 2016-2020 (All Ages)[14]

15 Leading Causes of Death	Deaths	Crude Rate per 100,000	Age Adjusted Rate per 100,000	Change from 2011-2015
Diseases of heart	11,009	268.2	165.2[b]	-6.8*
Malignant neoplasms	10,357	252.3	150.5[b]	-9.5*
Chronic lower respiratory diseases	3,809	92.8	54.3[a,b]	+3.3
Accidents (unintentional injuries)	3,661	89.2	83.5[a,b]	+4.4
Cerebrovascular diseases	2,243	54.6	33.5[b,c]	+1.6
Alzheimer disease	2,234	54.4	33.4[a]	+12.4*
Diabetes mellitus	1,600	39	25.2[a]	+2.5
COVID-19	1,568	38.2	25.5[a,b]	N/A
Chronic liver disease and cirrhosis	1,458	35.5	31.4[a,b]	+6.6*
Intentional self-harm (suicide)	1,411	34.4	33.4[a,b]	+3.1
Influenza and pneumonia	876	21.3	14.1[b]	-1.8
Nutritional deficiencies	693	16.9	10.4	N/A
Nephritis, nephrotic syndrome, and nephrosis	668	16.3	10.3[b,c]	+0.1
Essential hypertension and hypertensive renal disease	591	14.4	8.9[d]	+1.5
Parkinson disease	548	13.3	7.9	-0.5

[a]Significantly higher than the U.S. age-adjusted rate. Compared via 95% confidence interval.
[b]Significantly higher than the Arizona age-adjusted rate. Compared via 95% confidence interval.
[c]Significantly lower than the U.S. age-adjusted rate. Compared via 95% confidence interval.
[d]Significantly lower than the Arizona age-adjusted rate. Compared via 95% confidence interval.
*Significantly higher from 2011-2015 age-adjusted rate. Compared via 95% confidence interval.

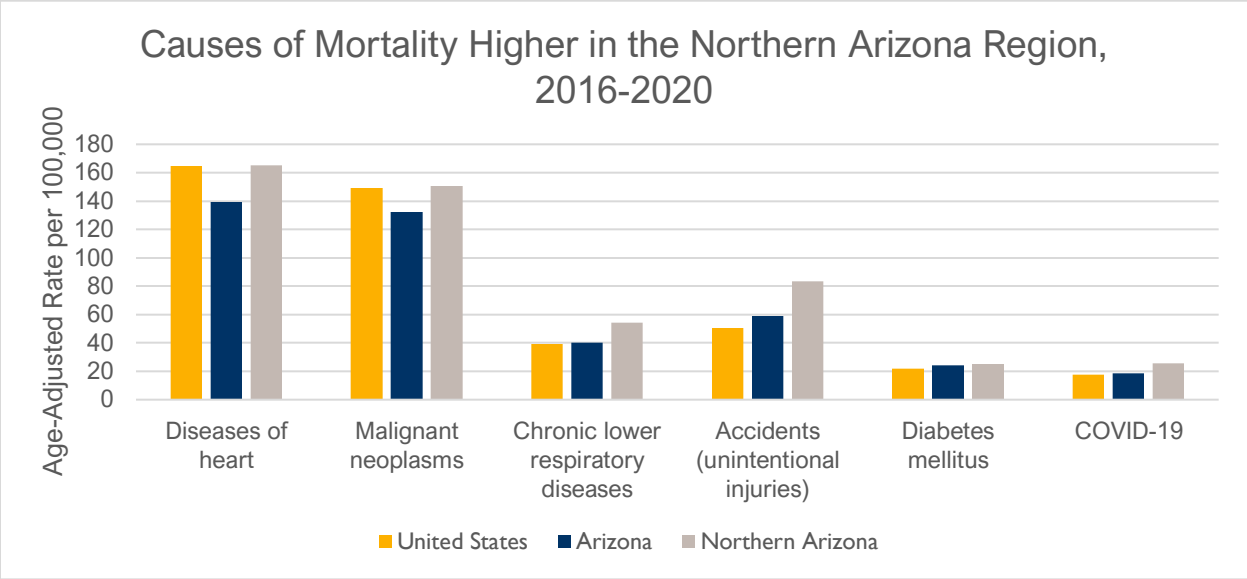


Figure 21. Mortality causes higher in northern Arizona compared to state and national rates. Age-adjusted rates per 100,000, 2016-2020.[14]

County Trends

Figures 22 and 23 show the top 10 leading causes of death for each northern Arizona county. The top 10 of the 15 leading causes of death are almost identical (although ordered differently) among Arizona and the five counties of northern Arizona. Apache and Yavapai counties each had one top 15 cause of death that was not in the top 10 in the other four counties. Apache County's 10th leading cause of death from 2016-2020 was influenza and pneumonia and Alzheimer's disease was the 11th leading cause. In Yavapai County, nutritional deficiencies were listed as the eighth leading cause of death and COVID-19 was the 11th leading cause. These data for top 15 cause of death are age-adjusted, but it is still important to note the differing age demographics of the counties, which can affect what types of diseases more commonly affect community members. Mohave and Yavapai counties have the highest rates of people over the age of 65 whereas in Apache and Navajo counties, over 30% of the population is under the age of 18. [5]

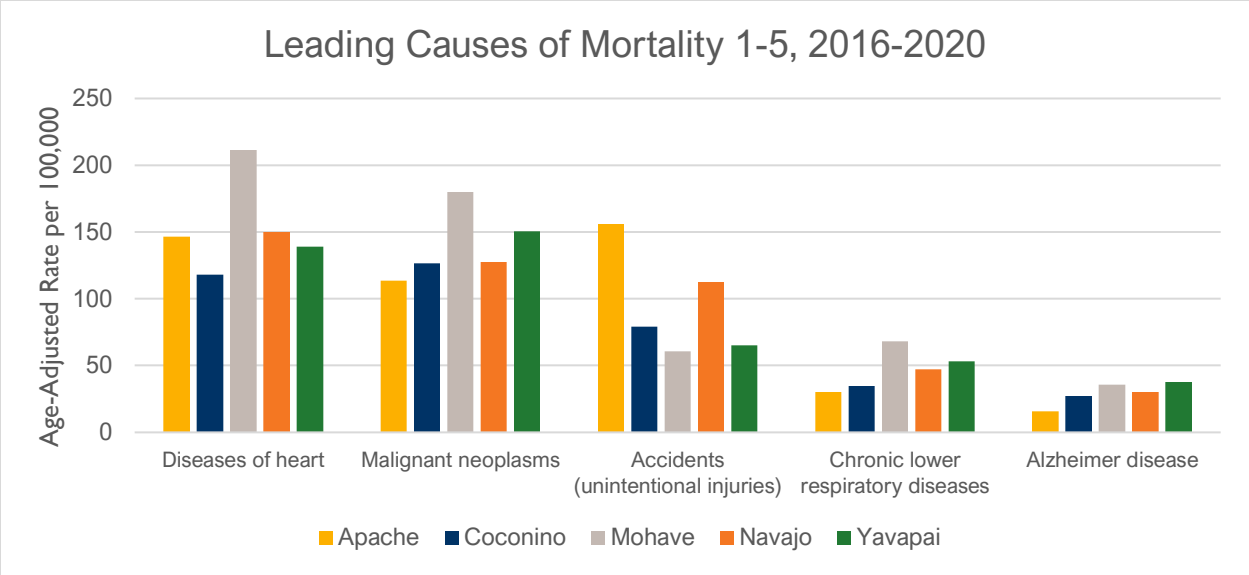


Figure 22. Leading causes of mortality by county, 1-5, 2016-2020.[14]

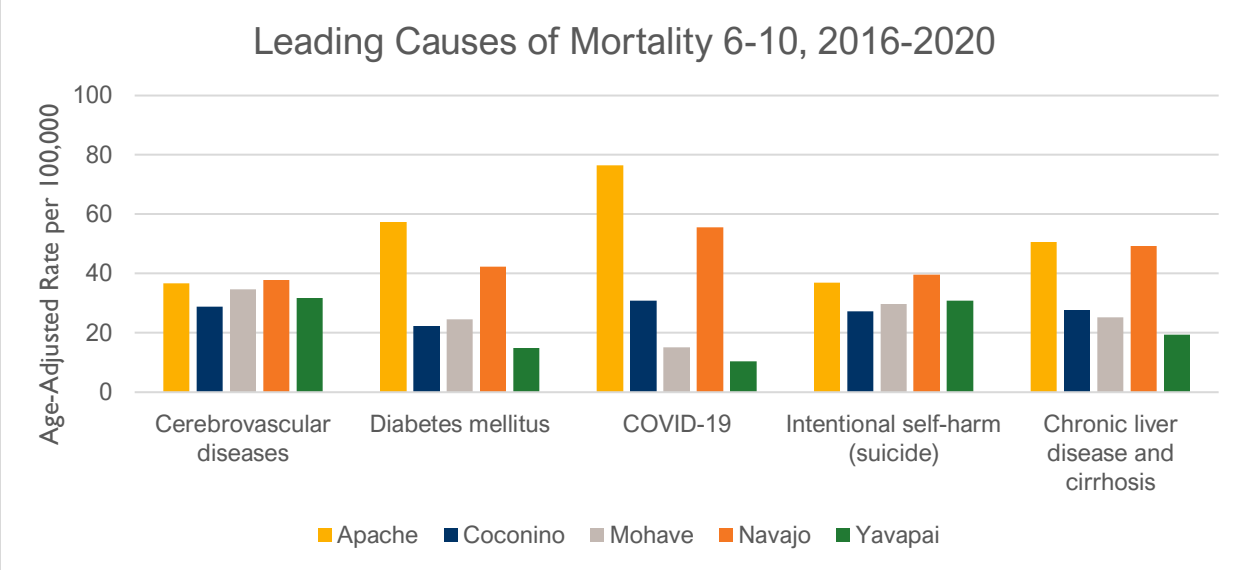


Figure 23. Leading causes of mortality by county, 6-10, 2016-2020.[14]

Causes of Hospital Admission and Emergency Visits

Hospital admission and emergency room visits help to understand the broader picture of health differences among populations living in northern Arizona. This update summarized hospital discharge databases provided by the Arizona Department of Health Services (ADHS) from 2016 through 2021. These data contained more than 100 variables for every inpatient and emergency department visit made by residents of each county of Arizona, excluding visits made to Indian Health Service facilities. This report only summarized data from the five northern Arizona counties.

To demonstrate the clinical diagnoses that are most commonly impacting the residents of northern Arizona, we used the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM), which is a standardized list of alphanumeric codes to describe diagnoses related to *morbidity*.[19] The original report used the previous version of ICD codes, ICD-9-CM, because the majority of their data sets fell into the same timeframe as the ICD-9-CM system (up to October 2015). Similar to the ICD-9-CM codes summarized in the original report, the ICD-10-CM codes are used by hospitals and physician offices from inpatient and outpatient records to categorize procedures and diagnoses for billing.[20] There have been some changes to the broader ICD code categories in the new tenth revision, namely that there are almost 5 times as many diagnosis codes, they now use alphanumeric categories instead of numeric categories, and the title and order of categories has changed slightly. The ICD-10-CM codes allow easier comparison of U.S. morbidity data to U.S. mortality data and enable greater specificity in identifying health conditions.[20]

ICD codes are not meant for research and therefore might not capture a diagnosis accurately. ICD codes may reflect provider diagnostic practices or preferences, as well as different choices in code detail used for conditions. Providers do not always choose the codes that make it to the final billing submission. Moreover, conditions must be diagnosed in order to be classified, and some diseases, such as hypertension, depression, and diabetes, are often under-diagnosed. Diagnosis information may not be comprehensive; for example, there is limited clinical information such as physiological measurements, test results, and data about how long someone has had a disease or condition and its severity. This data set is not "linked," meaning there is no way to account for one patient making multiple hospital visits for the same condition. Each time that person visited the hospital would count as a separate data entry. However, because the use of ICD codes is increasingly commonplace, studies on code accuracy are available for a wide variety of disease and discipline specific journals.

Regional Trends

To understand the larger picture of types of conditions that most commonly affect northern Arizona residents, we divided the ICD-10-CM codes into clinical categories. For a complete list of ICD-10-CM codes included in each category, see the left-hand column in Table 2.

To better understand the clinical manifestations that result in the greatest number of inpatient and emergency department visits, we parsed the data for the top 10 principal ICD-10-CM codes associated with visits. Table 3 shows the top 10 principal diagnostic codes for inpatient admissions and emergency department visits made by residents of the northern Arizona region from 2016-2021 to any hospital in Arizona (excluding Indian Health Service facilities) according to the clinical categories of the principal diagnosis codes. These are specific diagnoses that refer to specific conditions, not general categories as in Table 2. Table 3 also includes the total medical expenditures related to each condition.

Table 2. List of ICD-10-CM Code Categories

ICD-10-CM Codes	Disease Category
A00 – B99	Certain infectious and parasitic diseases
C00 – D49	Neoplasms
D50 – D89	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism
E00 – E89	Endocrine, nutritional, and metabolic diseases
F01 – F99	Mental, behavioral, and neurodevelopmental disorders
G00 – G99	Diseases of the nervous system
H00 – H59	Diseases of the eye and adnexa
H60 – H95	Diseases of the ear and mastoid process
I00 – I99	Diseases of the circulatory system
J00 – J99	Diseases of the respiratory system
K00 – K95	Diseases of the digestive system
L00 – L99	Diseases of the skin and subcutaneous tissue
M00 – M99	Diseases of the musculoskeletal system and connective tissue
N00 – N99	Diseases of the genitourinary system
O00 – O9A	Pregnancy, childbirth and the puerperium
P00 – P96	Certain conditions originating in the perinatal period
Q00 – Q99	Congenital malformations, deformations and chromosomal abnormalities
R00 – R99	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere classified
S00 – T88	Injury, poisoning, and certain other consequences of external causes
U00 – U85*	Codes for special purposes
V00 – Y99	External causes of morbidity
Z00 – Z99	Factors influencing health status and contact with health services

*The U00 – U85 codes are set aside for special purposes, particularly in emergencies. This category was used when the COVID-19 pandemic began. Specifically, the U071 code was implemented to categorize a diagnosis for COVID-19. In the summarization of the 2016-2021 data, U071 (COVID-19) is present in all tables. However, it is important to acknowledge that this code is not used before 2020.

Table 3. Top 10 Most Common Clinical Manifestations for Northern Arizona Residents, 2016-2021

Inpatient Visits				Emergency Department Visits			
Clinical Category	Visits	Charges	ICD-10-CM Codes	Clinical Category	Visits	Charges	ICD-10-CM Codes
Single liveborn infant, delivered vaginally	23621	$188,084,252	Z3800	Chest pain, unspecified	32128	$321,331,382	R079
Sepsis, unspecified organism	18402	$1,883,188,895	A419	Acute upper respiratory infection, unspecified	31032	$66,852,876	J069
COVID-19	10074	$1,140,242,618	U071	Urinary tract infection, site not specified	29480	$189,602,457	N390
Single liveborn infant, delivered by cesarean	8915	$203,293,871	Z3801	Other chest pain	28841	$322,945,056	R0789
Pneumonia, unspecified organism	7652	$360,513,586	J189	Unspecified abdominal pain	24302	$193,475,327	R109
Non-ST elevation (NSTEMI) myocardial infarction	7515	$973,036,009	I214	Alcohol abuse with intoxication unspecified	21240	$89,789,877	F10129
Acute kidney failure, unspecified	5561	$274,818,191	N179	COVID-19	19027	$112,476,302	U071
Hypertensive heart disease with heart failure	4851	$312,705,970	I110	Chronic low back pain	17462	$80,929,191	M545
Hyp hrt & chr kdny dis w hrt fail and stg 1-4/unsp chr kdny	4413	$360,065,122	I130	Headache	17190	$92,223,005	R51
Unilateral primary osteoarthritis, right knee	4366	$286,345,969	M1711	Nausea with vomiting, unspecified	17068	$102,032,251	R112

County Trends

For a full list of the top 15 diagnoses for inpatient admissions and ED visits by county, please see Appendix B. The ICD-10-CM categories with the highest percentages for inpatient visits were somewhat variable across counties. Diseases of the circulatory system were highest at 10–19%, digestive conditions at 9-10%, injury and poisoning at 7–13%, and respiratory conditions at 7–10%. Conditions related to pregnancy were in the 5–12% range and infectious diseases were in the 5–10% range. In Apache County, 13% of admissions were classified as injury and poisoning and the rate for all other counties was 7-10%. In Coconino County, mental/behavioral disorders and pregnancy were the highest at 12%. Mental/behavioral disorders were also relatively high in Apache and Navajo counties (10% each). Respiratory conditions had the greatest percent of admissions in Mohave County (19%), Navajo County (12%), and Yavapai County (17%), while the other counties ranged from 10-12%.

Most categories of ICD-10-CM codes for ED visits were similar across the counties, except for respiratory conditions and "symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified". Apache County had the highest percent of respiratory conditions at 19%, with other counties ranging from 9-11%. Apache County, conversely, had a much smaller percent of symptoms & signs (14%) compared to the other counties (19-25%). Overall, injury and poisoning was the most common code across counties, ranging from 18-22%. Next most common was the symptoms and signs code, with Yavapai (25%) and Mohave (23%) counties at the highest.

Primary Care Area Trends

Because there is a high degree of demographic variability in communities within the county boundaries, we used primary care areas (PCAs) as a more granular geographically defined category. Again, a PCA is defined as a geographic area in which most residents seek primary health services from the same health facilities. [15] Figure 24 shows the 26 PCAs in northern Arizona.

Figure 25 shows ED and inpatient visits per 10,000 residents living in a primary care area in 2021, calculated from the hospital discharge data. The values representing the height of each bar were determined by dividing the total number of visits per primary care area by the number of residents living in that primary care area, and then multiplying by 10,000 to get a crude rate. Because this is a rate of visits, instances where the rate per 10,000 people exceeds 10,000 indicates the prevalence of individuals visiting the hospital multiple times. Sometimes one individual could have dozens of visits to the hospital each year. Again, this does not include visits to IHS or all Tribally governed facilities.

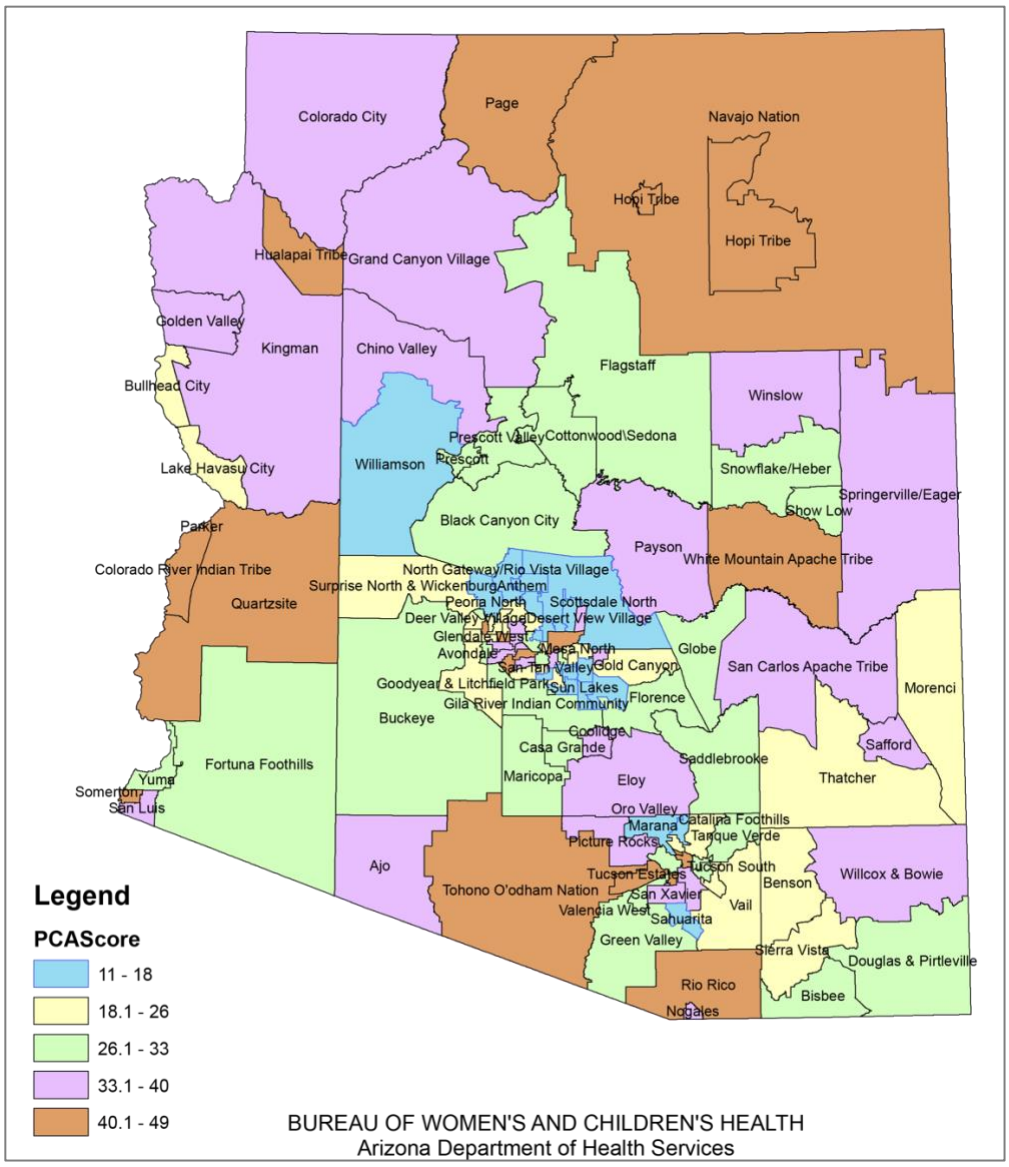


Figure 24. Map of ADHS primary care areas (PCAs) in Arizona, 2021.[21]
Created by ADHS.

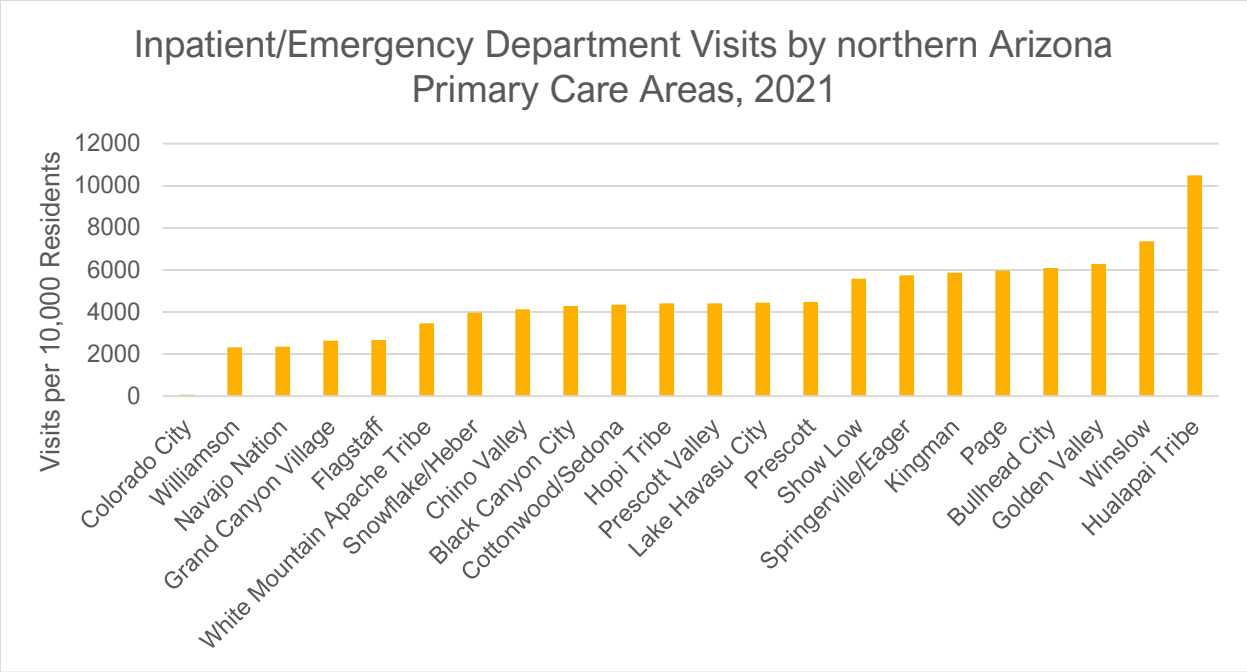


Figure 25. Inpatient and emergency department hospital visits per 10,000 residents living in a primary care area in 2021. ADHS Hospital Discharge data.

Substance Use and Behavioral Health Issues

Binge drinking and cigarette smoking for adults have remained as **leading health indicators** from Healthy People 2020 to Healthy People 2030. [12] See Figures 26 and 27 for summaries of BRFSS data on binge drinking and smoking. BRFSS defines binge drinking as consuming five or more alcoholic drinks in one sitting for men and four or more for women. Just over 15% of Arizona adults reported binge drinking, which is slightly lower than the 2019 U.S. rate of 20%.[6]

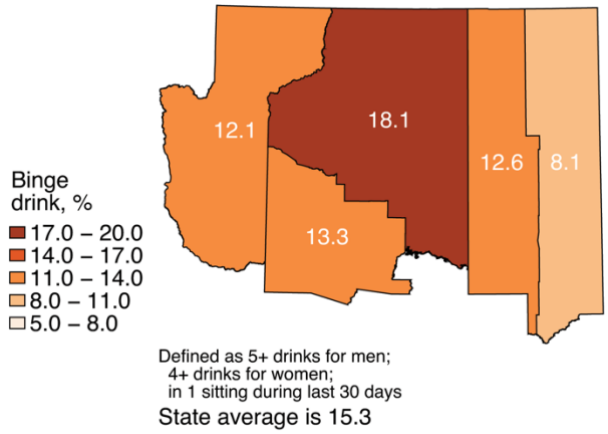


Figure 26. AZ BRFSS binge drinking by county, 2016-2019.

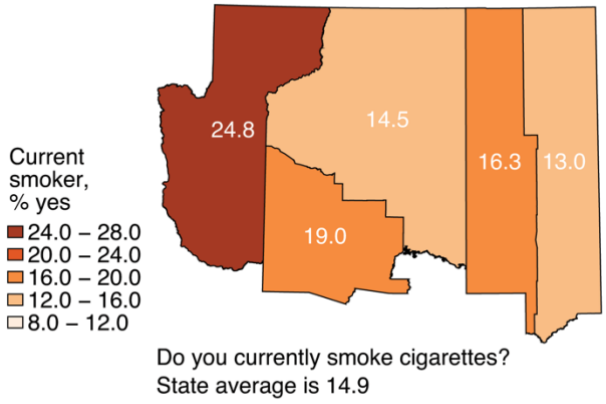


Figure 27. AZ BRFSS smoking by county, 2016-2019.

Coconino County (18.1%) was the only northern Arizona county that had a higher rate than the state average. Statewide, just under 15% of adults are current cigarette smokers, with Mohave (24.8%), Yavapai (19%), and Navajo (16.3%) having higher rates than the state average. The national average for cigarette smoking in 2019 was 16%.[6]

Figure 28 and Figure 29 summarize data from the Arizona Department of Public Safety's crime reports from 2020 for Figure 28 and from 2017 through 2019 for Figure 29. The graphs show substance use related to adult arrest rates per 1,000 people. In each year, the Apache County data had incomplete data from the Apache County Sheriff's Office, which could contribute to the overall much lower crime rates over all years. Due to the COVID-19 pandemic's potential impact on arrests, we created Figure 28 separately using the 2020 Arizona Crime report and the 2020 Census population estimates. [22,23] Figure 29 was created by averaging the total adult (over 18) arrests from 2017-2019, dividing by the average ACS 1-year population from 2017-2019, then multiplying by 1,000 for crude rates. Apache County and Yavapai County were the only counties with lower rates of DUI than the state rate of DUI across all years. Coconino County and Mohave County had higher 2017-2019 rates of all four arrest types than the state rates. [22]

The biggest difference seen between the 2017-2019 data and the 2020 data is the number of arrests related to marijuana possession. Almost all substance use related arrest rates were down from 2017-2019 to 2020, but marijuana possession has some of the largest drops in arrest rates. In every northern Arizona county except for Yavapai County, the marijuana possession rate was cut in half or more by 2020. Marijuana was legalized for adult personal use in November of 2020, which could have impacted the lower rates of arrests for marijuana possession.

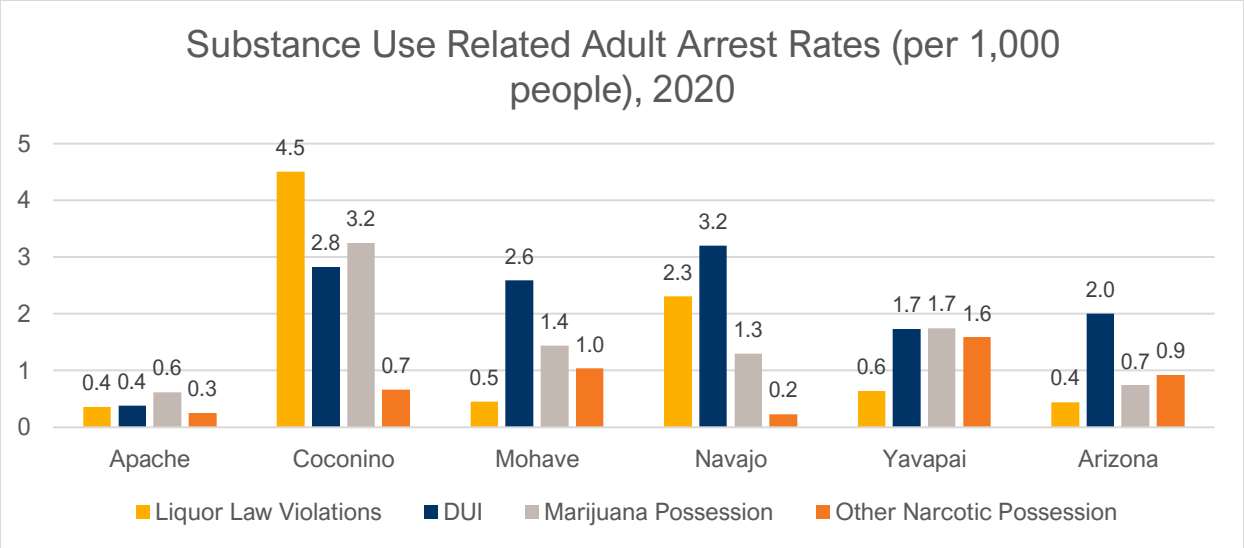


Figure 28. Regional substance use related arrest rates by county, compared to Arizona overall.[22,23] Calculated using data in the Crime in Arizona 2020 report and 2020 Census population estimates.

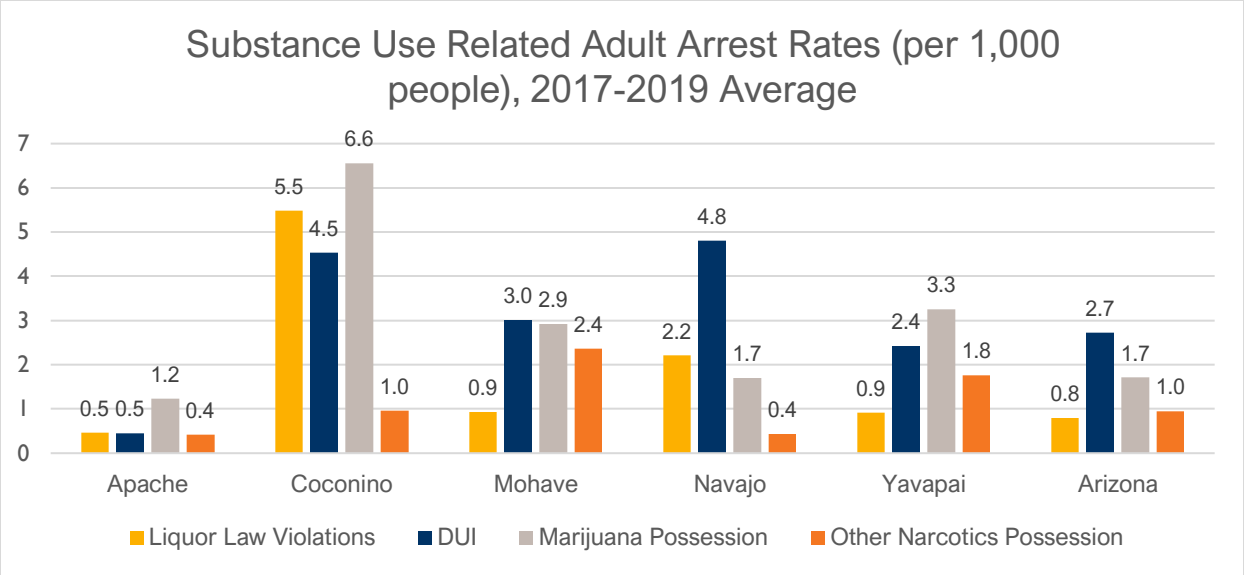


Figure 29. Regional substance use related arrest rates by county, compared to Arizona overall. [22,23] *Calculated using data in the Crime in Arizona 2017, 2018, and 2019 reports and the 2017, 2018, 2019 1-year ACS population estimates.*

According to data from the Arizona Youth Survey, in 2022, the most commonly used substances among twelfth graders are e-cigarettes, alcohol, and marijuana. In 2022, only Apache County and Yavapai County had a higher rate of e-cigarette use at least once in their lifetime compared to the state average. The percentages ranged from 33.6% in Apache County to 14.5% in Navajo County. The state average for this indicator is 27%. Figure 30 shows the percentage of twelfth graders who have used e-cigarettes, alcohol, or marijuana in the 30 days prior to taking the survey. In this figure, displaying *use in the past 30 days*, only Navajo County has a lower percentage of e-cigarette use compared to the state average (14.8%). Yavapai County (54.5%) reported the highest rates of alcohol and marijuana use, whereas Coconino County (40%) reported the lowest. [16] All northern Arizona counties except for Coconino County, which was almost even with the state average, had a higher rate of alcohol and marijuana use than the state average. This is in contrast with data from 2016, which found Coconino County had the highest rates of alcohol and marijuana use and Apache County had the lowest. Apache County (51.8%) had third highest rates of alcohol and marijuana use compared to the other northern Arizona counties in 2022 but was close to Yavapai (54.5%) and Mohave (52.5%) counties. [16]

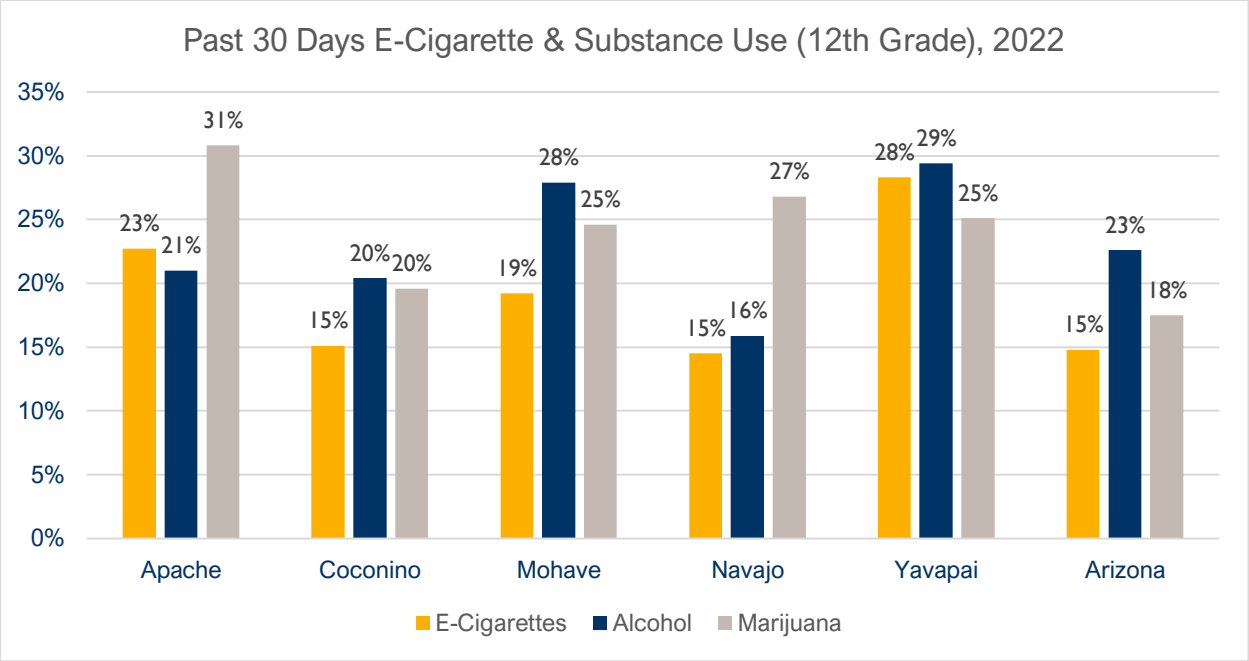


Figure 30. E-Cigarette, alcohol, and marijuana use by twelfth graders.[16]

The next highest most used substance among 12th graders for the five northern Arizona counties was poly drug use. Poly drug use is defined as using multiple drugs at the same time (e.g., alcohol, prescription medications, marijuana, and other illegal drugs). [16] Yavapai County had the highest rate at 8.2% and Coconino County had the lowest rate at 2.6%. All northern Arizona counties except for Coconino had a higher rate of poly drug use than the state average (4.5%). See Figure 31. The other most commonly used individual substances included prescription opioids, prescription tranquilizers, prescription stimulants, and over the counter drugs. [5] Methamphetamines, inhalants, heroin, and synthetic drugs were also reported but at rates much lower than the other substances. [16] Inhalants were used in all five counties, with the highest rate in Mohave County (1.8%), but the other substance use rates were scattered and below 1% for all five counties. See Figure 32.

Compared to data from 2016, the rates of other types of substance use by twelfth graders for 2022 are lower across all categories. In fact, the trends of substance use from the Arizona Youth Survey for almost all substances have consistently decreased since 2010. [16] That being said, many of the substance metrics are still higher than the state average, except for alcohol use in Apache, Coconino, and Navajo counties. [16] The Arizona Department of Public Safety data from 2017-2020 and the self-reported Arizona Youth Survey data from 2022 largely point to substance use rates either at or above the state average among the adult and adolescent population. [16,22]

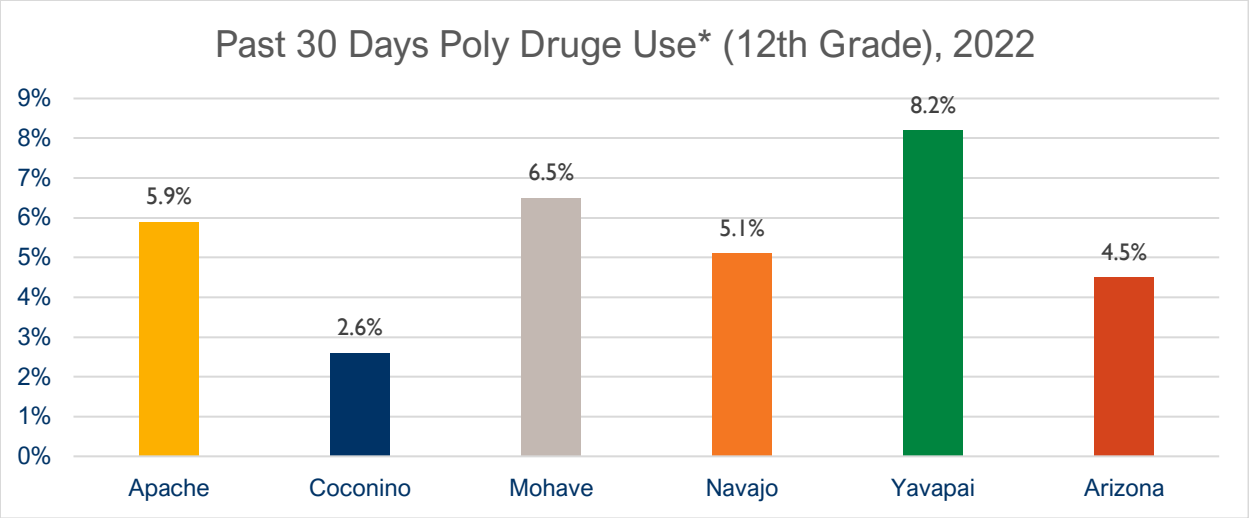


Figure 31. Poly drug use by twelfth graders.[16]
**Poly drug use is defined as using multiple drugs at the same time (e.g., alcohol, prescription medications, marijuana, and other illegal drugs).*

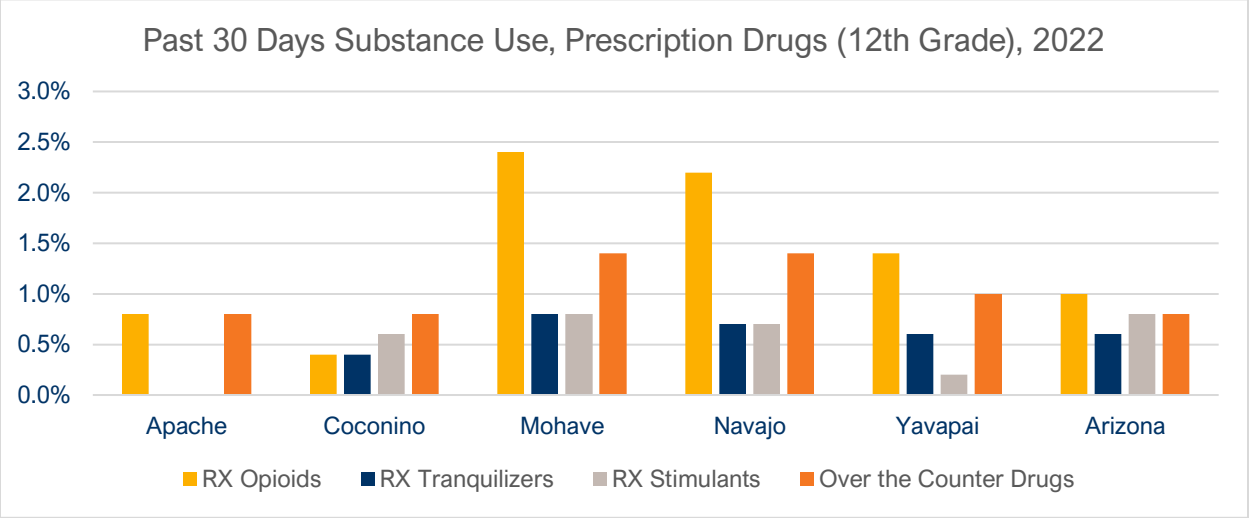


Figure 32. Other types of substance use by twelfth graders, prescription drugs, 2022.[16]

Intentional Self-Harm (Suicide)

Reducing the suicide rate is a **leading health indicator** for Healthy People 2030. The target is to reduce the number to 12.8 suicides per 100,000 people. [12] The current data from Healthy People 2030 indicates this metric is improving, but is still 14.1 suicides per 100,000 people.[12] According to CDC WONDER data between 2016 and 2020, suicide was ranked as the ninth leading cause of death for both the five-county region and the United States.[14] However, Arizona overall and all five northern Arizona counties had higher age-adjusted rates of suicide compared to the U.S. rate.[14] Apache and Navajo counties have particularly high rates compared to the state of Arizona and the United States, which is a pattern that has persisted from the 2016 data (see Figures 33 and 34).

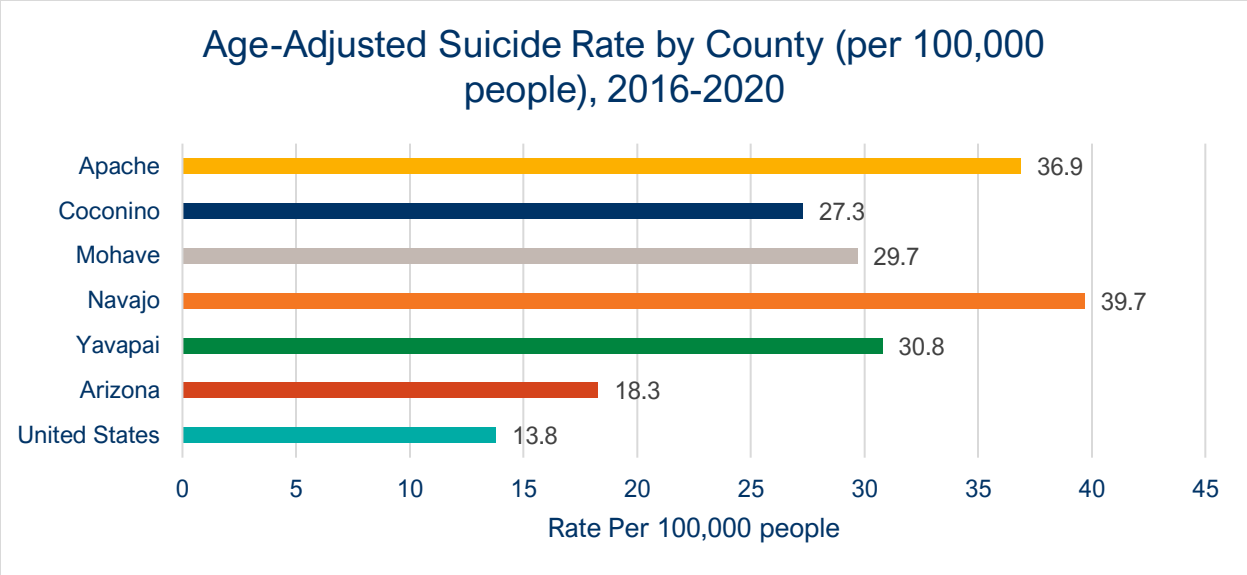


Figure 33. Age-adjusted suicide rates by county, 2016-2020.[14]

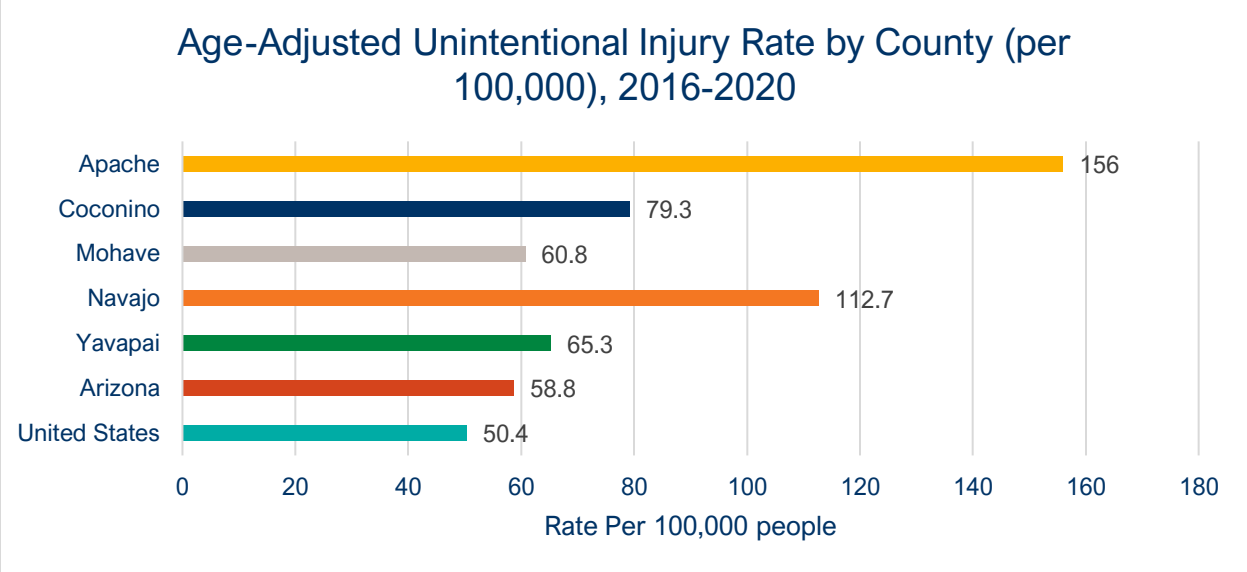


Figure 34. Age-adjusted unintentional injury rates by county, 2016-2020.[14]

Figure 35 describes the distribution of age of at the time of hospitalization for suicide, suicide attempt, or self-inflicted injury among northern Arizonans in 2021. Time of suicide, suicide attempt, or self-inflicted injury is identified from ICD-10-CM diagnostic codes from the Arizona Department of Health Services Hospital Discharge Data. These codes do not distinguish between patient encounters that resulted in death or any degree of recovery. For additional histograms showing age distributions by county, see Appendix C.

The hospital visit rate for suicide, suicide attempt, or self-inflicted injury for all northern Arizona counties was 3.17 per 1,000 people. Suicide rates ranged from 1.43 to 3.45 suicides per 1,000 residents. The rate was highest in Coconino County and lowest in Apache County (see Appendix C). Most suicides for all counties were attempted by residents younger than 45 years of age. The age of suicide attempters was highest in Mohave and Yavapai counties; 32–34% of all suicide attempts in these counties were carried out by residents older than 45 years of age. These counties also have the highest average age. Ages were youngest in Coconino and Navajo counties, where 32–38% of all suicide attempts were carried out by residents younger than 20 years of age. In Coconino County almost 50% of all suicide attempts were carried out by residents younger than 24 or younger.

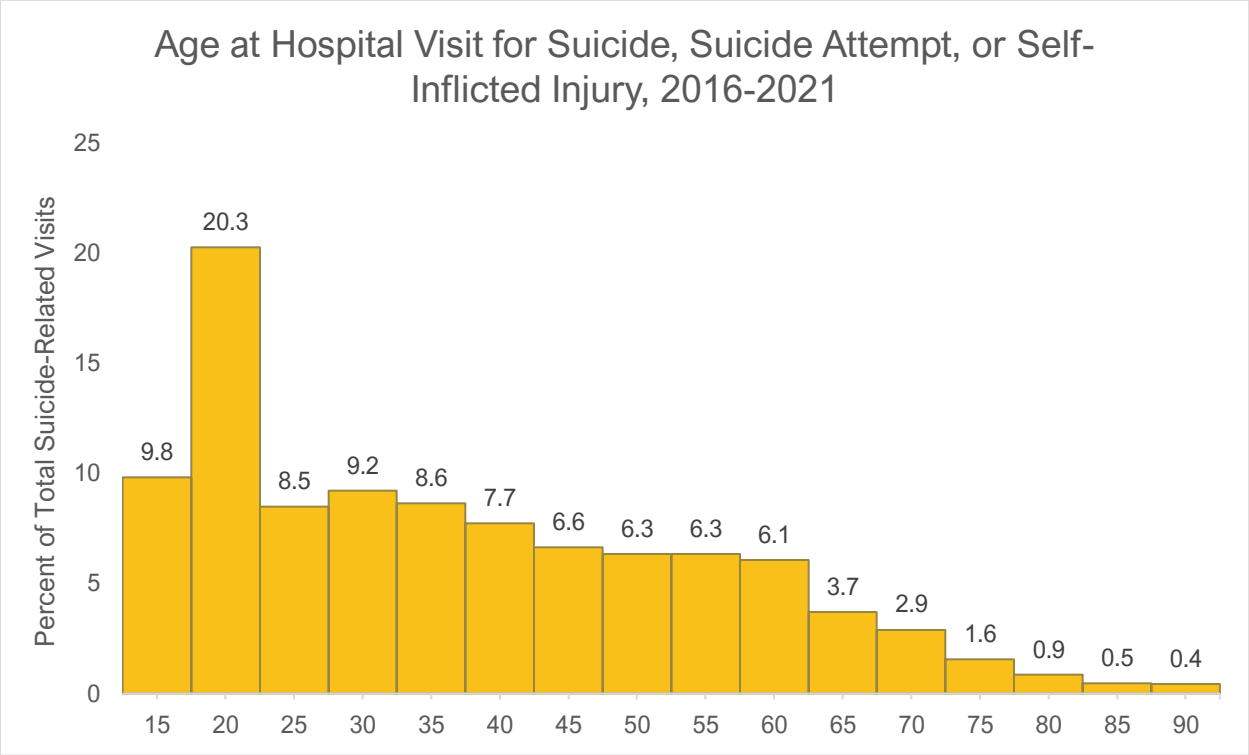


Figure 35. Age at time of hospitalization for suicide, suicide attempt, or self-inflicted injury in northern Arizona, 2016-2021. Source: ADHS Hospital Discharge data.

Chronic Health Conditions of Concern

BRFSS data continues to show high rates of diabetes and conditions linked to cardiovascular health in the northern Arizona region. See Figures 36-39. Compared to BRFSS data from 2011-2015, prior heart attack, diabetes, and high blood pressure had very similar state average percentages in the 2016-2019 data, except high cholesterol, which went down almost 10%. The percentage of those with a prior heart attack is particularly high in Mohave County (9.6%), but Yavapai (6.6%) and Navajo (6.5%) counties have percentages higher than the state average (4.4%).

People residing in the northern Arizona counties continue to have high percentages of high blood pressure, with Coconino County (25.8%) being the only county of the five that had a lower percentage than the state average (31.3%). Mohave County (41.1%) had the highest percentage of people with high blood pressure of the five counties. Diabetes rates in Apache (19.1%) and Navajo (17.7%) counties have increased since 2011-2015 but Mohave County (14.2%) remains to be above the state average (14.2%).

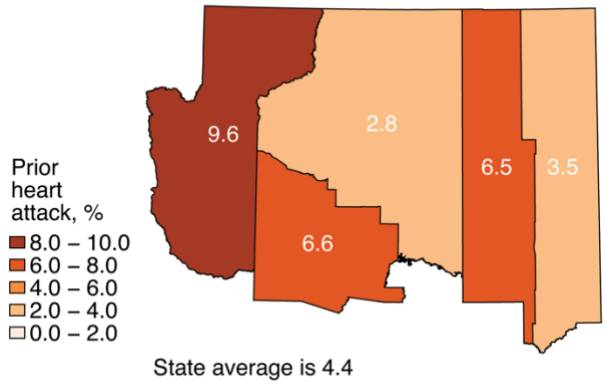


Figure 36. AZ BRFSS prior heart attack by county, 2016-2019.

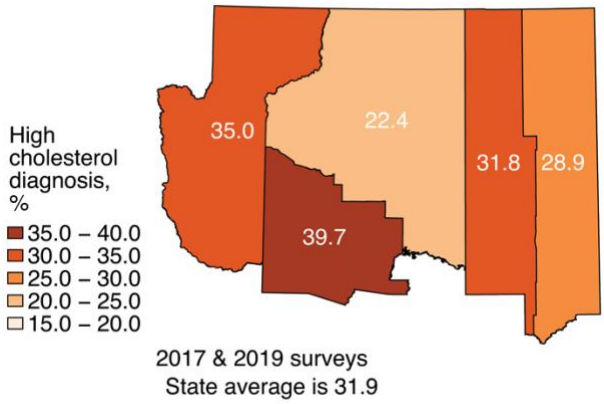


Figure 37. AZ BRFSS high cholesterol by county, 2017 & 2019.

Diagnosed high cholesterol has decreased in each of the five northern Arizona counties since 2011-2015. For 2016-2019 Coconino County (22.4%) had the lowest rate of high cholesterol, and while Apache County (28.9%) still is below the state average (31.9%), its rate increased from 2011-2015 (26%). While these estimates are still expected to be lower than the true prevalence because diagnosis requires screening and recollection of results, it is positive that the rates are going down. Overall, cardiovascular disease risk is still very high in Mohave County, but Yavapai's risk is also quite high, when considering all cardiovascular risk factors together.

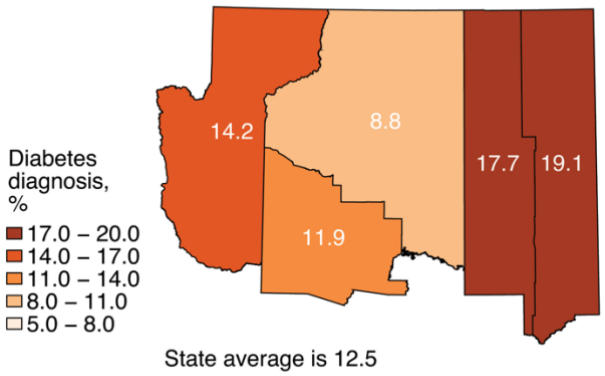


Figure 39. AZ BRFSS diabetes by county, 2016-2019.

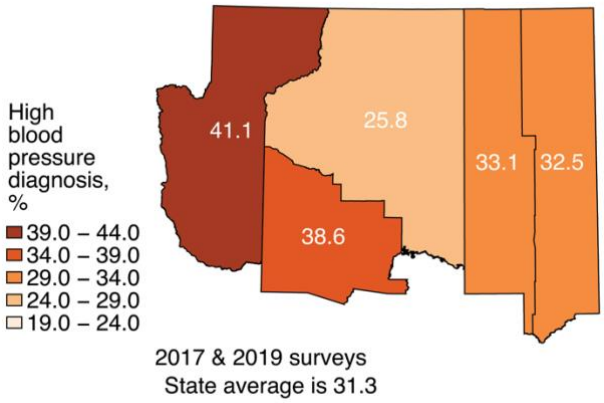


Figure 38. AZ BRFSS high blood pressure by county, 2016-2019.

Patterns and disparities in populations

Health Patterns and Disparities in Rural vs. Urban Areas

There are many areas in the northern Arizona region that are rural or remote, which impact presence and access of services and resources important to health equity. Sometimes this means living without basic utilities such as running water, electricity, and phone/internet service. There are fewer services in rural areas and transportation can be a common barrier to seeking services and resources.

As noted earlier in this report, almost half of the land area in northern Arizona region is considered rural (Figure 14). Apache County has the highest proportion of rural residents at 72% (defined as those living in communities of fewer than 2,500 people), followed by Navajo County at 32%. The health needs and concerns of the most rural areas in the region can be much different from urban communities with more access to health and social services, transportation, and more opportunities for productive and engaging social outlets.[10] Each county has some percentage of urban areas and urban clusters, but Coconino (85%) and Yavapai (91%) counties have the highest percent of residents living in urban areas or urban clusters. Even though more services and opportunities are available in urban areas, affordability, transportation, and other social barriers can still exist that inhibit people from accessing them.

We used the ADHS discharge data to observe patterns in hospital discharges among rural and urban populations. We described the top 20 ICD-10-CM diagnosis codes for inpatient admissions and emergency department visits for each zip code included in the urban/rural classification. We were able to identify patterns of ICD-10-CM discharge codes in rural and urban areas (described below).

The definitions used here to determine rural vs urban areas and the degree of rural remoteness is different than those used in the RUCA codes (shown in Figure 14). For the following analysis, we used two different classifications to determine the level of geographic remoteness for each aggregation level. For the first, we used zip code level discharge data. The USDA Economic Research Service (ERS) uses the term "Frontier and Remote" (FAR) to describe areas that have some combination of low populations and high geographic remoteness. [24] To capture variation in differing degrees of remoteness and access to goods and services, the USDA ERS uses four levels of designation to delineate these differences. [24] Each zip code is classified as Urban or Rural. If the zip code is rural, it is further classified as Level 1, 2, 3 or 4.

Level 1 FAR describes an area with a relatively high population and relatively easy access to high-level goods and services such as advanced medical procedures or regional airport hubs. Level 4 FAR more closely describes an area with a much smaller population with more difficult access to goods and services such as grocery stores, gas stations, and basic health care services. Each level is defined in relation to the time it takes to drive to the outer edges of the nearest urban area. Figure 40 shows a map of zip code areas in northern Arizona according to their rural code designations. Areas in white are not designated as rural. The lightest blue indicates Urban, and each level further indicates Level 1 Frontier and Remote to Level 4 Frontier and Remote. It should be noted that most of the Level 3 and 4 FAR regions correspond with Native nation lands. To further explore the relationship between degrees of FAR and health outcomes in northern Arizona, we would need to include tribal health data.

USDA ERS Frontier and Remote Area Codes Descriptions

Rural Level 1 – Areas with up to 50,000 people that are 60 minutes or more from an urban area of 50,000 or more people.

Rural Level 2 – Areas with up to 25,000 people that are 45 minutes or more from an urban area of 25,000–49,999 people and 60 minutes or more from an urban area of 50,000 or more people.

Rural Level 3 – Areas with up to 10,000 people that are 30 minutes or more from an urban area of 10,000–24,999 people, 45 minutes or more from an urban area of 25,000–49,999 people, and 60 minutes or more from an urban area of 50,000 or more people.

Rural Level 4 – Areas that are 15 minutes or more from an urban area of 2,500–9,999 people, 30 minutes or more from an urban area of 10,000–24,999 people, 45 minutes or more from an urban area of 25,000–49,999 people, and 60 minutes or more from an urban area of 50,000 or more people.

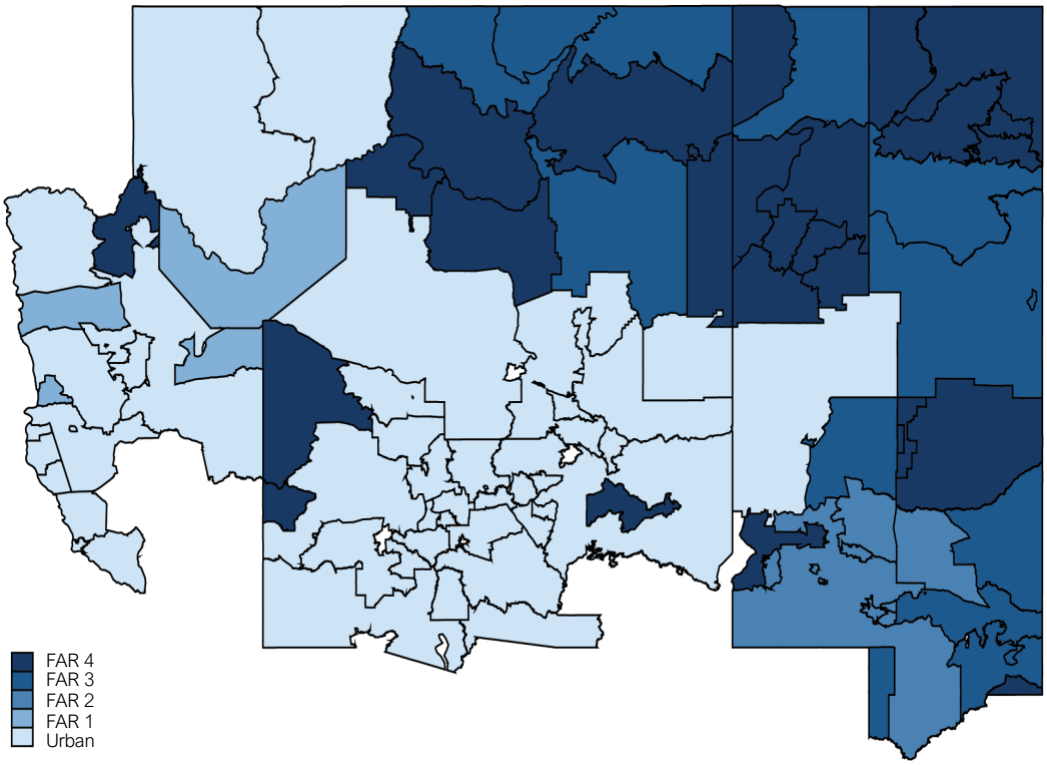


Figure 40. Map of Foreign and Remote Area Codes by zip code.[24]

Percentages in Figures 41 and 42 represent percent of total admissions in the top 15 diagnoses for inpatient admissions and emergency department visits. For a complete list of the top 15 diagnoses for each FAR level, see Appendix D. Abbreviations for the figures are as follows:

- Signs & Symptoms: Symptoms, signs, and abnormal clinical and lab findings, not elsewhere classified
- Respiratory: Diseases of the respiratory system
- Genitourinary: Diseases of the genitourinary system
- Injury: Injury, poisoning, and certain other consequences of external causes
- Circulatory: Diseases of the circulatory system
- Digestive: Diseases of the digestive system
- Infectious: Certain infectious and parasitic diseases
- Musculoskeletal: Diseases of the musculoskeletal system and connective tissue

In general, the top ICD-10-CM diagnostic codes for inpatient admission across all five classifications were fairly similar. However, most common categories across all classifications were diseases of the circulatory system and respiratory conditions. Common circulatory system diagnoses included hypertensive heart disease with heart failure, NSTEMI myocardial infarction, and hypertensive heart and chronic kidney disease with heart failure. Respiratory conditions commonly included pneumonia, acute respiratory failure with hypoxia, and chronic obstructive pulmonary disease. Infectious diseases and mental and behavioral conditions were also common, particularly for FAR 3 through FAR 4. The most common infectious diseases for FAR 3 and FAR 4 was sepsis. The most common mental and behavioral condition was major depressive disorder and alcohol dependence with withdrawal.

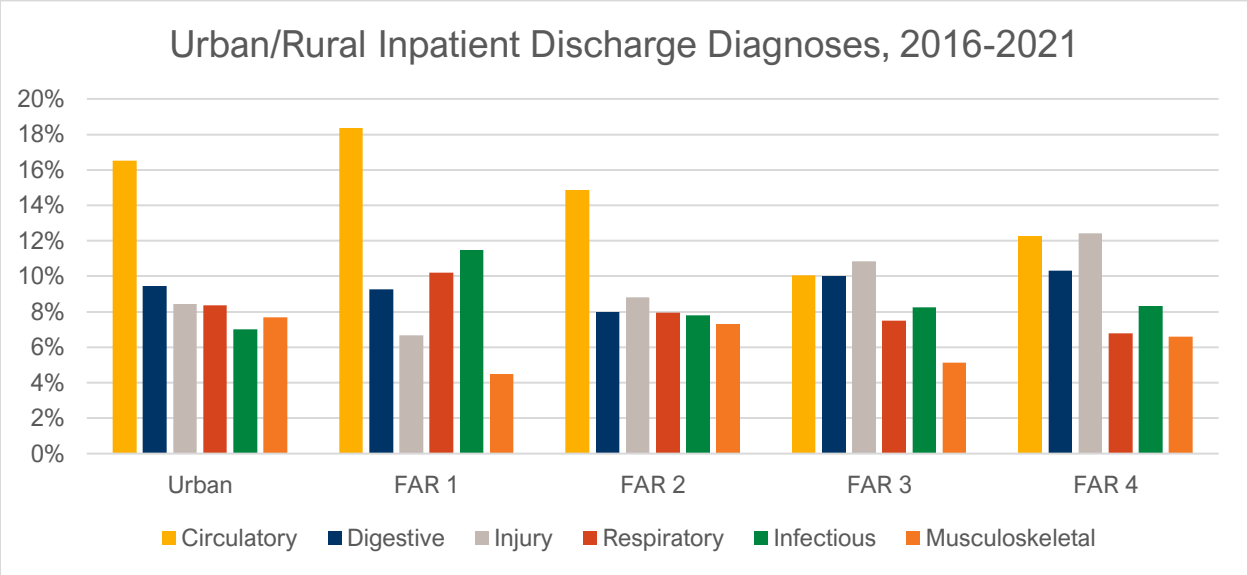


Figure 41. Top disease categories for inpatient admissions by Frontier and Remote Area Codes,[24] 2016-2021. Source: ADHS Hospital Discharge data.

There were also many similarities across rural classifications for Emergency Department (ED) visits. For all levels of geographic remoteness, "symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified" and respiratory conditions made up the majority of the top 15 diagnoses. The most common symptoms & signs were chest pain, abdominal pain, and headache. The respiratory conditions were acute upper respiratory infection, acute pharyngitis, and streptococcal pharyngitis. The next most common category in the top 15 diagnosis codes was mental/behavioral conditions, with the top diagnosis being alcohol abuse with intoxication. Alcohol abuse with intoxication was the overall top diagnosis of ED visits for urban areas, FAR 3, and FAR 4 levels.

COVID-19 was in the top 4 diagnoses for inpatient visits at every FAR level, despite only being present for 2 of the 6 years of data. For ED visits, COVID-19 was ranked 11th or higher in every geographic level.

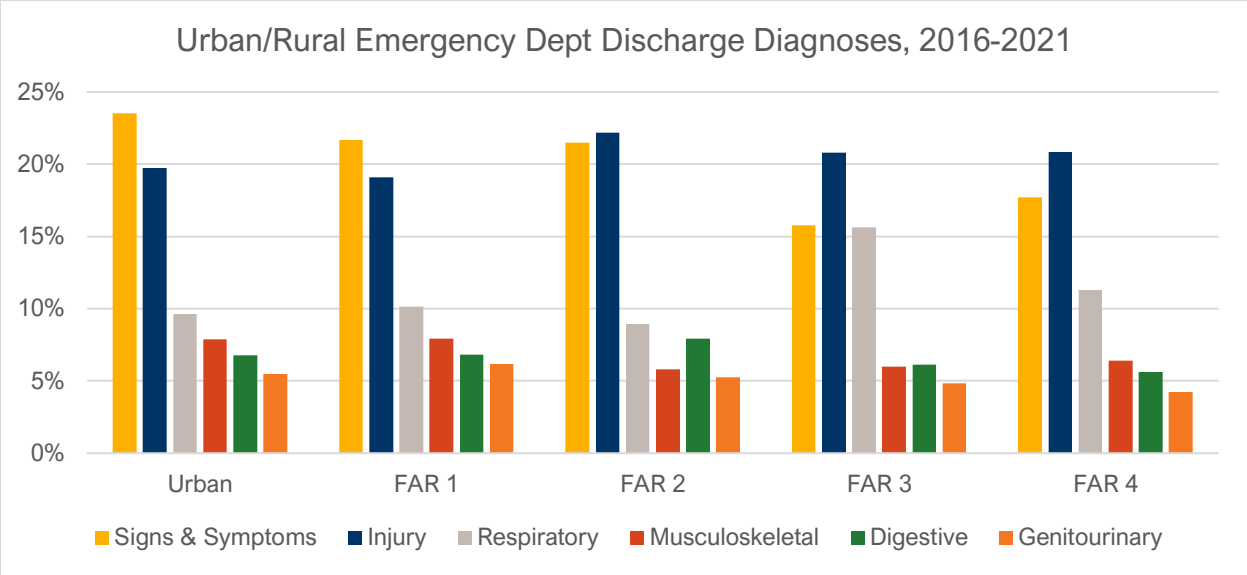


Figure 42. Top disease categories for emergency department visits by Frontier and Remote Area Codes,[24] 2016-2021. Source: ADHS Hospital Discharge data.

For the second characterization of rural and urban, we looked at PCA-level discharge data (see Figure 24 for a map of PCAs). We grouped the zip codes by their corresponding PCAs. ADHS categorizes each PCA as one of four potential descriptors: Urban, Rural, Frontier, or Indian. Urban PCAs are those that occur in counties with more than 400,000 people and contain Census tracts of more than 50,000 people. No PCAs in northern Arizona were designated as Urban. Rural PCAs are those that occur in counties of fewer than 400,000 people (if they do not qualify as Frontier or Indian). [21] Thirteen of 22 PCAs in northern Arizona are classified as Rural. Frontier PCAs are Rural but also have fewer than six people per square mile. Five of 22 PCAs in the region qualified as Frontier. Indian PCAs are defined as those within federally recognized Native nation borders. Four of the 26 PCAs are classified as Indian.

The most common diagnosis codes linked to inpatient admissions were very similar across the region. Most diagnoses for Rural, Frontier, and Indian PCAs were related to sepsis, COVID-19, and pneumonia. Major depressive disorder was the fourth most common inpatient diagnosis for Indian PCAs and was much higher than in Frontier or Rural PCAs. Most common ED codes in Rural, Frontier, and Indian PCAs were chest pain, urinary tract infection, and acute upper respiratory infections. Alcohol abuse with intoxication was the most common diagnosis for Indian PCAs and the second most common for Frontier PCAs.

Health Patterns and Disparities by Race/Ethnicity

It is well documented in the literature that ethnic minorities often receive a lower quality of care and that they often suffer from greater morbidity and mortality than non-minorities. [25-27] The reasons for this are incredibly complex and beyond the scope of this report. Health disparities that affect any ethnic population are always compounded by a host of social, economic, political, and cultural factors that intersect in a myriad of dynamic interactions. The following section explores racial/ethnic disparities identified in the BRFSS, CDC WONDER, and ADHS Hospital Discharge databases. It is important to note that one of the major limitations of this analysis is that it does not include any data from any Indian Health Service facilities.

Racial/Ethnic Patterns in Selected BRFSS Health Indicators for Northern Arizona

Despite 4 years of combined BRFSS data from 2016-2019, the sample sizes within county for non-Hispanic Black and non-Hispanic Asian are too small to estimate health characteristics for (Table 4). For BRFSS data, it is only appropriate to report results if the cell size is greater than 50 and the relative standard error is < 30%, to ensure stability of the estimate.

Table 4. Number of Survey Participants by Race/Ethnicity and County, 2016-2019 Arizona BRFSS

	Apache (*n*=2,500)	Coconino (*n*=2,100)	Mohave (*n*=1,748)	Navajo (*n*=2,146)	Yavapai (*n*=2,388)
Non-Hispanic White	1,183	1,586	1,498	1,429	2,143
Non-Hispanic Black	18	21	8	16	11
Non-Hispanic Asian	5	20	18	9	4
Non-Hispanic American Indian	1,036	245	40	486	28
Hispanic	156	167	123	130	134
Other	102	61	61	76	68

Figure 43 shows the percent of people rating their health as good, very good, or excellent, so a lower percent indicates worse self-rated health. There are clear disparities by race/ethnicity in self-rated health (Figure 43), but the level of disparity in perceived health status varies across county. For example, Hispanics in Navajo County have the best health rating (85%) in the county whereas Hispanics in Apache County have the lowest health rating (68%) in the county and among the lowest in northern Arizona. Also notable is that county-level variation is as large as variation across race and ethnicity. In some counties, non-Hispanic white respondents have the highest percentage of good self-rated health (e.g., Apache and Coconino), but might not be higher than other racial/ethnic categories in other counties (e.g., Hispanic in Navajo County). Thus, education and geography appear to be stronger determinants of self-rated health status than race/ethnicity.

Figure 44 shows slightly more consistent patterns for functional limitations, but still indicates some variability between groups. Non-Hispanic whites were more likely to report some limitation relative to others in Mohave and Yavapai counties, but not in Apache, Coconino, and Navajo counties. In Apache, Coconino, and Navajo counties, Hispanics have the greatest percent of those with any functional limitation. Interestingly, in Coconino and Navajo counties, Hispanics have two of the three highest self-rated health percentages of all northern Arizona counties. In terms of mental health, Hispanics reported more mentally unhealthy days relative to non-Hispanic whites and non-Hispanic AI/ANs, except for Mohave County (Figure 45). There was not a clear pattern between race/ethnicity and cardiovascular risk factors (Figure 46).

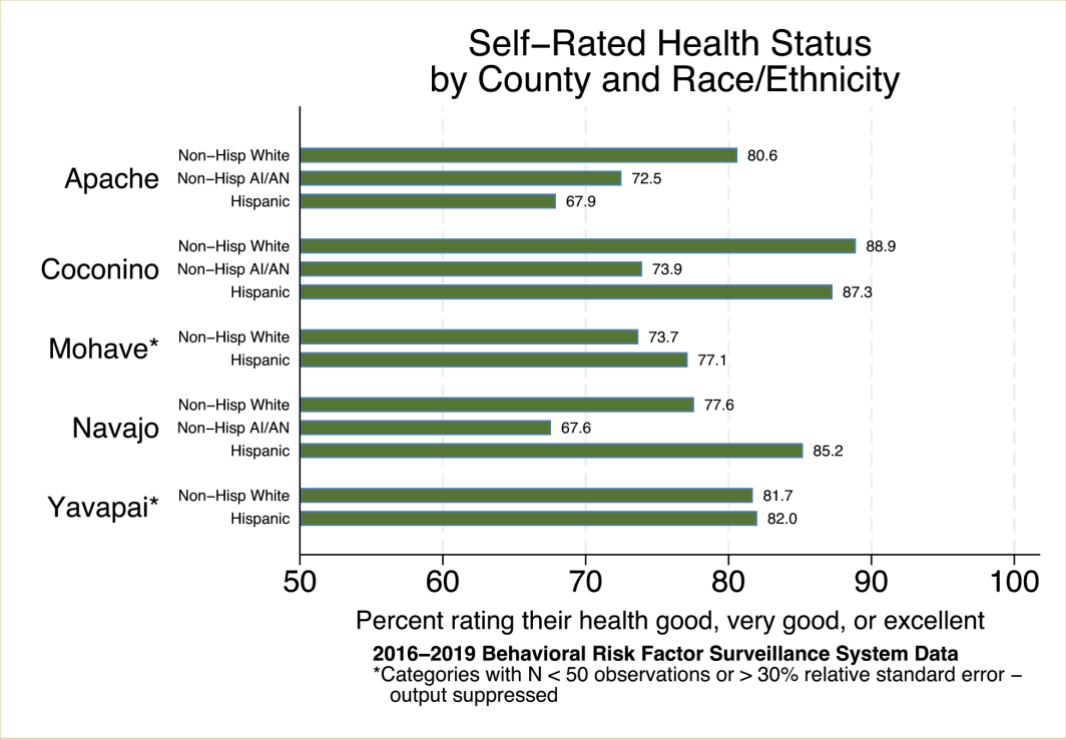


Figure 43. AZ BRFSS self-rated health status by race/ethnicity and county, 2016-2019.

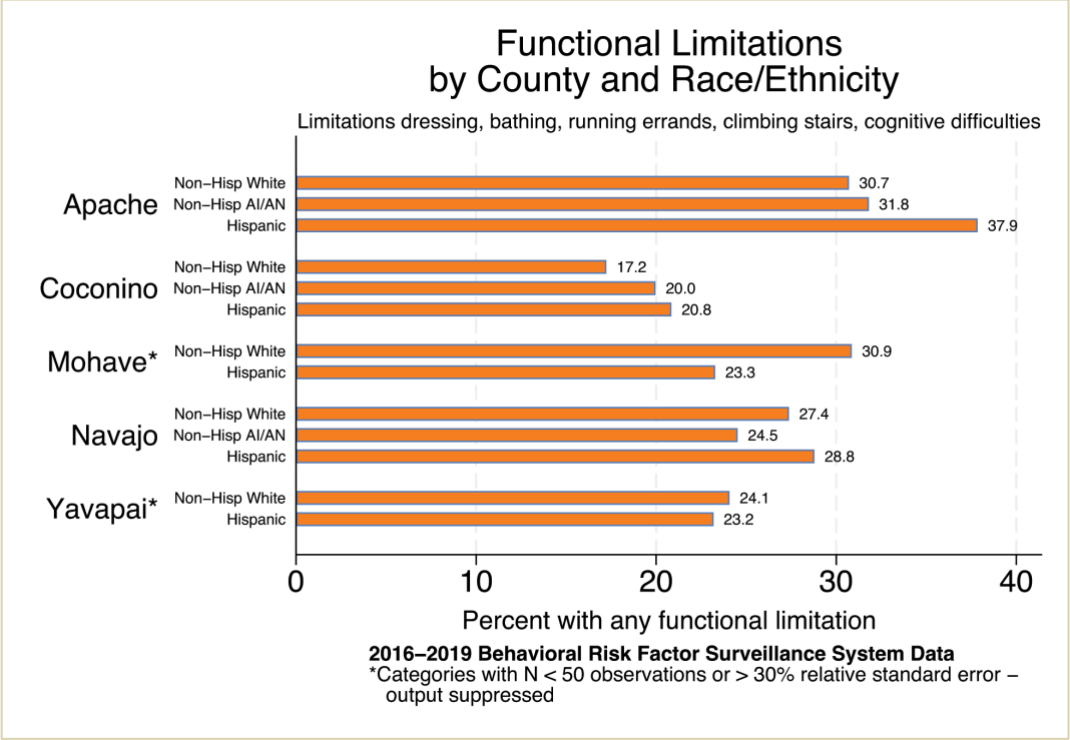


Figure 44. AZ BRFSS function limitations by race/ethnicity and county, 2016-2019.

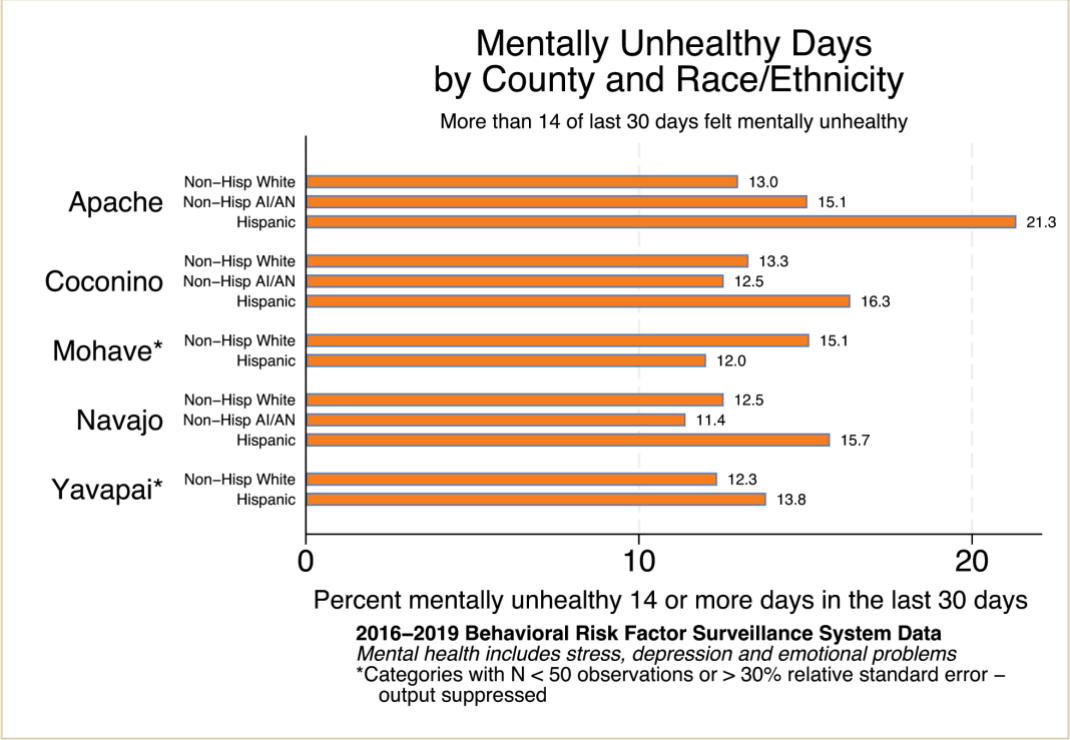


Figure 45. AZ BRFSS mentally unhealthy days by race/ethnicity and county, 2016-2019.

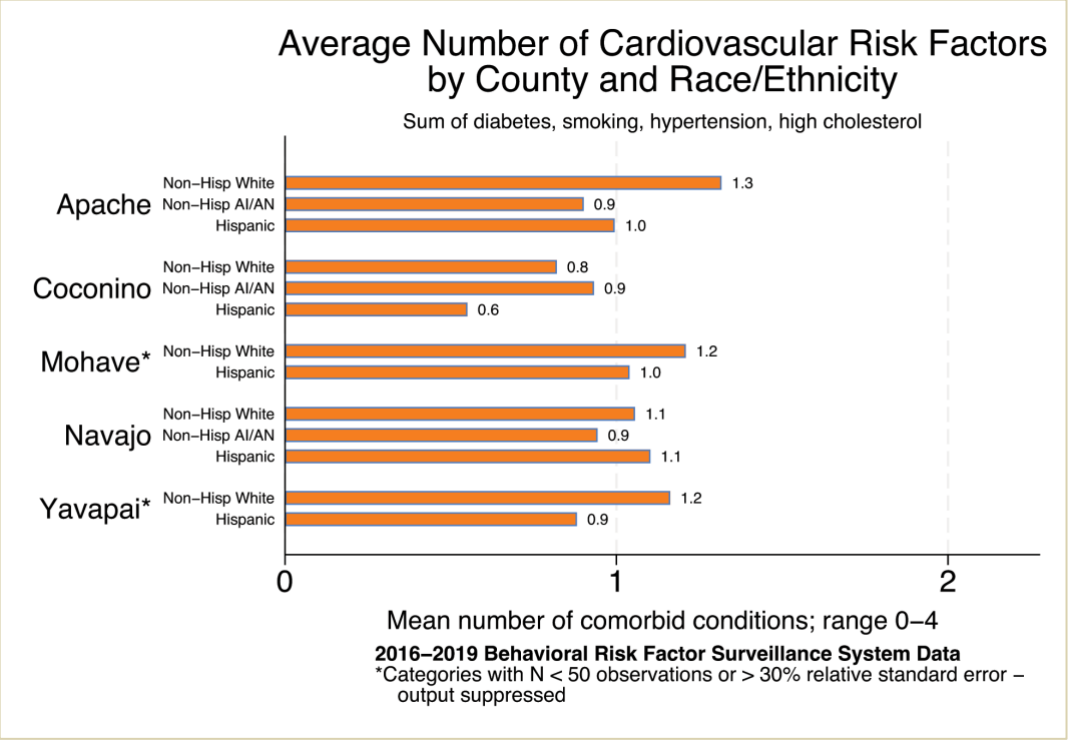


Figure 46. AZ BRFSS cardiovascular risk factors by race/ethnicity and county, 2016-2019.

Leading Causes of Mortality: Stratification by Race and Ethnicity by County

In the five counties of northern Arizona, non-Hispanic Whites, Hispanic and Latinos, and American Indians comprise nearly 95% of the total population. With this in mind, we sought to better understand differences in age-adjusted mortality rates among these racial/ethnic populations in each of these counties. [14] See Appendix E for a complete list of leading causes of mortality in each county by ethnicity.

A focused look within each county reveals substantial differences when county populations are stratified by race and ethnicity. In the following tables, the age-adjusted rates are for each leading cause of mortality by ethnicity. Cells are left blank when the data for that population are unreliable due to low rates or small populations. Using the age-adjusted estimate 95% confidence intervals produced by CDC WONDER for each county as a whole, we compared racial/ethnic subgroups to the rate of the county overall. [14] Rates with a plus sign next to them are significantly better than the county average and rates with a minus sign next to them are significantly worse.

Apache County

The 2021 American Community Survey estimated that there were 65,623 residents of Apache County, where 19.1% of the population was non-Hispanic White, 70.9% was American Indian, and 7.1% was Hispanic or Latino. [5] Almost 30% of the population lives below the poverty level. [5] Table 5 shows the leading causes of mortality in Apache County from 2016-2020. Cancer and diseases of the heart were disproportionately high

in the Hispanic and non-Hispanic white populations, but low in the American Indian population. Accidental injuries are disproportionately high in the American Indian populations and extremely low in the non-Hispanic White population. American Indians also had higher rates of diabetes, liver disease, and influenza/pneumonia. These significant differences between groups were also present in the 2011-2015 data. COVID-19 only became a diagnosis code in 2020, but still managed to end up as the fourth leading cause of death in Apache County for 2016-2020. American Indians had a significantly higher rate of COVID than the county overall suggests the disproportionate impact on American Indians in the county.

Table 5. Leading Causes of Mortality by Race/Ethnicity, Age-Adjusted Rate per 100,000, Apache County, 2016-2020, CDC WONDER[14]

Leading Causes of Death (ICD-10 Codes)	All Populations	Non-Hispanic White	Non-Hispanic AI	Hispanic
Diseases of heart (I00-I09,I11,I13,I20-I51)	146.4	204.4 (+)	118.1 (-)	218.5 (+)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	156	76.8 (-)	185.8 (+)	Unreliable
Malignant neoplasms (cancer) (C00-C97)	113.4	136.6 (+)	101.6 (-)	127.9 (+)
COVID-19 (U07.1)	76.4	--	111.4 (+)	--
Diabetes mellitus (E10-E14)	57.3	20.8 (-)	74.4 (+)	--
Chronic liver disease and cirrhosis (K70,K73-K74)	50.7	21 (-)	62.6 (+)	--
Cerebrovascular diseases (I60-I69)	36.6	39.4	35.3	--
Chronic lower respiratory diseases (J40-J47)	30.4	70.3 (+)	10.4 (-)	--
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	36.9	48.2 (+)	36.1	--
Influenza and pneumonia (J09-J18)	23.6	--	32 (+)	--

Coconino County

The 2021 American Community Survey estimated that there were 145,052 residents of Coconino County, where 54.2% of the population was non-Hispanic White, 26% was American Indian, and 14.9% was Hispanic. [5] Seventeen percent of the population lives below the poverty level. [5] Table 6 shows the leading causes of mortality in Coconino County from 2016-2020. There are relatively few data points for Coconino County for the Hispanic population. The American Indian population has a disproportionately high rate of accidental injury, intentional self-harm, liver disease, diabetes, and influenza/pneumonia, and a relatively low cancer and Alzheimer's rate. The non-Hispanic White population has higher than average chronic lower respiratory disease and Alzheimer's, but lower than average liver disease and diabetes (Table 6). With only one year of data, COVID-19 still managed to end up as the fifth leading cause of death in Coconino County for 2016-2020. American Indians had a significantly higher rate of COVID than the county overall and suggests the disproportionate impact on American Indians in the county.

Table 6. Leading Causes of Mortality by Race/Ethnicity, Age-Adjusted Rate per 100,000, Coconino County, 2016-2020, CDC WONDER[14]

Leading Causes of Death (ICD-10 Codes)	All Populations	Non-Hispanic White	Non-Hispanic AI	Hispanic
Malignant neoplasms (C00-C97) (cancer)	126.4	126.5	116.7 (-)	124.9
Diseases of heart (I00-I09,I11,I13,I20-I51)	118.2	117.7	120.8	99.1 (-)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	79.3	44.2 (-)	169 (+)	60.1 (-)
Chronic lower respiratory diseases (J40-J47)	34.8	40 (+)	18.4 (-)	Unreliable
COVID-19 (U07.1)	30.8	Unreliable	111.5 (+)	Unreliable
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	27.3	25.6	36 (+)	Unreliable
Chronic liver disease and cirrhosis (K70,K73-K74)	27.6	11.3 (-)	68.6 (+)	Unreliable
Cerebrovascular diseases (I60-I69)	28.9	26.7	32.4	Unreliable
Diabetes mellitus (E10-E14)	22.4	14.1 (-)	45.5 (+)	Unreliable
Alzheimer disease (G30)	27	33.1 (+)	16.2 (-)	--

Mohave County

The 2021 American Community Survey estimated that there were 217,692 residents of Mohave County, where 79.6% of the population is non-Hispanic White, 1.4% is American Indian, and 17.1% is Hispanic.[5] Just over 18% of the population lives below the poverty level.[5] Table 7 shows the leading causes of mortality in Mohave County from 2016-2020. Both Hispanic and American Indian populations have lower than average rates of cancer and non-Hispanic whites have a higher-than-average rate. Again, the American Indian population had about twice the average of accidental injury and three times the rates of liver disease and diabetes. The Hispanic population had more than half the rate of chronic lower respiratory diseases (Table 7). COVID-19 ended as the tenth leading cause of death in Mohave County for 2016-2020. The low number of American Indians in the county meant an unreliable data point for COVID, but Hispanics had a significantly higher rate of COVID than the county overall.

Table 7. Leading Causes of Mortality by Race/Ethnicity, Age-Adjusted Rate per 100,000, Mohave County, 2016-2020, CDC WONDER[14]

Leading Causes of Death (ICD-10 Codes)	All Populations	Non-Hispanic White	Non-Hispanic AI	Hispanic
Diseases of heart (I00-I09,I11,I13,I20-I51)	211.2	215.4	209.4	139.2 (-)
Malignant neoplasms (cancer) (C00-C97)	179.8	187.5 (+)	96.8 (-)	111.9 (-)
Chronic lower respiratory diseases (J40-J47)	68.2	71.8	--	27.2 (-)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	60.8	63.1	120.8 (+)	48.2 (-)
Alzheimer disease (G30)	35.7	35.5	--	36.9
Cerebrovascular diseases (I60-I69)	34.7	34.5	--	32.7
Diabetes mellitus (E10-E14)	24.6	22.8	81.9 (+)	30.7 (+)
Chronic liver disease and cirrhosis (K70,K73-K74)	25.3	24.7	81.5 (+)	22.3 (-)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	29.7	31.6	--	16.1 (-)
COVID-19 (U07.1)	15.1	13.7	Unreliable	21.7 (+)

Navajo County

The 2021 American Community Survey estimated that there were 108,147 residents of Navajo County, where 45.1% of the population is non-Hispanic White, 41.9% is American Indian, and 12.1% is Hispanic.[5] Just over 25% of the population is below the poverty level.[5] Table 8 shows the leading causes of mortality in Navajo County from 2016-2020. American Indian and Hispanic populations had relatively low rates of cancer and diseases of the heart whereas the non-Hispanic white populations had relatively higher rates of cancer. Again, American Indian populations have disproportionately higher rates of diabetes, liver disease, and accidental injury (Table 8). With only one year of data, COVID-19 still managed to end up as the fourth leading cause of death in Navajo County for 2016-2020. Non-Hispanic whites had a significantly lower rate of COVID while American Indians had a significantly higher rate of COVID than the county overall, which, again, suggests the disproportionate impact on American Indians in the county.

Table 8. Leading Causes of Mortality by Race/Ethnicity, Age-Adjusted Rate per 100,000, Navajo County, 2016-2020, CDC WONDER[14]

Leading Causes of Death ICD-10 Code	All Populations	Non-Hispanic White	Non-Hispanic AI	Hispanic
Diseases of heart (I00-I09,I11,I13,I20-I51)	150.1	154.4	134.8 (-)	139.8 (-)
Malignant neoplasms (cancer) (C00-C97)	127.8	137.3 (+)	111.2 (-)	117 (-)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	112.7	73.4 (-)	171.7 (+)	41.2 (-)
COVID-19 (U07.1)	55.6	8.2 (-)	138.4 (+)	Unreliable
Chronic lower respiratory diseases (J40-J47)	47.4	66.5 (+)	13.7 (-)	Unreliable
Diabetes mellitus (E10-E14)	42.3	24.1 (-)	75.5 (+)	Unreliable
Chronic liver disease and cirrhosis (K70,K73-K74)	49.2	14.8 (-)	92.7 (+)	Unreliable
Cerebrovascular diseases (I60-I69)	37.9	38.1	41	Unreliable
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	39.7	40.9	44.7	--
Alzheimer disease (G30)	30.4	36 (+)	19.1 (-)	Unreliable

Yavapai County

The 2021 American Community Survey estimated that there were 242,253 residents of Yavapai County, where 80% of the population is non-Hispanic White, 0.7% is American Indian, and 15.3% is Hispanic. [5] Yavapai County has the fewest number of people living in poverty, with 12.4% of the population living below the poverty level. [5] Table 9 shows the leading causes of mortality in Navajo County from 2016-2020. A majority of indicators are missing for the American Indian population in Yavapai County, but they suffer relatively low rates of cancer compared to other populations in the county. The Hispanic population had significantly lower rates of all causes of death except for diabetes. The non-Hispanic White population was on par with all indicators (Table 9). Yavapai County is the only county of the northern Arizona region where COVID-19 did not end up higher than the tenth leading cause of death.

Table 9. Leading Causes of Mortality by Race/Ethnicity, Age-Adjusted Rate per 100,000, Yavapai County, 2016-2020, CDC WONDER[14]

Leading Causes of Death (ICD-10 Codes)	All Populations	Non-Hispanic White	Non-Hispanic AI	Hispanic
Malignant neoplasms (cancer) (C00-C97)	150.6	153.2	151.2	123 (-)
Diseases of heart (I00-I09,I11,I13,I20-I51)	139.1	141.7	111.7 (-)	105.5 (-)
Chronic lower respiratory diseases (J40-J47)	53.3	55.1	Unreliable	25.5 (-)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	65.3	70.2	Unreliable	41.3 (-)
Alzheimer disease (G30)	37.6	37.9	--	29.8 (-)
Cerebrovascular diseases (I60-I69)	31.8	32.1	--	24.4 (-)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	30.8	33.9	--	14.2 (-)
Nutritional deficiencies (E40-E64)	15.4	16	--	Unreliable
Diabetes mellitus (E10-E14)	14.9	13.7	Unreliable	28.9 (+)
Chronic liver disease and cirrhosis (K70,K73-K74)	19.4	20.3	Unreliable	13.9 (-)

In general, American Indian populations in our region experienced much higher rates of COVID-19, accidental injury, chronic diseases of the liver, and diabetes and much lower rates of cancer and heart diseases.[14] Mohave and Yavapai counties had smaller numbers of non-Hispanic American Indians, but when estimates were available, they matched the patterns from other counties. The Hispanic population had many unreliable values between counties, but tended to have relatively low rates of cancer, heart disease, and accidental injury, and higher rates of diabetes. The non-Hispanic White population consistently had higher rates of cancer and heart disease and in most counties, higher rates of chronic respiratory diseases. They also generally suffered lower rates of accidental injury, diabetes, and chronic liver diseases.

Figure 47 shows the age-adjusted mortality rates for the top four leading causes of death by ethnicity. Age-adjusted rates for each county were averaged for each ethnic population. Heart disease, cancer, and chronic lower respiratory disease were much more likely to affect non-Hispanic whites, while accidents were much more likely to affect American Indians.

Non-Hispanic American Indians had dramatically higher rates of unintentional injury and chronic disease of the liver compared to non-Hispanic whites and Hispanics (Figures 48 and 49). In Yavapai County the numbers of non-Hispanic American Indians were too low to calculate reliable estimates. Rates for Hispanics were also unreliable for Apache County.

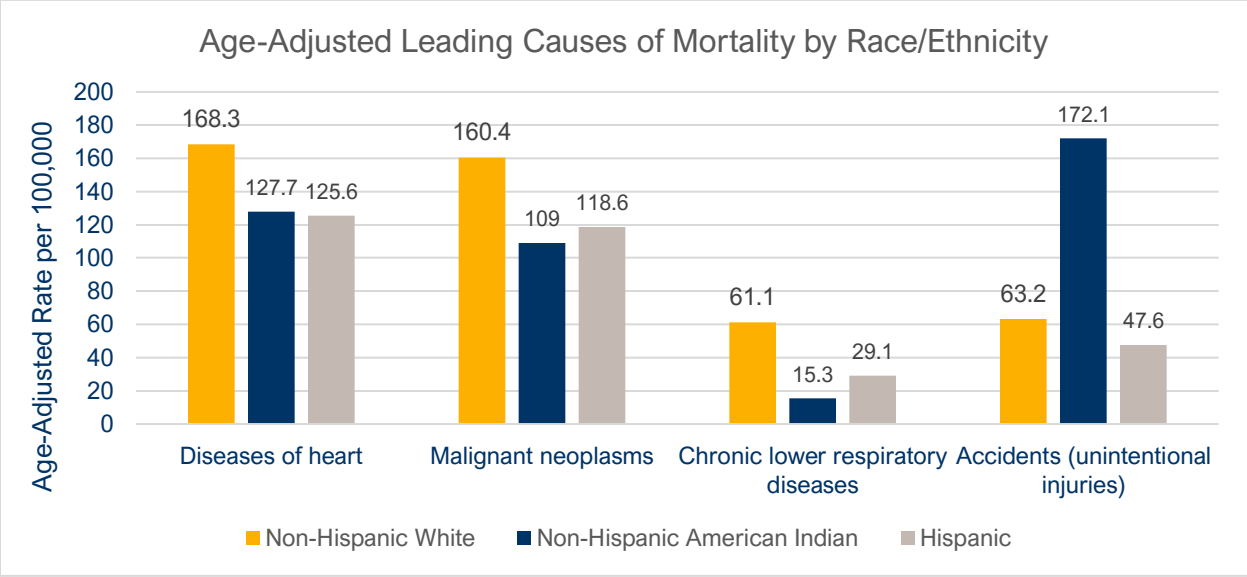


Figure 47. Top four causes of mortality by race/ethnicity for all five northern Arizona counties combined, 2016-2020.[14]

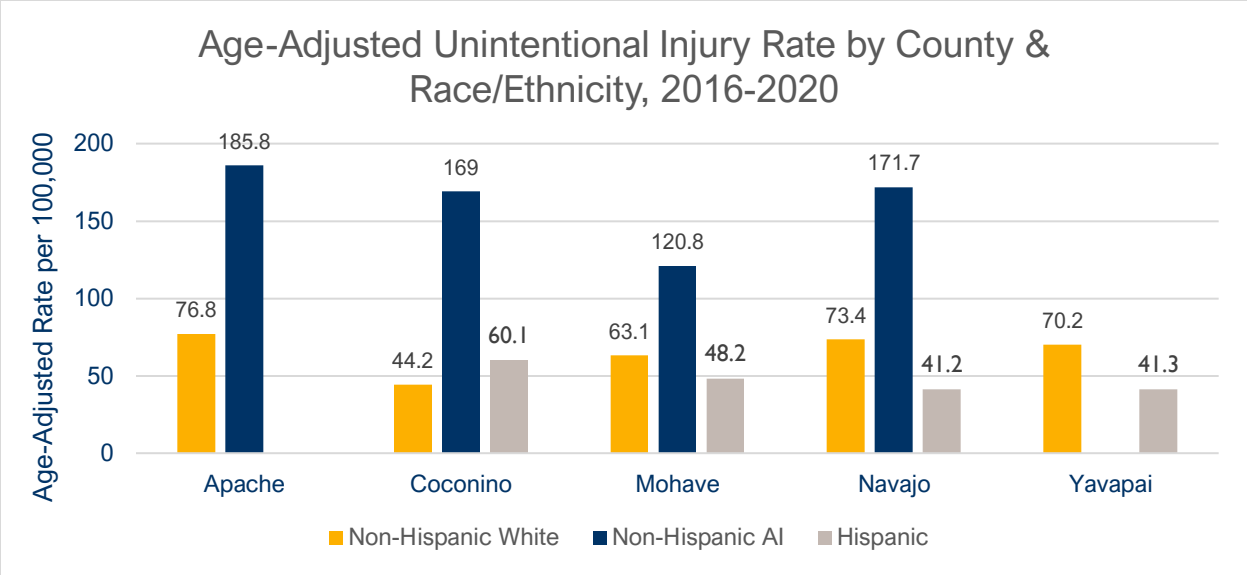


Figure 48. Age-adjusted unintentional injury rate by county and race/ethnicity, 2016-2020.[14]

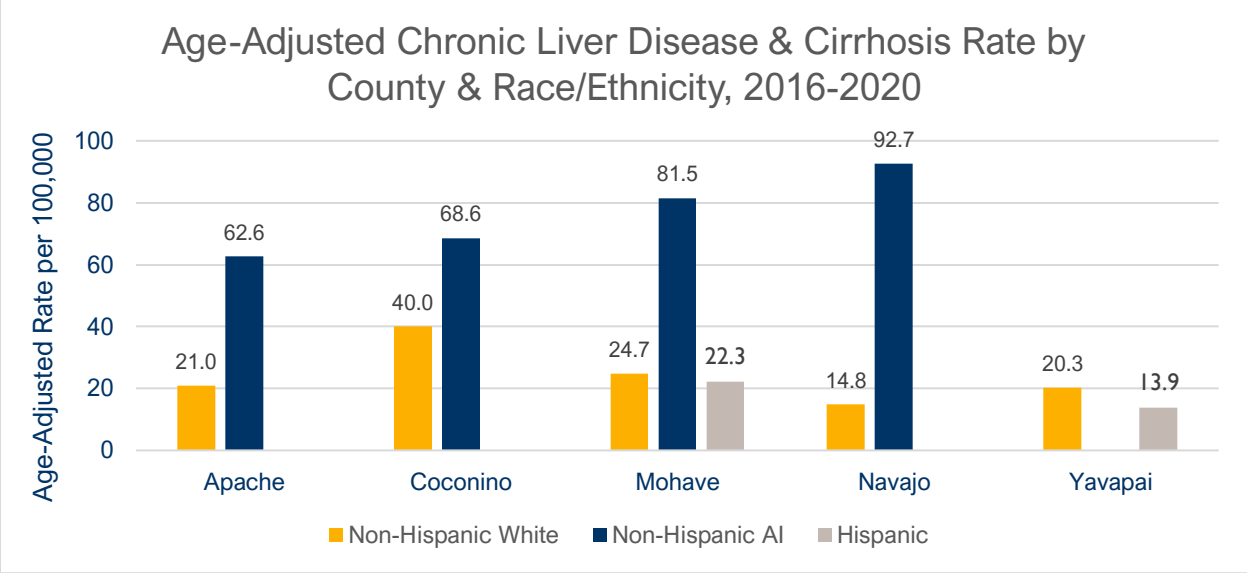


Figure 49. Age-adjusted chronic liver disease and cirrhosis rate by county and race/ethnicity, 2016-2020.[14]

Hospital Utilization for Certain Conditions by Race/Ethnicity

All inpatient and emergency department hospitalizations for residents living in the five counties of northern Arizona from 2016-2021 were incorporated into this analysis. All visits for each clinical category were stratified into the observed number of visits for individuals self-reported to be non-Hispanic White, non-Hispanic American Indian, or Hispanic. Visits were counted overall and for each race/ethnicity category by ICD-10-CM category from 2016 to 2021. Those counts were then divided by that group's population sum from 2016 to 2021 and multiplied by 10,000 to create a crude estimate per 10,000 people to compare across. The categories were ranked from highest to lowest for number of encounters and the top 12 categories were graphed (Figure 50).

Each subfigure within Figure 50 has a bar that represents the difference from the overall visits per 10,000 people in the northern Arizona counties. If the bar is above the x-axis, the estimate is above the overall estimate per 10,000 people and if it is below, the estimate for that group is below the overall. The red text on each subfigure indicates the reference value which is the overall (all race/ethnicities combined) estimate per 10,000 people.

Figure 50 illustrates hospital utilization rates by race/ethnicity for the top 12 ICD-10-CM categories. Hispanics had lower estimates per 10,000 people than the overall in every category except for pregnancies. Conversely, non-Hispanic whites had higher estimates per 10,000 people than the overall for every category except mental and behavioral conditions. Non-Hispanic American Indians had much more variability in their estimates. They were lower than the overall estimate for every category except respiratory conditions, mental and behavioral conditions, and infectious diseases. However, these data do not account for visits to Indian Health Service or other Tribally governed facilities.

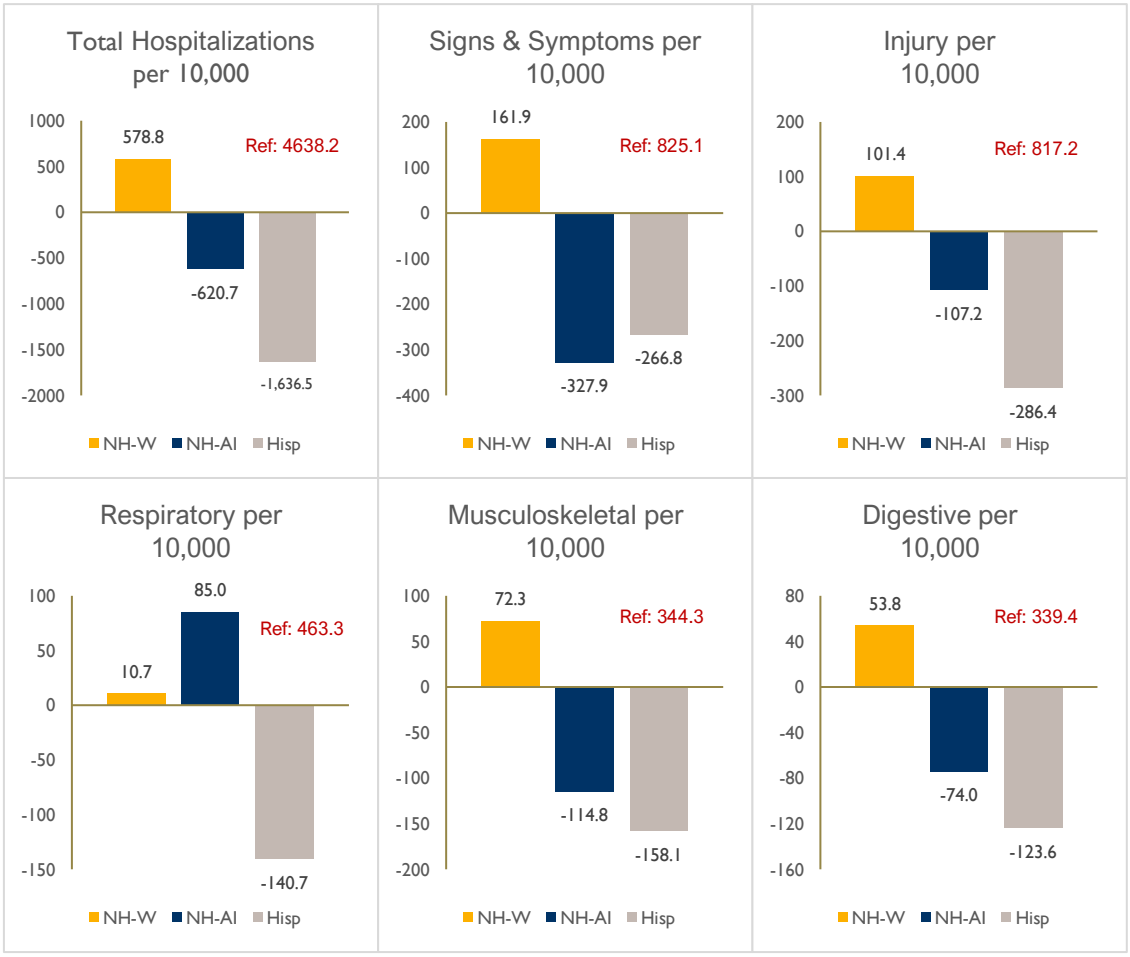


Figure 50. ICD-10-CM categories stratified by race/ethnicity.
Reference value is the proportion per 10,000 for all race/ethnicities in the five northern Arizona counties.
Source: ADHS Hospital Discharge data.

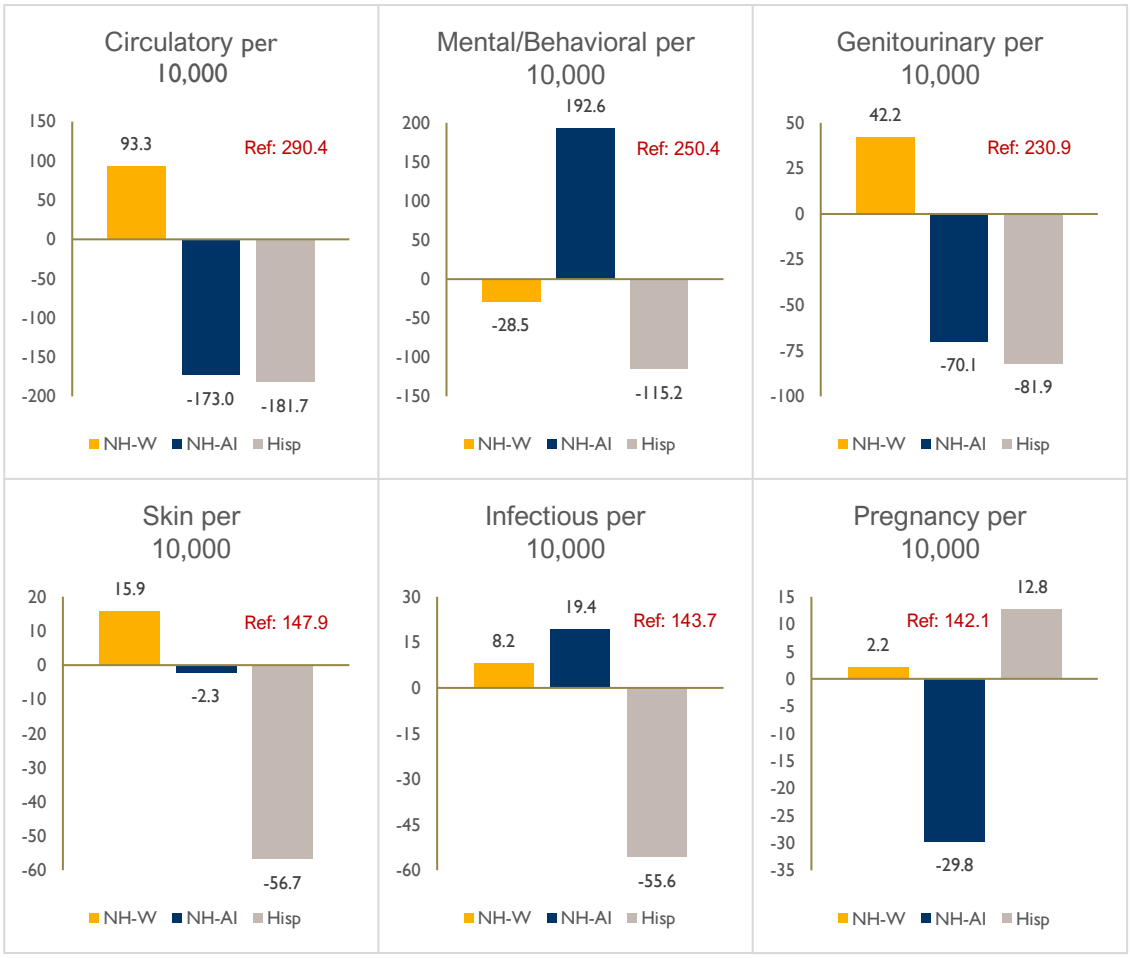


Figure 50 -continued. ICD-10-CM categories stratified by race/ethnicity.
Reference value is the proportion per 10,000 for all race/ethnicities in the five northern Arizona counties.
Source: ADHS Hospital Discharge data.

Figure 51 summarizes hospital utilization by ethnicity for each primary care area in the region in 2021. The values determining the height of each bar were calculated by dividing the total number of visits per primary care area per racial/ethnic groups by the number of residents of that racial/ethnic group living in the primary care area, and then multiplying by 10,000 to get a crude rate. If the number of visits is greater than 10,000, the number of visits made by a racial/ethnic group exceeded the number of residents in a primary care area that comprise that racial/ethnic group. This is due to the fact that single individuals can visit the hospital any number of times in a given year. For example, if the population of non-Hispanic White individuals in a primary care area was 10,000, but those individuals made 20,000 of the inpatient or emergency room visits, then the crude rate would be 20,000 visits per 10,000 non- Hispanic White residents.

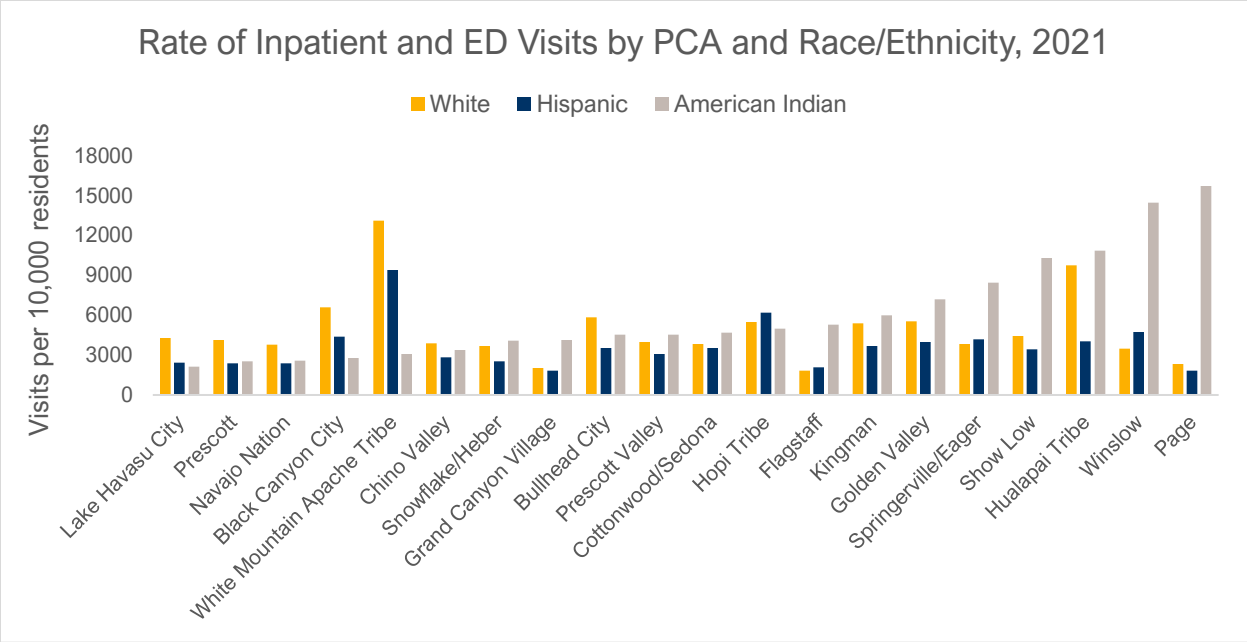


Figure 51. Hospital utilization by Primary Care Area and race/ethnicity, 2021.
Source: ADHS Hospital Discharge data.

Health Patterns in Children Age 0–24

Few health data on children are consistent at the county level in Arizona. To understand what conditions are affecting children ages 0–24, we consulted the Arizona Department of Health Services' Hospital Discharge data by age group. Of note, up to 25 ICD-10-CM codes can be specified in a claim and the primary diagnostic code was used for the purpose of this research.

The following analysis is based on data showing the 15 most common primary diagnosis codes for inpatient and emergency department visits by county. The diagnoses are categorized further by age group (less than 1 year old, 1–4 years old, 5–9 years old, 10–14 years old, and 15–24 years old). Each diagnosis code is classified as one of 21 general disease categories. We used those categories to code the top 15 diagnoses and ascertain the percentage of each disease category within the top 15 diagnoses.

Figures 52 depict the regional summaries for 2016 through 2021. Disease categories occurring among the top 15 diagnoses are summarized by age group. Percentages represent percent of total admissions. Some of the specific diseases that correspond with each category listed below vary between age groups and counties. For a complete list of the top 15 diagnoses and their corresponding disease categories by county and region, see Appendix F.

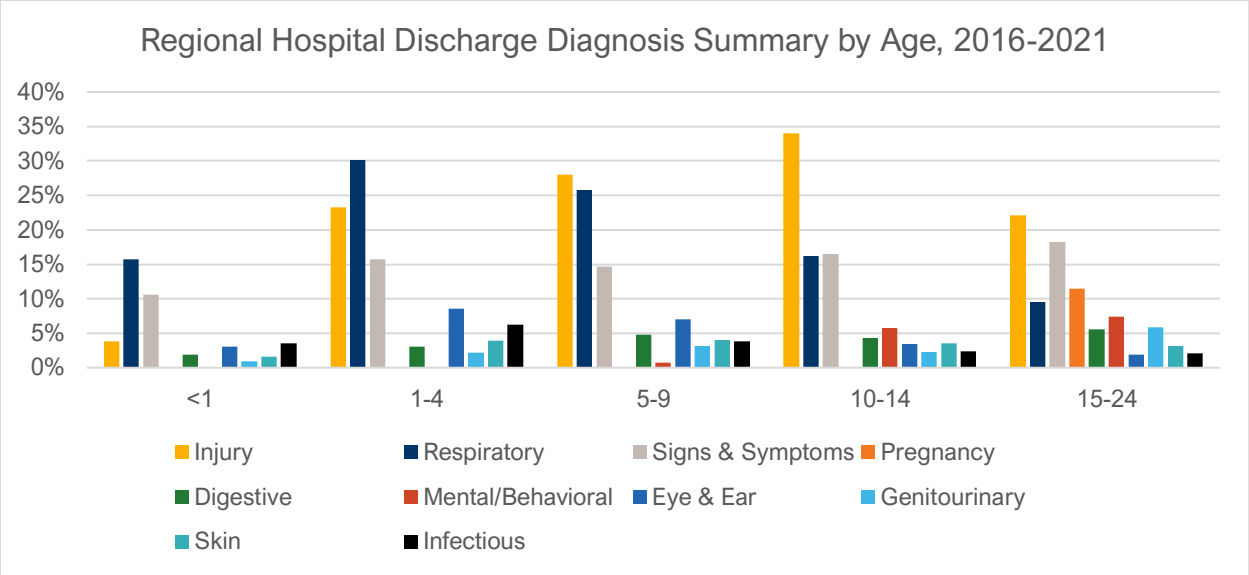


Figure 52. Top disease categories for northern Arizona counties across child/adolescent age groups, 2016-2021 (not graphed: childbirth).
Source: ADHS Hospital Discharge data.

Less than 1 Year

Figure 53 shows the top disease categories for hospital inpatient visits and ED visits by county for those less than one year old. The most common discharge diagnosis was birth (range 47%-64% of all visits). This category most commonly included single live birth babies born through cesarean and non-cesarean delivery as well as twin births born by cesarean section. Cesarean vs. vaginal deliveries were consistent across the counties, comprising between 23% and 30% of all live births across the region.

The second most common discharge diagnosis category was diseases of the respiratory system (range 7%-14% of all visits). This category commonly included acute upper respiratory infections, acute bronchitis, and croup. Less common diagnoses in this category were pneumonia and acute respiratory infections with hypoxia.

Symptoms, signs, and abnormal clinical and lab findings were third most common and typically made up 8–12% of all admissions for this age group. Specific diagnoses in this category commonly included fever, vomiting, vomiting with nausea, and cough.

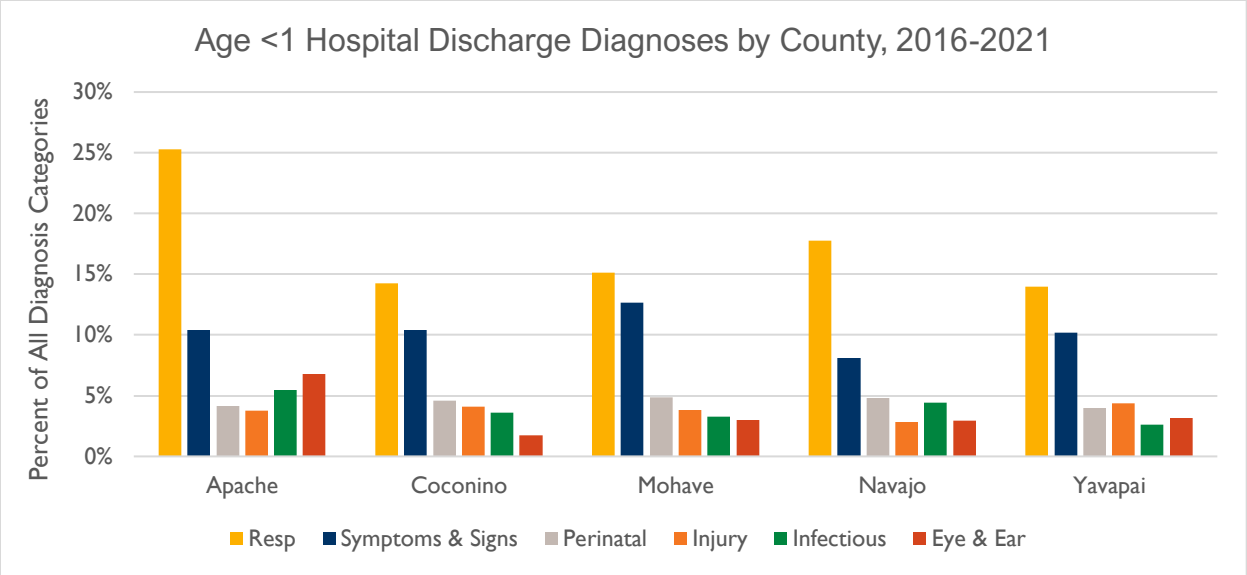


Figure 53. Top disease categories for children less than 1 year old by county, 2016-2021 (not graphed: childbirth). Source: ADHS Hospital Discharge data.

1–4 Years

Figure 54 shows the top disease categories for hospital inpatient visits and ED visits by county for ages 1-4. The most common disease category was diseases of the respiratory system (range 21%-27% of all visits). The diagnoses that comprised the majority of this category were upper respiratory infections followed by croup, bronchitis, pharyngitis, and pneumonia. Symptoms, signs, and abnormal clinical and lab findings were ranked second in the top 15 for this age group and included fever, vomiting, and cough. Injury was also common for this age group, comprising 21%-25% of all visits. Laceration of the head was the most common diagnosis, followed by unspecified head injury, laceration of the scalp, laceration of the lip, and foreign body in nostril.

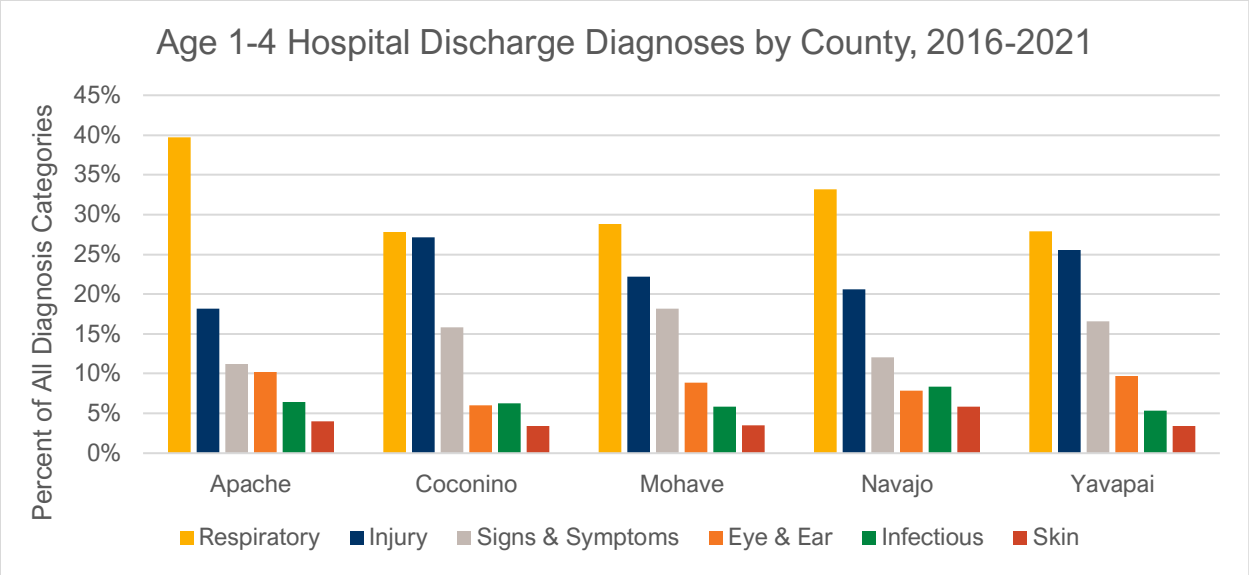


Figure 54. Top disease categories for children 1-4 years old by county, 2016-2021.
Source: ADHS Hospital Discharge data.

5–9 Years

Figure 55 shows the top disease categories for hospital inpatient visits and ED visits by county for ages 5-9. In the top 15 diagnoses, respiratory conditions were the highest (26–39% of all visits) followed by symptoms, signs, and abnormal clinical and lab findings (9-17% of all visits) and diseases of the ear (6-8% of all visits). Respiratory conditions were far higher in Apache County (39%) than the other counties (21-26% of all visits). The top respiratory conditions were upper respiratory infections, pharyngitis, and flu, while the top symptoms & signs were abdominal pain, fever, nausea, and cough. The top disease category overall for ages 5 to 9 years was injury (22-34%), but only shows up once on the top 15 diagnoses, likely due to the variety of injury diagnosis codes used. Coconino County had the highest percentage of injury (34%) of any category in any county, but injury was the top category in every county, except for Apache. The top injury diagnoses were head laceration, head injury, and head contusion.

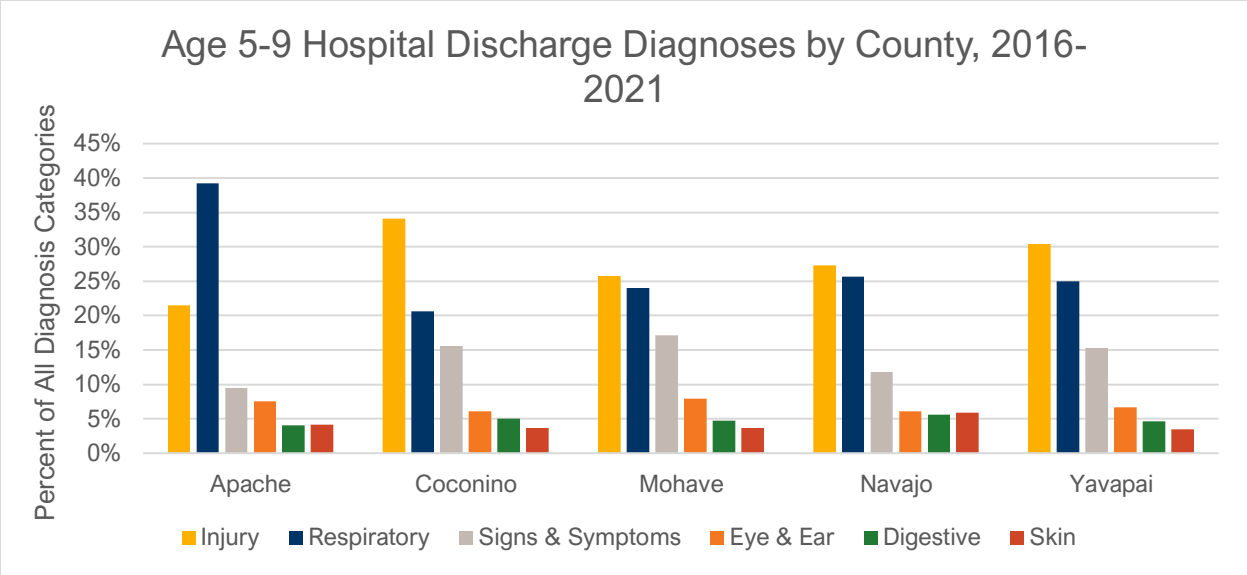


Figure 55. Top disease categories for children 5-9 years old by county, 2016-2021.
Source: ADHS Hospital Discharge data.

10-14 Years

Figure 56 shows the top disease categories for hospital inpatient visits and ED visits by county for ages 10-14. In the top 15 diagnoses, symptoms, signs, and abnormal clinical and lab findings were the highest (10-19% of all visits) followed by respiratory conditions (13-29% of all visits). The top symptoms & signs at this age group across all counties were suicidal ideation, abdominal pain, headache, and nausea. Suicidal ideation was in the top 7 diagnoses for each county except for Apache County where it was the 24th most common diagnosis. The top respiratory conditions were pharyngitis, acute upper respiratory infections, and flu. Again, respiratory conditions were far higher in Apache County (29%) than the other counties (13-16%). Injury was the third most common category in the top 15 diagnoses, but, similar to ages 5-9, was the top disease category overall for this age group (30-37%). The discrepancy between top category overall and top categories in the top 15 diagnoses is again likely due to the variety of injury diagnosis codes used. Coconino County, again, had the highest percentage of injury (37%) of any category in any county, but Yavapai was close behind (36%). The top injury diagnoses were head injury, ankle sprain, and concussion. Mental health conditions appear for the first time in this age group and represent 4% to 9% of all visits for this age group. Major depressive disorder, single episode and recurrent were the most common diagnoses.

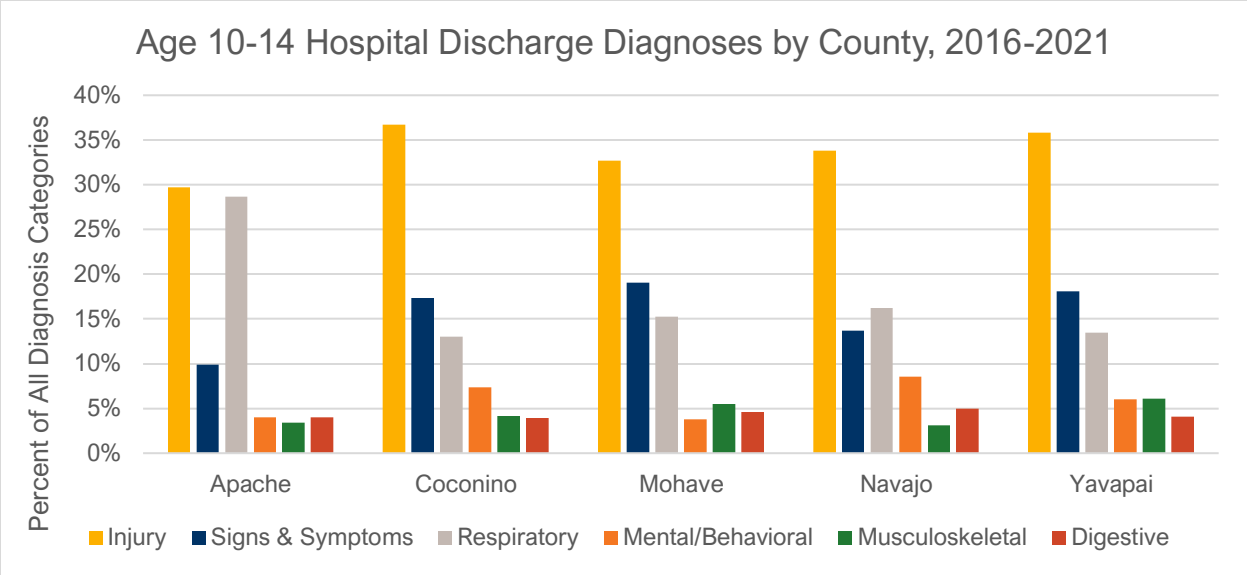


Figure 56. Top disease categories for children 10-14 years old by county in 2021.
Source: ADHS Hospital Discharge data.

15-24 Years

Figure 57 shows the top disease categories for hospital inpatient visits and ED visits by county for ages 15-24.

In the top 15 diagnoses, symptoms, signs, and abnormal clinical and lab findings were the highest (10-19% of all visits) followed by respiratory conditions (11-20% of all visits). The top symptoms & signs at this age group across all counties were abdominal pain, nausea, suicidal ideation, headache, and chest pain. Suicidal ideation was in the top 9 diagnoses for ages 15-24 in each county, except for Apache County where it was the 34th most common diagnosis. The top respiratory conditions for this age group were acute upper respiratory infections and pharyngitis. Again, respiratory conditions were far higher in Apache County (17%) than the other counties (8-10%).

Mental health conditions were the third most common category in the top 15 diagnoses for ages 15-24 and represent 5% to 10% of all visits for this age group. Major depressive disorder, single episode and alcohol abuse with intoxication were the most common diagnoses. Alcohol abuse with intoxication was in the top 6 diagnoses for Apache, Coconino, and Navajo counties. Anxiety disorder and major depressive disorder were in the top 15 diagnoses for Mohave and Yavapai counties. The injury category was not in the top 15 diagnoses, but, similar to ages 5-9 and 10-14, was the top disease category overall for this age group (19-26%). The discrepancy between top category overall and top categories in the top 15 diagnoses is again likely due to the variety of injury diagnosis codes used. Apache County and Coconino County had the highest percentage of injury (26%). The top injury diagnoses were head injury, muscle strain, ankle sprain, and concussion.

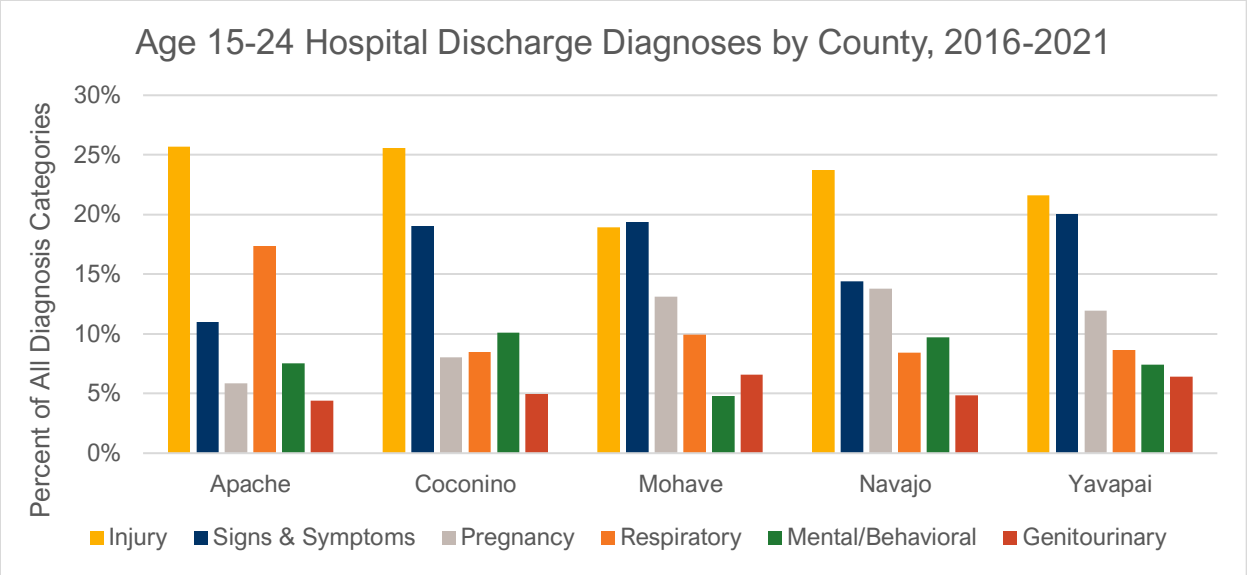


Figure 57. Top disease categories for children 10-14 years old by county, 2016-2021.
Source: ADHS Hospital Discharge data.

Social Determinants of Health

SDOH Factor 1: Health Care Access and Quality

Improving health care access and quality has persisted as a goal of the Healthy People initiative from 2020 to 2030. Some objectives from Healthy People 2030 related to health care are reducing the proportion of people who cannot get medical care when they need it and increasing the proportion of people with a usual primary care provider. [12]

Lack of Behavioral Health Providers

The Arizona Department of Health Services has designated all of northern Arizona as a Mental Health Professional Shortage Area (MHPSA) (see Figure 58). [28] Table 10 shows the ratio of mental health providers (i.e., psychiatrists, psychologists, licensed clinical social workers, marriage/family therapists, counselors, nurses specialized in mental health services, and mental health providers treating substance use) to population by county. According to County Health Rankings, the state average for the ratio of mental health providers to population is 839:1. [6] Only Yavapai County and Coconino County averages are better than the state average. The highest ratios are in Mohave and Navajo counties.

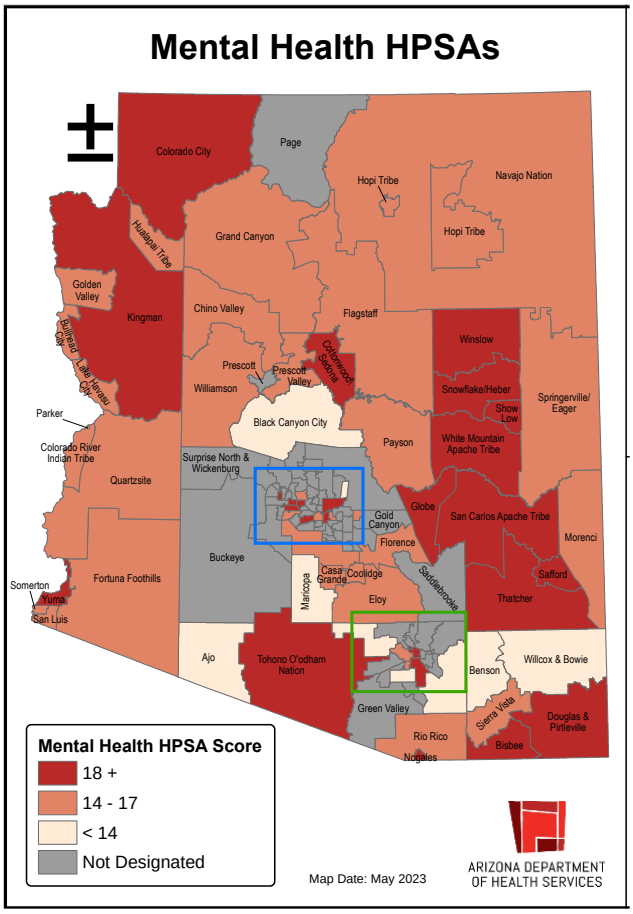


Figure 58. ADHS-designated mental health-health professional shortage area (HPSA) by PCA, 2023.[28]
**Higher scores indicate a greater shortage.*

Table 10. Population to mental health provider ratio, 2021.[15]

County	Population to Mental Health Provider Ratio
Arizona	660:1
Apache	960:1
Coconino	450:1
Mohave	1320:1
Navajo	1090:1
Yavapai	490:1

Lack of Primary Care Providers

In the northern region of Arizona, only 36% of Primary Care Areas (PCAs) had better population to PCP ratios than the state as a whole (Table 11). [15] The ratio of population to PCP in Arizona overall has gotten worse since 2016, going from 296:1 to 747:1 in 2021. Every PCA in the northern Arizona region had a worse population to PCP ratio in 2021 compared to 2016, except for Hualapai and White Mountain Apache. In more urban areas such as Prescott, Kingman, and Flagstaff, the ratios were lowest, except for Tuba City, which had the third lowest ratio (525:1). Surprisingly, ratios were highest in rural-designated PCA areas, which are larger than those designated as frontier. Most tribal PCAs do not have a general hospital, but two other frontier PCAs and one rural PCA also do not have one. When looking at northern Arizona PCA areas that have a general hospital, only 44% have a better ratio of hospital beds per 1,000 people than the state average, and only five PCAs either have both a skilled nursing facility as well as a home health agency.

Table 11. Primary Care Area Resource Profiles, 2021.[15]

Primary Care Area	Population	Pop-PCP Ratio*	General Hospital **	Hospital Beds per 1,000 ppl	Skilled Nursing Facilities	Home Health Agencies	Transport Score***
Arizona	7,285,370	747:1	Yes**	1.9	102	179	113
Springerville/Eager	17,768	2221:1	Yes	1.2	0	0	109
Page	9,918	902:1	Yes	2.5	0	2	110
Grand Canyon Village	10,931	2186:1	No	0	0	0	96
Flagstaff	100,457	577:1	Yes	2.7	2	2	80
Colorado City	8,094	2698:1	No	0	0	0	126
Kingman	67,301	534:1	Yes	3.5	1	3	119
Hualapai Tribe	1,261	630:1	No	0	0	0	180
Golden Valley	10,885	5443:1	Yes	0	0	0	128
Bullhead City	67,424	853:1	Yes	3.3	0	3	119
Lake Havasu City	61,562	821:1	Yes	2.5	0	3	99
Navajo Nation	91,041	3502:1	Yes	0.3	1	1	165
Hopi Tribe	10,497	525:1	No	0	0	0	162
Winslow	17,010	654:1	Yes	1.5	1	0	125
Snowflake/Heber	18,650	2664:1	Yes	0	0	0	104
Show Low	30,216	719:1	Yes	3.3	1	1	105
White Mountain Apache Tribe	13,924	696:1	No	0	0	0	195
Cottonwood/Sedona	66,115	859:1	Yes	1.5	1	2	107
Chino Valley	27,217	5443:1	Yes	0	0	0	91
Williamson	13,336	4445:1	Yes	0	0	0	93
Prescott Valley	68,687	2747:1	Yes	1	0	2	96
Prescott	55,319	350:1	Yes	2.4	0	4	114
Black Canyon City	13,508	4503:1	No	0	0	0	113

*Number of active providers, and ratio of population of Family Practice, General Practice, Gynecology, Internal Medicine, Obstetrics and Gynecology, Obstetrics, Pediatrics (MD's) physicians and all active Osteopathic Physicians (DO's) working in Primary Care (includes federal doctors). **A general hospital is defined by the Arizona Department of Health Services as a short-stay, acute care, non-federal general hospital. "Yes" means that there is a short-stay, acute care, non-federal general hospital within a driving time of 35 minutes or less. There are 71 general hospitals in the state. ***The transportation score is determined by six indicators including % of population with annual income less than 100% of poverty line, % population over 65 and under 14, % of population with disability, % of population without a motor vehicle, and the motor vehicle to population ratio. The higher the score, the less adequate or greater the need for transportation.

Adequacy of transportation is determined by the transportation score (Table 11 above), which is part of the Primary Care Index. Transportation scores are based on poverty and access to a personal vehicle and not on access to public transportation, infrastructure, and distance to services. [15] Higher scores indicate less adequate or greater need for transportation. PCAs with the worst transportation scores include the White Mountain Apache Tribe, Hualapai Tribe, Navajo Nation, and Hope Tribe, and the best scores came from Flagstaff, Chino Valley, and Williamson. [15]

According to the quantitative (BRFSS) data, only Yavapai County and Mohave County is above the state average for residents who self-reported that they have a usual source of care. In Coconino and Apache counties the averages are in the mid-to-low-60s, the lowest in the region. However, the rates for all the northern Arizona counties have gone up since 2015. The percentages of people who visited their doctor for a routine check-up in the past year are closer to the state average, except for Coconino County. For both indicators, Yavapai and Mohave counties are the highest (Figures 59 and 60).

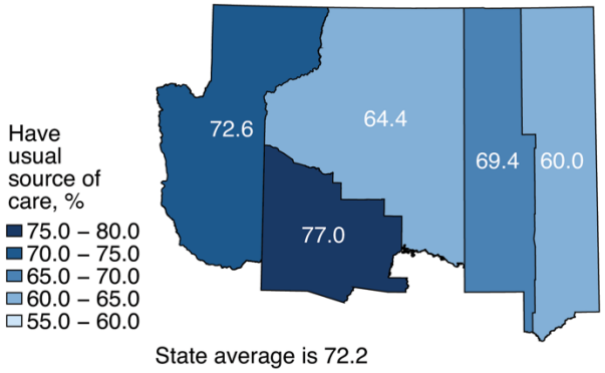


Figure 60. AZ BRFSS usual source of care by county, 2016-2019.

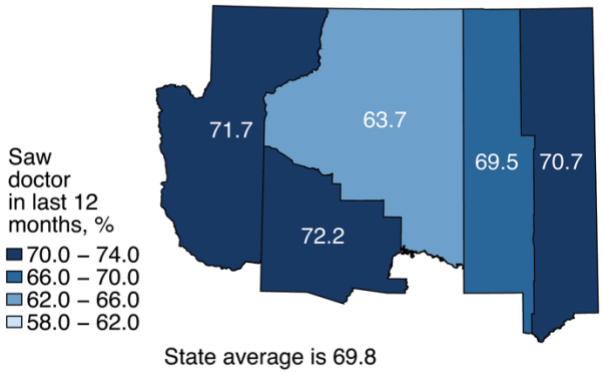


Figure 59. AZ BRFSS recent doctor visit by county, 2016-2019.

Lack of Dental Providers

According to BRFSS data, preventive oral health care, another leading health indicator, varied from 49% to 65% across counties, with only half of residents in Yavapai and Mohave counties having seen a dentist in the last 12 months (Figure 61). Table 12 shows the population to dentist ratio for each Primary Care Area in the northern Arizona region. [15]

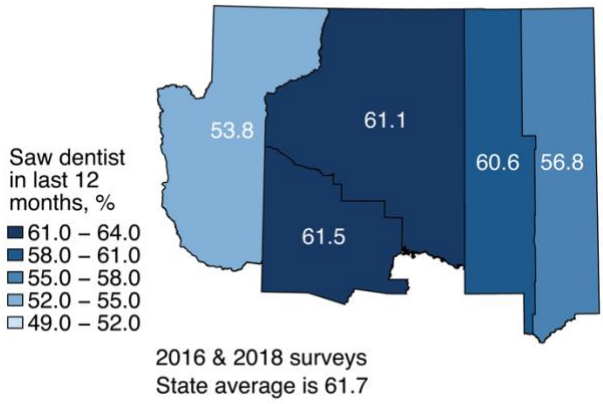


Figure 61. AZ BRFSS recent dentist visit by county, 2016-2019.

Table 12. Population to dentist ratio, 2021.[15]

Primary Care Area	Population to Dentist Ratio
Arizona State	1684:1
Springerville/Eager	2221:1
Page	2480:1
Grand Canyon Village	0
Flagstaff	1142:1
Colorado City	0
Kingman	2321:1
Hualapai Tribe	0
Golden Valley	0
Bullhead City	2408:1
Lake Havasu City	2798:1
Navajo Nation	7587:1
Hopi Tribe	10497:1
Winslow	3402:1
Snowflake/Heber	2664:1
Show Low	1119:1
White Mountain Apache Tribe	0
Cottonwood/Sedona	1407:1
Chino Valley	3888:1
Williamson	1905:1
Prescott Valley	2642:1
Prescott	892:1
Black Canyon City	13508:1

Distance to Providers and Services

ADHS's 2022 Arizona Medically Underserved Areas Biennial Report found that of the eight PCAs with the longest travel distance, half are tribal areas, and all are rural or frontier.[29] Figure 62 from that report shows that northern Arizona PCAs make up some of the highest travel distances of all Arizona PCAs, with Colorado City at the highest distance of 73 miles to the nearest provider.[29] Each of the four tribal PCAs in northern Arizona have minimum a 25-mile distance to the nearest provider. It is clear that many northern Arizona communities have barriers to accessing health care in their area.

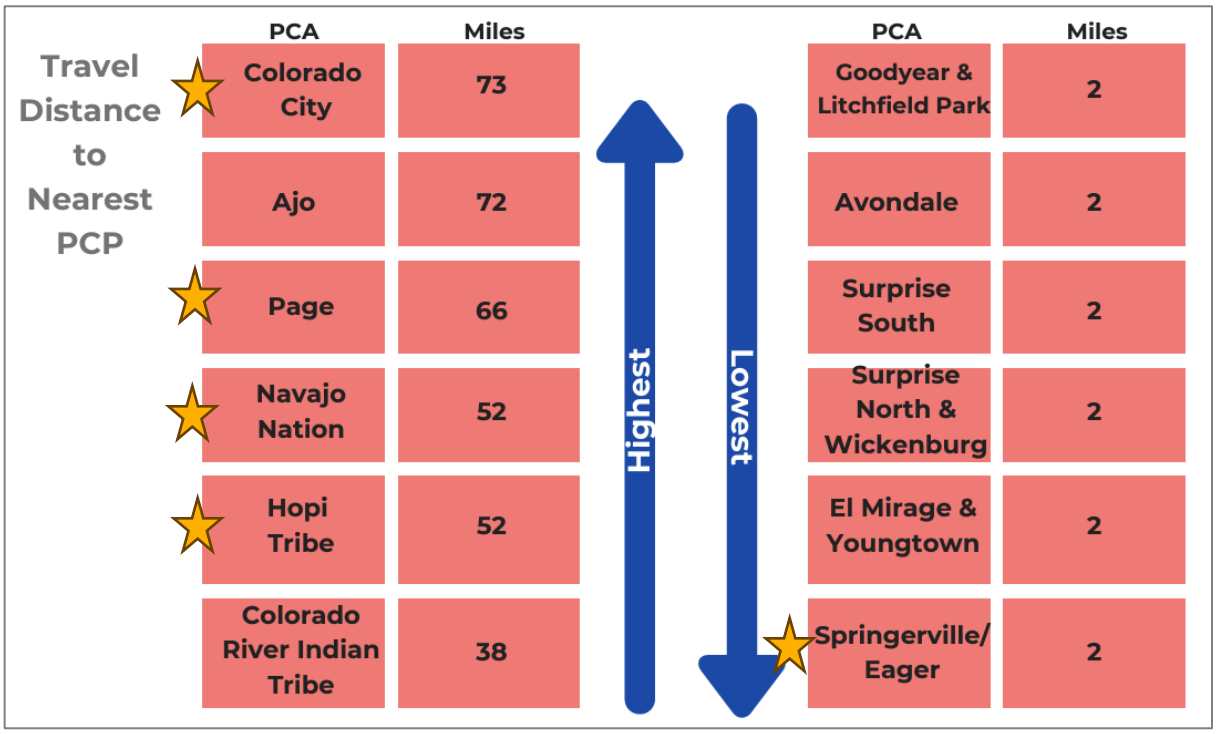


Figure 62. ADHS ranked PCA distance to nearest primary care provider, 2022. [9] Published in ADHS's 2022 Arizona Medically Underserved Areas Biennial Report.[2] Stars were added to indicate northern Arizona PCAs.

Insurance Coverage and Cost Barriers

Having health insurance is a **leading health indicator** for Healthy People 2030. The target is 92.4% of persons under 65 years old. [12] Current Healthy People 2030 estimate is 89.7% of the country is insured. BRFSS data over time indicates that insurance coverage in the northern Arizona counties continues to increase, and all surpass the state average for 2016-2019 (86.5%) but are all below Healthy People 2030's target (Figure 63 and 64). Estimated rates of the medically insured population from other sources are only substantially different in Apache and Navajo counties, which are 10% and 6% lower. The only group to see a decrease from 2015 to 2021 was the percent of children insured in Navajo County, which went from 88% in 2015 to 81% in 2021. Despite widespread insurance coverage in the region, 12–16% of northern Arizona adults reported that they could not afford to see a doctor when they needed one. This is comparable to the Arizona average, although Navajo and Yavapai counties were below the state average (Figure 65).

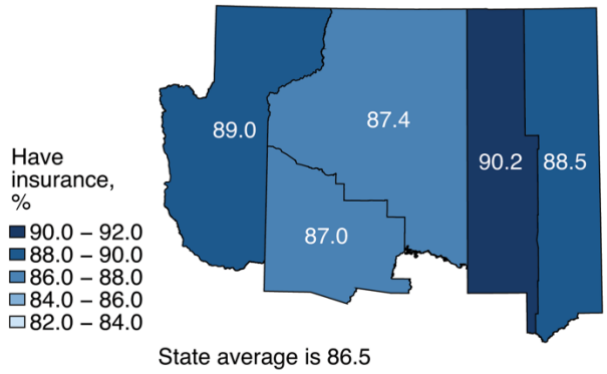


Figure 63. AZ BRFSS insurance coverage by county, 2016-2019.

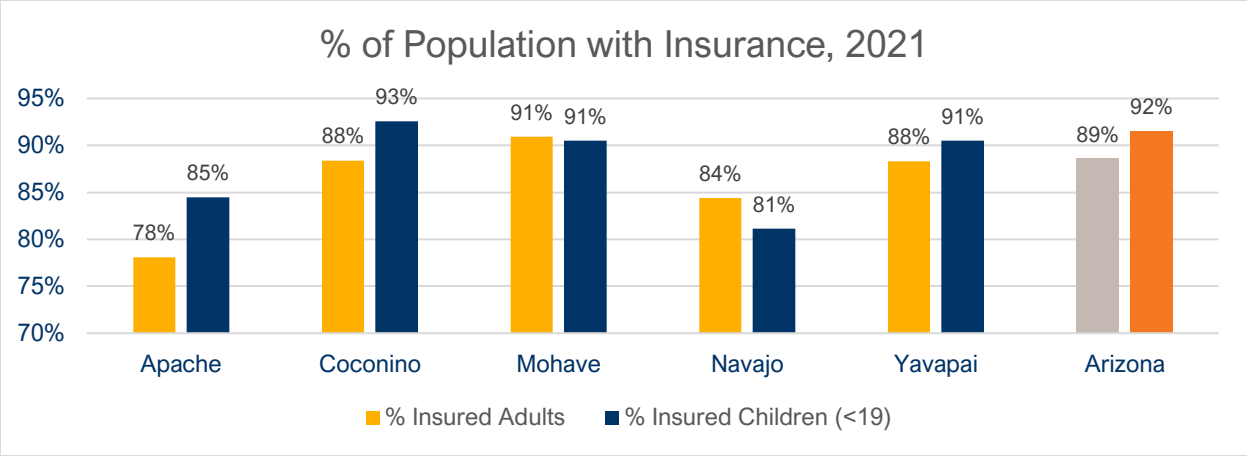


Figure 64. Rates of insured populations by county, 2021.[5]

The rate of insurance coverage for many American Indians living on Native nations in the region is significantly lower than the general population, particularly the Kaibab Paiute who have a rate of 67% (Figure 66). According to the same data source, [5,8] the percent of children who are insured is generally better than the percent of adults insured. Six of the Native nations have 80% or more children medically insured, but children from Kaibab Paiute and Yavapai Prescott have very low percentages of insurance (61% and 57%, respectively). However, even without insurance, American Indians are eligible to receive care at IHS, tribally governed, or Urban Indian health facilities.

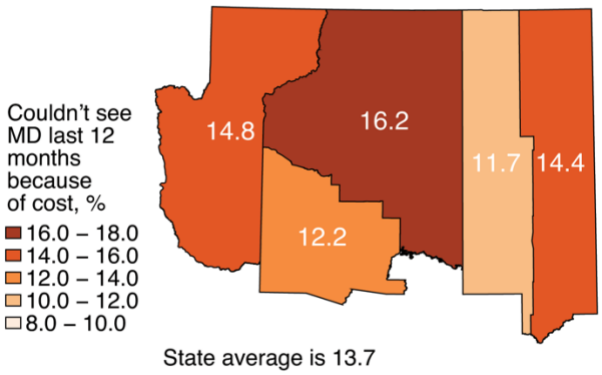


Figure 65. AZ BRFSS couldn't see a doctor because of cost by county, 2016-2019.

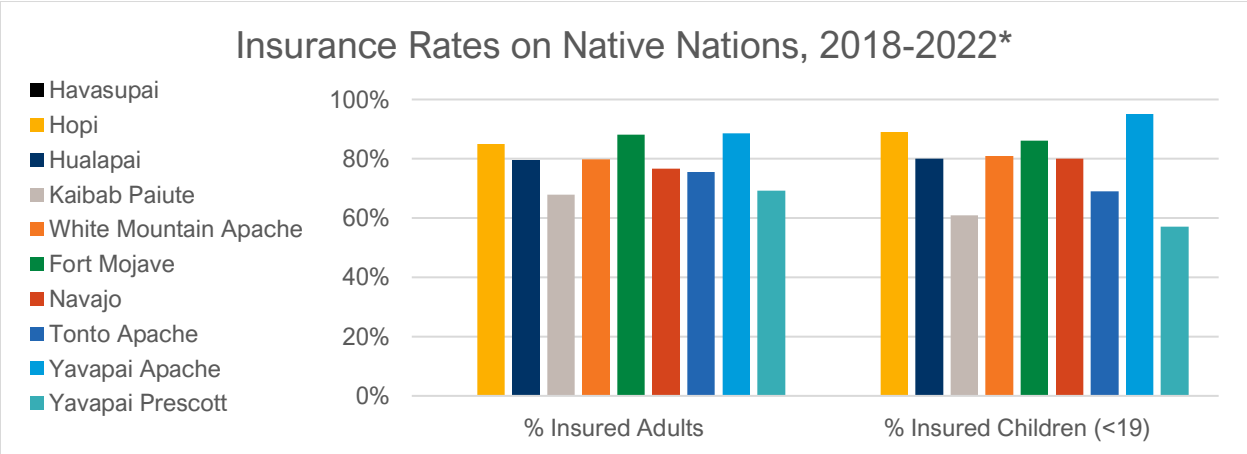
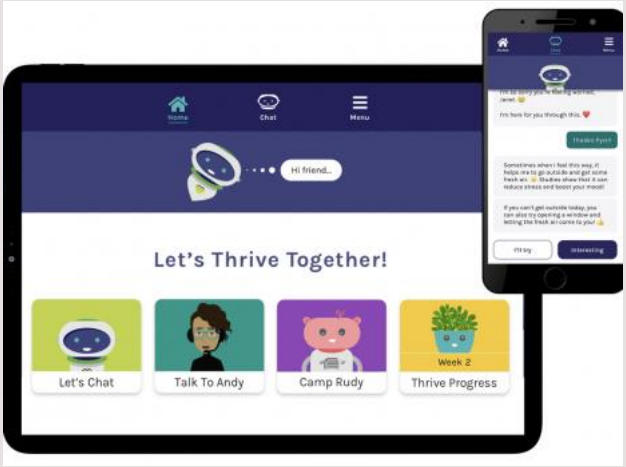


Figure 66. Rates of insured population on Native nations, 2018-2022.[8]
**Havasupai do not have any data for the 2018-2022 estimates.*

Evaluation of the Pyx Health Mobile Platform for Improving Health and Health Equity of Arizonans

In 2022, Northern Arizona University's Center for Health Equity Research initiated an evaluation focused on Pyx Health, an interactive mobile health platform designed to address loneliness and social isolation in underserved communities. Loneliness and isolation are prevalent issues in the United States, affecting approximately 58% of adults and contributing to health problems, including heart disease, depression, and early mortality. The Pyx Health platform incorporates a mobile app to provide customized support, positive psychology activities, and an AI -based chatbot (Pyxir), as well as a Call Center from which users may receive live supportive interactions.



The evaluation, commissioned by the Northern Arizona Regional Behavioral Health Authority Institute (NARBHA), employed a convergent mixed-methods approach. Qualitative process evaluation data obtained through interviews with Pyx Health users revealed strengths of the platform such as daily reminders within the app, resources and features to help troubleshoot health issues, and respectful and consistent interactions with Call Center staff. However, users identified weaknesses including difficulty with accessibility of the app and live check-in calls from Center staff that were too frequent or occurred at inconvenient times. Survey results showed overall satisfaction but indicated room for improvement.

In the outcomes evaluation, the study analyzed data from Medicaid enrollees who used Pyx Health. Loneliness scores improved or maintained for 72.48% of users, with similar trends across general and maternal user groups. Healthcare utilization data indicated changes in inpatient, outpatient, and behavioral health claims, suggesting a potential positive impact of Pyx Health usage. The evaluation acknowledged limitations, such as challenges in inter-organization cooperation and the impact of the COVID-19 pandemic on user engagement.

To provide a broader context, a scoping review of mobile health interventions targeting loneliness and psychological distress in underserved rural populations was conducted. The review identified strengths and weaknesses in existing interventions, aligning with Pyx Health's features but also highlighting concerns such as privacy issues and the need for frequent monitoring.

The evaluation offers valuable insights into the Pyx Health platform's effectiveness. Recommendations include exploring differences between heavy and light users, coordinating app usage with physicians, and addressing limitations related to the COVID-19 context. The report provides a foundation for future research and improvements in Pyx Health's design, implementation, and evaluation (see full report here).

SDOH Factor 2: Economic Stability

Living in an impoverished state has been linked with poor health outcomes. [30] Healthy People 2030 includes objectives focused on reducing the proportion of people living in poverty, having difficulty affording housing, and experiencing food insecurity. [12]

Poverty/Unemployment

Poverty and unemployment are obvious obstacles to accessing health care services. They also contribute to other barriers discussed below such as lack of access to childcare, higher education, healthy foods and adequate housing.

Figure 67 illustrates the level of poverty experienced by residents in all five counties. National estimates of poverty from American Community Survey indicate that in 2021, 11.6% of the population broadly live in poverty and 17% of children are living in poverty. [5] All counties in northern Arizona except Yavapai were above these poverty thresholds, for the general population and for children. [5]

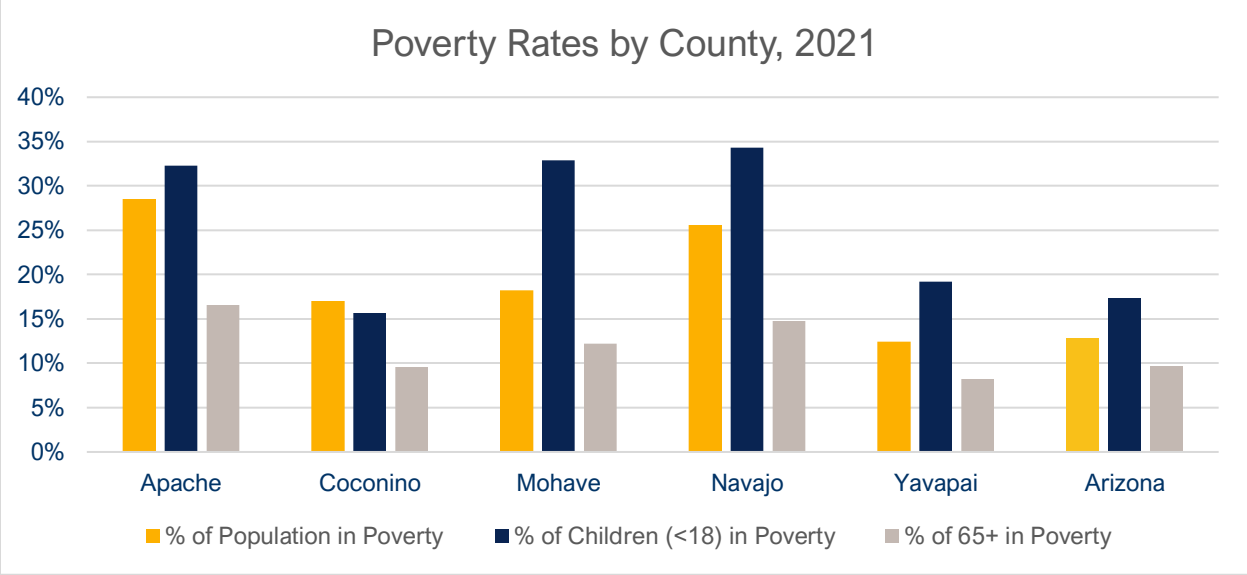


Figure 67. Regional poverty rates by county compared to Arizona overall, 2021.[5]

Employment among working-age people is a **leading health indicator** for Healthy People 2030. The target is 75% of the working-age population aged 16-64. [12] This marker pertains to the eligible labor force, which includes individuals who are either employed or unemployed. The current data from Healthy People 2030 indicates 70.7% of the US's working-age population is employed.[12] Improving this percentage requires unemployment rates to decrease.

According to the U.S. Bureau of Labor Statistics, the unemployment rate in the United States was 6.3% in January of 2021 and has hovered around 3.5% since March of 2022.[31] Figure 68 highlights the great disruption in employment caused by the COVID-19 pandemic, and it looks to have impacted northern Arizona counties similarly. Before COVID, Apache and Navajo counties had noticeably higher rates of unemployment compared to the other northern Arizona counties and Arizona overall. Following COVID, Navajo County has tracked closer with Coconino and Mohave counties, while Apache County has remained much higher than all other counties. Yavapai County is the only county that has tracked close to or under the national unemployment rate (Figure 68).[4]

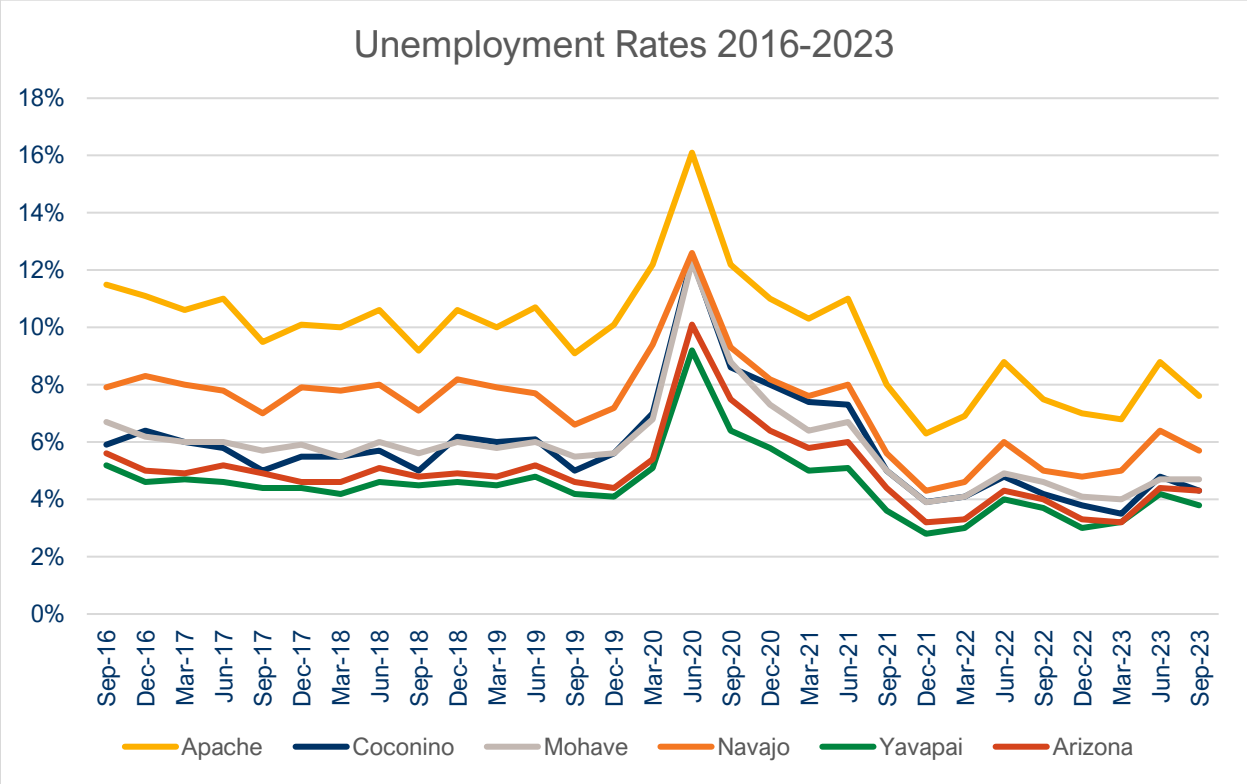


Figure 68. Regional trends in unemployment by county compared to Arizona overall.[4]

Poverty and Unemployment in the American Indian Community

In most tribal communities living on Native nations, rates of poverty and unemployment are dramatically higher than in the rest of the population. On average, the tribal poverty rates are 6% higher than the county levels and the unemployment rates are almost twice as high on Native nations.[5,8] Among the Native nations in northern Arizona, the White Mountain Apache had the highest unemployment rate and Navajo had the highest poverty rate (Figure 69).[8] Figure 70 shows the rate of children in poverty for Native nations.

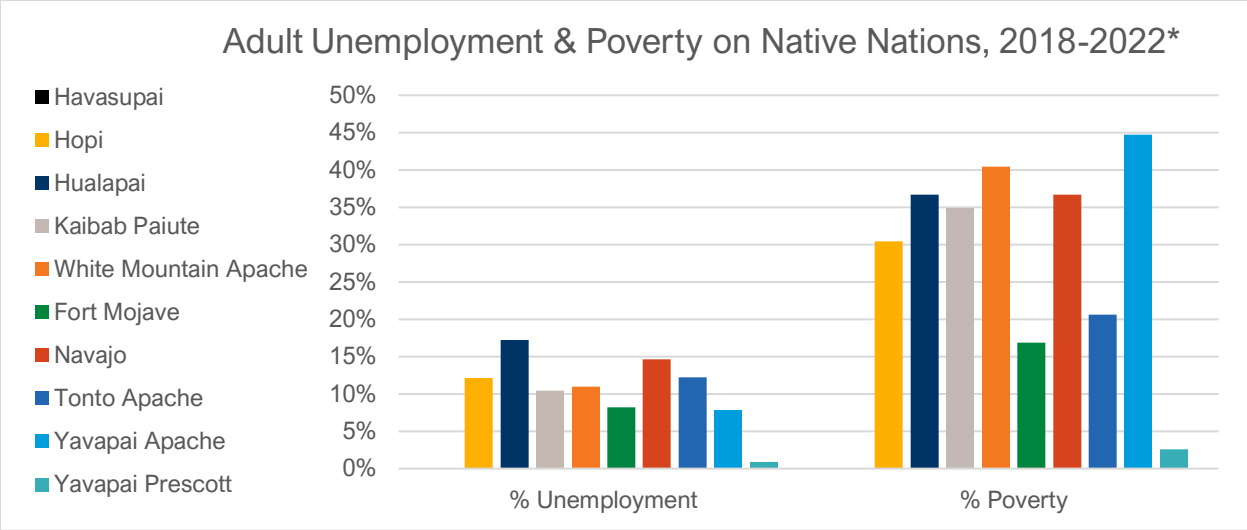


Figure 69. Adult tribal unemployment and poverty rates, 2018-2022.[8]
**Havasupai do not have any data for the 2018-2022 estimates.*

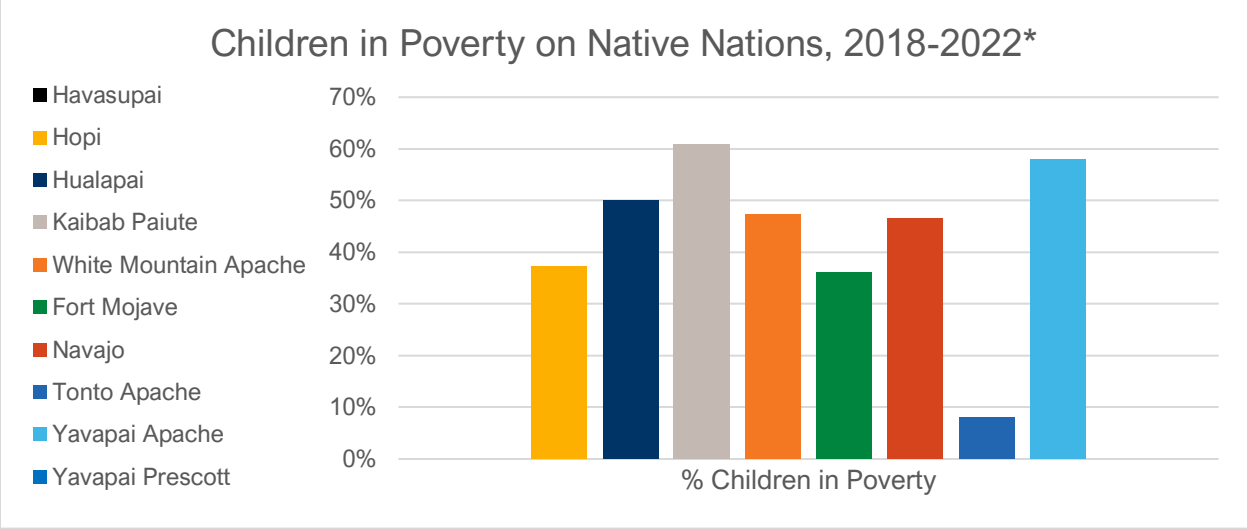


Figure 70. Percent of children in poverty on Native nations, 2018-2022.[8]
**Havasupai do not have any data for the 2018-2022 estimates.*

High Cost of Living and Housing

Reducing the proportion of families that spend more than 30% of income on housing is a Healthy People 2030 objective. Current data indicates the national rate is 32% spending >30% of income on housing, and the target is 25.5%.[12] High housing costs can influence home ownership levels (Figure 71). Coconino County (60%) has the lowest home ownership percentage of the northern Arizona counties and is the only county lower than the state average (65%). This is clarified with high housing cost data, as Coconino County (34%) has higher housing costs than the other counties, Arizona overall, and the United States overall. When families are spending a larger than normal percentage of their income on rent, lower-income families are often not able to procure healthy foods, health care services, and other basic resources that facilitate health and wellbeing. [32]

Besides Coconino, the remaining counties are below the U.S. median for the percentage of the population with high housing costs. However, only Apache and Navajo counties have percentages that are at least 5% lower than the U.S. and Arizona estimates. While they have the lowest housing costs in the region, Apache and Navajo residents also have the highest proportion of households experiencing housing stress, indicating poor quality housing conditions (Figure 72).[6] In Apache County, 12.1% of households had no plumbing and 7.7% had no kitchen, while Navajo County had 9% of households with no plumbing and 7.3% of households with no kitchen.[6]

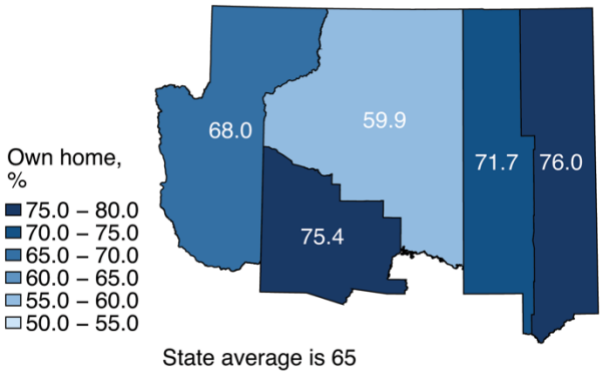


Figure 71. AZ BRFSS home ownership by county, 2016-2019.

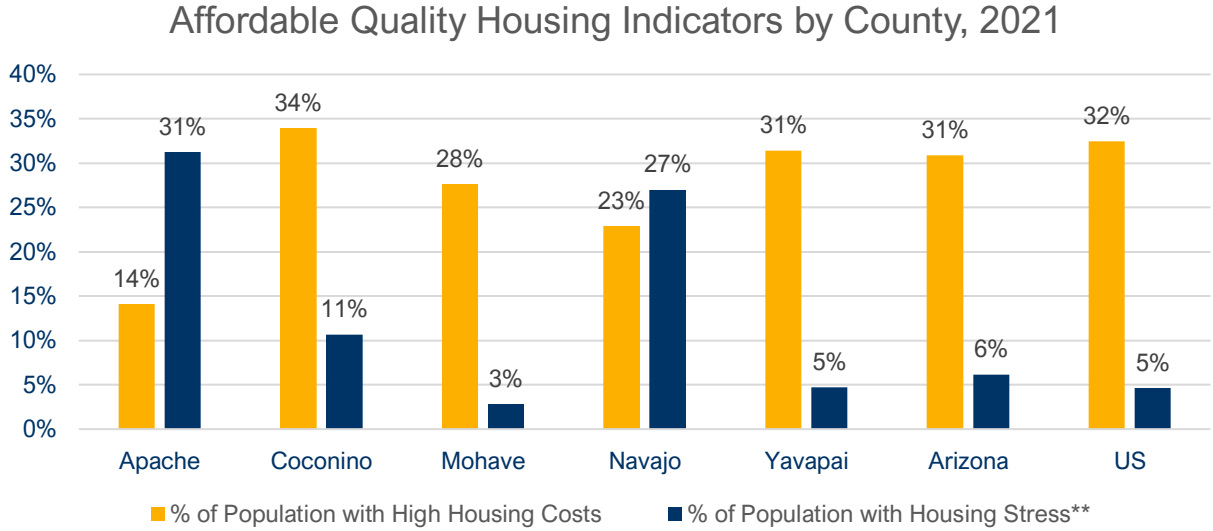


Figure 72. Regional affordable quality housing measures by county.[5]
**Renters or owners living in units with a mortgage spending 30% or more of household income on rent, American Community Survey 2021 estimate. **A house is defined as stressed if one of the following criteria is met: (1) housing unit lacks complete plumbing; (2) housing unit lacks complete kitchen; (3) household is overcrowded (more than 1 person per room; or (4) household is cost burdened (housing costs > 30% of monthly household income).*

Income Patterns in Selected BRFSS Health Indicators for Northern Arizona

We examined disparities for four key health indicators as a function of reported household income (Figures 73–76). To ensure adequate stability of income estimates, the eight income categories were collapsed into four categories. Better self-rated health status showed a positive association with income level. For each county, higher income was associated with a higher percentage of people who rated their health as good, very good, or excellent.

Functional limitations were strongly related to household income, with the two lowest income categories (representing incomes less than $25,000 per year) having the greatest prevalence of functional limitations. Lower income levels were associated with a greater burden of poor mental health, with the exception of Apache County, which had a distinctly lower percent of mentally unhealthy days only at the $25K-$50K category. Coconino and Mohave counties had far greater percentages of mentally unhealthy days by income level than the other counties.

Lastly, comorbid cardiovascular risk factors followed the expected inverse association with income levels for Mohave, Navajo, and Yavapai counties but in Apache and Coconino counties, there doesn't seem to be a clear relationship between income and comorbid cardiovascular risk factors. It is unclear why that might be. Mohave and Yavapai counties have the highest mean number of comorbid cardiovascular risk factors in each income category compared to the other four counties, but they also have the highest number of 65+ individuals among the northern Arizona counties. This might explain the higher rate of cardiovascular risk factors, but low-income older individuals in Mohave and Yavapai counties might also have additional barriers to managing these risk factors.

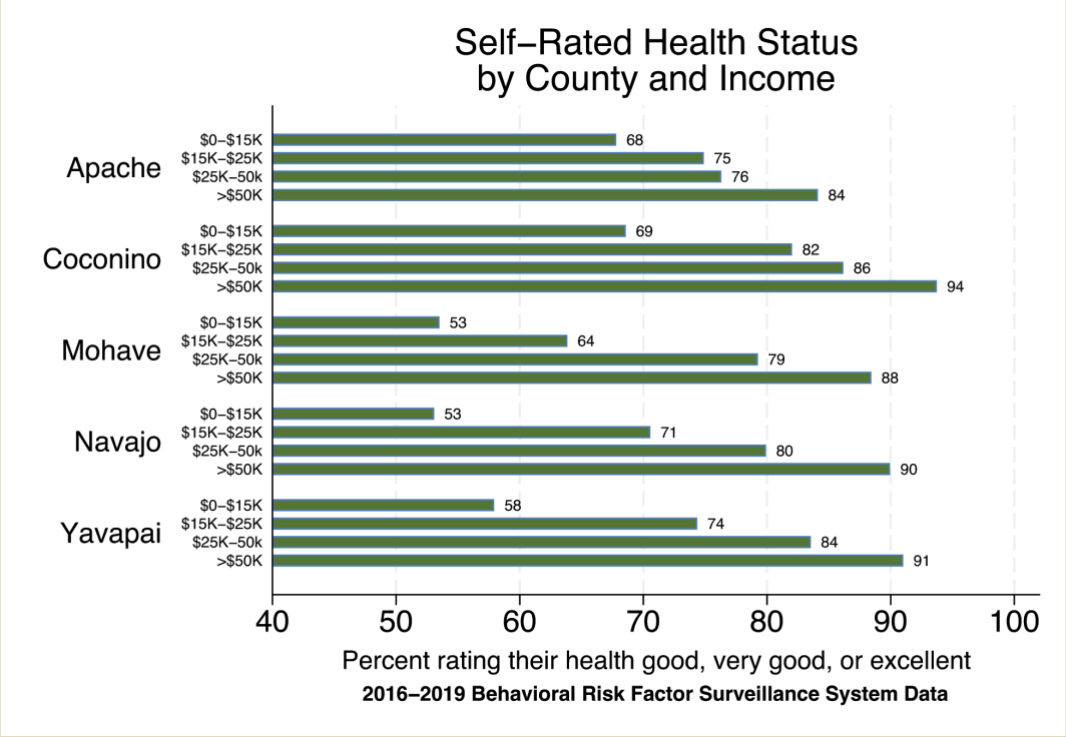


Figure 73. AZ BRFSS self-rated health by income and county, 2016-2019.

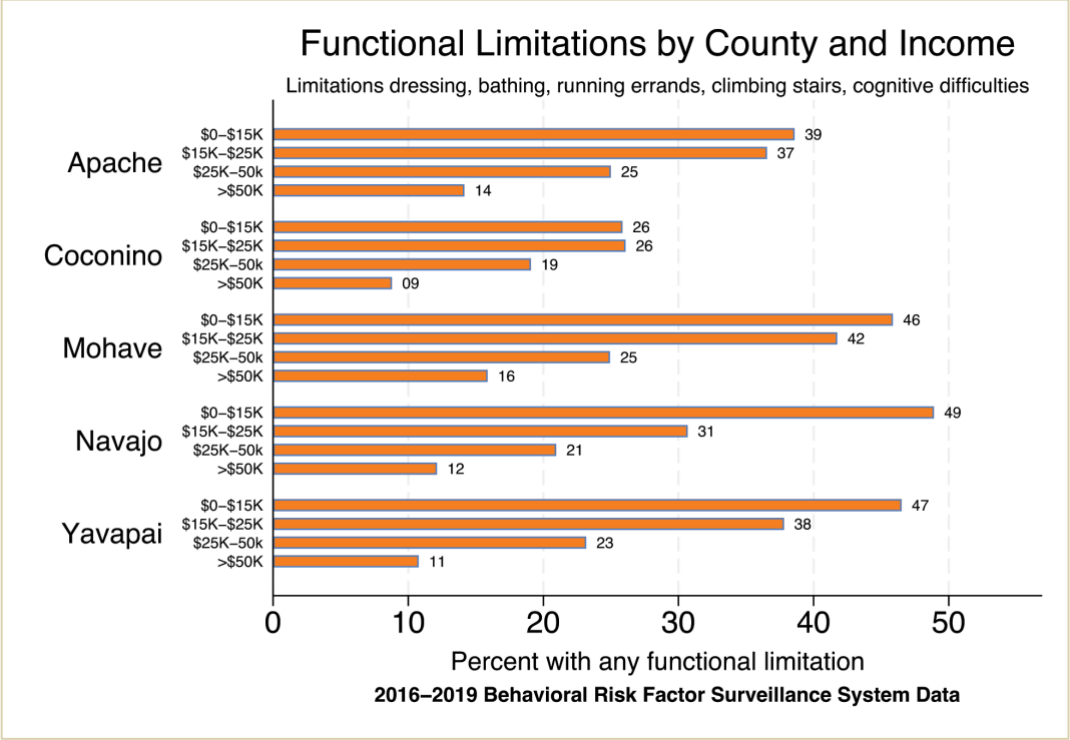


Figure 74. AZ BRFSS functional limitations by income and county, 2016-2019.

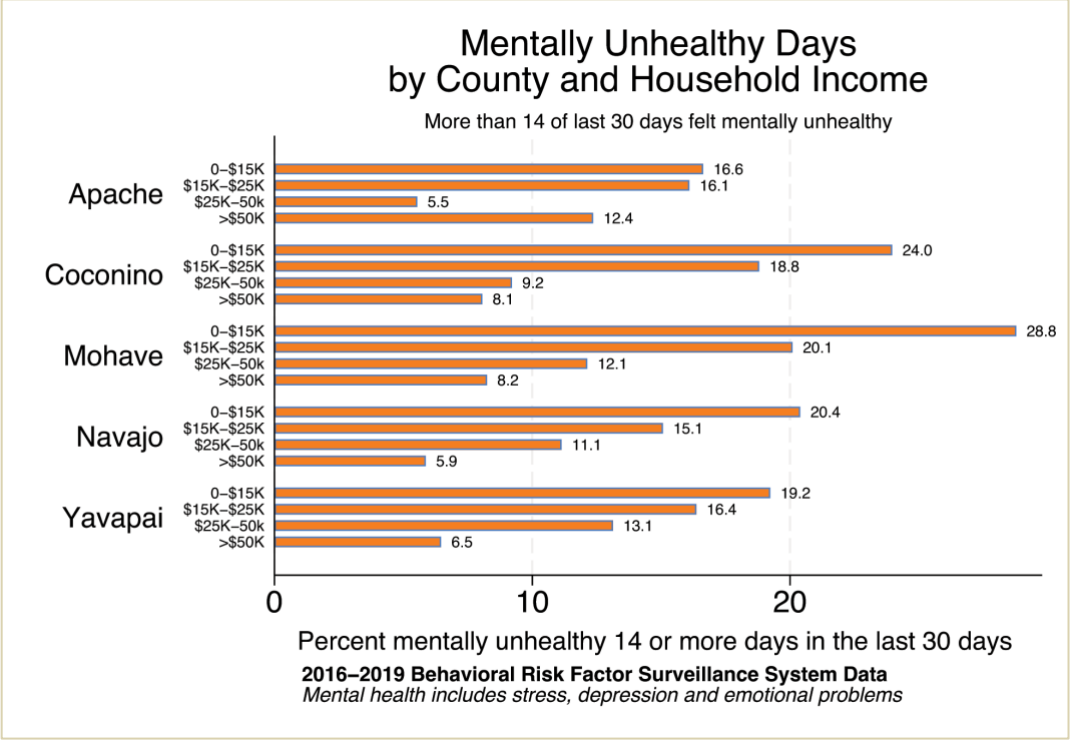


Figure 75. AZ BRFSS mentally healthy days by income and county, 2016-2019.

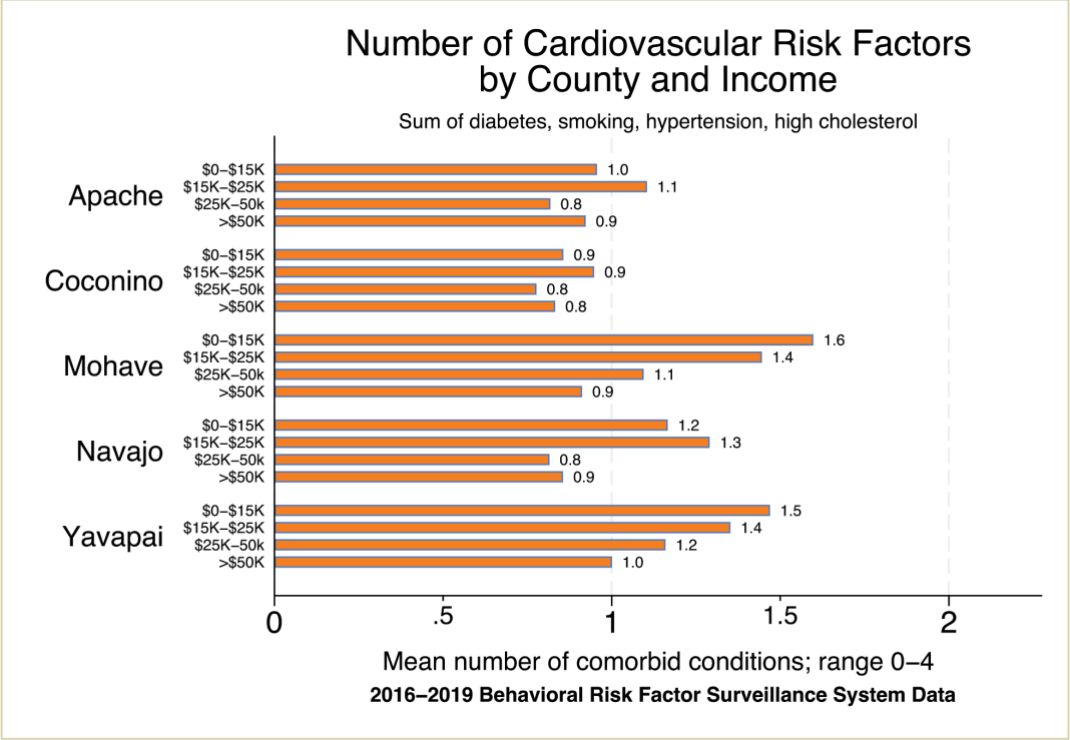


Figure 76. AZ BRFSS cardiovascular risk by income and county, 2016-2019.

Access to Healthier Food

Diabetes, heart disease, and obesity are health outcomes related to poor nutrition and lack of exercise. This is due to both a lack of awareness and food insecurity. Many people do not have the money or time to buy and cook healthier foods or participate in recreational activities. Diabetes is often not properly managed and leads to very serious and debilitating complications.

Food insecurity is an economic and social indicator of the health of a community. The USDA defines food insecurity as limited or uncertain availability of nutritionally adequate foods or uncertain ability to acquire these foods in socially acceptable ways. [33] There is strong evidence that residing in a food desert is correlated with a high prevalence of overweight, obesity, and premature death. [34] Supermarkets traditionally provide healthier options than convenience stores or smaller grocery stores. Additionally, lack of access to fresh fruits and vegetables is a substantial barrier to consumption and is related to premature mortality. [35] The major determinants of food security are the physical availability of healthy foods and the economic and physical ability of a person to procure healthy foods, as well as food utilization practices which include eating habits, food preparation, and household distribution of foods. [36]

Household food insecurity and hunger is a new Healthy People 2030 **leading health indicator**.[12] While it was a designated objective for Healthy People 2020, it was designated one of the leading health indicators for all ages for 2030. The target percent for this objective is 6%. The national estimate has improved from 2018 at 11.1% to 10.2% in 2021. Figure 77 demonstrates the regional percentages of food insecure residents by county. Each northern Arizona county and Arizona overall (13%) is over the national estimate. However, food insecurity in the northern Arizona region has improved since 2015 and the Healthy People 2030 objective in listed as improving.

Figure 77 also shows the percentage of people in each county who have limited access to food.[6] This is defined by the percentage of people who are low income and who live more than 1 mile (urban residents) and more than 10 miles (rural residents) from a grocery store. All counties have higher rates than the state average for both indicators, but Apache County has particularly high rates of both percent food insecure residents and percent who are low income with limited access to health foods. Yavapai (26%) and Navajo (19%) counties also has a high rate of those who are low income with limited access to healthy foods, and Navajo County has the second highest percent of food insecure residents (21%). Figure 78 shows the percent of children with low access to a store, which uses the same definition of distance. Apache County again has the highest rate of limited access to healthy foods for children (22.4%), followed by Navajo County (12%).[33] The average for Arizona is 4.5%.

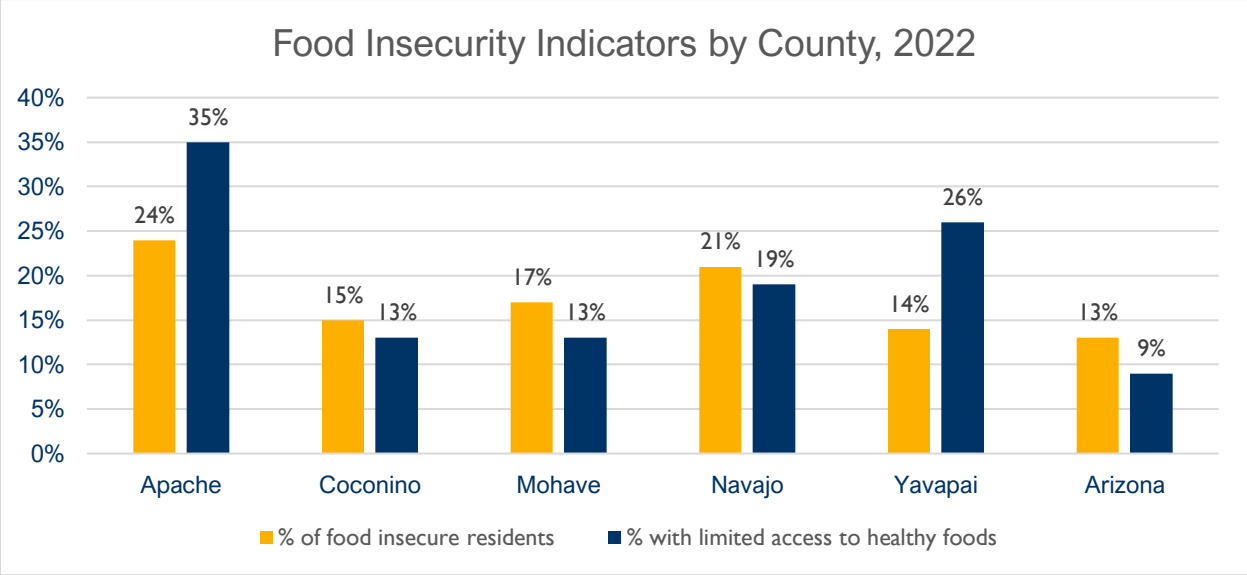


Figure 77. Regional percent of residents who are food insecure and residents with limited access to healthy foods by county, 2022.[6]

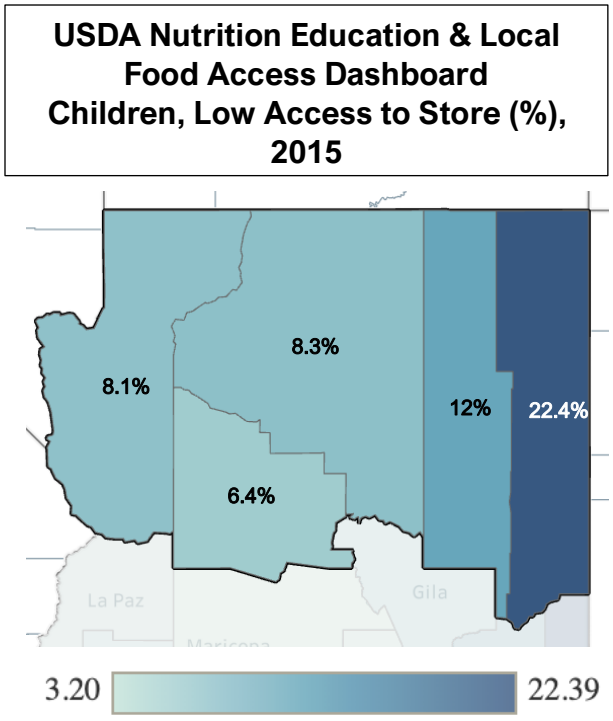
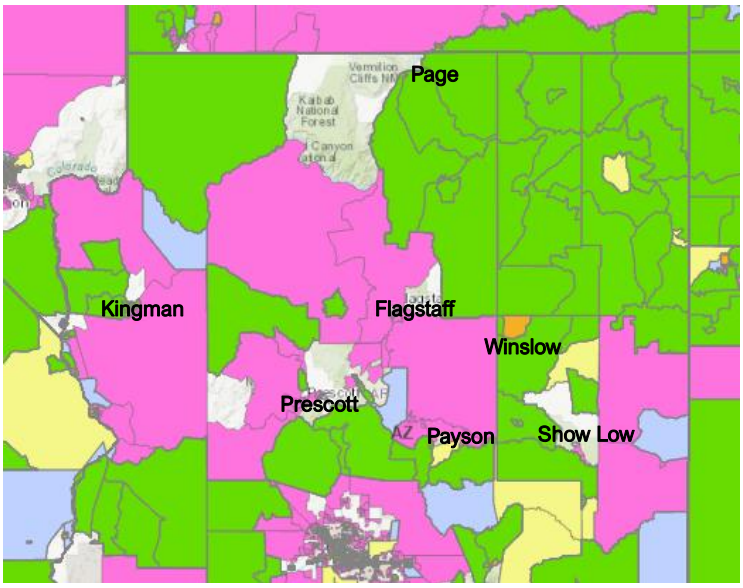


Figure 78. Percent of children living more than 1 mile from a supermarket or large grocery store if in an urban area, or more than 10 miles from a supermarket or large grocery if in a rural area, 2015.[33]

Figure 79 was created using the USDA Economic Research Service interactive mapper.[37] The map shows areas based on Census tract where a significant percentage of the population is low income and/or has low access to a grocery store. The light blue indicates Census tracts with a poverty rate of 20% or higher, or tracts with a median family income less than 80% of the income for the state or metropolitan area.
The pink indicates Census tracts in which at least 500 people or 33% of the population live farther than 1 mile (urban) or 10 miles (rural) from the nearest supermarket. Green indicates meeting both criteria. The light yellow indicates a low-income census tract where more than 100 housing units do not have a vehicle and are more than ½ mile from the nearest supermarket, or a significant number or share of residents are more than 20 miles from the nearest supermarket.[37]



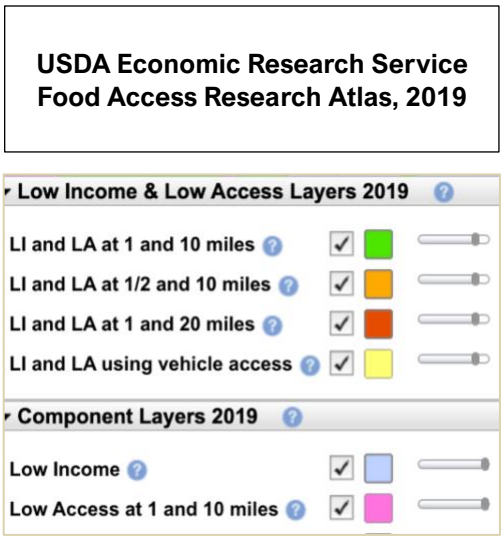


Figure 79. Map of regional food insecurity by census tract, 2019.[37]

Much of northern Arizona's population lives far from a regular source of healthy foods, such as fruits and vegetables, which are two leading health indicators (Figures 80 and 81). Currently (2023) the national baseline is 0.49 cup of fruit per 1,000 calories (for people 2 years and over) and the goal is to increase that to 0.56 cup per 1,000 calories. For vegetables, the current and targeted amounts are 0.73 and 0.84 cups per 1,000 calories, respectively. Arizona is on target for these goals, as are most northern Arizona counties. However, there are vulnerable sub-county regions without access to fruits and vegetables that merit attention.

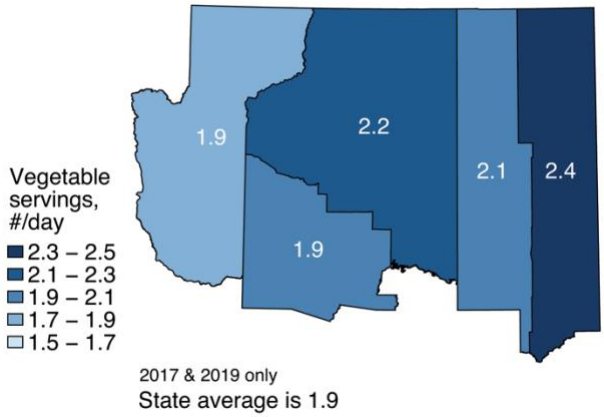


Figure 80. AZ BRFSS daily vegetable intake by county, 2016-2019.

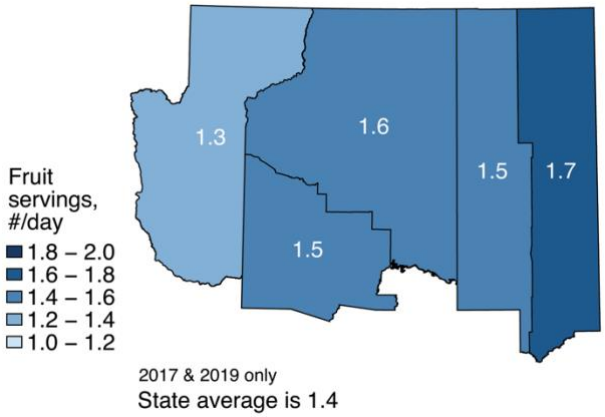


Figure 81. AZ BRFSS daily fruit intake by county, 2016-2019.

SDOH Factor 3: Education

According to national data from the U.S. Census Bureau and BRFSS, people with more education are likely to live longer and experience better health outcomes. Better education confers health benefits at the individual, community, and societal level. [38] The linkages between educational attainment and health are complex. Researchers at the Robert Wood Johnson Foundation found three major interrelated pathways between educational attainment and health. First, educational attainment is linked to health knowledge, literacy, and behaviors. Second, education is linked to employment, working conditions, work-related resources, and income. And third, education is linked to social outcomes such as efficacy, social standing, and social supports. [39]

Figure 82 shows rates of educational achievement by county according to the BRFSS data 2016–2019. Apache, Navajo, and Mohave counties have the highest rates of residents with less than a high school diploma and Yavapai and Coconino counties have the highest populations of college graduates.

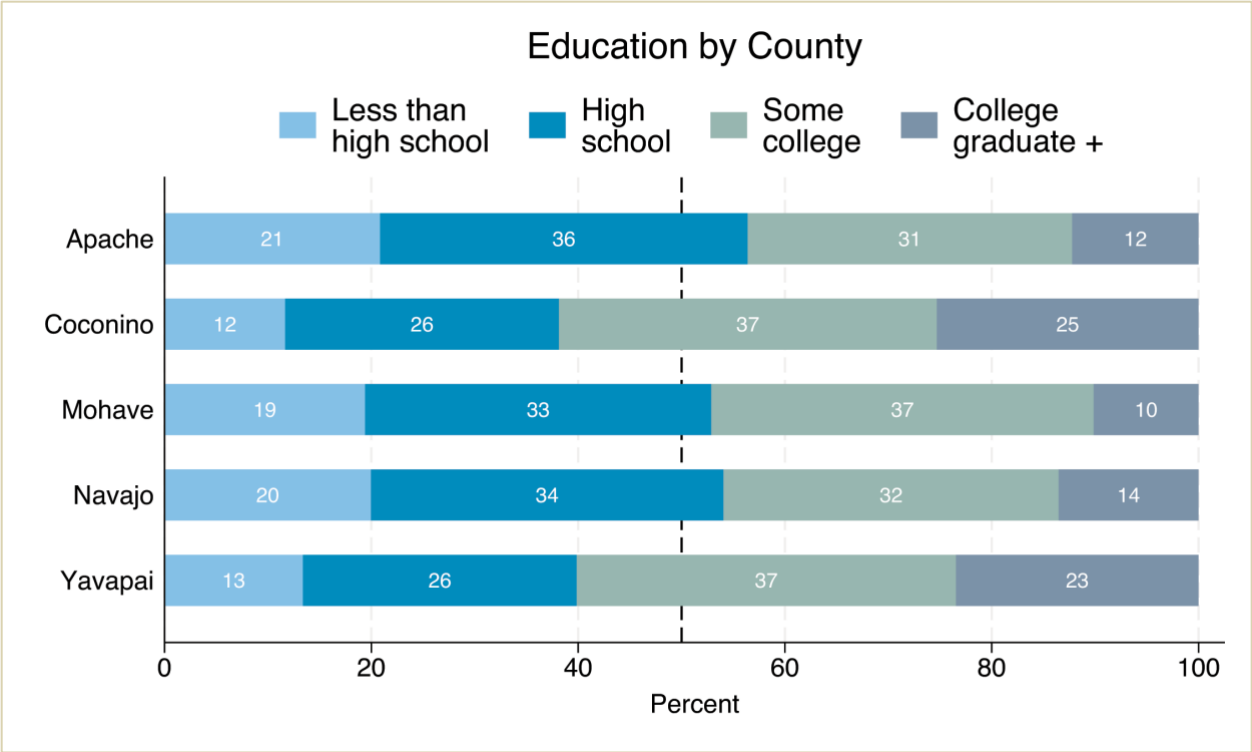


Figure 82. AZ BRFSS regional educational attainment by county, 2016-2019.

Figure 83 shows the annual dropout rates per county in northern Arizona and Arizona overall. This indicator includes the percentage of 7–12 graders who dropped out each year. The graph depicts an average of the total percentage of dropouts for 2017–2022 in each county and Arizona also shows the county rates in 2022 alone.[17] In 2022, Apache (8.3%) by far had the highest percent of 7-12 graders who dropped out, followed by Navajo (6%) and Coconino (5.6%) counties. These rates were higher than the state average (5.4%).

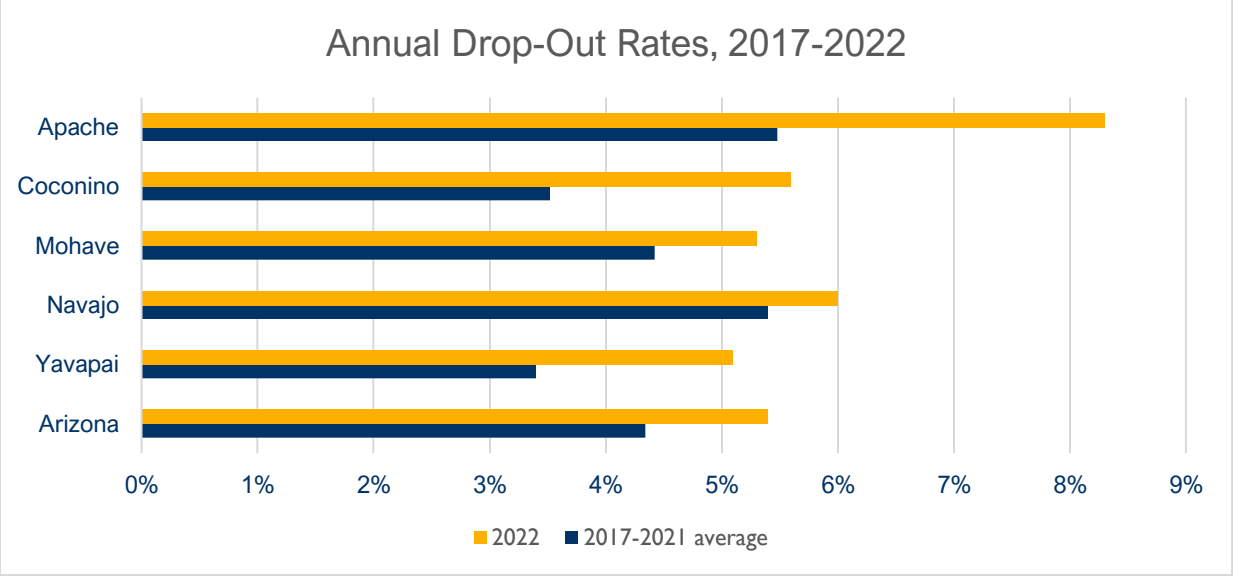


Figure 83. Regional annual drop-out rates by county, 2017-2022.[17]

Figure 84 shows that American Indian students have the lowest 4-year graduation rates in every northern Arizona county, as well as Arizona overall, followed by Hispanic students. However, Hispanic students In Mohave and Yavapai counties have higher or equal graduation rates compared to white students and when all races are combined. American Indian students in Mohave County are disproportionately lower than in other counties (54%).[17]

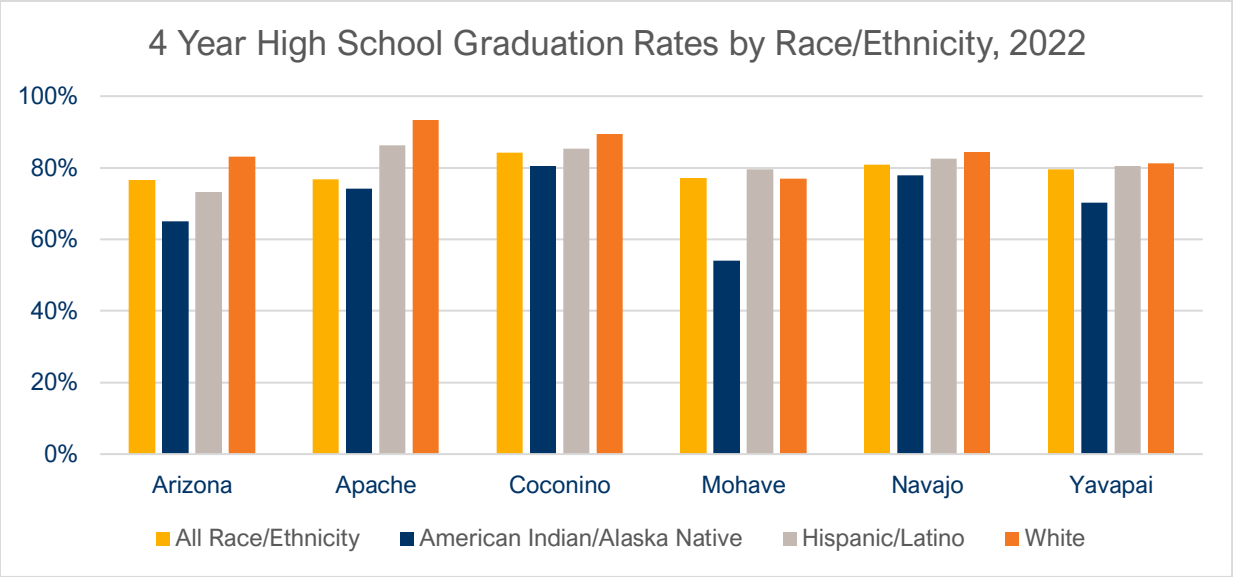


Figure 84. Regional "on time" high school graduation rates by county and ethnicity, 2022.[17]

Education Patterns in Selected BRFSS Health Indicators for Northern Arizona

Because educational achievement is an important social determinant of health, we examined four broad health domains by level of education. These include cardiovascular disease risk factors, self-rated health, functional limitations, and mental health. We categorized respondents into four groups: less than a high school education, high school degree or equivalent, some college, and college graduates or higher. Education categories with fewer than 50 respondents or estimates with a standard error of < 30% do not provide sufficient stability for estimation and are thus omitted.

As shown in Figure 85, cardiovascular comorbidity was greater among persons with lower education, although this was less evident in Coconino County. The absolute magnitude of these differences was more noticeable in Mohave and Navajo counties.

Persons with less than a high school education were more likely to rate their health as fair or poor, vs. good, very good, or excellent (Figure 86). This disadvantage decreased in a dose-response manner with educational attainment across most counties. This is consistent with national-level data from the BRFSS and other sources. Education has the most striking difference on the dose-response relationship of these health factors when compared to race/ethnicity and household income.

Persons reporting any functional limitation (Figure 87) were also more likely to have lower education. Education gradients were not observed as clearly in Coconino and Mohave counties, whereas in the rest of northern Arizona having less than a high school education was associated with a substantial burden. These data show that low education is strongly associated with functional limitations and that this subgroup has 8–20% higher prevalence of limitations relative to the county average. The form of this association was threshold rather than linear. That is, categories at or above a high school education were similar to one another rather than each higher education category evincing a more desirable health profile (e.g., as seen for self-rated health judgments).

Unfortunately, every county except for Apache County had an unstable estimate for the less than high school category, so a clear picture of the relationship between education and mental health by county is not possible (Figure 88). However, the high percentage of Apache residents with less than a high school education reporting 14 or more mentally unhealthy days out of the last 30 is staggering. That is more than twice the average of Apache County overall (Figure 19). Coconino, Navajo, and Yavapai counties had a dose-response relationship between education level and mental health, even though the numbers are not as staggering. Although the potential sources of mental health difficulties are heterogeneous (problems with stress, depression, and/or emotions), this illustrates an area of health need and a domain in which additional mental health screening is warranted.

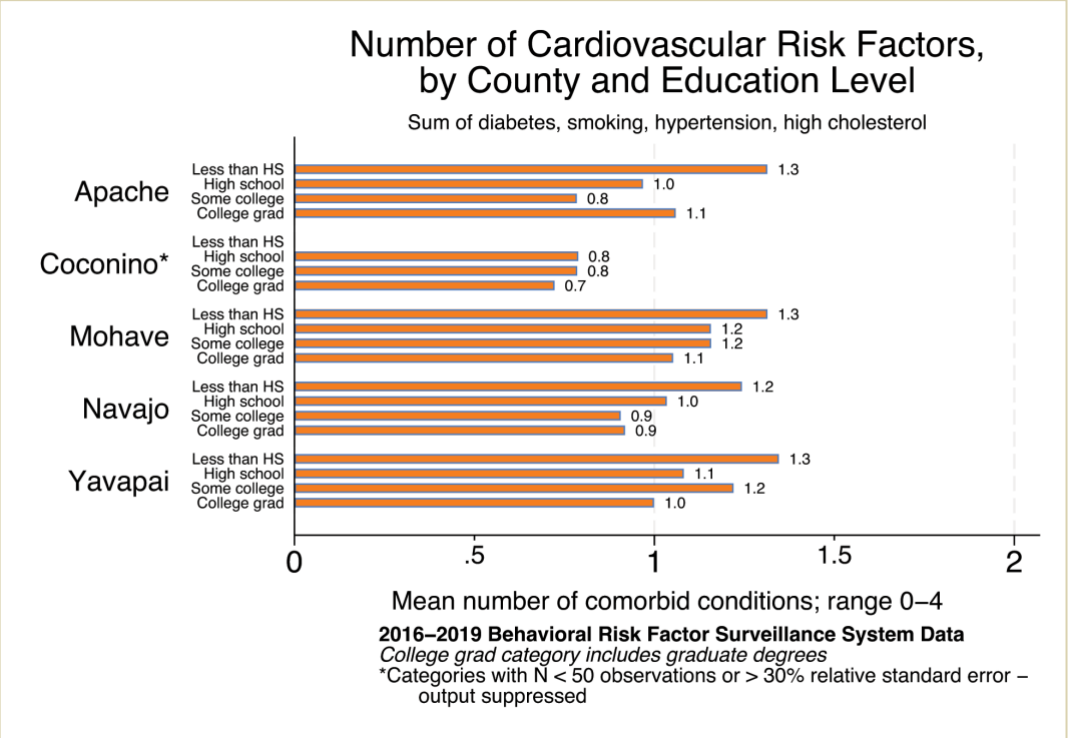


Figure 85. AZ BRFSS cardiovascular risk by education and county, 2016-2019.

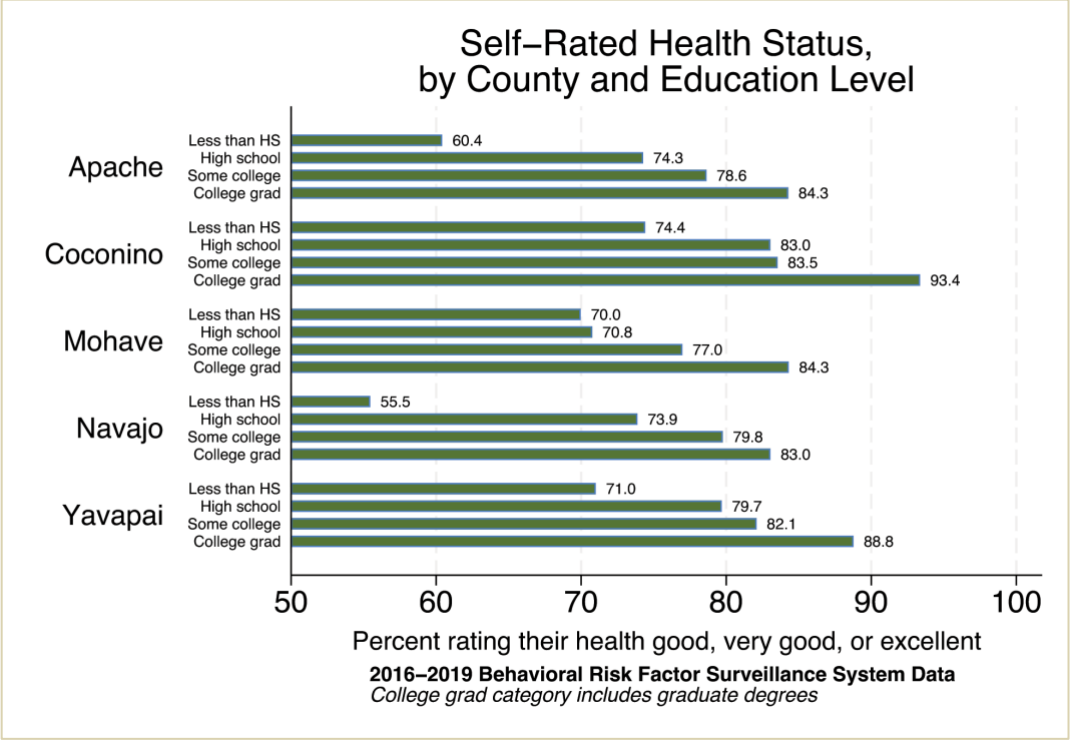


Figure 86. AZ BRFSS self-rated health by education and county, 2016-2019.

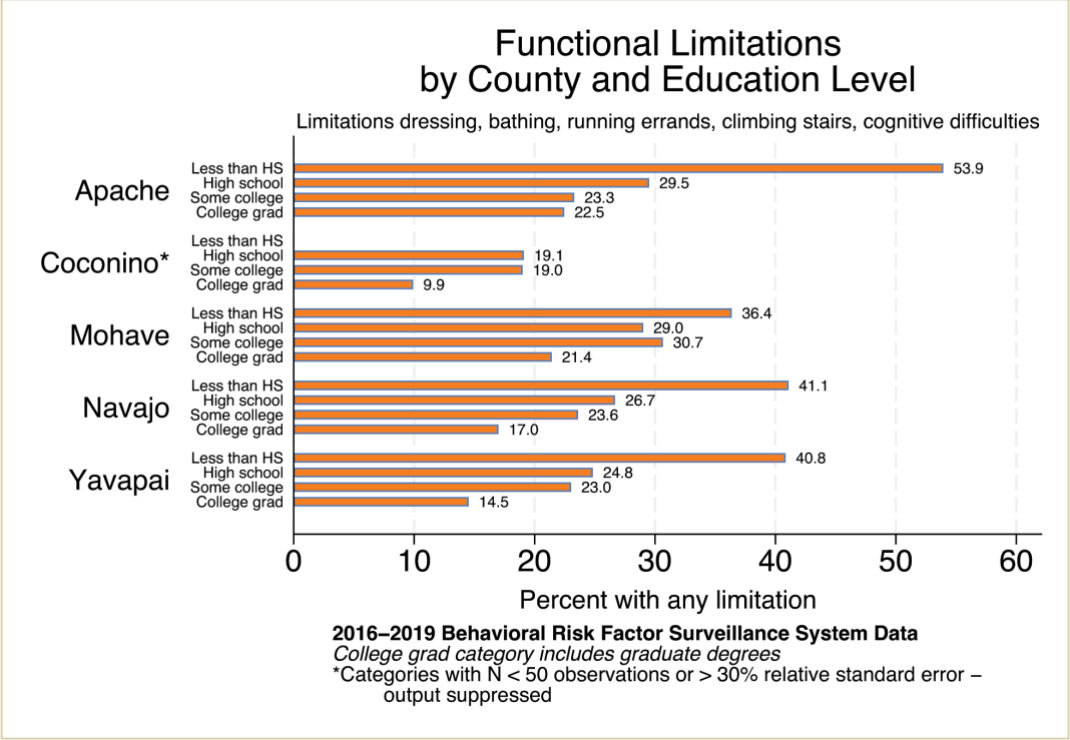


Figure 87. AZ BRFSS functional limitations by education and county, 2016-2019.

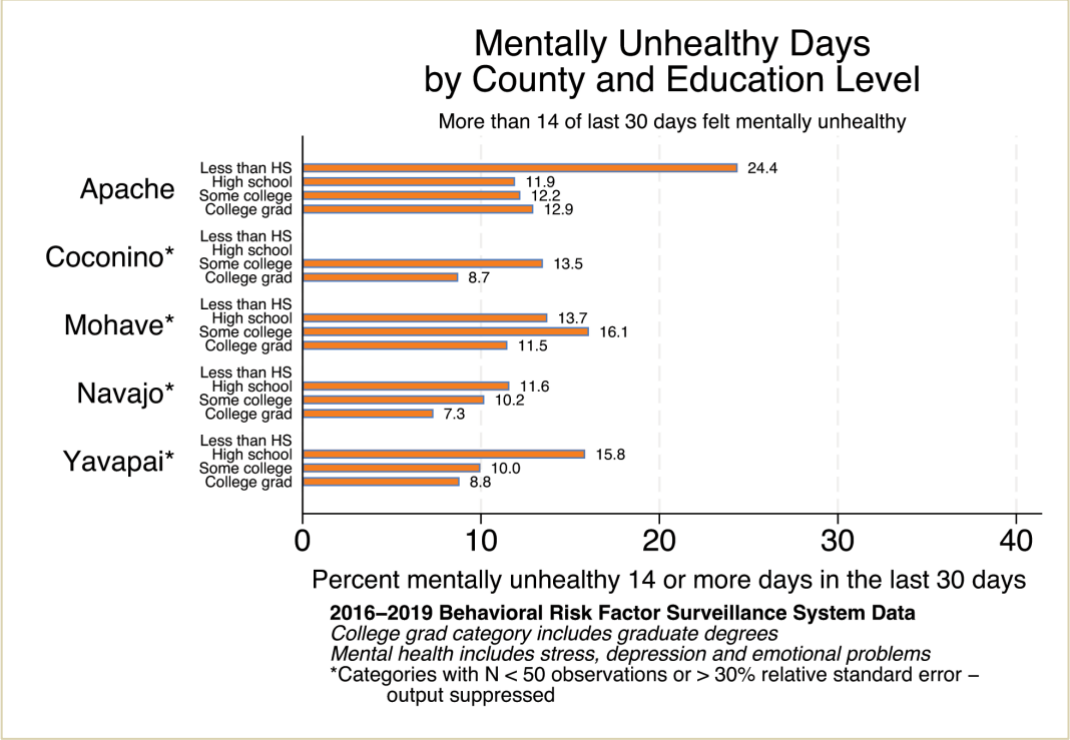


Figure 88. AZ BRFSS cardiovascular risk by income and county, 2016-2019.

SDOH Factor 4: Neighborhood and Built Environment

The physical context in which populations live also influences their health and wellness. This can include the natural environment, the built environment, crime and safety, or the availability of utilities and material goods. [12]

Physical Activity and Access to Recreation Facilities

Adults meeting aerobic and muscle-strengthening physical activity recommendations is a **leading health indicator** that has been retained from Healthy People 2020 to Healthy People 2030. [12] Recommended levels for this objective are 150/week of moderate-intensity aerobic activity and muscle-strengthening activity at least 2 days a week. The target percent for aerobic and muscle strengthening is 29.7% for Healthy People 2030. Increasing the proportion of adults who do enough aerobic physical activity for substantial health benefits is also a Healthy People 2030 objective. Recommended levels for this objective are 150 minutes/week, or at least 75 minutes/week of vigorous intensity aerobic physical activity. The target percent for aerobic activity for substantial health benefits is 52.9%.[12]

BRFSS asks a series of questions about leisure-time physical activity as part of a "rotating core" of physical activity questions asked every other year. These cover different types of activities along with their duration and frequency. These features are matched with typical energy expenditures for the activities to determine whether respondents meet physical activity guidelines. Physical activity is presented as a binary

outcome reflecting the percentage of respondents who meet recommended weekly activity levels. Figures 89 and 90 summarize BRFSS data on aerobic activity for substantial health benefits and meeting aerobic and muscle strengthening activity goals.

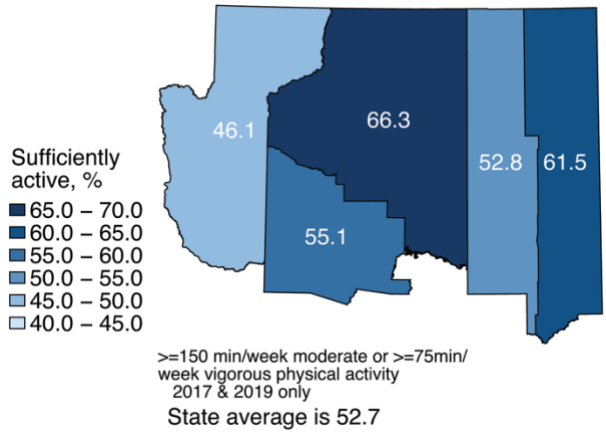


Figure 89. AZ BRFSS sufficiently active by county, 2016-2019. Healthy People 2030 goal is 52.9%.[12]

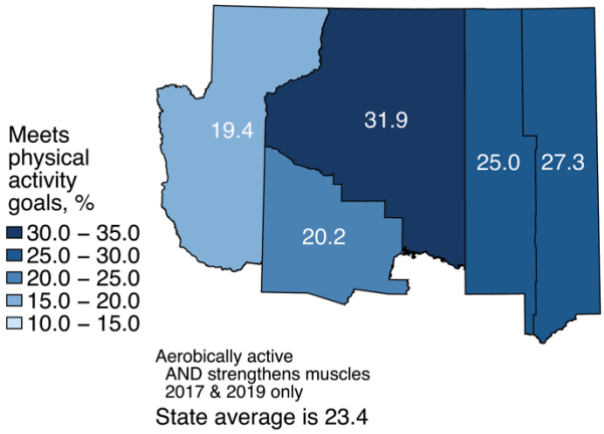


Figure 90. AZ BRFSS meets physical activity goals by county, 2016-2019. Healthy People 2030 goal is 29.7%.[12]

Mohave County residents are slightly lower than the state average for being sufficiently active, whereas the rest of northern Arizona is above the state average (Figure 89). Muscle strengthening is also an important activity with health benefits beyond aerobic activity. Apache, Coconino, and Navajo counties were above the state average on muscle strengthening activities compared to Arizona overall (23.4%) (Figure 90). Mohave County (19.4%) and Yavapai County (20.2%), perhaps because of the older average age of their residents, had fewer residents meeting physical activity guidelines and were below the state average.

BRFSS data paired with the County Health Rankings data (see Figure 91) indicates that despite challenges with access to recreational facilities, those in Apache and Navajo counties are able to maintain an adequate level of activity. Coconino (77%) and Yavapai (84%) counties had the best level of access to parks or recreational facilities in the region and were comparable to Arizona overall (82%). The influences on obesity are complex, though, and physical activity, while important, is not the only relevant factor. Despite a higher percentage of those meeting both physical activity guidelines compared to Arizona overall, Apache and Navajo counties have higher rates of obesity than Arizona overall (Figure 92).

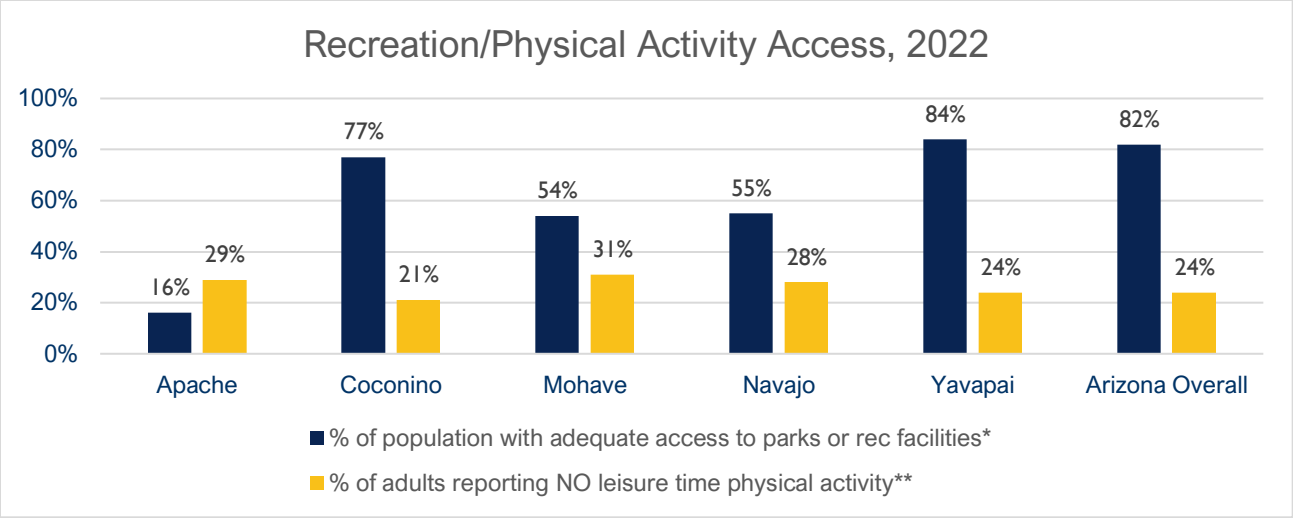


Figure 91. Regional access to physical activity and recreation opportunities by county, 2022.[6]

**Access to exercise opportunities measures the percentage of individuals in a county who live reasonably close to a location for physical activity. Locations for physical activity are defined as parks or recreational facilities. Individuals are considered to have adequate access to exercise opportunities if they reside in a census block that is within a half mile of a park or reside in a census block that is within one mile of a recreational facility in an urban area or reside in a census block that is within three miles of a recreational facility in a rural area. **Physical inactivity is the percentage of adults ages 18 and over reporting no leisure-time physical activity in the past month.*

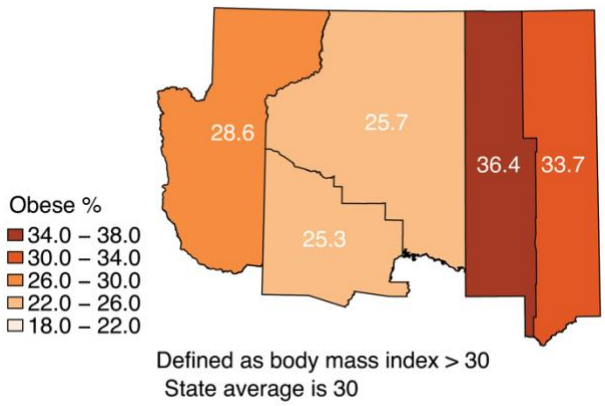


Figure 92. AZ BRFSS obesity by county, 2016-2019.

Crime and Violence

Crime and violence are often linked to geographic locale and is therefore a neighborhood and built environment factor within the SDOH model. Figure 93 summarizes violent crime rates per 100,000 people by county. A violent crime is defined as a crime where there is a face-to-face confrontation. These include homicide, rape, robbery, and aggravated assault. The rates in all of the counties in the northern Arizona region fall below the state average. Apache and Mohave counties have the lowest rates of violent crime and Coconino and Yavapai counties have the highest. [6]

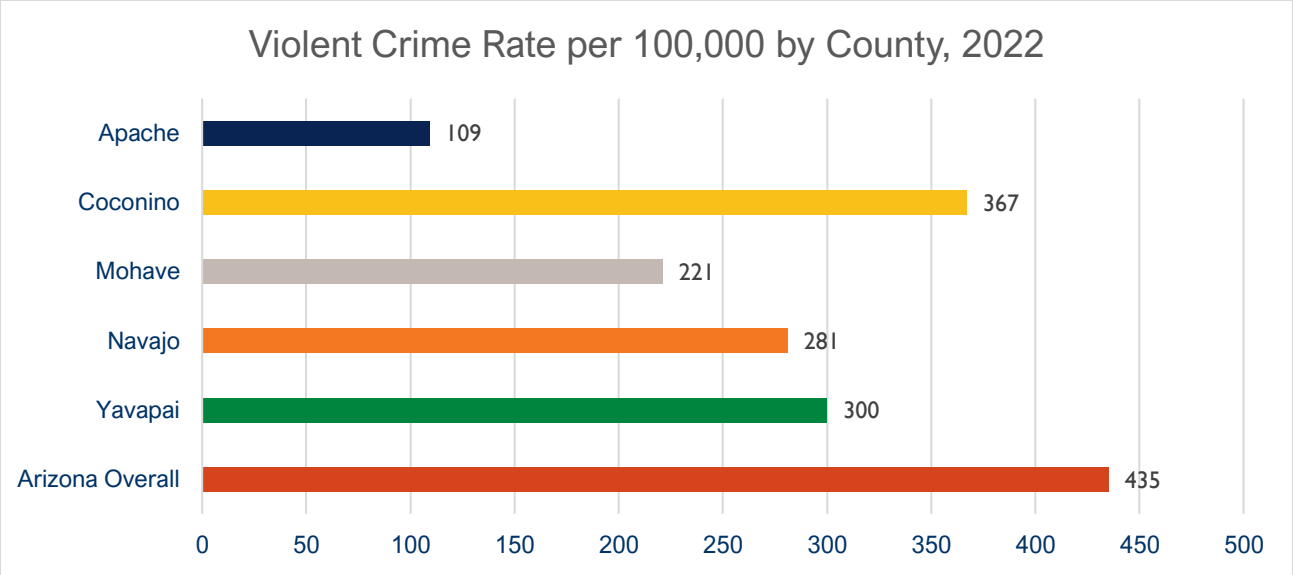


Figure 93. Number of reported violent crime offenses per 100,000 by county, 2022. [6]

Environmental Toxins

Exposure to unhealthy air is a **leading health indicator** that has been retained from Healthy People 2020 to Healthy People 2030. [12] Figure 94 shows air pollution averages for 2022. Air quality rates for the region are close to or below the state average (5.8) except for Mohave (6.3) and Yavapai (6.3) counties. These counties also have the largest percent of their populations living in urban areas or urban clusters. Except for Apache County, all of the northern Arizona counties have reported a drinking water violation. [6]

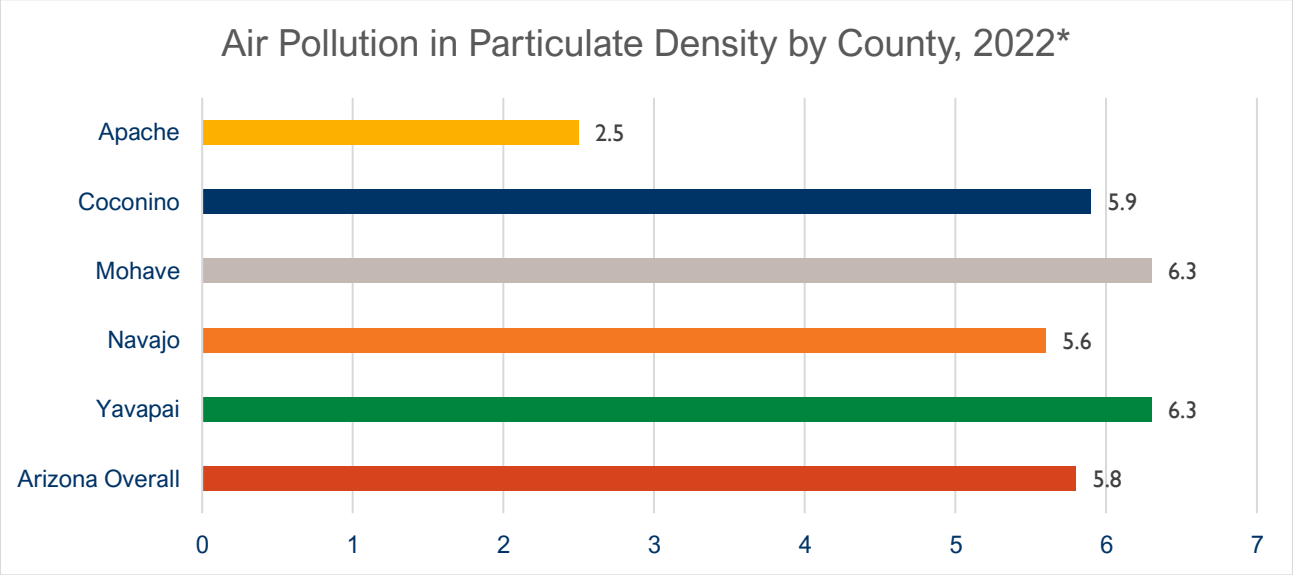


Figure 94. Air pollution by county, 2022.[6]
**Based on an average daily density of fine particulate matter in micrograms per cubic meter. Fine particulate matter is defined as particles of air pollutants with an aerodynamic diameter less than 2.5 micrometers ($PM_{2.5}$). The Environmental Protection Agency (EPA) has primary annual average standards of 12.0 micrograms per cubic meter.*

Appendices

Appendix A. CDC WONDER Leading Causes of Mortality by Nation, State, and County

Data from Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 1999-2020 on CDC WONDER Online Database, released in 2021. Data are from the Multiple Cause of Death Files, 1999-2020, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Rates are per 100,000 individuals. Population size is the cumulative sum across all 5 years.

Table A1: Leading Causes of Mortality Age-Adjusted Rate per 100,000, United States, 2016-2020 (all ages) (*N* = 1,633,737,771)

Leading 15 Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Diseases of heart (I00-I09,I11,I13,I20-I51)	3,294,101	201.6	164.8	(164.6 - 164.9)
Malignant neoplasms (C00-C97)	2,998,371	183.5	149.4	(149.2 - 149.6)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	872,432	53.4	50.4	(50.3 - 50.5)
Chronic lower respiratory diseases (J40-J47)	783,919	48	39.1	(39.0 - 39.2)
Cerebrovascular diseases (I60-I69)	746,604	45.7	37.6	(37.5 - 37.6)
Alzheimer disease (G30)	615,267	37.7	30.8	(30.8 - 30.9)
Diabetes mellitus (E10-E14)	438,403	26.8	22.1	(22.0 - 22.1)
COVID-19 (U07.1)	350,831	21.5	17.7	(17.6 - 17.7)
Influenza and pneumonia (J09-J18)	269,656	16.5	13.6	(13.5 - 13.7)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	256,177	15.7	12.9	(12.8 - 12.9)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	233,972	14.3	13.8	(13.8 - 13.9)
Chronic liver disease and cirrhosis (K70,K73-K74)	221,126	13.5	11.5	(11.4 - 11.5)
Septicemia (A40-A41)	200,734	12.3	10.1	(10.1 - 10.2)
Essential hypertension and hypertensive renal disease (I10,I12,I15)	182,828	11.2	9.1	(9.1 - 9.2)
Parkinson disease (G20-G21)	171,084	10.5	8.8	(8.7 - 8.8)

Table A2: Leading Causes of Mortality Age-Adjusted Rate per 100,000, Arizona, 2016-2020 (all ages) (*N* = 35,819,105)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Diseases of heart (I00-I09,I11,I13,I20-I51)	10,011	261	162.1	(158.8 - 165.5)
Malignant neoplasms (C00-C97)	9,643	251.4	151.6	(148.5 - 154.8)
Chronic lower respiratory diseases (J40-J47)	3,495	91.1	54.1	(52.2 - 55.9)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	3,393	88.5	82.9	(79.8 - 85.9)
Alzheimer disease (G30)	2,091	54.5	34	(32.5 - 35.5)
Cerebrovascular diseases (I60-I69)	2,070	54	33.5	(32.0 - 35.0)
Diabetes mellitus (E10-E14)	1,472	38.4	25	(23.6 - 26.3)
COVID-19 (U07.1)	1,450	37.8	25.5	(24.0 - 26.9)
Chronic liver disease and cirrhosis (K70,K73-K74)	1,325	34.5	30.3	(28.5 - 32.1)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	1,303	34	32.8	(30.9 - 34.7)
Influenza and pneumonia (J09-J18)	818	21.3	14.2	(13.2 - 15.3)
Nutritional deficiencies (E40-E64)	657	17.1	10.6	(9.8 - 11.5)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	598	15.6	9.9	(9.1 - 10.8)
Essential hypertension and hypertensive renal disease (I10,I12,I15)	540	14.1	8.9	(8.1 - 9.7)
Parkinson disease (G20-G21)	510	13.3	8	(7.3 - 8.7)

Table A3: Leading Causes of Mortality Age-Adjusted Rate per 100,000, All 5 Northern Arizona Counties, 2016-2020 (all ages) (*N* = 3,835,690)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Diseases of heart (I00-I09,I11,I13,I20-I51)	10,011	261	162.1	(158.8 - 165.5)
Malignant neoplasms (C00-C97)	9,643	251.4	151.6	(148.5 - 154.8)
Chronic lower respiratory diseases (J40-J47)	3,495	91.1	54.1	(52.2 - 55.9)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	3,393	88.5	82.9	(79.8 - 85.9)
Alzheimer disease (G30)	2,091	54.5	34	(32.5 - 35.5)
Cerebrovascular diseases (I60-I69)	2,070	54	33.5	(32.0 - 35.0)
Diabetes mellitus (E10-E14)	1,472	38.4	25	(23.6 - 26.3)
COVID-19 (U07.1)	1,450	37.8	25.5	(24.0 - 26.9)
Chronic liver disease and cirrhosis (K70,K73-K74)	1,325	34.5	30.3	(28.5 - 32.1)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	1,303	34	32.8	(30.9 - 34.7)
Influenza and pneumonia (J09-J18)	818	21.3	14.2	(13.2 - 15.3)
Nutritional deficiencies (E40-E64)	657	17.1	10.6	(9.8 - 11.5)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	598	15.6	9.9	(9.1 - 10.8)
Essential hypertension and hypertensive renal disease (I10,I12,I15)	540	14.1	8.9	(8.1 - 9.7)
Parkinson disease (G20-G21)	510	13.3	8	(7.3 - 8.7)

Table A4: Leading Causes of Mortality Age-Adjusted Rate per 100,000, Apache County, 2016-2020 (all ages) (*N* = 360,298)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Diseases of heart (I00-I09,I11,I13,I20-I51)	584	162.1	146.4	(134.3 - 158.5)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	533	147.9	156	(142.3 - 169.6)
Malignant neoplasms (C00-C97)	469	130.2	113.4	(102.9 - 123.9)
COVID-19 (U07.1)	300	83.3	76.4	(67.5 - 85.3)
Diabetes mellitus (E10-E14)	230	63.8	57.3	(49.7 - 64.8)
Chronic liver disease and cirrhosis (K70,K73-K74)	172	47.7	50.7	(42.9 - 58.6)
Cerebrovascular diseases (I60-I69)	143	39.7	36.6	(30.5 - 42.8)
Chronic lower respiratory diseases (J40-J47)	127	35.2	30.4	(25.0 - 35.7)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	121	33.6	36.9	(30.2 - 43.6)
Influenza and pneumonia (J09-J18)	89	24.7	23.6	(18.9 - 29.1)
Alzheimer disease (G30)	59	16.4	15.6	(11.8 - 20.1)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	54	15	13.6	(10.2 - 17.8)
Assault (homicide) (*U01-*U02,X85-Y09,Y87.1)	52	14.4	15.3	(11.4 - 20.2)
Septicemia (A40-A41)	46	12.8	11.8	(8.6 - 15.9)
Parkinson disease (G20-G21)	41	11.4	10.7	(7.7 - 14.6)
Essential hypertension and hypertensive renal disease (I10,I12,I15)	41	11.4	10.4	(7.4 - 14.1)

Table A5: Leading Causes of Mortality Age-Adjusted Rate per 100,000, Coconino County, 2016-2020 (all ages) (*N* =710,495)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Malignant neoplasms (C00-C97)	848	119.4	126.4	(117.6 - 135.1)
Diseases of heart (I00-I09,I11,I13,I20-I51)	737	103.7	118.2	(109.5 - 127.0)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	518	72.9	79.3	(72.2 - 86.4)
Chronic lower respiratory diseases (J40-J47)	218	30.7	34.8	(30.1 - 39.6)
COVID-19 (U07.1)	207	29.1	30.8	(26.4 - 35.1)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	195	27.4	27.3	(23.3 - 31.4)
Chronic liver disease and cirrhosis (K70,K73-K74)	174	24.5	27.6	(23.3 - 31.8)
Cerebrovascular diseases (I60-I69)	172	24.2	28.9	(24.5 - 33.3)
Diabetes mellitus (E10-E14)	148	20.8	22.4	(18.7 - 26.1)
Alzheimer disease (G30)	147	20.7	27	(22.6 - 31.4)
Nutritional deficiencies (E40-E64)	69	9.7	12.5	(9.7 - 15.8)
Influenza and pneumonia (J09-J18)	68	9.6	10.7	(8.2 - 13.6)
Parkinson disease (G20-G21)	66	9.3	11.3	(8.7 - 14.4)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	60	8.4	10.1	(7.7 - 13.0)
Assault (homicide) (*U01-*U02,X85-Y09,Y87.1)	53	7.5	8.2	(6.1 - 10.8)

Table A6: Leading Causes of Mortality Age-Adjusted Rate per 100,000, Mohave County, 2016-2020 (all ages) (*N* =1,051,386)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Diseases of heart (I00-I09,I11,I13,I20-I51)	4,380	416.6	211.2	(204.5 - 217.9)
Malignant neoplasms (C00-C97)	3,807	362.1	179.8	(173.6 - 186.0)
Chronic lower respiratory diseases (J40-J47)	1,489	141.6	68.2	(64.5 - 71.9)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	824	78.4	60.8	(55.9 - 65.7)
Alzheimer disease (G30)	765	72.8	35.7	(33.1 - 38.2)
Cerebrovascular diseases (I60-I69)	729	69.3	34.7	(32.0 - 37.4)
Diabetes mellitus (E10-E14)	466	44.3	24.6	(22.1 - 27.1)
Chronic liver disease and cirrhosis (K70,K73-K74)	402	38.2	25.3	(22.4 - 28.2)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	362	34.4	29.7	(26.2 - 33.3)
COVID-19 (U07.1)	326	31	15.1	(13.4 - 16.8)
Influenza and pneumonia (J09-J18)	319	30.3	16.8	(14.7 - 18.9)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	254	24.2	12.1	(10.5 - 13.6)
Essential hypertension and hypertensive renal disease (I10,I12,I15)	193	18.4	9.1	(7.8 - 10.5)
Nutritional deficiencies (E40-E64)	141	13.4	6.6	(5.5 - 7.8)
Parkinson disease (G20-G21)	135	12.8	6	(5.0 - 7.0)

Table A7: Leading Causes of Mortality Age-Adjusted Rate per 100,000, Navajo County, 2016-2020 (all ages) (*N* = 552,463)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Diseases of heart (I00-I09,I11,I13,I20-I51)	1,008	182.5	150.1	(140.6 - 159.6)
Malignant neoplasms (C00-C97)	905	163.8	127.8	(119.2 - 136.4)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	582	105.3	112.7	(103.2 - 122.2)
COVID-19 (U07.1)	365	66.1	55.6	(49.7 - 61.6)
Chronic lower respiratory diseases (J40-J47)	336	60.8	47.4	(42.2 - 52.5)
Diabetes mellitus (E10-E14)	287	51.9	42.3	(37.2 - 47.4)
Chronic liver disease and cirrhosis (K70,K73-K74)	268	48.5	49.2	(42.9 - 55.4)
Cerebrovascular diseases (I60-I69)	254	46	37.9	(33.2 - 42.7)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	204	36.9	39.7	(34.1 - 45.4)
Alzheimer disease (G30)	193	34.9	30.4	(26.1 - 34.7)
Influenza and pneumonia (J09-J18)	120	21.7	18.7	(15.2 - 22.2)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	92	16.7	14.3	(11.4 - 17.6)
Assault (homicide) (*U01-*U02,X85-Y09,Y87.1)	82	14.8	17.3	(13.7 - 21.7)
Essential hypertension and hypertensive renal disease (I10,I12,I15)	74	13.4	11.8	(9.2 - 14.9)
Parkinson disease (G20-G21)	56	10.1	8.5	(6.4 - 11.0)

Table A8: Leading Causes of Mortality Age-Adjusted Rate per 100,000, Yavapai County, 2016-2020 (all ages) (*N* =1,161,048)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Malignant neoplasms (C00-C97)	3,614	311.3	150.6	(145.2 - 156.0)
Diseases of heart (I00-I09,I11,I13,I20-I51)	3,302	284.4	139.1	(134.0 - 144.2)
Chronic lower respiratory diseases (J40-J47)	1,325	114.1	53.3	(50.3 - 56.3)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	936	80.6	65.3	(60.4 - 70.3)
Alzheimer disease (G30)	927	79.8	37.6	(35.2 - 40.1)
Cerebrovascular diseases (I60-I69)	772	66.5	31.8	(29.4 - 34.1)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	421	36.3	30.8	(27.3 - 34.3)
Nutritional deficiencies (E40-E64)	383	33	15.4	(13.8 - 16.9)
Diabetes mellitus (E10-E14)	341	29.4	14.9	(13.1 - 16.7)
Chronic liver disease and cirrhosis (K70,K73-K74)	309	26.6	19.4	(16.8 - 22.0)
COVID-19 (U07.1)	252	21.7	10.5	(9.1 - 11.9)
Influenza and pneumonia (J09-J18)	222	19.1	9.7	(8.3 - 11.1)
Parkinson disease (G20-G21)	212	18.3	8.4	(7.2 - 9.5)
Essential hypertension and hypertensive renal disease (I10,I12,I15)	180	15.5	7.7	(6.5 - 8.9)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	138	11.9	6.2	(5.1 - 7.4)

Appendix B. Total Number of Hospital Admissions and Emergency Department Visits 2016-2021 for each ICD-10-CM Code Category by County

Table B1: Inpatient Visits by County and Clinical Disease Category, 2016-2021. ADHS Hospital Discharge data.

ICD-10 Category	ICD-10 Category Description	Apache	Coconino	Mohave	Navajo	Yavapai
A&B	Certain infectious and parasitic diseases	2052	3115	13279	6176	8838
C	Neoplasms	534	1318	3593	1461	4599
D	Neoplasms & Blood	293	680	1752	759	2047
E	Endocrine, nutritional, and metabolic diseases	1008	2021	5141	2786	4867
F	Mental, behavioral, and neurodevelopmental disorders	2636	6990	2722	7476	11576
G	Diseases of the nervous system	604	1372	2659	1476	3617
H	Diseases of the ear and mastoid process	42	77	131	105	171
I	Diseases of the circulatory system	3128	5983	25778	8830	26634
J	Diseases of the respiratory system	2063	4003	13346	5792	12070
K	Diseases of the digestive system	2594	5140	13174	6892	15022
L	Diseases of the skin and subcutaneous tissue	525	1250	2275	1490	2530
M	Diseases of the musculoskeletal system and connective tissue	1896	4341	8557	4434	13872
N	Diseases of the genitourinary system	780	1609	6036	2102	6083
O	Pregnancy, childbirth, and the puerperium	1400	7043	9839	7036	10784
P	Certain conditions originating in the perinatal period	111	384	631	454	429
Q	Congenital malformations, deformations, and chromosomal abnormalities	98	225	214	275	384
R	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	481	911	3002	1078	3180
S&T	Injury, poisoning, and certain other consequences of external causes	3235	5054	10150	7053	14944
U	Codes for special purposes	736	1315	3025	2038	2969
Z	Factors influencing health status and contact with health services	1596	7032	10277	7156	12304

Table B2: Emergency Department Visits by County and Clinical Disease Category, 2016-2021. ADHS Hospital Discharge data.

ICD-10 Category	ICD-10 Category Description	Apache	Coconino	Mohave	Navajo	Yavapai
A&B	Certain infectious and parasitic diseases	3753	4626	10817	5601	6779
C	Neoplasms	114	279	1493	292	1079
D	Neoplasms & Blood	348	809	3178	796	2580
E	Endocrine, nutritional, and metabolic diseases	2657	4241	11060	4401	10135
F	Mental, behavioral, and neurodevelopmental disorders	6919	20927	20204	15800	18053
G	Diseases of the nervous system	3337	8494	15867	7096	11908
H	Diseases of the ear and mastoid process	4232	4857	14612	5305	10557
I	Diseases of the circulatory system	2874	5298	23930	7245	21671
J	Diseases of the respiratory system	22915	20460	59536	23525	45901
K	Diseases of the digestive system	7919	12996	41470	15221	33137
L	Diseases of the skin and subcutaneous tissue	4546	6695	22694	8078	16834
M	Diseases of the musculoskeletal system and connective tissue	7544	13902	49136	12880	39228
N	Diseases of the genitourinary system	6134	10087	34022	10165	27440
O	Pregnancy, childbirth, and the puerperium	954	3700	11644	4250	7642
P	Certain conditions originating in the perinatal period	47	178	325	161	325
Q	Congenital malformations, deformations, and chromosomal abnormalities	16	47	145	76	131
R	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	16928	48238	134888	41198	123393
S&T	Injury, poisoning, and certain other consequences of external causes	23893	49698	105993	46778	102939
U	Codes for special purposes	1700	1923	6353	2632	6433
Z	Factors influencing health status and contact with health services	3268	5890	19587	7064	10287

Appendix C. Hospital Discharge Summary of Age Distributions at Time of Hospitalization Related to Suicide, Suicide Attempt, or Self-Inflicted Injury by County (2016-2021)

Data Source: Arizona Department of Health Services Hospital Discharge Dataset.

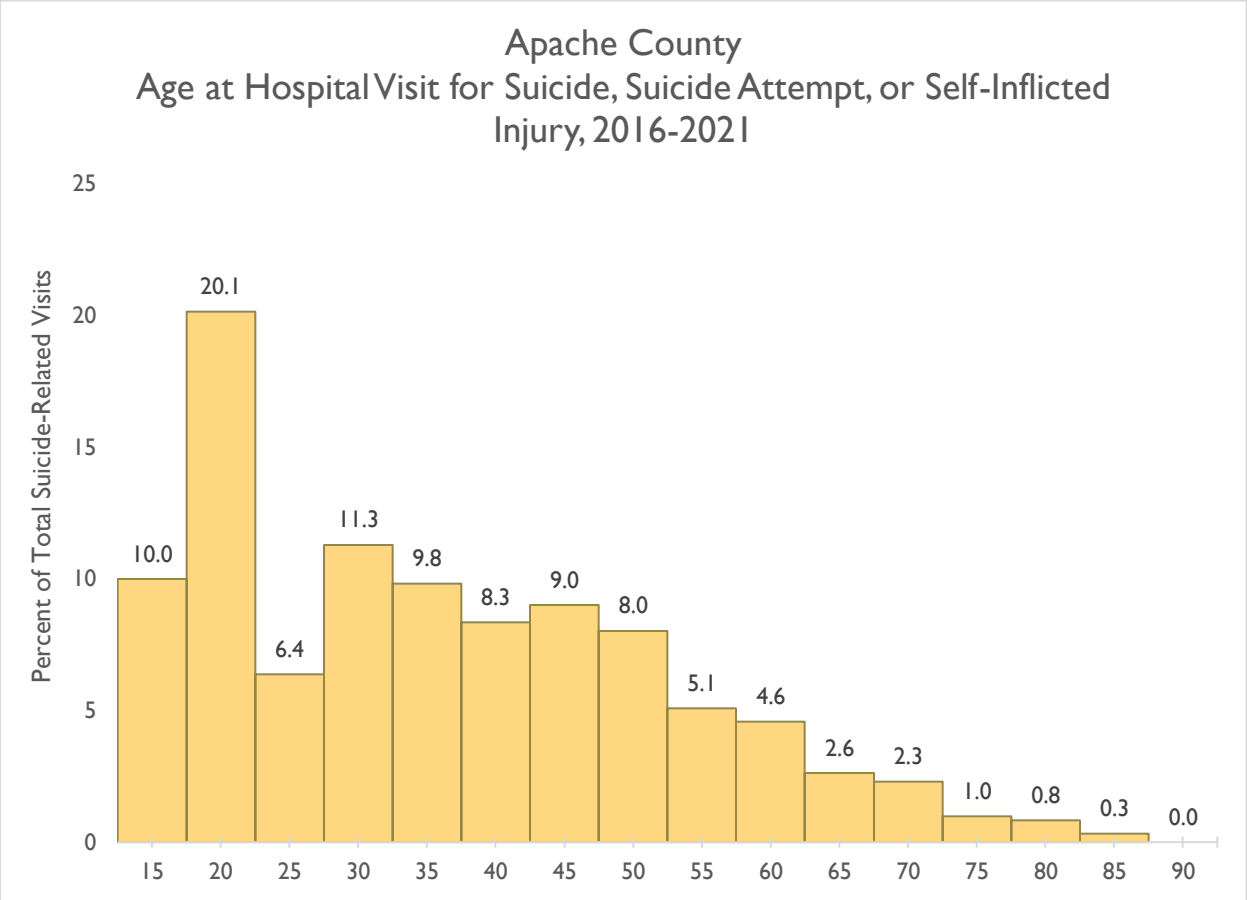


Figure C1. Distribution of age at time of hospitalization for suicide, suicide attempt, or self-inflicted injury in Apache County, 2016-2021.

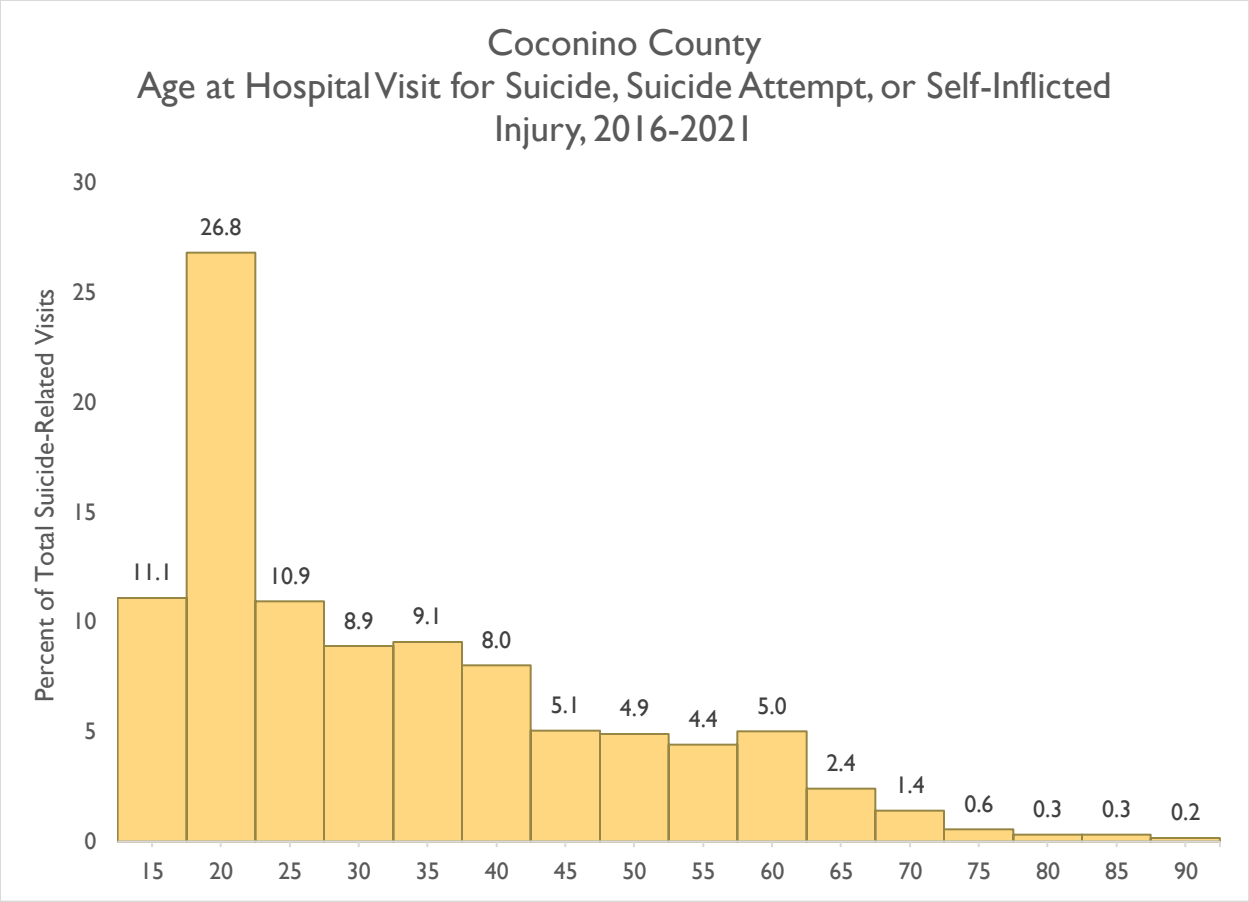


Figure C2. Distribution of age at time of hospitalization for suicide, suicide attempt, or self-inflicted injury in Coconino County, 2016-2021.

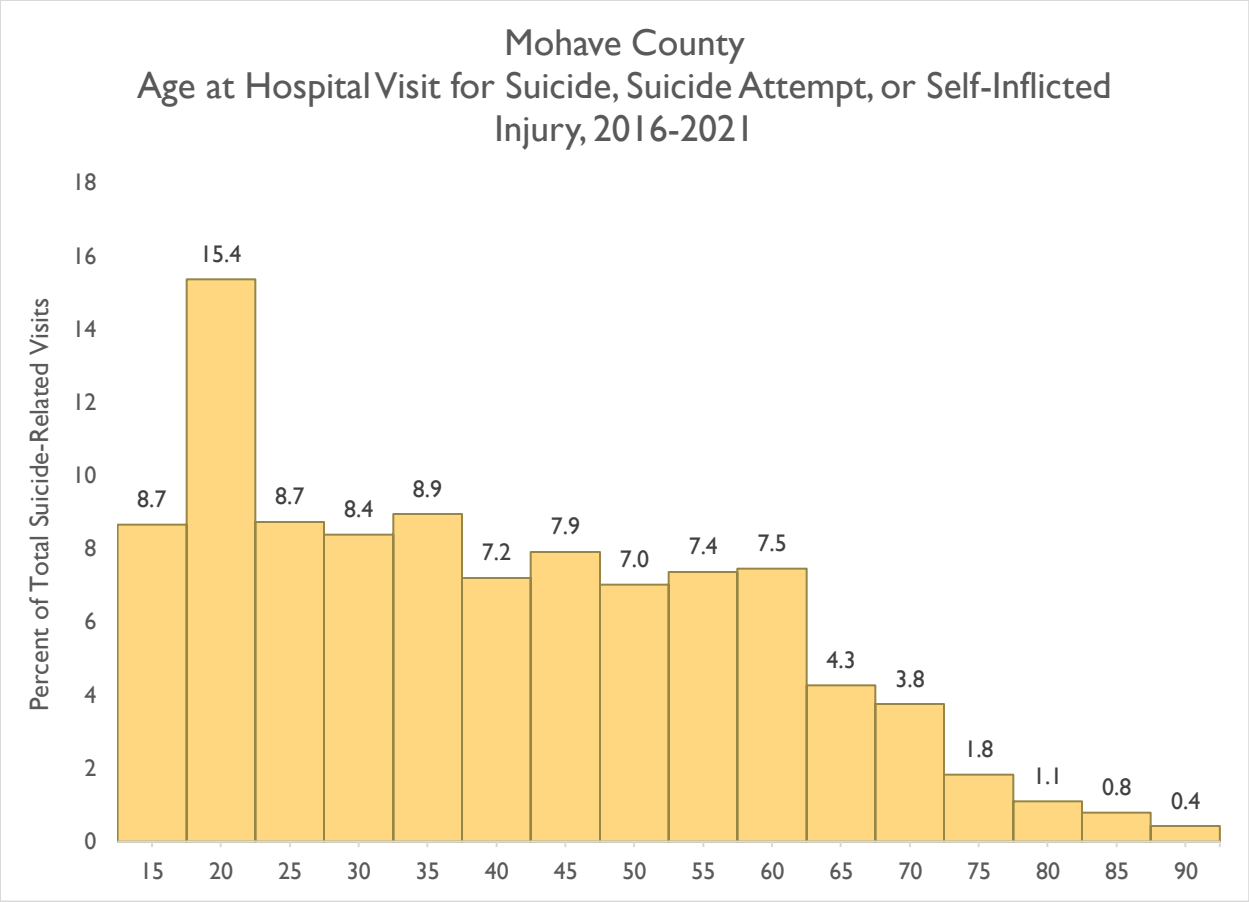


Figure C3. Distribution of age at time of hospitalization for suicide, suicide attempt, or self-inflicted injury in Mohave County, 2016-2021.

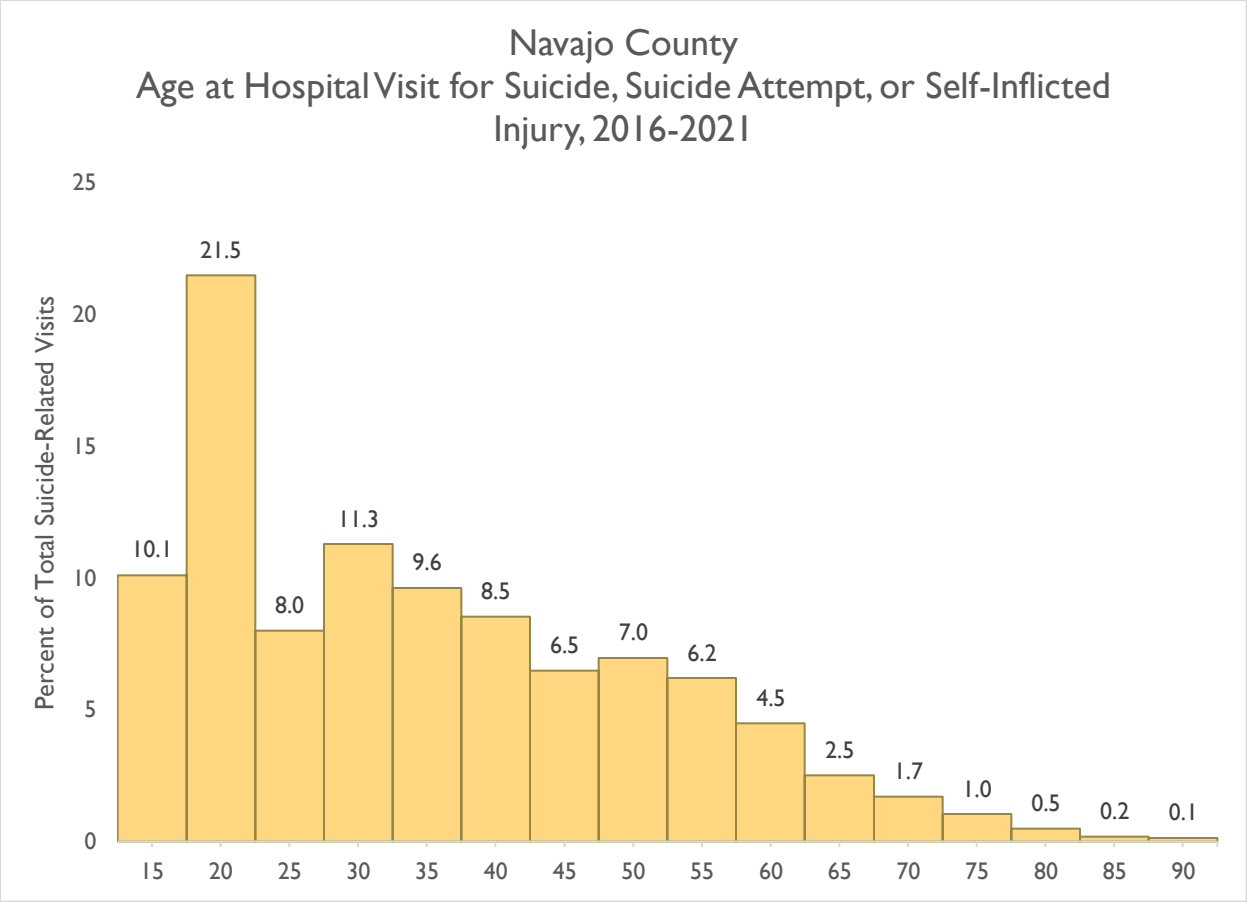


Figure C4. Distribution of age at time of hospitalization for suicide, suicide attempt, or self-inflicted injury in Navajo County, 2016-2021.

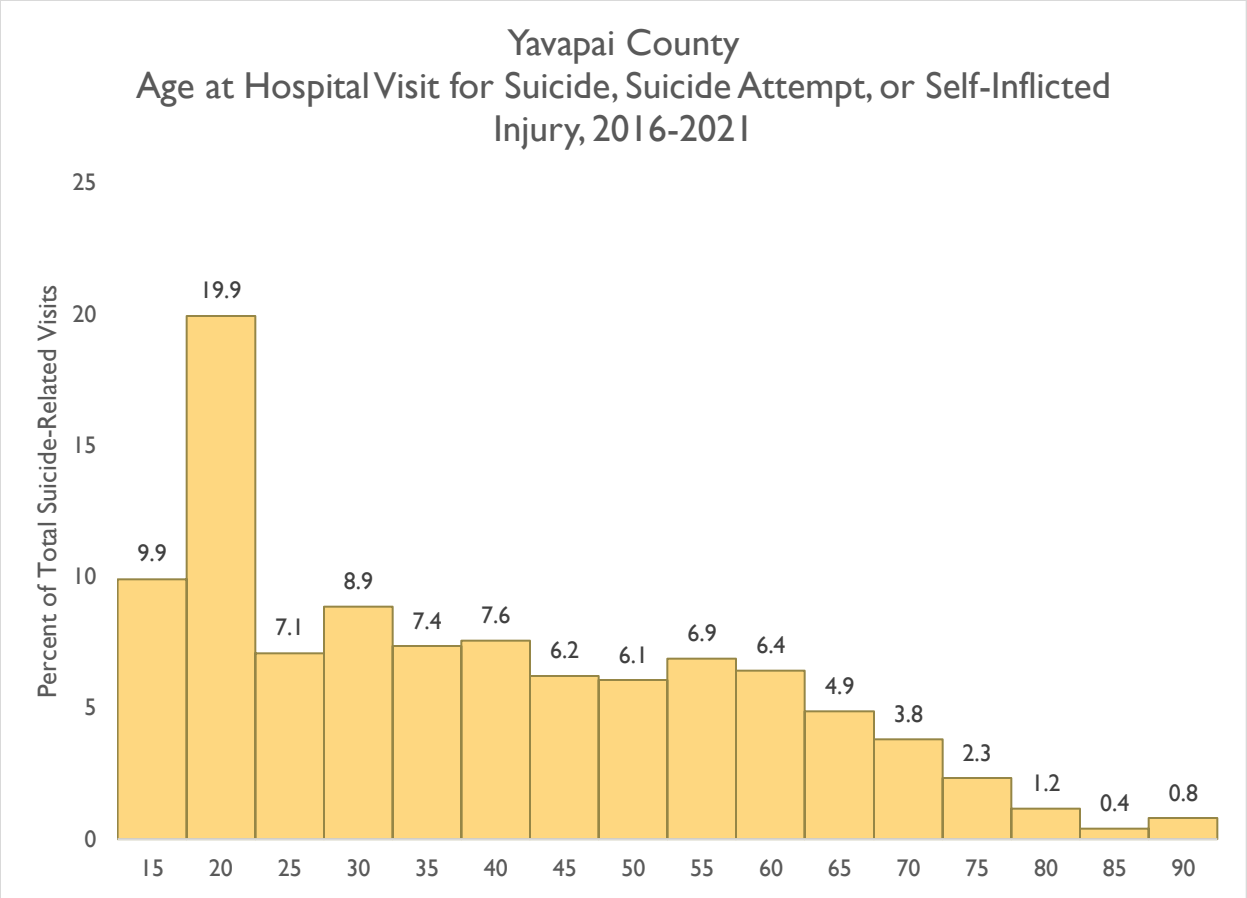


Figure C5. Distribution of age at time of hospitalization for suicide, suicide attempt, or self-inflicted injury in Yavapai County, 2016-2021.

Appendix D. Top 15 Hospital Discharge Diagnoses for Inpatient Admission and ED Visits by Urban Area and Rural Areas, 2021

Inpatient Visits – FAR Codes

Table D1: Top 15 discharge codes for inpatient visits, Urban Area, 2016-2021 (*N* = 323,183)

Rank	ICD-10	Category	Description	Count	Charges
1	Z3800	Factors influencing health status and contact with health services	Single liveborn infant, delivered vaginally	16860	$131,502,063
2	A419	Certain infectious and parasitic diseases	Sepsis, unspecified organism	12859	$1,344,560,646
3	U071	Codes for special purposes	COVID-19	6716	$763,563,800
4	Z3801	Factors influencing health status and contact with health services	Single liveborn infant, delivered by cesarean	6524	$127,097,810
5	J189	Diseases of the respiratory system	Pneumonia, unspecified organism	5896	$288,295,046
6	I214	Diseases of the circulatory system	Non-ST elevation (NSTEMI) myocardial infarction	5522	$738,644,560
7	N179	Diseases of the genitourinary system	Acute kidney failure, unspecified	4385	$218,686,301
8	I110	Diseases of the circulatory system	Hypertensive heart disease with heart failure	3662	$241,410,768
9	J441	Diseases of the respiratory system	Chronic obstructive pulmonary disease w (acute) exacerbation	3474	$183,378,873
10	I130	Diseases of the circulatory system	Hyp hrt & chr kdny dis w hrt fail and stg 1-4/unsp chr kdny	3464	$278,812,008
11	M1711	Diseases of the musculoskeletal system and connective tissue	Unilateral primary osteoarthritis, right knee	3410	$227,396,084
12	M1712	Diseases of the musculoskeletal system and connective tissue	Unilateral primary osteoarthritis, left knee	3064	$205,784,231
13	J9601	Diseases of the respiratory system	Acute respiratory failure with hypoxia	2885	$237,075,475
14	J9621	Diseases of the respiratory system	Acute and chronic respiratory failure with hypoxia	2326	$205,901,808
15	F332	Mental, behavioral, and neurodevelopmental disorders	Major depressv disorder, recurrent severe w/o psych features	2289	$41,798,010

Table D2: Top 15 discharge codes for inpatient visits, FAR Level 1, 2016-2021 (*N* = 7,550)

Rank	ICD-10	Category	Description	Count	Charges
1	A419	Certain infectious and parasitic diseases	Sepsis, unspecified organism	554	$78,989,873
2	Z3800	Factors influencing health status and contact with health services	Single liveborn infant, delivered vaginally	301	$1,843,046
3	J189	Diseases of the respiratory system	Pneumonia, unspecified organism	167	$12,106,091
4	U071	Codes for special purposes	COVID-19	165	$29,476,400
5	I130	Diseases of the circulatory system	Hyp hrt & chr kdny dis w hrt fail and stg 1-4/unsp chr kdny	153	$19,533,811
6	I214	Diseases of the circulatory system	Non-ST elevation (NSTEMI) myocardial infarction	151	$29154,579
7	N179	Diseases of the genitourinary system	Acute kidney failure, unspecified	144	$8,400,280
8	Z3801	Factors influencing health status and contact with health services	Single liveborn infant, delivered by cesarean	141	$2,064,566
9	I110	Diseases of the circulatory system	Hypertensive heart disease with heart failure	123	$13,116,446
10	J441	Diseases of the respiratory system	Chronic obstructive pulmonary disease w (acute) exacerbation	107	$9,723,046
11	J9601	Diseases of the respiratory system	Acute respiratory failure with hypoxia	97	$13,148,393
12	J9621	Diseases of the respiratory system	Acute and chronic respiratory failure with hypoxia	91	$14,049,140
13	I639	Diseases of the circulatory system	Cerebral infarction, unspecified	79	$7,985,347
14	A4151	Certain infectious and parasitic diseases	Sepsis due to Escherichia coli [E. coli]	76	$7,536,179
15	A4189	Certain infectious and parasitic diseases	Other specified sepsis	54	$15,913,997

Table D3: Top 15 discharge codes for inpatient visits, FAR Level 2, 2016-2021 (*N* = 32,330)

Rank	ICD-10	Category	Description	Count	Charges
1	Z3800	Factors influencing health status and contact with health services	Single liveborn infant, delivered vaginally	2058	$15,773,408
2	A419	Certain infectious and parasitic diseases	Sepsis, unspecified organism	1286	$97,229,960
3	U071	Codes for special purposes	COVID-19	747	$61,087,408
4	Z3801	Factors influencing health status and contact with health services	Single liveborn infant, delivered by cesarean	677	$14,311,886
5	I214	Diseases of the circulatory system	Non-ST elevation (NSTEMI) myocardial infarction	660	$66,341,974
6	O480	Pregnancy, childbirth, and the puerperium	Post-term pregnancy	505	$6,465,506
7	A4189	Certain infectious and parasitic diseases	Other specified sepsis	369	$42,895,565
8	J9621	Diseases of the respiratory system	Acute and chronic respiratory failure with hypoxia	357	$21,889,563
9	I110	Diseases of the circulatory system	Hypertensive heart disease with heart failure	334	$16,768,219
10	F332	Mental, behavioral, and neurodevelopmental disorders	Major depressv disorder, recurrent severe w/o psych features	334	$5,513,268
11	J189	Diseases of the respiratory system	Pneumonia, unspecified organism	322	$12,385,736
12	M1712	Diseases of the musculoskeletal system and connective tissue	Unilateral primary osteoarthritis, left knee	306	$18,987,390
13	I2699	Diseases of the circulatory system	Other pulmonary embolism without acute cor pulmonale	303	$13,474,387
14	M1711	Diseases of the musculoskeletal system and connective tissue	Unilateral primary osteoarthritis, right knee	298	$18,972,589
15	J9601	Diseases of the respiratory system	Acute respiratory failure with hypoxia	282	$17,645,941

Table D4: Top 15 discharge codes for inpatient visits, FAR Level 3, 2016-2021 (*N* = 41,171)

Rank	ICD-10	Category	Description	Count	Charges
1	Z3800	Factors influencing health status and contact with health services	Single liveborn infant, delivered vaginally	2346	$18,677,802
2	A419	Certain infectious and parasitic diseases	Sepsis, unspecified organism	1673	$156,390,728
3	U071	Codes for special purposes	COVID-19	1180	$136,870,599
4	Z3801	Factors influencing health status and contact with health services	Single liveborn infant, delivered by cesarean	857	$31,364,493
5	F332	Mental, behavioral, and neurodevelopmental disorders	Major depressv disorder, recurrent severe w/o psych features	636	$11,057,398
6	J189	Diseases of the respiratory system	Pneumonia, unspecified organism	549	$17,372,953
7	I214	Diseases of the circulatory system	Non-ST elevation (NSTEMI) myocardial infarction	481	$52,869,454
8	J9601	Diseases of the respiratory system	Acute respiratory failure with hypoxia	453	$47,026,210
9	A4189	Certain infectious and parasitic diseases	Other specified sepsis	434	$104,904,982
10	O480	Pregnancy, childbirth, and the puerperium	Post-term pregnancy	392	$5,222,943
11	F10239	Mental, behavioral, and neurodevelopmental disorders	Alcohol dependence with withdrawal, unspecified	360	$9,828,395
12	I110	Diseases of the circulatory system	Hypertensive heart disease with heart failure	302	$16,267,653
13	N179	Diseases of the genitourinary system	Acute kidney failure, unspecified	297	$15,029,955
14	A4151	Certain infectious and parasitic diseases	Sepsis due to Escherichia coli [E. coli]	283	$24,317,273
15	F333	Mental, behavioral, and neurodevelopmental disorders	Major depressv disorder, recurrent, severe w psych symptoms	275	$5,963,319

Table D5: Top 15 discharge codes for inpatient visits, FAR Level 4, 2016-2021 (*N* = 18,295)

Rank	ICD-10	Category	Description	Count	Charges
1	Z3800	Factors influencing health status and contact with health services	Single liveborn infant, delivered vaginally	850	$7,835,042
2	A419	Certain infectious and parasitic diseases	Sepsis, unspecified organism	713	$77,764,439
3	U071	Codes for special purposes	COVID-19	500	$65,363,948
4	Z3801	Factors influencing health status and contact with health services	Single liveborn infant, delivered by cesarean	256	$12,047,627
5	I214	Diseases of the circulatory system	Non-ST elevation (NSTEMI) myocardial infarction	246	$29,193,416
6	A4189	Certain infectious and parasitic diseases	Other specified sepsis	213	$51,296,783
7	J9601	Diseases of the respiratory system	Acute respiratory failure with hypoxia	211	$22,096,368
8	J189	Diseases of the respiratory system	Pneumonia, unspecified organism	210	$7,759,864
9	F332	Mental, behavioral, and neurodevelopmental disorders	Major depressv disorder, recurrent severe w/o psych features	198	$3,393,084
10	F10239	Mental, behavioral, and neurodevelopmental disorders	Alcohol dependence with withdrawal, unspecified	153	$4,755,839
11	N179	Diseases of the genitourinary system	Acute kidney failure, unspecified	151	$7,933,769
12	I110	Diseases of the circulatory system	Hypertensive heart disease with heart failure	143	$8,624,844
13	I130	Diseases of the circulatory system	Hyp hrt & chr kdny dis w hrt fail and stg 1-4/unsp chr kdny	136	$12,375,478
14	A4151	Certain infectious and parasitic diseases	Sepsis due to Escherichia coli [E. coli]	126	$14,249,670
15	M1711	Diseases of the musculoskeletal system and connective tissue	Unilateral primary osteoarthritis, right knee	124	$6,744,575

Inpatient Visits – PCA Designations

Table D6: Top 15 discharge codes for inpatient visits, Indian PCA, 2016-2021 (*N* = 51,292)

Rank	ICD-10	Category	Description	Count	Charges
1	A419	Certain infectious and parasitic diseases	Sepsis, unspecified organism	2320	$235,251,890
2	Z3800	Factors influencing health status and contact with health services	Single liveborn infant, delivered vaginally	1927	$24,864,656
3	U071	Codes for special purposes	COVID-19	1532	$212,994,817
4	F332	Mental, behavioral, and neurodevelopmental disorders	Major depressv disorder, recurrent severe w/o psych features	979	$16,690,888
5	Z3801	Factors influencing health status and contact with health services	Single liveborn infant, delivered by cesarean	815	$41,212,255
6	A4189	Certain infectious and parasitic diseases	Other specified sepsis	662	$177,067,654
7	J189	Diseases of the respiratory system	Pneumonia, unspecified organism	650	$24,741,581
8	J9601	Diseases of the respiratory system	Acute respiratory failure with hypoxia	614	$62,780,912
9	F10239	Mental, behavioral, and neurodevelopmental disorders	Alcohol dependence with withdrawal, unspecified	604	$16,566,181
10	I214	Diseases of the circulatory system	Non-ST elevation (NSTEMI) myocardial infarction	559	$66,433,374
11	F333	Mental, behavioral, and neurodevelopmental disorders	Major depressv disorder, recurrent, severe w psych symptoms	450	$8,766,876
12	A4151	Certain infectious and parasitic diseases	Sepsis due to Escherichia coli [E. coli]	440	$39,580,885
13	F329	Mental, behavioral, and neurodevelopmental disorders	Major depressive disorder, single episode, unspecified	395	$6,666,195
14	N179	Diseases of the genitourinary system	Acute kidney failure, unspecified	376	$18,530,365
15	E1110	Endocrine, nutritional, and metabolic diseases	Type 2 diabetes mellitus with ketoacidosis without coma	354	$15,008,719

Table D7: Top 15 discharge codes for inpatient visits, Frontier PCA, 2016-2021 (*N* = 27,011)

Rank	ICD-10	Category	Description	Count	Charges
1	Z3800	Factors influencing health status and contact with health services	Single liveborn infant, delivered vaginally	1974	$11,727,656
2	A419	Certain infectious and parasitic diseases	Sepsis, unspecified organism	908	$78,571,853
3	U071	Codes for special purposes	COVID-19	693	$56,262,788
4	Z3801	Factors influencing health status and contact with health services	Single liveborn infant, delivered by cesarean	608	$16,545,501
5	J189	Diseases of the respiratory system	Pneumonia, unspecified organism	420	$12,248,581
6	I214	Diseases of the circulatory system	Non-ST elevation (NSTEMI) myocardial infarction	376	$40,500,557
7	O480	Pregnancy, childbirth, and the puerperium	Post-term pregnancy	306	$4,108,125
8	J9601	Diseases of the respiratory system	Acute respiratory failure with hypoxia	279	$23,286,605
9	M1711	Diseases of the musculoskeletal system and connective tissue	Unilateral primary osteoarthritis, right knee	257	$14,813,437
10	I110	Diseases of the circulatory system	Hypertensive heart disease with heart failure	240	$11,814,023
11	M1712	Diseases of the musculoskeletal system and connective tissue	Unilateral primary osteoarthritis, left knee	225	$12,524,702
12	N179	Diseases of the genitourinary system	Acute kidney failure, unspecified	211	$8,630,673
13	J9621	Diseases of the respiratory system	Acute and chronic respiratory failure with hypoxia	200	$18,315,697
14	F332	Mental, behavioral, and neurodevelopmental disorders	Major depressv disorder, recurrent severe w/o psych features	199	$3,383,463
15	O34211	Pregnancy, childbirth, and the puerperium	Matern care for low transverse scar from prev cesarean del	196	$4,240,767

Table D8: Top 15 discharge codes for inpatient visits, Rural PCA, 2016-2021 (*N* = 374,541)

Rank	ICD-10	Category	Description	Count	Charges
1	Z3800	Factors influencing health status and contact with health services	Single liveborn infant, delivered vaginally	19716	$151,476,563
2	A419	Certain infectious and parasitic diseases	Sepsis, unspecified organism	15156	$1,566,603,762
3	U071	Codes for special purposes	COVID-19	7843	$869,966,118
4	Z3801	Factors influencing health status and contact with health services	Single liveborn infant, delivered by cesarean	7486	$145,493,267
5	J189	Diseases of the respiratory system	Pneumonia, unspecified organism	6578	$323,353,235
6	I214	Diseases of the circulatory system	Non-ST elevation (NSTEMI) myocardial infarction	6575	$865,285,741
7	N179	Diseases of the genitourinary system	Acute kidney failure, unspecified	4970	$247,495,432
8	I110	Diseases of the circulatory system	Hypertensive heart disease with heart failure	4297	$282,840,470
9	J441	Diseases of the respiratory system	Chronic obstructive pulmonary disease w (acute) exacerbation	4010	$208,494,570
10	I130	Diseases of the circulatory system	Hyp hrt & chr kdny dis w hrt fail and stg 1-4/unsp chr kdny	3946	$323,186,045
11	M1711	Diseases of the musculoskeletal system and connective tissue	Unilateral primary osteoarthritis, right knee	3909	$262,399,391
12	M1712	Diseases of the musculoskeletal system and connective tissue	Unilateral primary osteoarthritis, left knee	3581	$241,428,555
13	J9601	Diseases of the respiratory system	Acute respiratory failure with hypoxia	3380	$276,190,465
14	J9621	Diseases of the respiratory system	Acute and chronic respiratory failure with hypoxia	2842	$241,909,403
15	F332	Mental, behavioral, and neurodevelopmental disorders	Major depressv disorder, recurrent severe w/o psych features	2764	$50,354,897

Emergency Visits – FAR Codes

Table D9: Top 15 discharge codes for inpatient visits, Urban Area, 2016-2021 (*N* = 1,194,509)

Rank	ICD-10	Category	Description	Count	Charges
1	F10129	Mental, behavioral, and neurodevelopmental disorders	Alcohol abuse with intoxication, unspecified	3040	$9,373,738
2	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	1332	$1,595,723
3	R0789	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Other chest pain	785	$6,961,887
4	J020	Diseases of the respiratory system	Streptococcal pharyngitis	723	$936,792
5	G312	Diseases of the nervous system	Degeneration of nervous system due to alcohol	716	$2,098,765
6	R079	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Chest pain, unspecified	715	$5,865,170
7	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	668	$791,156
8	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	667	$2,656,909
9	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	657	$3,502,893
10	F10229	Mental, behavioral, and neurodevelopmental disorders	Alcohol dependence with intoxication, unspecified	555	$1,905,051
11	U071	Codes for special purposes	COVID-19	514	$2,249,308
12	M545	Diseases of the musculoskeletal system and connective tissue	Low back pain	501	$1,611,712
13	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	452	$2,062,164
14	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	443	$1,704,683
15	Z0289	Factors influencing health status and contact with health services	Encounter for other administrative examinations	439	$488,029

Table D10: Top 15 discharge codes for inpatient visits, FAR Level 1, 2016-2021 (*N* = 31,217)

Rank	ICD-10	Category	Description	Count	Charges
1	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	823	$7,222,382
2	R079	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Chest pain, unspecified	747	$9,224,593
3	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	604	$1,810,506
4	R0789	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Other chest pain	532	$8,974,515
5	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	392	$3,977,514
6	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	390	$3,765,201
7	U071	Codes for special purposes	COVID-19	364	$2,320,448
8	M545	Diseases of the musculoskeletal system and connective tissue	Low back pain	335	$2,240,862
9	J441	Diseases of the respiratory system	Chronic obstructive pulmonary disease w (acute) exacerbation	326	$3,585,354
10	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	296	$2,459,979
11	F10129	Mental, behavioral, and neurodevelopmental disorders	Alcohol abuse with intoxication, unspecified	285	$2,082,990
12	I10	Diseases of the circulatory system	Essential (primary) hypertension	264	$1,996,864
13	J209	Diseases of the respiratory system	Acute bronchitis, unspecified	262	$1,285,387
14	K5900	Diseases of the digestive system	Constipation, unspecified	260	$2,784,243
15	R55	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Syncope and collapse	235	$3,862,844

Table D11: Top 15 discharge codes for inpatient visits, FAR Level 2, 2016-2021 (*N* = 100,181)

Rank	ICD-10	Category	Description	Count	Charges
1	R0789	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Other chest pain	2996	$33,815,041
2	U071	Codes for special purposes	COVID-19	1433	$9,414,408
3	R079	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Chest pain, unspecified	1188	$11,686,738
4	R55	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Syncope and collapse	1114	$12,119,256
5	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	1083	$6,161,780
6	K5900	Diseases of the digestive system	Constipation, unspecified	1022	$6,673,544
7	S161XXA	Injury, poisoning, and certain other consequences of external causes	Strain of muscle, fascia and tendon at neck level, init	1011	$9,072,812
8	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	988	$7,741,488
9	J020	Diseases of the respiratory system	Streptococcal pharyngitis	913	$2,031,166
10	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	901	$6,280,310
11	S39012A	Injury, poisoning, and certain other consequences of external causes	Strain of muscle, fascia and tendon of lower back, init	872	$4,978,339
12	R072	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Precordial pain	830	$10,353,637
13	R42	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Dizziness and giddiness	815	$5,947,786
14	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	805	$2,136,233
15	R1084	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Generalized abdominal pain	783	$6,276,814

Table D12: Top 15 discharge codes for inpatient visits, FAR Level 3, 2016-2021 (*N* = 161,543)

Rank	ICD-10	Category	Description	Count	Charges
1	F10129	Mental, behavioral, and neurodevelopmental disorders	Alcohol abuse with intoxication, unspecified	4875	$16,511,036
2	J020	Diseases of the respiratory system	Streptococcal pharyngitis	4792	$6,055,434
3	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	3934	$4,648,338
4	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	3474	$3,289,947
5	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	2393	$7,782,106
6	R0789	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Other chest pain	2335	$13,721,074
7	U071	Codes for special purposes	COVID-19	1958	$6,954,456
8	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	1743	$2,714,285
9	R079	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Chest pain, unspecified	1640	$9,691,954
10	J00	Diseases of the respiratory system	Acute nasopharyngitis [common cold]	1613	$1,670,525
11	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	1555	$7,587,730
12	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	1302	$4,107,178
13	M545	Diseases of the musculoskeletal system and connective tissue	Low back pain	1298	$3,035,294
14	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	1277	$3,654,878
15	R05	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Cough	1176	$1,158,897

Table D13: Top 15 discharge codes for inpatient visits, FAR Level 4, 2016-2021 (*N* = 50,285)

Rank	ICD-10	Category	Description	Count	Charges
1	F10129	Mental, behavioral, and neurodevelopmental disorders	Alcohol abuse with intoxication, unspecified	3040	$9,373,738
2	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	1332	$1,595,723
3	R0789	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Other chest pain	785	$6,961,887
4	J020	Diseases of the respiratory system	Streptococcal pharyngitis	723	$936,792
5	G312	Diseases of the nervous system	Degeneration of nervous system due to alcohol	716	$2,098,765
6	R079	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Chest pain, unspecified	715	$5,865,170
7	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	668	$791,156
8	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	667	$2,656,909
9	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	657	$3,502,893
10	F10229	Mental, behavioral, and neurodevelopmental disorders	Alcohol dependence with intoxication, unspecified	555	$1,905,051
11	U071	Codes for special purposes	COVID-19	514	$2,249,308
12	M545	Diseases of the musculoskeletal system and connective tissue	Low back pain	501	$1,611,712
13	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	452	$2,062,164
14	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	443	$1,704,683
15	Z0289	Factors influencing health status and contact with health services	Encounter for other administrative examinations	439	$488,029

Emergency Visits – PCA Designations

Table D14: Top 15 discharge codes for inpatient visits, Indian PCA, 2016-2021 (*N* = 167,188)

Rank	ICD-10	Category	Description	Count	Charges
1	F10129	Mental, behavioral, and neurodevelopmental disorders	Alcohol abuse with intoxication, unspecified	8104	$29,580,535
2	J020	Diseases of the respiratory system	Streptococcal pharyngitis	6682	$8,490,228
3	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	4857	$5,654,863
4	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	4541	$4,342,396
5	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	2394	$7,303,832
6	J00	Diseases of the respiratory system	Acute nasopharyngitis [common cold]	2315	$2,426,799
7	R0789	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Other chest pain	2011	$13,042,487
8	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	1948	$2,835,661
9	F10229	Mental, behavioral, and neurodevelopmental disorders	Alcohol dependence with intoxication, unspecified	1877	$7,641,398
10	G312	Diseases of the nervous system	Degeneration of nervous system due to alcohol	1845	$5,542,157
11	U071	Codes for special purposes	COVID-19	1737	$5,109,246
12	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	1621	$7,382,688
13	M545	Diseases of the musculoskeletal system and connective tissue	Low back pain	1541	$3,313,706
14	R079	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Chest pain, unspecified	1537	$9,789,199
15	R05	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Cough	1512	$1,349,557

Table D15: Top 15 discharge codes for inpatient visits, Frontier PCA, 2016-2021 (*N* = 108,879)

Rank	ICD-10	Category	Description	Count	Charges
1	R0789	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Other chest pain	2165	$15,928,234
2	F10129	Mental, behavioral, and neurodevelopmental disorders	Alcohol abuse with intoxication, unspecified	2004	$5,390,858
3	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	1933	$2,699,398
4	R079	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Chest pain, unspecified	1487	$11,041,994
5	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	1386	$6,248,901
6	U071	Codes for special purposes	COVID-19	1328	$6,035,598
7	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	1328	$5,141,098
8	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	1177	$6,793,625
9	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	974	$1,253,465
10	J020	Diseases of the respiratory system	Streptococcal pharyngitis	939	$1,428,604
11	R55	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Syncope and collapse	937	$7,136,277
12	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	888	$1,736,224
13	K5900	Diseases of the digestive system	Constipation, unspecified	886	$3,773,712
14	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	867	$3,404,104
15	R1013	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Epigastric pain	844	$4,401,332

Table D16: Top 15 discharge codes for inpatient visits, Rural PCA, 2016-2021 (*N* = 1,368,610)

Rank	ICD-10	Category	Description	Count	Charges
1	R079	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Chest pain, unspecified	29086	$300,266,129
2	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	25690	$175,946,817
3	R0789	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Other chest pain	24640	$293,600,353
4	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	24234	$58,474,793
5	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	21493	$179,213,894
6	U071	Codes for special purposes	COVID-19	15954	$101,264,499
7	M545	Diseases of the musculoskeletal system and connective tissue	Low back pain	15118	$74,809,110
8	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	14913	$84,937,433
9	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	14774	$93,535,146
10	R55	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Syncope and collapse	14068	$155,000,411
11	R42	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Dizziness and giddiness	12619	$100,505,000
12	I10	Diseases of the circulatory system	Essential (primary) hypertension	11182	$55,734,879
13	F10129	Mental, behavioral, and neurodevelopmental disorders	Alcohol abuse with intoxication, unspecified	11132	$54,818,484
14	K5900	Diseases of the digestive system	Constipation, unspecified	11083	$76,267,948
15	S0990XA	Injury, poisoning, and certain other consequences of external causes	Unspecified injury of head, initial encounter	10686	$76,316,045

Appendix E. Leading Causes of Mortality by Race/Ethnicity and County

Data from Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 1999-2020 on CDC WONDER Online Database, released in 2021. Data are from the Multiple Cause of Death Files, 1999-2020, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Rates are per 100,000 individuals. Population size is the cumulative sum across all 5 years.

Apache County

Table E1: Leading Causes of Mortality for Non-Hispanic American Indians, Age-Adjusted Rate per 100,000, Apache County, 2016-2020 (*N* = 265,749)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	461	173.5	185.8	(168.5 - 203.1)
Diseases of heart (I00-I09,I11,I13,I20-I51)	306	115.1	118.1	(104.7 - 131.5)
COVID-19 (U07.1)	291	109.5	111.4	(98.4 - 124.5)
Malignant neoplasms (C00-C97)	270	101.6	101.6	(89.3 - 113.9)
Diabetes mellitus (E10-E14)	196	73.8	74.4	(63.8 - 84.9)
Chronic liver disease and cirrhosis (K70,K73-K74)	151	56.8	62.6	(52.4 - 72.9)
Cerebrovascular diseases (I60-I69)	90	33.9	35.3	(28.3 - 43.5)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	89	33.5	36.1	(28.8 - 44.7)
Influenza and pneumonia (J09-J18)	80	30.1	32	(25.3 - 39.9)
Assault (homicide) (*U01-*U02,X85-Y09,Y87.1)	49	18.4	19.2	(14.1 - 25.5)
Septicemia (A40-A41)	40	15.1	15	(10.7 - 20.6)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	35	13.2	13.8	(9.5 - 19.2)
Essential hypertension and hypertensive renal disease (I10,I12,I15)	32	12	12.2	(8.3 - 17.3)
Alzheimer disease (G30)	28	10.5	11.4	(7.6 - 16.5)
Chronic lower respiratory diseases (J40-J47)	27	10.2	10.4	(6.9 - 15.2)

Table E2: Leading Causes of Mortality for Non-Hispanic Whites, Age-Adjusted Rate per 100,000, Apache County, 2016-2020 (*N* = 66,654)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Diseases of heart (I00-I09,I11,I13,I20-I51)	227	340.6	204.4	(175.5 - 233.4)
Malignant neoplasms (C00-C97)	168	252	136.6	(113.9 - 159.2)
Chronic lower respiratory diseases (J40-J47)	91	136.5	70.3	(56.0 - 87.2)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	56	84	76.8	(55.6 - 103.5)
Cerebrovascular diseases (I60-I69)	46	69	39.4	(28.4 - 53.3)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	28	42	48.2	(30.9 - 71.7)
Alzheimer disease (G30)	27	40.5	24.2	(15.8 - 35.4)
Diabetes mellitus (E10-E14)	24	36	20.8	(12.5 - 32.4)
Chronic liver disease and cirrhosis (K70,K73-K74)	20	30	21	(12.2 - 33.7)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	16	Unreliable	Unreliable	Unreliable
Parkinson disease (G20-G21)	13	Unreliable	Unreliable	Unreliable

Table E3: Leading Causes of Mortality for Hispanics, Age-Adjusted Rate per 100,000, Apache County, 2016-2020 (*N* = 23,011)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Diseases of heart (I00-I09,I11,I13,I20-I51)	44	191.2	218.5	(158.2 - 294.4)
Malignant neoplasms (C00-C97)	26	113	127.9	(83.5 - 187.3)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	14	Unreliable	Unreliable	Unreliable

Coconino County

Table E4: Leading Causes of Mortality for Non-Hispanic American Indians, Age-Adjusted Rate per 100,000, Coconino County, 2016-2020 (*N* = 188,348)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	286	151.8	169	(148.9 - 189.0)
COVID-19 (U07.1)	177	94	111.5	(94.8 - 128.3)
Malignant neoplasms (C00-C97)	176	93.4	116.7	(99.2 - 134.3)
Diseases of heart (I00-I09,I11,I13,I20-I51)	175	92.9	120.8	(102.7 - 139.0)
Chronic liver disease and cirrhosis (K70,K73-K74)	113	60	68.6	(55.7 - 81.6)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	71	37.7	36	(27.9 - 45.7)
Diabetes mellitus (E10-E14)	70	37.2	45.5	(35.3 - 57.7)
Cerebrovascular diseases (I60-I69)	45	23.9	32.4	(23.6 - 43.5)
Influenza and pneumonia (J09-J18)	43	22.8	30.1	(21.7 - 40.7)
Assault (homicide) (*U01-*U02,X85-Y09,Y87.1)	32	17	18.4	(12.4 - 26.2)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	28	14.9	21	(13.9 - 30.3)
Chronic lower respiratory diseases (J40-J47)	25	13.3	18.4	(11.9 - 27.1)
Parkinson disease (G20-G21)	25	13.3	18.7	(12.1 - 27.5)
Alzheimer disease (G30)	21	11.1	16.2	(10.0 - 24.8)
Essential hypertension and hypertensive renal disease (I10,I12,I15)	19	Unreliable	Unreliable	Unreliable

Table E5: Leading Causes of Mortality for Non-Hispanic Whites, Age-Adjusted Rate per 100,000, Coconino County, 2016-2020 (*N* = 393,040)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Malignant neoplasms (C00-C97)	573	145.8	126.5	(115.7 - 137.3)
Diseases of heart (I00-I09,I11,I13,I20-I51)	486	123.7	117.7	(106.9 - 128.5)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	178	45.3	44.2	(37.3 - 51.1)
Chronic lower respiratory diseases (J40-J47)	170	43.3	40	(33.8 - 46.2)
Alzheimer disease (G30)	117	29.8	33.1	(27.1 - 39.1)
Cerebrovascular diseases (I60-I69)	105	26.7	26.7	(21.4 - 31.9)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	104	26.5	25.6	(20.3 - 30.8)
Diabetes mellitus (E10-E14)	57	14.5	14.1	(10.5 - 18.4)
Chronic liver disease and cirrhosis (K70,K73-K74)	48	12.2	11.3	(8.2 - 15.2)
Nutritional deficiencies (E40-E64)	46	11.7	12.7	(9.2 - 16.9)
Parkinson disease (G20-G21)	35	8.9	8.9	(6.2 - 12.5)
Essential hypertension and hypertensive renal disease (I10,I12,I15)	29	7.4	6.4	(4.2 - 9.3)
Influenza and pneumonia (J09-J18)	20	5.1	4.3	(2.6 - 6.9)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	19	Unreliable	Unreliable	Unreliable
COVID-19 (U07.1)	19	Unreliable	Unreliable	Unreliable

Table E6: Leading Causes of Mortality for Hispanics, Age-Adjusted Rate per 100,000, Coconino County, 2016-2020 (*N* = 101,139)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Malignant neoplasms (C00-C97)	67	66.2	124.9	(95.7 - 160.1)
Diseases of heart (I00-I09,I11,I13,I20-I51)	50	49.4	99.1	(72.8 - 131.8)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	48	47.5	60.1	(43.1 - 81.5)
Chronic lower respiratory diseases (J40-J47)	17	Unreliable	Unreliable	(19.1 - 54.2)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	16	Unreliable	Unreliable	(10.2 - 30.1)
Cerebrovascular diseases (I60-I69)	15	Unreliable	Unreliable	(17.0 - 50.1)
Diabetes mellitus (E10-E14)	15	Unreliable	Unreliable	(14.2 - 43.6)
Chronic liver disease and cirrhosis (K70,K73-K74)	12	Unreliable	Unreliable	(9.3 - 33.5)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	10	Unreliable	Unreliable	(10.8 - 41.4)
COVID-19 (U07.1)	10	Unreliable	Unreliable	(7.7 - 31.9)

Mohave County

Table E7: Leading Causes of Mortality for Non-Hispanic American Indians, Age-Adjusted Rate per 100,000, Mohave County, 2016-2020 (*N* = 23,820)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Diseases of heart (I00-I09,I11,I13,I20-I51)	52	218.3	209.4	(153.9 - 278.5)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	28	117.5	120.8	(78.9 - 176.9)
Malignant neoplasms (C00-C97)	25	105	96.8	(61.4 - 145.2)
Chronic liver disease and cirrhosis (K70,K73-K74)	21	88.2	81.5	(49.1 - 127.2)
Diabetes mellitus (E10-E14)	20	84	81.9	(48.6 - 129.5)
COVID-19 (U07.1)	14	Unreliable	Unreliable	(25.5 - 82.0)

Table E8: Leading Causes of Mortality for Non-Hispanic Whites, Age-Adjusted Rate per 100,000, Mohave County, 2016-2020 (*N* = 820,869)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Diseases of heart (I00-I09,I11,I13,I20-I51)	3,964	482.9	215.4	(208.1 - 222.8)
Malignant neoplasms (C00-C97)	3,482	424.2	187.5	(180.5 - 194.6)
Chronic lower respiratory diseases (J40-J47)	1,397	170.2	71.8	(67.7 - 75.8)
Alzheimer disease (G30)	694	84.5	35.5	(32.8 - 38.1)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	686	83.6	63.1	(57.2 - 69.0)
Cerebrovascular diseases (I60-I69)	649	79.1	34.5	(31.6 - 37.4)
Diabetes mellitus (E10-E14)	382	46.5	22.8	(20.1 - 25.5)
Chronic liver disease and cirrhosis (K70,K73-K74)	333	40.6	24.7	(21.5 - 28.0)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	309	37.6	31.6	(27.3 - 36.0)
Influenza and pneumonia (J09-J18)	290	35.3	17.8	(15.3 - 20.2)
COVID-19 (U07.1)	264	32.2	13.7	(11.9 - 15.5)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	215	26.2	11.3	(9.6 - 12.9)
Essential hypertension and hypertensive renal disease (I10,I12,I15)	169	20.6	8.6	(7.3 - 10.0)
Nutritional deficiencies (E40-E64)	134	16.3	7	(5.8 - 8.3)
Parkinson disease (G20-G21)	130	15.8	6.3	(5.2 - 7.4)

Table E9: Leading Causes of Mortality for Hispanics, Age-Adjusted Rate per 100,000, Mohave County, 2016-2020 (*N* = 175,796)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Diseases of heart (I00-I09,I11,I13,I20-I51)	216	122.9	139.2	(120.2 - 158.2)
Malignant neoplasms (C00-C97)	184	104.7	111.9	(95.4 - 128.5)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	82	46.6	48.2	(38.2 - 60.1)
Diabetes mellitus (E10-E14)	52	29.6	30.7	(22.8 - 40.5)
Alzheimer disease (G30)	49	27.9	36.9	(27.2 - 49.0)
Cerebrovascular diseases (I60-I69)	48	27.3	32.7	(24.0 - 43.7)
Chronic lower respiratory diseases (J40-J47)	42	23.9	27.2	(19.4 - 37.0)
Chronic liver disease and cirrhosis (K70,K73-K74)	40	22.8	22.3	(15.8 - 30.5)
COVID-19 (U07.1)	36	20.5	21.7	(15.0 - 30.3)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	29	16.5	16.1	(10.7 - 23.3)
Influenza and pneumonia (J09-J18)	21	11.9	12.6	(7.7 - 19.5)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	20	11.4	11.8	(7.1 - 18.4)
Septicemia (A40-A41)	15	Unreliable	Unreliable	(5.2 - 15.8)
Essential hypertension and hypertensive renal disease (I10,I12,I15)	11	Unreliable	Unreliable	(3.9 - 13.9)

Navajo County

Table E10: Leading Causes of Mortality for Non-Hispanic American Indians, Age-Adjusted Rate per 100,000, Navajo County, 2016-2020 (*N* = 245,162)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	380	155	171.7	(154.0 - 189.4)
COVID-19 (U07.1)	307	125.2	138.4	(122.6 - 154.2)
Diseases of heart (I00-I09,I11,I13,I20-I51)	289	117.9	134.8	(119.0 - 150.5)
Malignant neoplasms (C00-C97)	243	99.1	111.2	(96.9 - 125.4)
Chronic liver disease and cirrhosis (K70,K73-K74)	206	84	92.7	(79.7 - 105.7)
Diabetes mellitus (E10-E14)	169	68.9	75.5	(63.8 - 87.1)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	106	43.2	44.7	(36.0 - 53.4)
Cerebrovascular diseases (I60-I69)	87	35.5	41	(32.7 - 50.8)
Influenza and pneumonia (J09-J18)	79	32.2	36.8	(29.0 - 46.1)
Assault (homicide) (*U01-*U02,X85-Y09,Y87.1)	60	24.5	28.8	(21.8 - 37.4)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	48	19.6	22.9	(16.8 - 30.4)
Essential hypertension and hypertensive renal disease (I10,I12,I15)	38	15.5	18.2	(12.8 - 25.0)
Alzheimer disease (G30)	37	15.1	19.1	(13.4 - 26.3)
Septicemia (A40-A41)	36	14.7	16.6	(11.6 - 23.1)
Chronic lower respiratory diseases (J40-J47)	30	12.2	13.7	(9.2 - 19.7)

Table E11: Leading Causes of Mortality for Non-Hispanic Whites, Age-Adjusted Rate per 100,000, Navajo County, 2016-2020 (*N* = 233,183)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Diseases of heart (I00-I09,I11,I13,I20-I51)	632	271	154.4	(141.9 - 167.0)
Malignant neoplasms (C00-C97)	589	252.6	137.3	(125.4 - 149.2)
Chronic lower respiratory diseases (J40-J47)	287	123.1	66.5	(58.4 - 74.5)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	173	74.2	73.4	(61.2 - 85.6)
Cerebrovascular diseases (I60-I69)	155	66.5	38.1	(31.9 - 44.3)
Alzheimer disease (G30)	140	60	36	(30.0 - 42.1)
Diabetes mellitus (E10-E14)	97	41.6	24.1	(19.2 - 29.9)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	90	38.6	40.9	(32.1 - 51.3)
Chronic liver disease and cirrhosis (K70,K73-K74)	50	21.4	14.8	(10.5 - 20.5)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	40	17.2	10.1	(7.1 - 14.0)
COVID-19 (U07.1)	38	16.3	8.2	(5.7 - 11.3)
Parkinson disease (G20-G21)	37	15.9	9	(6.3 - 12.5)
Essential hypertension and hypertensive renal disease (I10,I12,I15)	32	13.7	8.1	(5.4 - 11.5)
Influenza and pneumonia (J09-J18)	31	13.3	7.5	(4.9 - 10.9)
Nutritional deficiencies (E40-E64)	26	11.2	6.6	(4.2 - 9.8)

Table E12: Leading Causes of Mortality for Hispanics, Age-Adjusted Rate per 100,000, Navajo County, 2016-2020 (*N* = 63,335)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Diseases of heart (I00-I09,I11,I13,I20-I51)	64	101	139.8	(107.0 - 179.6)
Malignant neoplasms (C00-C97)	58	91.6	117	(88.1 - 152.2)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	23	36.3	41.2	(25.8 - 62.4)
Diabetes mellitus (E10-E14)	19	Unreliable	Unreliable	(24.4 - 65.1)
Chronic lower respiratory diseases (J40-J47)	17	Unreliable	Unreliable	(21.6 - 61.5)
COVID-19 (U07.1)	16	Unreliable	Unreliable	(18.8 - 55.5)
Cerebrovascular diseases (I60-I69)	12	Unreliable	Unreliable	(14.0 - 47.4)
Alzheimer disease (G30)	12	Unreliable	Unreliable	(14.5 - 49.0)
Chronic liver disease and cirrhosis (K70,K73-K74)	11	Unreliable	Unreliable	(10.4 - 37.3)

Yavapai County

Table E13: Leading Causes of Mortality for Non-Hispanic American Indians, Age-Adjusted Rate per 100,000, Yavapai County, 2016-2020 (*N* = 18,942)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	Age Adjusted Rate 95% CI
Malignant neoplasms (C00-C97)	32	168.9	151.2	(100.5 - 218.5)
Diseases of heart (I00-I09,I11,I13,I20-I51)	22	116.1	111.7	(68.2 - 172.5)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	18	Unreliable	Unreliable	(60.5 - 166.2)
Diabetes mellitus (E10-E14)	13	Unreliable	Unreliable	(28.0 - 100.3)
Chronic liver disease and cirrhosis (K70,K73-K74)	13	Unreliable	Unreliable	(30.9 - 104.5)
Chronic lower respiratory diseases (J40-J47)	12	Unreliable	Unreliable	(27.4 - 98.4)

Table E14: Leading Causes of Mortality for Non-Hispanic Whites, Age-Adjusted Rate per 100,000, Yavapai County, 2016-2020 (*N* = 944,925)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	95% CI
Malignant neoplasms (C00-C97)	3,356	355.2	153.2	(147.4 - 159.1)
Diseases of heart (I00-I09,I11,I13,I20-I51)	3,108	328.9	141.7	(136.2 - 147.2)
Chronic lower respiratory diseases (J40-J47)	1,259	133.2	55.1	(51.8 - 58.3)
Alzheimer disease (G30)	875	92.6	37.9	(35.4 - 40.4)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	839	88.8	70.2	(64.2 - 76.2)
Cerebrovascular diseases (I60-I69)	720	76.2	32.1	(29.5 - 34.6)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	383	40.5	33.9	(29.7 - 38.1)
Nutritional deficiencies (E40-E64)	371	39.3	16	(14.3 - 17.6)
Diabetes mellitus (E10-E14)	278	29.4	13.7	(11.8 - 15.6)
Chronic liver disease and cirrhosis (K70,K73-K74)	272	28.8	20.3	(17.2 - 23.3)
COVID-19 (U07.1)	205	21.7	8.9	(7.6 - 10.1)
Influenza and pneumonia (J09-J18)	204	21.6	9.4	(8.0 - 10.9)
Parkinson disease (G20-G21)	193	20.4	8.1	(7.0 - 9.3)
Essential hypertension and hypertensive renal disease (I10,I12,I15)	167	17.7	7.7	(6.4 - 9.0)
Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)	126	13.3	6	(4.8 - 7.2)

Table E14: Leading Causes of Mortality for Hispanics, Age-Adjusted Rate per 100,000, Yavapai County, 2016-2020 (*N* = 170,236)

15 Leading Causes of Death	Deaths	Crude Rate	Age Adjusted Rate	95% CI
Malignant neoplasms (C00-C97)	170	99.9	123	(104.0 - 142.0)
Diseases of heart (I00-I09,I11,I13,I20-I51)	130	76.4	105.5	(87.0 - 124.1)
Accidents (unintentional injuries) (V01-X59,Y85-Y86)	60	35.2	41.3	(31.3 - 53.6)
Diabetes mellitus (E10-E14)	39	22.9	28.9	(20.3 - 39.8)
Alzheimer disease (G30)	33	19.4	29.8	(20.4 - 42.1)
Chronic lower respiratory diseases (J40-J47)	31	18.2	25.5	(17.2 - 36.4)
COVID-19 (U07.1)	31	18.2	21.5	(14.4 - 30.8)
Cerebrovascular diseases (I60-I69)	30	17.6	24.4	(16.4 - 35.1)
Chronic liver disease and cirrhosis (K70,K73-K74)	22	12.9	13.9	(8.6 - 21.3)
Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)	22	12.9	14.2	(8.8 - 21.7)
Parkinson disease (G20-G21)	14	Unreliable	Unreliable	(6.3 - 20.2)
Influenza and pneumonia (J09-J18)	13	Unreliable	Unreliable	(5.7 - 18.4)
Nutritional deficiencies (E40-E64)	10	Unreliable	Unreliable	(3.9 - 14.8)
Congenital malformations, deformations and chromosomal abnormalities (Q00-Q99)	10	Unreliable	Unreliable	(2.9 - 11.0)

Appendix F. Top 15 Discharge Diagnoses for Selected Age Groups by County, 2021

Age Less than 1 Year

Table F1: Top 15 discharge codes for inpatient and emergency department visits, <1 year (all northern Arizona counties), 2016-2021, *N* = 67,111

Rank	ICD-10	Category	Description	Encounters	Charges
1	Z3800	Factors influencing health status and contact with health services	Single liveborn infant, delivered vaginally	23642	$188,137,202
2	Z3801	Factors influencing health status and contact with health services	Single liveborn infant, delivered by cesarean	8915	$203,293,871
3	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	3537	$6,140,114
4	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	1664	$4,428,206
5	J210	Diseases of the respiratory system	Acute bronchiolitis due to respiratory syncytial virus	1617	$15,638,233
6	J219	Diseases of the respiratory system	Acute bronchiolitis, unspecified	1094	$5,045,326
7	R1110	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Vomiting, unspecified	1016	$1,964,661
8	R05	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Cough	925	$1,428,925
9	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	903	$1,812,831
10	P599	Certain conditions originating in the perinatal period	Neonatal jaundice, unspecified	653	$3,648,778
11	Z3831	Factors influencing health status and contact with health services	Twin liveborn infant, delivered by cesarean	625	$39,992,612
12	S0990XA	Injury, poisoning, and certain other consequences of external causes	Unspecified injury of head, initial encounter	581	$1,049,701
13	J00	Diseases of the respiratory system	Acute nasopharyngitis [common cold]	567	$712,216
14	J050	Diseases of the respiratory system	Acute obstructive laryngitis [croup]	524	$1,356,341
15	J189	Diseases of the respiratory system	Pneumonia, unspecified organism	440	$2,674,439

Table F2: Top 15 discharge codes for inpatient and emergency department visits, <1 year (Apache County), 2016-2021, *N* = 3,826

Rank	ICD-10	Category	Description	Encounters	Charges
1	Z3800	Factors influencing health status and contact with health services	Single liveborn infant, delivered vaginally	921	$8,119,072
2	Z3801	Factors influencing health status and contact with health services	Single liveborn infant, delivered by cesarean	311	$11,650,623
3	J00	Diseases of the respiratory system	Acute nasopharyngitis [common cold]	196	$174,134
4	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	185	$236,870
5	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	96	$73,442
6	J210	Diseases of the respiratory system	Acute bronchiolitis due to respiratory syncytial virus	89	$921,057
7	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	86	$191,103
8	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	85	$98,555
9	J020	Diseases of the respiratory system	Streptococcal pharyngitis	83	$75,945
10	J219	Diseases of the respiratory system	Acute bronchiolitis, unspecified	64	$29,8041
11	R05	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Cough	64	$41,170
12	H6691	Diseases of the ear and mastoid process	Otitis media, unspecified, right ear	44	$29,882
13	J050	Diseases of the respiratory system	Acute obstructive laryngitis [croup]	43	$88,993
14	K5900	Diseases of the digestive system	Constipation, unspecified	42	$35,121
15	H6693	Diseases of the ear and mastoid process	Otitis media, unspecified, bilateral	42	$34,796

Table F3: Top 15 discharge codes for inpatient and emergency department visits, <1 year (Coconino County), 2016-2021, *N* = 12,275

Rank	ICD-10	Category	Description	Encounters	Charges
1	Z3800	Factors influencing health status and contact with health services	Single liveborn infant, delivered vaginally	4817	$42,017,120
2	Z3801	Factors influencing health status and contact with health services	Single liveborn infant, delivered by cesarean	1439	$42,778,767
3	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	803	$1,030,029
4	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	357	$960,847
5	R1110	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Vomiting, unspecified	212	$294,097
6	J210	Diseases of the respiratory system	Acute bronchiolitis due to respiratory syncytial virus	201	$3,078,054
7	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	144	$233,070
8	J219	Diseases of the respiratory system	Acute bronchiolitis, unspecified	124	$363,883
9	J9601	Diseases of the respiratory system	Acute respiratory failure with hypoxia	120	$3,325,249
10	R05	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Cough	120	$104,915
11	S0990XA	Injury, poisoning, and certain other consequences of external causes	Unspecified injury of head, initial encounter	118	$197,866
12	Z3831	Factors influencing health status and contact with health services	Twin liveborn infant, delivered by cesarean	102	$8,373,326
13	J189	Diseases of the respiratory system	Pneumonia, unspecified organism	97	$602,691
14	R6812	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fussy infant (baby)	92	$105,773
15	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	72	$470,082

Table F4: Top 15 discharge codes for inpatient and emergency department visits, <1 year (Mohave County), 2016-2021, *N* = 19,471

Rank	ICD-10	Category	Description	Encounters	Charges
1	Z3800	Factors influencing health status and contact with health services	Single liveborn infant, delivered vaginally	6362	$45,221,014
2	Z3801	Factors influencing health status and contact with health services	Single liveborn infant, delivered by cesarean	2744	$35,505,563
3	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	1181	$2,459,278
4	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	552	$1,685,011
5	J219	Diseases of the respiratory system	Acute bronchiolitis, unspecified	387	$2,114,651
6	R05	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Cough	386	$707,142
7	P599	Certain conditions originating in the perinatal period	Neonatal jaundice, unspecified	379	$1,544,255
8	J210	Diseases of the respiratory system	Acute bronchiolitis due to respiratory syncytial virus	370	$2,671,600
9	R1110	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Vomiting, unspecified	358	$720,196
10	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	298	$713,681
11	R0981	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nasal congestion	200	$333,100
12	Z3831	Factors influencing health status and contact with health services	Twin liveborn infant, delivered by cesarean	171	$3,734,188
13	R21	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Rash and other nonspecific skin eruption	156	$265,925
14	J050	Diseases of the respiratory system	Acute obstructive laryngitis [croup]	154	$436,957
15	S0990XA	Injury, poisoning, and certain other consequences of external causes	Unspecified injury of head, initial encounter	154	$284,709

Table F5: Top 15 discharge codes for inpatient and emergency department visits, <1 year (Navajo County), 2016-2021, *N* = 12,786

Rank	ICD-10	Category	Description	Encounters	Charges
1	Z3800	Factors influencing health status and contact with health services	Single liveborn infant, delivered vaginally	4619	$39,404,429
2	Z3801	Factors influencing health status and contact with health services	Single liveborn infant, delivered by cesarean	1612	$52,402,996
3	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	495	$834,709
4	J210	Diseases of the respiratory system	Acute bronchiolitis due to respiratory syncytial virus	366	$4,437,656
5	J00	Diseases of the respiratory system	Acute nasopharyngitis [common cold]	333	$473,912
6	J219	Diseases of the respiratory system	Acute bronchiolitis, unspecified	266	$1,327,249
7	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	229	$445,088
8	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	228	$551,110
9	R1110	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Vomiting, unspecified	136	$308,471
10	Z3831	Factors influencing health status and contact with health services	Twin liveborn infant, delivered by cesarean	133	$12,676,776
11	J050	Diseases of the respiratory system	Acute obstructive laryngitis [croup]	101	$243,454
12	J9601	Diseases of the respiratory system	Acute respiratory failure with hypoxia	89	$3,758,792
13	R05	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Cough	84	$105,743
14	J159	Diseases of the respiratory system	Unspecified bacterial pneumonia	83	$510,082
15	P599	Certain conditions originating in the perinatal period	Neonatal jaundice, unspecified	82	$843,507

Table F6: Top 15 discharge codes for inpatient and emergency department visits, <1 year (Yavapai County), 2016-2021, *N* = 18,753

Rank	ICD-10	Category	Description	Encounters	Charges
1	Z3800	Factors influencing health status and contact with health services	Single liveborn infant, delivered vaginally	6923	$53375567
2	Z3801	Factors influencing health status and contact with health services	Single liveborn infant, delivered by cesarean	2809	$60955922
3	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	873	$1579228
4	J210	Diseases of the respiratory system	Acute bronchiolitis due to respiratory syncytial virus	591	$4529866
5	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	441	$1040135
6	R1110	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Vomiting, unspecified	275	$583807
7	R05	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Cough	271	$469955
8	J219	Diseases of the respiratory system	Acute bronchiolitis, unspecified	253	$941502
9	S0990XA	Injury, poisoning, and certain other consequences of external causes	Unspecified injury of head, initial encounter	251	$471481
10	Z3831	Factors influencing health status and contact with health services	Twin liveborn infant, delivered by cesarean	204	$15125232
11	J050	Diseases of the respiratory system	Acute obstructive laryngitis [croup]	155	$428275
12	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	147	$322437
13	H6691	Diseases of the ear and mastoid process	Otitis media, unspecified, right ear	135	$186414
14	H6692	Diseases of the ear and mastoid process	Otitis media, unspecified, left ear	133	$174288
15	J101	Diseases of the respiratory system	Flu due to other ident influenza virus w other resp manifest	132	$359753

Ages 1-4

Table F7: Top 15 discharge codes for inpatient and emergency department visits, 1-4 years (all northern Arizona counties), 2016-2021, *N* = 75,890

Rank	ICD-10	Category	Description	Encounters	Charges
1	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	6214	$10622630
2	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	3123	$6779765
3	J050	Diseases of the respiratory system	Acute obstructive laryngitis [croup]	2312	$5264677
4	J020	Diseases of the respiratory system	Streptococcal pharyngitis	2229	$3594909
5	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	1923	$4000035
6	R1110	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Vomiting, unspecified	1565	$2772795
7	S0181XA	Injury, poisoning, and certain other consequences of external causes	Laceration w/o foreign body of other part of head, initial encntr	1521	$2818169
8	H6691	Diseases of the ear and mastoid process	Otitis media, unspecified, right ear	1379	$1799430
9	R05	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Cough	1242	$1784771
10	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	1231	$1551083
11	J210	Diseases of the respiratory system	Acute bronchiolitis due to respiratory syncytial virus	1230	$9170161
12	J101	Diseases of the respiratory system	Flu due to other ident influenza virus w other resp manifest	1216	$3982399
13	H6692	Diseases of the ear and mastoid process	Otitis media, unspecified, left ear	1200	$1660384
14	J219	Diseases of the respiratory system	Acute bronchiolitis, unspecified	1188	$5772500
15	S0990XA	Injury, poisoning, and certain other consequences of external causes	Unspecified injury of head, initial encounter	1178	$2257611

Table F8: Top 15 discharge codes for inpatient and emergency department visits, 1-4 years (Apache County), 2016-2021, *N* = 7,097

Rank	ICD-10	Category	Description	Encounters	Charges
1	J020	Diseases of the respiratory system	Streptococcal pharyngitis	671	$658521
2	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	452	$507485
3	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	416	$308055
4	J00	Diseases of the respiratory system	Acute nasopharyngitis [common cold]	354	$302506
5	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	222	$270006
6	R05	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Cough	177	$73274
7	J050	Diseases of the respiratory system	Acute obstructive laryngitis [croup]	163	$298969
8	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	158	$171483
9	H6692	Diseases of the ear and mastoid process	Otitis media, unspecified, left ear	122	$98619
10	H6691	Diseases of the ear and mastoid process	Otitis media, unspecified, right ear	111	$91619
11	H6693	Diseases of the ear and mastoid process	Otitis media, unspecified, bilateral	91	$69857
12	J09X2	Diseases of the respiratory system	Flu due to ident novel influenza A virus w oth resp manifest	90	$143270
13	S0181XA	Injury, poisoning, and certain other consequences of external causes	Laceration w/o foreign body of oth part of head, init encntr	81	$142704
14	J210	Diseases of the respiratory system	Acute bronchiolitis due to respiratory syncytial virus	77	$570932
15	K5900	Diseases of the digestive system	Constipation, unspecified	76	$111588

Table F9: Top 15 discharge codes for inpatient and emergency department visits, 1-4 years (Coconino County), 2016-2021, *N* = 12,073

Rank	ICD-10	Category	Description	Encounters	Charges
1	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	1371	$1721943
2	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	527	$782104
3	J050	Diseases of the respiratory system	Acute obstructive laryngitis [croup]	377	$737796
4	S0181XA	Injury, poisoning, and certain other consequences of external causes	Laceration w/o foreign body of oth part of head, init encntr	307	$379127
5	R1110	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Vomiting, unspecified	299	$352360
6	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	296	$441189
7	S0990XA	Injury, poisoning, and certain other consequences of external causes	Unspecified injury of head, initial encounter	247	$327289
8	J189	Diseases of the respiratory system	Pneumonia, unspecified organism	201	$1351751
9	H6691	Diseases of the ear and mastoid process	Otitis media, unspecified, right ear	189	$152278
10	S0101XA	Injury, poisoning, and certain other consequences of external causes	Laceration without foreign body of scalp, initial encounter	186	$237410
11	H6692	Diseases of the ear and mastoid process	Otitis media, unspecified, left ear	155	$153316
12	J219	Diseases of the respiratory system	Acute bronchiolitis, unspecified	152	$413409
13	J210	Diseases of the respiratory system	Acute bronchiolitis due to respiratory syncytial virus	150	$1486700
14	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	145	$378939
15	J101	Diseases of the respiratory system	Flu due to oth ident influenza virus w oth resp manifest	143	$542855

Table F10: Top 15 discharge codes for inpatient and emergency department visits, 1-4 years (Mohave County), 2016-2021, *N* = 26,651

Rank	ICD-10	Category	Description	Encounters	Charges
1	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	2102	$4368649
2	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	1207	$3088563
3	J020	Diseases of the respiratory system	Streptococcal pharyngitis	730	$1551174
4	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	675	$1699970
5	J050	Diseases of the respiratory system	Acute obstructive laryngitis [croup]	632	$1891249
6	R05	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Cough	536	$918435
7	R1110	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Vomiting, unspecified	513	$1133129
8	S0181XA	Injury, poisoning, and certain other consequences of external causes	Laceration w/o foreign body of oth part of head, init encntr	451	$1077577
9	H6691	Diseases of the ear and mastoid process	Otitis media, unspecified, right ear	443	$705596
10	J101	Diseases of the respiratory system	Flu due to oth ident influenza virus w oth resp manifest	428	$1378283
11	J219	Diseases of the respiratory system	Acute bronchiolitis, unspecified	421	$2353830
12	J189	Diseases of the respiratory system	Pneumonia, unspecified organism	399	$2590964
13	H6692	Diseases of the ear and mastoid process	Otitis media, unspecified, left ear	366	$580785
14	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	359	$804326
15	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	346	$632592

Table F11: Top 15 discharge codes for inpatient and emergency department visits, 1-4 years (Navajo County), 2016-2021, *N* = 12,653

Rank	ICD-10	Category	Description	Encounters	Charges
1	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	816	$1428346
2	J00	Diseases of the respiratory system	Acute nasopharyngitis [common cold]	474	$670547
3	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	409	$791410
4	J020	Diseases of the respiratory system	Streptococcal pharyngitis	399	$652132
5	J050	Diseases of the respiratory system	Acute obstructive laryngitis [croup]	369	$841728
6	J210	Diseases of the respiratory system	Acute bronchiolitis due to respiratory syncytial virus	364	$3198394
7	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	363	$803838
8	J219	Diseases of the respiratory system	Acute bronchiolitis, unspecified	281	$1479141
9	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	193	$327889
10	R1110	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Vomiting, unspecified	181	$315524
11	S0181XA	Injury, poisoning, and certain other consequences of external causes	Laceration w/o foreign body of oth part of head, init encntr	168	$299666
12	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	156	$217098
13	J101	Diseases of the respiratory system	Flu due to oth ident influenza virus w oth resp manifest	152	$661170
14	H6691	Diseases of the ear and mastoid process	Otitis media, unspecified, right ear	152	$176115
15	J159	Diseases of the respiratory system	Unspecified bacterial pneumonia	150	$1055266

Table F12: Top 15 discharge codes for inpatient and emergency department visits, 1-4 years (Yavapai County), 2016-2021, *N* = 20,416

Rank	ICD-10	Category	Description	Encounters	Charges
1	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	1473	$2596207
2	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	868	$1933777
3	J050	Diseases of the respiratory system	Acute obstructive laryngitis [croup]	771	$1494935
4	R1110	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Vomiting, unspecified	515	$914197
5	S0181XA	Injury, poisoning, and certain other consequences of external causes	Laceration w/o foreign body of oth part of head, init encntr	514	$919095
6	S0990XA	Injury, poisoning, and certain other consequences of external causes	Unspecified injury of head, initial encounter	503	$1102672
7	H6691	Diseases of the ear and mastoid process	Otitis media, unspecified, right ear	484	$673822
8	J210	Diseases of the respiratory system	Acute bronchiolitis due to respiratory syncytial virus	448	$2871059
9	J101	Diseases of the respiratory system	Flu due to oth ident influenza virus w oth resp manifest	437	$1305077
10	H6692	Diseases of the ear and mastoid process	Otitis media, unspecified, left ear	426	$636509
11	J020	Diseases of the respiratory system	Streptococcal pharyngitis	383	$673503
12	J189	Diseases of the respiratory system	Pneumonia, unspecified organism	328	$1407994
13	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	321	$797460
14	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	311	$573583
15	R05	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Cough	304	$509705

Ages 5-9

Table F13: Top 15 discharge codes for inpatient and emergency department visits, 5-9 years (all northern Arizona counties), 2016-2021, *N* = 55,125

Rank	ICD-10	Category	Description	Encounters	Charges
1	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	2795	$4082624
2	J020	Diseases of the respiratory system	Streptococcal pharyngitis	2724	$4385420
3	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	1729	$2298766
4	J101	Diseases of the respiratory system	Flu due to oth ident influenza virus w oth resp manifest	1148	$2877856
5	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	982	$3290203
6	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	920	$2914417
7	S0181XA	Injury, poisoning, and certain other consequences of external causes	Laceration w/o foreign body of oth part of head, init encntr	898	$1855767
8	K5900	Diseases of the digestive system	Constipation, unspecified	895	$2779693
9	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	895	$2495440
10	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	885	$1608918
11	J111	Diseases of the respiratory system	Flu due to unidentified influenza virus w oth resp manifest	752	$1580375
12	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	720	$1672337
13	R05	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Cough	713	$990202
14	H6691	Diseases of the ear and mastoid process	Otitis media, unspecified, right ear	693	$728277
15	H6692	Diseases of the ear and mastoid process	Otitis media, unspecified, left ear	684	$662096

Table F14: Top 15 discharge codes for inpatient and emergency department visits, 5-9 years (Apache County), 2016-2021, *N* = 6,484

Rank	ICD-10	Category	Description	Encounters	Charges
1	J020	Diseases of the respiratory system	Streptococcal pharyngitis	817	$805910
2	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	446	$354407
3	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	337	$312287
4	J00	Diseases of the respiratory system	Acute nasopharyngitis [common cold]	241	$196089
5	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	139	$137456
6	J09X2	Diseases of the respiratory system	Flu due to ident novel influenza A virus w oth resp manifest	125	$131976
7	R05	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Cough	121	$47379
8	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	79	$289204
9	S0181XA	Injury, poisoning, and certain other consequences of external causes	Laceration w/o foreign body of oth part of head, init encntr	73	$172472
10	J101	Diseases of the respiratory system	Flu due to oth ident influenza virus w oth resp manifest	72	$176350
11	K529	Diseases of the digestive system	Noninfective gastroenteritis and colitis, unspecified	71	$110179
12	H6691	Diseases of the ear and mastoid process	Otitis media, unspecified, right ear	66	$55199
13	K5900	Diseases of the digestive system	Constipation, unspecified	55	$123209
14	S0101XA	Injury, poisoning, and certain other consequences of external causes	Laceration without foreign body of scalp, initial encounter	54	$92513
15	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	53	$75507

Table F15: Top 15 discharge codes for inpatient and emergency department visits, 5-9 years (Coconino County), 2016-2021, *N* = 8,637

Rank	ICD-10	Category	Description	Encounters	Charges
1	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	666	$690988
2	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	185	$311499
3	S0181XA	Injury, poisoning, and certain other consequences of external causes	Laceration w/o foreign body of oth part of head, init encntr	178	$239730
4	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	176	$356636
5	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	176	$169178
6	S0101XA	Injury, poisoning, and certain other consequences of external causes	Laceration without foreign body of scalp, initial encounter	171	$242103
7	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	159	$139721
8	J101	Diseases of the respiratory system	Flu due to oth ident influenza virus w oth resp manifest	131	$286682
9	S0990XA	Injury, poisoning, and certain other consequences of external causes	Unspecified injury of head, initial encounter	127	$212617
10	J020	Diseases of the respiratory system	Streptococcal pharyngitis	126	$201325
11	H6691	Diseases of the ear and mastoid process	Otitis media, unspecified, right ear	122	$80245
12	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	119	$299274
13	K5900	Diseases of the digestive system	Constipation, unspecified	119	$241989
14	H6692	Diseases of the ear and mastoid process	Otitis media, unspecified, left ear	110	$72204
15	J111	Diseases of the respiratory system	Flu due to unidentified influenza virus w oth resp manifest	98	$214510

Table F16: Top 15 discharge codes for inpatient and emergency department visits, 5-9 years (Mohave County), 2016-2021, *N* = 17,188

Rank	ICD-10	Category	Description	Encounters	Charges
1	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	852	$1551033
2	J020	Diseases of the respiratory system	Streptococcal pharyngitis	705	$1406617
3	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	519	$918172
4	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	414	$1563794
5	J101	Diseases of the respiratory system	Flu due to oth ident influenza virus w oth resp manifest	361	$1122478
6	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	340	$1322687
7	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	323	$1232365
8	K5900	Diseases of the digestive system	Constipation, unspecified	319	$1111714
9	R05	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Cough	304	$517399
10	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	281	$720629
11	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	280	$835768
12	S0181XA	Injury, poisoning, and certain other consequences of external causes	Laceration w/o foreign body of oth part of head, init encntr	260	$648283
13	H6692	Diseases of the ear and mastoid process	Otitis media, unspecified, left ear	250	$306914
14	H6691	Diseases of the ear and mastoid process	Otitis media, unspecified, right ear	234	$290859
15	R1110	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Vomiting, unspecified	232	$551133

Table F17: Top 15 discharge codes for inpatient and emergency department visits, 5-9 years (Navajo County), 2016-2021, *N* = 8,637

Rank	ICD-10	Category	Description	Encounters	Charges
1	J020	Diseases of the respiratory system	Streptococcal pharyngitis	427	$769505
2	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	324	$478136
3	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	252	$352671
4	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	193	$381453
5	J00	Diseases of the respiratory system	Acute nasopharyngitis [common cold]	192	$263678
6	K5900	Diseases of the digestive system	Constipation, unspecified	171	$565528
7	J111	Diseases of the respiratory system	Flu due to unidentified influenza virus w oth resp manifest	149	$271885
8	J101	Diseases of the respiratory system	Flu due to oth ident influenza virus w oth resp manifest	134	$359124
9	L0101	Diseases of the skin and subcutaneous tissue	Non-bullous impetigo	126	$104435
10	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	121	$267206
11	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	105	$210417
12	S0181XA	Injury, poisoning, and certain other consequences of external causes	Laceration w/o foreign body of oth part of head, init encntr	104	$257192
13	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	101	$342581
14	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	96	$287996
15	J45901	Diseases of the respiratory system	Unspecified asthma with (acute) exacerbation	80	$567137

Table F18: Top 15 discharge codes for inpatient and emergency department visits, 5-9 years (Yavapai County), 2016-2021, *N* = 14,179

Rank	ICD-10	Category	Description	Encounters	Charges
1	J020	Diseases of the respiratory system	Streptococcal pharyngitis	649	$1202063
2	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	616	$1050180
3	J101	Diseases of the respiratory system	Flu due to oth ident influenza virus w oth resp manifest	450	$933222
4	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	336	$504338
5	S0181XA	Injury, poisoning, and certain other consequences of external causes	Laceration w/o foreign body of oth part of head, init encntr	283	$538090
6	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	274	$849935
7	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	269	$900259
8	S0990XA	Injury, poisoning, and certain other consequences of external causes	Unspecified injury of head, initial encounter	266	$773553
9	J111	Diseases of the respiratory system	Flu due to unidentified influenza virus w oth resp manifest	249	$478825
10	K5900	Diseases of the digestive system	Constipation, unspecified	231	$737253
11	J050	Diseases of the respiratory system	Acute obstructive laryngitis [croup]	223	$393874
12	H6691	Diseases of the ear and mastoid process	Otitis media, unspecified, right ear	221	$253084
13	H6692	Diseases of the ear and mastoid process	Otitis media, unspecified, left ear	203	$187606
14	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	197	$428767
15	R509	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Fever, unspecified	196	$518541

Ages 10-14

Table F19: Top 15 discharge codes for inpatient and emergency department visits, 10-14 years (all northern Arizona counties), 2016-2021, *N* = 57,418

Rank	ICD-10	Category	Description	Encounters	Charges
1	J020	Diseases of the respiratory system	Streptococcal pharyngitis	1799	$2840724
2	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	1766	$2436696
3	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	1589	$2566572
4	R45851	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Suicidal ideations	927	$4380701
5	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	830	$4066257
6	K5900	Diseases of the digestive system	Constipation, unspecified	649	$2799091
7	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	649	$1999625
8	F329	Mental, behavioral, and neurodevelopmental disorders	Major depressive disorder, single episode, unspecified	610	$6540227
9	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	588	$1301822
10	S0990XA	Injury, poisoning, and certain other consequences of external causes	Unspecified injury of head, initial encounter	574	$2065833
11	S93401A	Injury, poisoning, and certain other consequences of external causes	Sprain of unspecified ligament of right ankle, init encntr	552	$1058764
12	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	530	$1636105
13	J101	Diseases of the respiratory system	Flu due to oth ident influenza virus w oth resp manifest	513	$1362619
14	R55	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Syncope and collapse	499	$2270747
15	S93402A	Injury, poisoning, and certain other consequences of external causes	Sprain of unspecified ligament of left ankle, init encntr	487	$918967

Table F20: Top 15 discharge codes for inpatient and emergency department visits, 10-14 years (Apache County), 2016-2021, *N* = 7,147

Rank	ICD-10	Category	Description	Encounters	Charges
1	J020	Diseases of the respiratory system	Streptococcal pharyngitis	668	$681162
2	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	475	$375901
3	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	204	$186415
4	J00	Diseases of the respiratory system	Acute nasopharyngitis [common cold]	166	$137710
5	R05	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Cough	123	$50564
6	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	107	$119186
7	U071	Codes for special purposes	COVID-19	74	$390574
8	J09X2	Diseases of the respiratory system	Flu due to ident novel influenza A virus w oth resp manifest	72	$77105
9	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	64	$96025
10	K5900	Diseases of the digestive system	Constipation, unspecified	61	$180272
11	K529	Diseases of the digestive system	Noninfective gastroenteritis and colitis, unspecified	59	$120108
12	F332	Mental, behavioral, and neurodevelopmental disorders	Major depressv disorder, recurrent severe w/o psych features	57	$1134380
13	F329	Mental, behavioral, and neurodevelopmental disorders	Major depressive disorder, single episode, unspecified	54	$546671
14	S93401A	Injury, poisoning, and certain other consequences of external causes	Sprain of unspecified ligament of right ankle, init encntr	51	$78477
15	S060X0A	Injury, poisoning, and certain other consequences of external causes	Concussion without loss of consciousness, initial encounter	50	$205709

Table F21: Top 15 discharge codes for inpatient and emergency department visits, 10-14 years (Coconino County), 2016-2021, *N* = 9,230

Rank	ICD-10	Category	Description	Encounters	Charges
1	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	370	$443768
2	R45851	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Suicidal ideations	225	$964522
3	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	191	$194649
4	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	149	$431955
5	F329	Mental, behavioral, and neurodevelopmental disorders	Major depressive disorder, single episode, unspecified	134	$1897204
6	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	119	$259255
7	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	107	$129057
8	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	103	$169939
9	J020	Diseases of the respiratory system	Streptococcal pharyngitis	97	$147298
10	S0990XA	Injury, poisoning, and certain other consequences of external causes	Unspecified injury of head, initial encounter	96	$209613
11	J45901	Diseases of the respiratory system	Unspecified asthma with (acute) exacerbation	92	$485160
12	S060X0A	Injury, poisoning, and certain other consequences of external causes	Concussion without loss of consciousness, initial encounter	90	$284838
13	S93401A	Injury, poisoning, and certain other consequences of external causes	Sprain of unspecified ligament of right ankle, init encntr	90	$132525
14	R55	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Syncope and collapse	89	$254152
15	S93402A	Injury, poisoning, and certain other consequences of external causes	Sprain of unspecified ligament of left ankle, init encntr	87	$130096

Table F22: Top 15 discharge codes for inpatient and emergency department visits, 10-14 years (Mohave County), 2016-2021, *N* = 16,413

Rank	ICD-10	Category	Description	Encounters	Charges
1	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	528	$983056
2	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	465	$971298
3	J020	Diseases of the respiratory system	Streptococcal pharyngitis	384	$861665
4	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	321	$1969236
5	R45851	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Suicidal ideations	263	$1423101
6	K5900	Diseases of the digestive system	Constipation, unspecified	238	$1264352
7	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	185	$636789
8	S93401A	Injury, poisoning, and certain other consequences of external causes	Sprain of unspecified ligament of right ankle, init encntr	179	$436533
9	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	178	$731389
10	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	167	$546398
11	S93402A	Injury, poisoning, and certain other consequences of external causes	Sprain of unspecified ligament of left ankle, init encntr	167	$406619
12	Z5321	Factors influencing health status and contact with health services	Procedure and treatment not carried out due to patient leaving prior to being seen by health care provider	164	$182604
13	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	157	$777959
14	J101	Diseases of the respiratory system	Flu due to oth ident influenza virus w oth resp manifest	153	$489363
15	S0990XA	Injury, poisoning, and certain other consequences of external causes	Unspecified injury of head, initial encounter	146	$627458

Table F23: Top 15 discharge codes for inpatient and emergency department visits, 10-14 years (Navajo County), 2016-2021, *N* = 9,179

Rank	ICD-10	Category	Description	Encounters	Charges
1	J020	Diseases of the respiratory system	Streptococcal pharyngitis	350	$557798
2	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	252	$386460
3	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	205	$347275
4	F332	Mental, behavioral, and neurodevelopmental disorders	Major depressv disorder, recurrent severe w/o psych features	149	$3082343
5	R45851	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Suicidal ideations	138	$656493
6	F329	Mental, behavioral, and neurodevelopmental disorders	Major depressive disorder, single episode, unspecified	131	$1433053
7	J00	Diseases of the respiratory system	Acute nasopharyngitis [common cold]	122	$180133
8	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	121	$236470
9	K5900	Diseases of the digestive system	Constipation, unspecified	111	$464992
10	S060X0A	Injury, poisoning, and certain other consequences of external causes	Concussion without loss of consciousness, initial encounter	92	$356683
11	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	78	$268454
12	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	74	$428371
13	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	72	$183327
14	R55	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Syncope and collapse	71	$470329
15	R1031	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Right lower quadrant pain	68	$546217

Table F24: Top 15 discharge codes for inpatient and emergency department visits, 10-14 years (Yavapai County), 2016-2021, *N* = 15,449

Rank	ICD-10	Category	Description	Encounters	Charges
1	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	345	$617816
2	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	320	$496630
3	J020	Diseases of the respiratory system	Streptococcal pharyngitis	300	$592801
4	S0990XA	Injury, poisoning, and certain other consequences of external causes	Unspecified injury of head, initial encounter	280	$1079543
5	R45851	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Suicidal ideations	267	$1226191
6	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	245	$1106752
7	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	209	$824229
8	J101	Diseases of the respiratory system	Flu due to oth ident influenza virus w oth resp manifest	200	$450021
9	S93401A	Injury, poisoning, and certain other consequences of external causes	Sprain of unspecified ligament of right ankle, init encntr	182	$316617
10	F329	Mental, behavioral, and neurodevelopmental disorders	Major depressive disorder, single episode, unspecified	180	$2012343
11	R55	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Syncope and collapse	175	$756189
12	K5900	Diseases of the digestive system	Constipation, unspecified	171	$723206
13	R1031	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Right lower quadrant pain	166	$1150494
14	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	140	$412719
15	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	139	$572699

Ages 15-24

Table F25: Top 15 discharge codes for inpatient and emergency department visits, 15-24 years (all northern Arizona counties), 2016-2021, *N* = 214,872

Rank	ICD-10	Category	Description	Encounters	Charges
1	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	3781	$7257166
2	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	3720	$6311258
3	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	3271	$21075402
4	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	3221	$16856082
5	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	3075	$14620120
6	R45851	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Suicidal ideations	2605	$12982230
7	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	2556	$10764437
8	J020	Diseases of the respiratory system	Streptococcal pharyngitis	2476	$4762884
9	R0789	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Other chest pain	2006	$8838159
10	R1013	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Epigastric pain	1963	$9477551
11	R079	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Chest pain, unspecified	1957	$9828531
12	R55	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Syncope and collapse	1915	$10361494
13	F329	Mental, behavioral, and neurodevelopmental disorders	Major depressive disorder, single episode, unspecified	1862	$13540824
14	F10129	Mental, behavioral, and neurodevelopmental disorders	Alcohol abuse with intoxication, unspecified	1745	$8274274
15	O200	Pregnancy, childbirth, and the puerperium	Threatened abortion	1680	$7245009

Table F26: Top 15 discharge codes for inpatient and emergency department visits, 15-24 years (Apache County), 2016-2021, *N* = 14,334

Rank	ICD-10	Category	Description	Encounters	Charges
1	J020	Diseases of the respiratory system	Streptococcal pharyngitis	679	$785892
2	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	531	$447220
3	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	279	$258218
4	U071	Codes for special purposes	COVID-19	169	$572347
5	B349	Certain infectious and parasitic diseases	Viral infection, unspecified	161	$228709
6	F10129	Mental, behavioral, and neurodevelopmental disorders	Alcohol abuse with intoxication, unspecified	139	$639821
7	J00	Diseases of the respiratory system	Acute nasopharyngitis [common cold]	133	$115280
8	J0100	Diseases of the respiratory system	Acute maxillary sinusitis, unspecified	132	$115252
9	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	131	$295363
10	R05	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Cough	130	$53996
11	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	122	$369552
12	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	121	$368547
13	F332	Mental, behavioral, and neurodevelopmental disorders	Major depressv disorder, recurrent severe w/o psych features	117	$1684933
14	K529	Diseases of the digestive system	Noninfective gastroenteritis and colitis, unspecified	108	$440443
15	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	97	$158272

Table F27: Top 15 discharge codes for inpatient and emergency department visits, 15-24 years (Coconino County), 2016-2021, *N* = 41,000

Rank	ICD-10	Category	Description	Encounters	Charges
1	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	998	$1141033
2	F10129	Mental, behavioral, and neurodevelopmental disorders	Alcohol abuse with intoxication, unspecified	749	$2577313
3	R45851	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Suicidal ideations	712	$2988315
4	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	632	$783012
5	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	605	$1726406
6	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	600	$2383899
7	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	567	$1510715
8	R1013	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Epigastric pain	504	$1594208
9	R55	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Syncope and collapse	433	$1384012
10	F329	Mental, behavioral, and neurodevelopmental disorders	Major depressive disorder, single episode, unspecified	425	$3492263
11	R0789	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Other chest pain	417	$1278029
12	R079	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Chest pain, unspecified	407	$1307398
13	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	401	$1349380
14	R1031	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Right lower quadrant pain	352	$2140845
15	U071	Codes for special purposes	COVID-19	317	$2263708

Table F28: Top 15 discharge codes for inpatient and emergency department visits, 15-24 years (Mohave County), 2016-2021, *N* = 68,035

Rank	ICD-10	Category	Description	Encounters	Charges
1	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	1378	$9164452
2	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	1272	$2711590
3	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	1267	$10105772
4	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	1261	$7879936
5	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	1222	$3219633
6	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	865	$4526557
7	R079	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Chest pain, unspecified	814	$4631466
8	Z5321	Factors influencing health status and contact with health services	Procedure and treatment not carried out due to patient leaving prior to being seen by health care provider	789	$825868
9	R45851	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Suicidal ideations	721	$4425338
10	J020	Diseases of the respiratory system	Streptococcal pharyngitis	657	$1727231
11	R0789	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Other chest pain	609	$3495556
12	M545	Diseases of the musculoskeletal system and connective tissue	Low back pain	591	$2549541
13	O200	Pregnancy, childbirth, and the puerperium	Threatened abortion	574	$2863229
14	R55	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Syncope and collapse	544	$3887904
15	F419	Mental, behavioral, and neurodevelopmental disorders	Anxiety disorder, unspecified	523	$1914549

Table F29: Top 15 discharge codes for inpatient and emergency department visits, 15-24 years (Navajo County), 2016-2021, *N* = 31,091

Rank	ICD-10	Category	Description	Encounters	Charges
1	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	451	$771853
2	O480	Pregnancy, childbirth, and the puerperium	Post-term pregnancy	417	$6249161
3	J020	Diseases of the respiratory system	Streptococcal pharyngitis	414	$766472
4	R45851	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Suicidal ideations	376	$1820343
5	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	362	$661471
6	F10129	Mental, behavioral, and neurodevelopmental disorders	Alcohol abuse with intoxication, unspecified	327	$1709052
7	F332	Mental, behavioral, and neurodevelopmental disorders	Major depressv disorder, recurrent severe w/o psych features	326	$5340770
8	F329	Mental, behavioral, and neurodevelopmental disorders	Major depressive disorder, single episode, unspecified	325	$2942705
9	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	312	$1425861
10	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	306	$1690191
11	R0789	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Other chest pain	303	$1321771
12	O200	Pregnancy, childbirth, and the puerperium	Threatened abortion	296	$1213916
13	R1013	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Epigastric pain	268	$1348081
14	R55	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Syncope and collapse	257	$1461934
15	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	240	$949535

Table F30: Top 15 discharge codes for inpatient and emergency department visits, 15-24 years (Yavapai County), 2016-2021, *N* = 60,412

Rank	ICD-10	Category	Description	Encounters	Charges
1	N390	Diseases of the genitourinary system	Urinary tract infection, site not specified	1080	$4710953
2	R109	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Unspecified abdominal pain	977	$6526993
3	J069	Diseases of the respiratory system	Acute upper respiratory infection, unspecified	920	$1976811
4	J029	Diseases of the respiratory system	Acute pharyngitis, unspecified	834	$1597583
5	R51	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Headache	787	$3619358
6	R112	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Nausea with vomiting, unspecified	775	$3218365
7	R45851	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Suicidal ideations	737	$3510500
8	R1013	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Epigastric pain	684	$3253407
9	F329	Mental, behavioral, and neurodevelopmental disorders	Major depressive disorder, single episode, unspecified	641	$4196445
10	R55	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Syncope and collapse	615	$3325215
11	S0990XA	Injury, poisoning, and certain other consequences of external causes	Unspecified injury of head, initial encounter	614	$4071752
12	R079	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Chest pain, unspecified	612	$3281985
13	R0789	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Other chest pain	586	$2509481
14	R1031	Symptoms, signs, and abnormal clinical and lab findings, not elsewhere specified	Right lower quadrant pain	568	$4574301
15	O200	Pregnancy, childbirth, and the puerperium	Threatened abortion	550	$2255940

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