

# 2020 Navajo Nation Maternal and Child Health Needs Assessment



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## ACRONYMS AND ABBREVIATIONS

ACS	American Community Survey
ADHS	Arizona Department of Health Services
AHCCCS	Arizona Health Cost Containment System
AI/AN	American Indian/Alaska Native
AIDS	Acquired immune deficiency syndrome
ATSDR	Agency for Toxic Substances and Disease Registry
BMI	Body mass index
BRFSS	Behavioral Risk Factor Surveillance System
CDC	Centers for Disease Control and Prevention
CEDS	Comprehensive Economic Development Strategy
DINEH	Diné Network for Environmental Health
FAS	Fetal Alcohol Syndrome
GPRA	Government Performance Resulting Act
GRP	Gross Regional Product
HIV	Human Immunodeficiency virus
HP2020	Healthy People 2020
IHS	Indian Health Service
MCH	Maternal and child health
MCLs	Maximum Contamination Levels
n =	Specifies the number in a population
NAU	Northern Arizona University
NBCS	Navajo Birth Cohort Study
NICU	Neonatal Intensive Care Unit
NN DED	Navajo Nation Division of Economic Development
NN GIB	Growing in beauty
NNDOH	Navajo Nation Department of Health
NNHS	Navajo Nation Health Survey
NTD	Neural tube defect
PE	Physical education
PRAMS	Pregnancy Risk Assessment Monitoring System
PUH	Public health course acronym used at Diné College
SNAP	Supplemental Nutrition Assistance Program
SNBH	Sa'ah Naaghai Bik'eh Hozhoo
USGS	United States Geological Survey
WIC	Women Infants Children program
WONDER	CDC Wide-ranging ONLineData for Epidemiological Research
YRBS	Youth Risk Behavioral Survey

## INTRODUCTION



Every five years the Arizona Department of Health Services, Bureau of Women's and Children's Health assesses the status of the health and wellbeing of women and children in Arizona as a requirement of the Title V Maternal Child Health Block Grant. The Bureau serves as the administrator of this grant, created in 1981, to serve women and infants, children, and children with special health care needs.

In 2020, the Bureau contracted with Diné College to lead a Maternal and Child Health (MCH) Needs Assessment specific to the Navajo Nation reservation. Diné College engaged the Navajo Nation Epidemiology Center, the Navajo Nation Pregnancy Risk Assessment Monitoring System (PRAMS) advisory group and Northern Arizona University to collaborate in the design, implementation and development of the 2020 Navajo Nation MCH Needs Assessment.

This assessment documents the health status of women and children residing within the Navajo Nation and indirectly, is a review of the strengths and weaknesses of the health care systems in place for women and children. The intention is to inform MCH priority setting for the next five years within the Navajo Nation. Unique to this assessment, a Navajo specific cultural framework, Sa'ah Naagháí Bik'eh Hózhóón (SNBH), was used to emphasize that health outcomes expand beyond socioeconomic status and biomedical factors, and are influenced by the balance between individual, family, community, and environmental health. The application of the Navajo world view and concept of health is critical to guide locally and culturally relevant priorities.

This document includes an overview of the Navajo Nation, a description of the processes used to gather quantitative data from health programs and agencies serving the Navajo people and to solicit public input on the status of women and children, and a compilation of findings. To create an actionable foundation to guide MCH services, findings were presented to a panel of health care practitioners and program managers to set the Navajo Nation MCH priorities for the next five years. The 2020 Navajo Nation MCH Needs Assessment will be used to engage stakeholders and the larger Navajo community to direct resource allocation and planning to improve the health and wellbeing of every woman and child in Navajo Nation.



## EXECUTIVE SUMMARY

The purpose of the Navajo Maternal and Child Health Needs Assessment is to identify areas where maternal, infant, and child health can improve on the Navajo Nation. In the Diné (the Navajo name for themselves) view, the concept of 'health' goes well beyond familiar socioeconomic and medical models. At the same time, that broader view does not exclude important scientific health information. That inclusive viewpoint is reflected in this document to keep in mind the roles of family, our land, our traditional practices and values as Diné, in guiding our efforts to sustain the public's health and safety, protect our citizens, and supporting our living healthily in harmony with our surroundings.

Qualitative and quantitative methods were used to collect health data. Primary health data was collected from adolescent, caregiver, and provider input sessions. Secondary health data was reviewed to provide an understanding of health status. Unique to this needs assessment is the focus on environmental health issues including abandoned uranium mines, and water and air quality; nutritious food access; and motor vehicle crashes. Using a mixed-methods approach provides a broad understanding and identifies the health priority areas for children 0-18 years of age and mothers on the Navajo Nation.

For women and mothers on the Navajo Nation, most women reported fair to excellent health and most reported having visited a doctor within the past year. However, prenatal care begun in the first trimester and adequate prenatal care were lower than the Healthy People 2020 goal. Pre-pregnancy and gestational diabetes have steadily increased. Unintended pregnancies decreased from previous years and contraception use was higher than the Healthy People 2020 goal. "Ever breastfed" exceeds the national goals but breastfeeding duration decreases over time. Still, Native American and Alaska Native women are second highest in overall maternal mortality of U.S. populations.

For children under 18 years of age, preterm birth still exceeds the Healthy People 2020 goal. Child mortality related to unintentional injuries and congenital malformations are the leading causes of death. Oral health care is adequate; however, services including fluoride application are lower than national goals. Substance use, including tobacco and marijuana, are higher than national rates. Unintentional injury and suicide are the top two leading causes of death for adolescent-age children. Suicide planning and suicide attempts for Navajo adolescents were higher than national rates. Overall, most Navajo children had a dental checkups, were physically active, ate nutritious foods and reported not being overweight or obese.



Through the qualitative input sessions, feedback provided by adolescents and caregivers helped provide context for, and insight into, the secondary data findings. Adolescents indicated that safety, health care access, nutritious foods, and land use were considered important to their health. Caregivers felt similarly that housing, healthier-food availability and options, and also mental and substance use treatment services were important. Area health providers prioritized prevention programs, childcare services, healthcare, physical activity, food security, adequate housing and economic stability as ways to improve health for Navajo mothers and children.

This needs assessment process provides a baseline understanding of child and maternal health needs and starting point to address these broad health areas. Engaging with Navajo-regional stakeholders will ensure these needs are met at the tribal, state, and federal levels to improve health and wellbeing of the very sacred Diné.



## PROCESS

### **Program Managers: Dr. Mark Bauer, Dr. Nicolette Teufel-Shone, Kelly McCue, and Craig Manning**

The program managers oversee the implementation team and the advisory council through regularly scheduled meetings. Additionally, program managers are responsible for administering budgets, contracts, and data requests, reporting preliminary findings and priorities of the needs assessment by July 10, 2020. The final report was completed by September 11, 2020. Dissemination takes place until December 2020. Program managers provide technical assistance on the writing and construction of the report, as well as development of any additional information products needed to disseminate the report's recommendations and findings to the wider Navajo community.

### **Implementation Team**

The Diné College work group was responsible for the secondary data retrieval and analysis. The Northern Arizona University work group was responsible for coordinating the input events and clinical and non-clinical based provider survey. Senior level Bachelor of Science in Public Health students enrolled at Diné College received guidance while assisting in each area of implementation as part of their practicum experience.

### **Public Health Student Practicum**

As part of the Public Health Practicum course taught by Dr. Mark Bauer at Diné College, nine students worked with program managers as part of the implementation team. Students gained public health experience on developing a public health needs assessment by focusing on an individual maternal child health topic. The students collected, analyzed, and summarized publicly-available, secondary data, then presented the findings for their own project. This practicum added to the larger needs assessment.

### **Data Retrieval and Analysis: Amber-Rose Waters and Dr. Christopher Dickerson**

The Diné College team collaborated with stakeholders to establish data indicators, gather and analyze data, and interpret the findings, under the direction of the program managers. Amber-Rose Waters led the data retrieval and analysis, with assistance from Dr. Christopher Dickerson. Dr. Dickerson provided input and consultation on secondary data retrieval and analysis for both the group and Public Health practicum students.

### **Input Events**

#### **Dr. Nicolette Teufel-Shone, Kelly McCue, Marissa Tutt, Kristen Tallis**

The Northern Arizona University (NAU) work group was responsible for planning and coordinating the input events to provide qualitative data for the needs-assessment report from the focus population. They developed a survey for clinical and non-clinical based providers to obtain stakeholder feedback on maternal and child health topics. Marissa Tutt is a program coordinator with the Native American Research Center for Health-Center for Health Equity Research at NAU. Kirsten Tallis, MPH, was a graduate student at NAU.

### **Needs Assessment Advisory Council**

The Advisory Council, consisting of public health and medical professionals, and other state and tribal health program directors on and off the Navajo Nation, provided feedback on the implementation of the needs assessment. They gave important guidance on where the resources and needs are in their respective areas.

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### **Input Events**

Input events serve to gather people's perspectives on current and future MCH services, including but not limited to healthcare, education, food assistance, and other resources across Navajo Nation Reservation. These input events were conducted to reach parents and other caregivers of children under 18 years of age, adolescents, and healthcare providers. These sessions were intentionally participant-driven, and participants were provided with prompts or clarification when a question needed clarification. The team purposely did not start these events with the presentation of MCH-related data, in order to avoid influencing the participants in their responses. To support the free flow of information, 10 open-ended questions (Appendix A) were created to explore the insights of participants. Responses from input events were reviewed for themes and were compiled for inclusion in this report.



### **Methods**

#### **Community Input Events**

In February and March 2020, five input events were held throughout the Navajo Nation Reservation facilitated by Diné College and Northern Arizona University public health staff. All input events took place at pre-existing events held throughout Navajo and were conducted in one of two ways: in-person using large Post-It™ notes, or by having participants write their answers to the questions or remotely through a Google Form while staff were facilitating the discussion through video conferencing. Participants were asked about: 1) cultural teachings; 2) the health needs of caregivers and/or their children; 3) what problems/barriers caregivers and/or children experience when trying to access services; 4) services that are needed but not being received; and 5) what is needed in the community and/or Navajo.

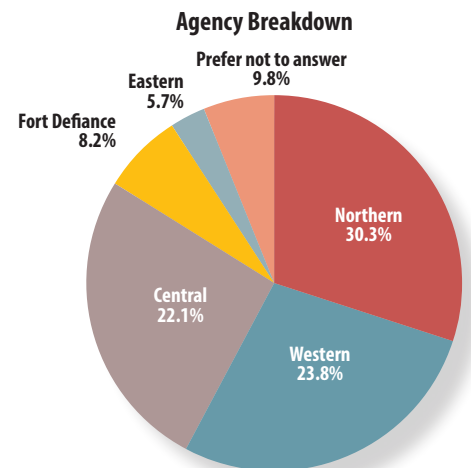
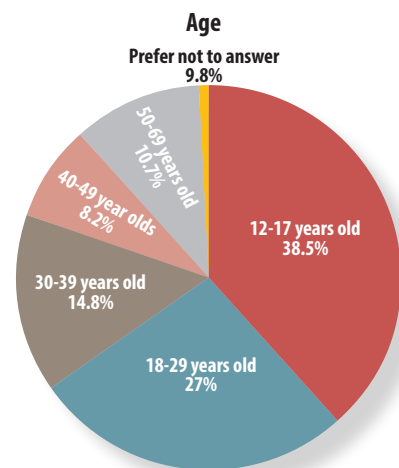
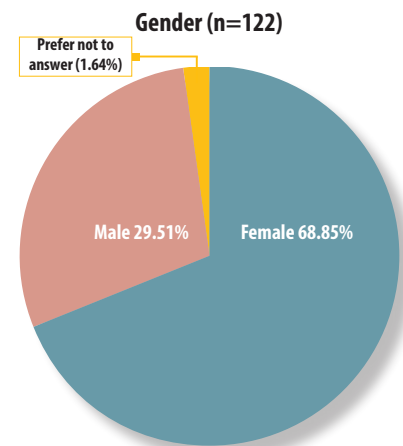
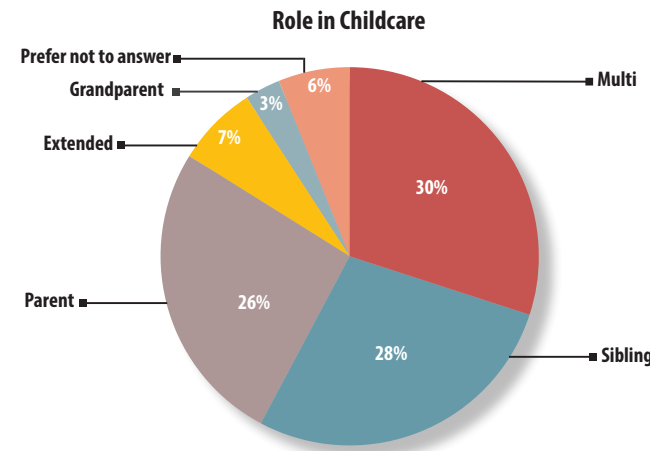
### Provider Survey

The provider survey was launched in April and concluded at the end of May 2020. The eight-question survey (open ended and multiple-choice questions) was administered through the Qualtrics survey platform (Appendix B) to gather demographics, and provider perspectives on 1) intervention use and needs, 2) client and provider barriers, 3) health information, and 4) maternal and child health priorities. Data was stored in Excel and analyzed by content analysis. Participants working in the Navajo-MCH field were recruited through professional contacts of the research team Advisory-Council members.

### Participant Demographics

#### Adolescent and Adult Respondents

At the end of data collection, a total of 122 individuals from the adult and adolescent group responded to the survey. A large proportion (65%) of the participants were between the ages of 12-29, female (69%), and from the Northern, Western, and Central Agencies, the largest tribal subdivision. About 28% identified as being caregivers in the sibling role and 26% identified as a parent. Thirty percent reported have having multiple caregiving roles, for example, a person who cares for a child as a mother, aunt, and/or older sibling.



### Introduction to the Navajo health and wellness framework, Sa'ah Naaghái Bik'eh Hozhoo

The Sa'ah Naaghái Bik'eh Hózhóón (SNBH) model emphasizes the Navajo worldview, a perspective grounded in maintaining balance in health between the individual, the family, the community, and the environment. Incorporating the SNBH model into MCH assessment provides a framework that goes beyond socioeconomic status and biomedical models, providing space for interpreting factors such as language, traditional teachings, and culture that influence health. The SNBH model focuses on four components used to analyze problems through a Navajo lens: 1) thought, 2) body 3) emotion and 4) environment. In the Navajo worldview, health begins with an individual mindset cultivated by the relationships with family (biological and kinship), other living beings, land, and traditional practices. Traditional teachings about health are based on Navajo creation stories that explain destructive behaviors/lifestyle such as laziness, selfishness, uncleanliness and greediness as causal factors for disease or illness.

### FINDINGS

Using the SNBH model, the MCH team qualitatively analyzed the responses from both adolescent and adult input session participants. The responses begin below.

#### Adolescent Responses Needs (Thoughts)

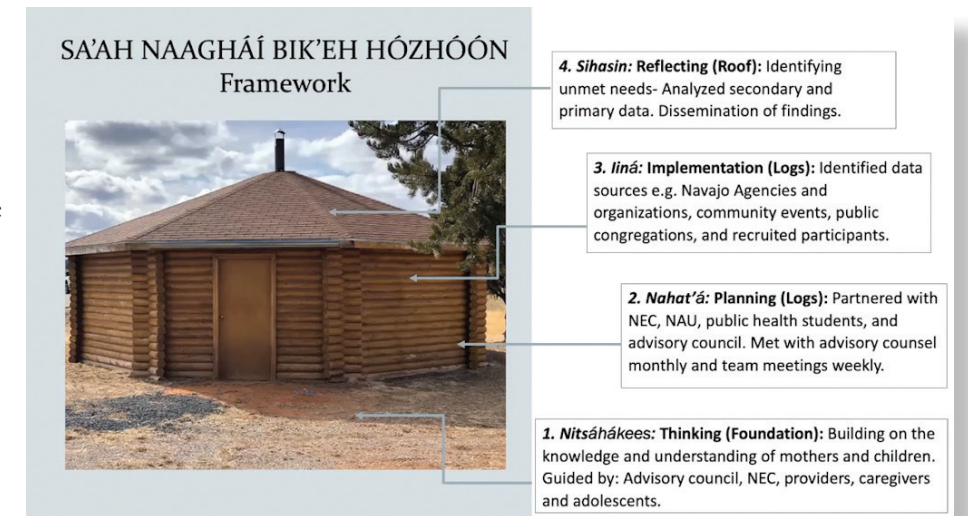
Participants believed there is a responsibility to provide safety and order, expanded health care centers and services, healthier-food outlets, and sustainable land-use planning initiatives.

- Respondents reported they were unsatisfied with the local healthcare system and mentioned the need to expand the services for specialty and primary care providers/family practitioners for the whole family. These concerns were also raised among adolescents who live in rural areas.
- Respondents thought community needs were related to the presence of transient, homeless, and substance user population. Adolescents thought the root of the problem was the lack of employment opportunities, treatment and rehabilitation services, and homeless shelters for substance abuse.

#### Self-Awareness (Body)

Participants recognized their health was largely dependent on self-awareness and personal agency. Adolescent health behaviors and knowledge revolved around the importance of exercise, nutrition, and participation in traditional ceremonies.

- Respondents reported walking was often their choice of physical activity or being a part of a sports program. Running and walking were often mentioned as ways to be physically active.
- Nutrition and physical activity were commonly mentioned together. Teachings were related to eating nutritiously, drinking water, and exercising often. Students associated this with being self-aware especially in making nutritious food choices with a focus on vegetables and leafy greens.
- Respondents expressed they made drinking water a habit, whether they were being physically active or not, on an everyday basis.





- Respondents expressed they themselves hindered their own ability to make health choices or change. Lacking discipline and “laziness” were some personal barriers the respondents reported.
- Respondents reported having greater access to unhealthy foods in comparison to healthy food. They noted rural environments make it harder to reach healthy food outlets.
- Respondents reported that hygiene practices like washing hands, taking showers, and brushing teeth were teachings they learned from others.

### Regulation in Home and Community (Emotions)

Participants believed that emotional regulation was highly influenced by the coping mechanisms in the community provided by their teachers, coaches, or family members. Positive coping mechanisms were established with positive experiences in learning environments like school, sports, and during ceremony. Negative coping mechanisms were mentioned with negative experiences with the lack of support from mentors and lack of access to quality services in the healthcare setting. Additional negative coping experiences were present within their family.

- Respondents referred to programs like team sports, health classes, dorm programs, and Junior Reserve Officer’s Training Corps (JROTC) as programs they used to stay healthy. Within these programs, students learned about health, how to cope, and various life skills.
- Respondents expressed their healthy coping behaviors and mental and emotional well-being were related to being physically active, taking nutritional supplements, socializing, meditation/prayer, accessing school-based services and eating healthily.
- Cultural teachings about moral obligations to be helpful, respectful, and studious in all things related to culture, self-care, and academics.
- Respondents reported depression and substance use were common in the family which contributed to instability and unsafe home environments.
- Respondents also reported no problems with their school or the programs they were enrolled in at school or local organizations.
- Others reported being unhappy with treatment received in school, feeling a lack of encouragement and support or a lack of programs and engagement with students.

### Home infrastructure (Home)

Participants reported their homes lacked the infrastructure to maintain their own health. Respondents reported their community, or the Navajo Nation Reservation as a whole, needed utility infrastructure improvements to connect their homes to water, electricity, and paved roads.

### Adult Responses Needs (Thoughts)

Participants thought their health could improve if their leaders and policies prioritized funding for future housing, healthy food options, and mental health and substance use treatment.

- Respondents reported a need for more organic foods, affordable fresh foods, and the option to buy foods in bulk. There was a preference for more grocery stores over convenience stores.
- Respondents reported always traveling to refill supplies and get the services they need. For example, they often traveled to vision care, dental services, and treatment centers. They also believed increases in education about related aspects of health, including preventative health, are necessary.
- Respondents believed a need exists for more public housing and housing assistance programs to overcome overcrowded homes and housing waitlists.

### Self-Awareness (Body)

Participants were aware their health relies on daily lifestyle habits; whether good or bad (i.e. running to the east versus avoiding exercise, assisting with chores and livestock). They rely on traditional teachings to be physically active throughout the day to avoid being sedentary and to combat laziness. Participants stayed active by interacting with their surrounding environment; doing household chores, like cleaning in home, and outdoor chores like tending to livestock or maintaining outdoor spaces.

- Respondents reported teaching their children about portion size, fruit and vegetable consumption, and drinking water. Eating unhealthy foods and sugar-sweetened beverages were discouraged and monitored by parents. To support healthy eating habits, caregivers made meals at home and taught their children how to prepare meals at home to do so also.
- Caregivers supported and encouraged their children to participate in school, club sports, or playing outside. Respondents reported teaching their children about basic hygiene and sanitary practices such as brushing teeth, washing hands, and cleaning personal space.

### Regulation in Home and Community (Emotion)

Participants felt Navajo teachings and participation in health programs helped them make healthy choices and maintain healthy lifestyles. Respondents reported prayer was a major component of their teachings to overcome personal troubles. Ceremony helped them maintain a positive outlook, provided emotional grounding, supported mental strength, and cleansed the mind, whether it was at church or during daily prayer. In traditional settings, prayer occurs while completing daily chores, food preparation, speaking the language, and at the beginning and end of each day. Through prayer individuals are capable of strengthening self-control, self-respect, and self-care. Beliefs -- whether traditional or not -- provide guidance and promote physical, mental, social, and emotional health. Respondents reported the teachings they were taught encouraged them to be helpful, respectful, humble, and kind to others, especially to elders. Teachings that come from beliefs include the importance of self-identity and kinship.

### Community Infrastructure (Environment)

Participants felt a need for more health facilities, gyms, playgrounds, and safer surroundings (i.e. security, cleanliness) to improve the health of the community. Adult respondents said they used several forms of care including both family traditional practitioners and healthcare services (fitness facilities, primary care, special health needs, dental, vision, checkups, and traditional practitioners) in their location.

- Respondents reported a need for facilities that were safe and within the distance of their neighborhood as safe play areas for children and adult outdoor leisure activities. Preferred recreational areas include trails, playgrounds, sports fields and courts, and wellness centers.
- Respondents reported a need for program development at the local level (i.e., the Chapter), expansion of community activities beyond “Just Move It”, to develop family exercise programs and holistic health programs at schools. Adult respondents reported a need to provide substance use prevention and increase community activities.

## Provider Survey Results

### *Indicated intervention used by mothers and children*

The providers reported the programs available to their clients were broadly categorized as non-profit, state and federal programs, and Navajo Nation programs. State and Federal services were the most frequently reported, and included the Women, Infants, and Children (WIC) nutrition program and Arizona Health Care Cost Containment System (AHCCCS), Indian Health Service, public health nursing, well-visits, and breastfeeding support. Navajo Nation programs followed and referred to social services, NNDOH outreach, Growing in Beauty, and disease prevention programs related to the Coronavirus response. The next category were family-centered non-profit programs like Family Spirit and the Asdzaan Be'eena': Female Pathways Program. These programs focus on childhood and adolescent development based on a culturally-developed curriculum.

### *Indicated intervention needs*

Providers identified interventions their patients needed but which were unavailable. Broadly, these included:

- 1) Resources and Treatment for addressing substance abuse disorders, early exposure to substances, maternal mental health, and supporting domestic violence victims' support.
- 2) Specialized childcare education to supporting caregivers who have children with disabilities, live in rural areas, and who need basic childcare education that is culturally relevant.
- 3) Health promotion and health education to address unhealthy lifestyle behaviors through program development for unhealthy eating, risk taking, and Covid-19 prevention.
- 4) Food and water access, the basic need for caregivers and children to have the ability to eat nutritious food and access to clean water at an affordable price.

### *Where patients retrieve health information*

Providers indicated health education and information came most often by word of mouth, followed by health campaigns, health providers, public organization, and cultural knowledge. The transfer of health information by word of mouth was associated most frequently with family, friends, and personal relationships. The second most frequently mentioned method of receiving health information was through online health campaigns. Healthcare providers were the third leading source of health education as the IHS and other local clinics and hospitals provided resources for their patients. Public organizations like schools, chapters, and other health promotion programs were also sites where patients received health information. Lastly, cultural knowledge was identified as a source of health knowledge through cultural practices and consulting with elders.

### *Indicated barriers for mothers and children*

Providers identified barriers preventing or inhibiting their clients from maintaining their health. These barriers were organized under the social determinants of health, and included:

- neighborhood and environment,
- economic stability,
- healthcare,
- community and social support, and
- food.

The most frequently mentioned factor was healthcare; clients lacked access to healthcare, substance use treatment, health-promotion programs, reliable transportation, and had difficulties navigating the healthcare system. These issues influenced their ability to maintain immunization and medication schedules as well as post-partum appointments. Second was the patient's neighborhood and environment, with health negatively impacted by lack of access to housing, safe places to exercise, basic utilities, and presence of domestic violence leading to housing insecurity. The third most frequently mentioned barrier was economic instability; patients lacked employment, thus income, leading to poverty. The fourth frequently mentioned barrier was the lack of community and social support systems; families impacted by absent fathers; multi-generational homes, leading to over-crowding; peer-pressure; and residing with substance-using relatives and lack of childcare services. Lastly providers mentioned lack of access to affordable and quality food as a barrier to their patients' health maintenance.

### *Indicated barriers for providers*

Providers identified barriers in their own practices and in interactions with their patients that hindered the ability to treat their patients. These issues were broadly categorized as:

- 1) scheduling difficulties,
- 2) client's home conditions,
- 3) beyond scope of program, and
- 4) economic stability.

Providers reported scheduling difficulties limited their ability to ensure patients stayed on track for care and preventative treatment. Scheduling difficulties were attributed to short appointments times, transportation issues, and adherence to home-visiting appointments that decreased client-provider interactions and ability to develop a trusting relationship. Providers also identified clients' home conditions as a barrier as clients needed additional support for children care, lacked personal initiative to adhere to medical advice, or experienced violence and substance use in the home. Economic stability refers to clients' inability to buy nutritious food due to unemployment, financial stress, and poverty. A "Beyond the scope of the program" barrier referred to factors related to scheduling difficulties and a client's home condition, in which providers were unable to address an underlying need that led to their client's inability to maintain appointments or follow treatment plans, such as addressing socioeconomic disparities and limited program resources.

### *Indicated needs among providers*

Providers were questioned about what kind of health issues needed to be addressed. Eight were identified:

1. **Increase prevention programs:** Providers often mentioned the need for more prevention programs on a wide range of topics such as mental health, substance use, and domestic violence.
2. **Childcare services and parenting programs:** The need to increase childcare services for working parents who may not meet income requirements and parenting programs that provide childrearing education in rural areas.
3. **Healthcare utilization and continuity of care: Improve healthcare utilization among the mother and child population by improve health navigation and patient knowledge to promote compliance and preventative health treatment.**
4. **Physical activity and nutrition programs:** Focus on promoting healthy lifestyle behaviors, like increasing physical activity and decreasing unhealthy habits like frequent sugar-sweetened beverage consumption.



5. **Food insecurity:** Improve food security for mothers and children by increasing access to affordable and nutritious foods.
6. **Home utility connection:** Providers pointed to the need to ensure mothers/caregivers, and children have electricity, air conditioning, and water in their homes.
7. **Economic instability:** Improving economic stability through increase employment opportunities.
8. **Culturally relevant health programming and research:** Incorporate language and cultural research into health programs/services were the final priorities indicated by providers.

### Conclusion

We see that among all groups food insecurity, housing, substance use, and violence were significant concerns. Therefore, it is recommended programs, at minimum, expand services and/or increase training to better support mothers/caregivers and children in these areas.

### Secondary Data Retrieval

From January to May 2020, secondary data was gathered from previously published reports, public databases, and requests made to programs or institutions. Data was retrieved and reviewed for the following health areas:

- 1) women and maternal,
- 2) perinatal and infant,
- 3) children,
- 4) adolescent,
- 5) disabled children and youths under 18 years of age, and
- 6) environmental health research.

Additional data was collected on education, tribal programs, and other services provided to Navajo mothers and children pertaining to health. During the 2020 spring semester, senior-level public health students at Diné College analyzed this data to identify potential priority areas in health disparities, providing interpretive guidance, and creating graphs, charts, and tables. Findings were shared as their final Public Health Capstone presentations. This work was used to inform the data on each population domain. Presentations and PowerPoints (including video presentations with links) were sent to Navajo-regional stakeholders as part of the priorities setting.

### Data Sources

Healthy People 2020 rates for the overall United States and American Indian and Alaskan Natives were used for comparison, as were other appropriate national rates. Data sources may overlap but different data were extracted for each group.

#### *American Community Survey*

The American Community Survey (ACS), conducted annually, uses a national, representative sample to ask about socioeconomic characteristics, in order to provide population estimates. Data estimates from 2014-2018 provided information on health insurance as well as disability estimates on children under 18 years of age.

#### *Arizona Birth Defects Monitoring Program Report*

The Arizona Birth Defects Monitoring Program Report (2006-2015), by the Arizona Department of Health Services (ADHS), reports rates per 10,000 live births on neural tube defects, orofacial defects, and congenital heart defects broken down by county and race, including Native American.

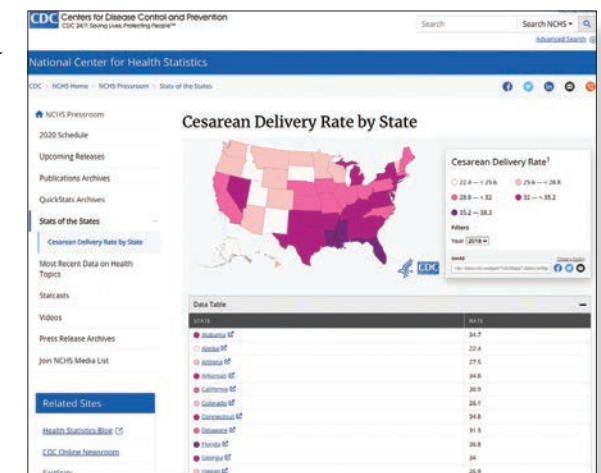
#### *CDC Wide-ranging ONline Data for Epidemiological Research (CDC WONDER)*

The CDC Wide-ranging ONline Data for Epidemiological Research (CDC WONDER), a public use database, includes data on birth and maternal characteristics. 2016-2018 data obtained for the report included demographic data for the mother, pregnancy interval, pre-pregnancy diabetes and hypertension, gestational diabetes, preterm birth, cesarean and vaginal delivery, source of payment for delivery, maternal morbidities, breastfeeding, birth weight, birth age, congenital anomalies, pre-term birth, low birth weight, admission to neonatal intensive care unit, WIC and Medicaid enrollment, breastfeeding, and delivery method. Due to privacy restrictions, data was obtained on Native American, not specifically Navajo, births for three counties containing portions of the Navajo Nation: Coconino and Navajo counties in Arizona and San Juan County in New Mexico. (Note: county population needed to exceed 100,000 for the data to be publicly accessible.)

#### *Government Performance and Results Act*

The Government Performance and Results Act (GPRA) requires federal agencies, such as the Indian Health Service (IHS), to report performance measures to ensure they are meeting goals and using funds effectively and appropriately. Data for 2016-2019 was retrieved from the IHS GPRA report on childhood weight control, immunizations, and oral health for children, 2 months to 17 years of age, utilizing Navajo Area hospital facilities.

	Women's health	Maternal health	Perinatal & infant health	Child health	Adolescent health	Disabled children & youth	Environmental health
American Community Survey				X		X	
Arizona Birth Defects Monitoring Program Report			X				
CDC Wide-ranging ONLINE Data for Epidemiological Research (CDC WONDER)		X	X				
Government Performance and Results Act (GPRA)			X	X			
National Immunizations Reporting System					X		
Navajo Health Survey	X						
Navajo Hospitalizations Report		X					
Navajo Mortality Report		X	X	X	X		
Navajo Nation Youth Risk Behavior Survey				X	X		
Navajo-Area Hospital Data		X					
Pregnancy Risk Assessment Monitoring System (PRAMS)	X	X					
Research Studies							X
Women, Infants, & Children (WIC) Breastfeeding Report		X	X				



### *National Immunizations Reporting System*

The National Immunizations Reporting System is a public database IHS facilities across the United States contribute immunization data to by age and quarter. For this report, 2019 data on recommended vaccines, including human papilloma virus and influenza, were obtained for adolescents 13-17 years at six IHS facilities.

### *Navajo Health Survey*

The Navajo Health Survey, the primary source for women's health, is a 204-question survey administered in all five agencies of the Navajo Nation between 2013-2016. It asks demographic, healthcare access, health screening, substance use, violence, and nutrition questions. For this analysis, only female responses were included and the data was weighted across the population of women on the Navajo Nation.

### *Navajo Hospitalizations and Emergency Room Rates Report*

The 2013-2016 Navajo Hospitalizations Report was created by the Navajo Epidemiology Center (NEC) to describe six hospitalization types for women among Navajo-Area facilities, including unintentional injuries, emergency-room visits, and intentional and undetermined-intent emergency room visits. Pregnancy-related hospitalizations were also reviewed, including emergency-room visits for abortive pregnancies and other pregnancy issues, hospitalizations for abortive and other pregnancy issues, and all healthcare visits for abortive pregnancy and other pregnancy issues.

### *Navajo Nation Mortality Report, 2006-2009 Arizona & New Mexico Navajo Mortality 2010-2013 New Mexico Portion of the Navajo Nation*

Both the 2006-2009 Navajo Nation Mortality Report Arizona and New Mexico, and the Navajo Mortality 2010-2013 New Mexico Portion of the Navajo Nation were created by the Navajo Epidemiology Center and reports age-adjusted rates for the leading causes of death among women, infants, children aged 0-9 years of age, and adolescents aged 10-19. Other reported data includes infant mortality rates per 1,000 for Arizona and New Mexico and gender for each state (Navajo Nation Mortality Report, 2006-2009 Arizona and New Mexico only). The rates per 100,000 per year were calculated for males and females. Unintentional injuries, suicide, and all other causes were the leading causes of death in adolescents by rate per 100,000.

### *Navajo Nation Youth Risk Behavior Survey*

The 2017 Navajo Nation Youth Risk Behavior Survey is an 82-question survey conducted around the Navajo Nation Reservation among middle and high schools whose student population is Native American. This survey collects data on substance use, unintentional injuries, violence, sexual behaviors, nutrition, physical activities, and other cultural behaviors leading to resilience. 9,023 high school students and 2,289 middle school students completed the survey, with an approximately equal sex distribution in each group. Rates from the National Youth Risk Behavior Survey were used for comparison.

### *Navajo-Area Hospital Data*

The 2019 Navajo-Area Hospital Data included women who gave birth at IHS and IHS-funded contracted hospitals in Chinle, AZ; Gallup, NM; Shiprock, NM; Ft. Defiance, AZ; Tuba City AZ; and Winslow, AZ. Data on delivery methods included vaginal and cesarean delivery as well as repeat and primary cesarean deliveries.

### *Pregnancy Risk Assessment Monitoring System*

The Pregnancy Risk Assessment Monitoring System (PRAMS) included Navajo-specific data from Arizona for the years 2016-2017 and New Mexico for the years 2016-2018. The PRAMS questionnaire asks demographic, insurance access, contraception usage, oral health care, prenatal care, infant sleep position, health care access, breastfeeding, substance use, violence, and mental health-related questions for the pre-conception, prenatal, and post-partum periods.

### *Women, Infants, & Children Breastfeeding Report*

The 2016-2018 Women Infants and Children (WIC) Breastfeeding Report for Arizona and Navajo Area was retrieved online. This report included women enrolled in WIC and rates of breastfeeding and formula usage.

### *Environmental Health Research Studies*

Environmental health data was included to describe issues affecting the health of Navajo mothers and children. Secondary data was collected and reviewed from the following environmental research studies:

- Metal Exposures and Oxidative Stress Markers in Pregnant Navajo Birth Cohort Study Participants
- Nutritional Assessment of Pregnant and Lactating Navajo Women
- Diet Quality Among Pregnant Women in the Navajo Birth Cohort Study
- Residential Proximity to Abandoned Uranium Mine and Serum Inflammatory Potential in Chronically Exposed Navajo Communities
- Quantification of Elemental Contaminants in Unregulated Water Across Western Navajo Nation
- Effects of Bicarbonate and Oxidizing Conditions on U(IV) and U(VI) Reactivity in Mineralized Deposits of New Mexico
- Effects of Bicarbonate, Calcium, and pH on the Reactivity of As(V) and U(VI) Mixtures
- Arsenic Association with Circulating Oxidized Low-Density Lipoprotein in a Native American Community
- Calcium in Carbonate Water Facilities the Transport of U(VI) in *Brassica juncea* Roots and Enables Root-to-Shoot Translocation
- Exposures to Uranium and Arsenic Alter Intraepithelial and Innate Immune Cells in the Small Intestine of Male and Female Mice
- Respirable Uranyl-Vanadate-Containing Particulate Matter Derived From A Legacy Uranium Mine Site Exhibits Potentiated Cardiopulmonary Toxicity
- Spatial and Temporal Study of Arsenic and Lead in Soil and Sediment Samples Collected from the San Juan River on the Navajo Nation After the Gold King Mine Spill
- Assessing the Impact of Housing Features and Environmental Factors on Home Indoor Radon Concentration Levels on the Navajo Nation
- Low-cost Measurement Techniques to Characterize the Influence of Home Heating Fuels on Carbon Monoxide in Navajo Homes
- A Description of Fatal Car Crashes Occurring within the Navajo Nation and its Border Towns Between 2005-2014
- Complexities of Selling Fruits and Vegetables in Remote Navajo Nation Retail Outlets: Perspectives from Owners and Manager of Small Stores
- Household Food Security in the United States in 2013
- Healthful Nutrition of Foods in Navajo Nation Stores: Availability and Pricing
- Healthy Stores Initiative Associated with Produce Purchasing on Navajo Nation
- High Levels of Household Food Insecurity on the Navajo Nation
- The Variety, Affordability, and Availability of Healthful Foods at Convenience Stores and Trading Posts on the Navajo Reservation

Summaries for each research article are included in the Environmental Health section.



### Education and Tribal Program data

Due to the timeline and impacts of Covid-19, the MCH team sought Advisory Council input on additional data sources that could provide information on other health-related areas, such as education and tribal programs. Data on education was retrieved from reports and online databases accessible to the public for schools in Arizona, New Mexico and Utah. Tribal programs unable to fulfill data requests, were asked to provide a program summary giving background, service areas, approximate enrollment numbers, types of referrals made, strategies or interventions that facilitate program objectives, a list of collaborations with other programs or community groups, and three needs they felt should be met in their field. Although this was sent to various programs, though only one completed the request.

### Priority Setting

After secondary data were collected and analyzed, preliminary priorities were established for each population domain. PowerPoint presentations were created on the health data findings, with video versions of the presentations available, to allow stakeholders to review the information before priorities setting meetings. This approach was designed to allow more time for discussions on priorities. Four separate priorities setting meetings were held in June 2020 via Zoom on the domains:

- 1) women’s/maternal health,
- 2) perinatal/infant health,
- 3) child health,
- 4) adolescent health.

During these 1-hour meetings, data and preliminary priorities were discussed for the first 30 minutes after which stakeholders were asked to complete a Qualtrics survey to rank priorities and add any additional priorities. Once the surveys were completed, rankings were averaged and ordered. A presentation, created to show stakeholders how the priorities ranked for each population domain, was presented at the final priority setting meeting on July 2, 2020. Findings from the caregiver listening sessions and Navajo-area provider survey were presented. All priorities, including additional priorities from the earlier priorities setting meetings, were ranked through a Qualtrics survey by stakeholders. The priorities, from highest priority (1) to lowest (5) for each domain are:

Perinatal/ Infant 0-5 years	Adolescent 12 - 17 years	Maternal
1. Mortality (Sudden Unexpected Infant Death Syndrome and Shaken Baby Syndrome)	1. Mental health (ACEs)	1. Prenatal care in the 1st trimester (family planning education)
2. Preterm birth, low birth weight	2. Alcohol use	2. Adequate prenatal care
3. Breastfeeding duration	3. Nutrition	3. Maternal mortality
4. Birth defects	4. Sexual risk behavior - coming of age health education	4. Breastfeeding duration
5. Oral health	5. Tobacco use	5. Drug use
6. Large infant gestational size	6. Family composition, displacement, and homelessness	6. Diabetes
	7. Marijuana use	7. Obesity
	8. Cognitive disabilities	8. Oral health
	9. Sex trafficking and sexual violence	
	10. Dating violence	
	11. Cyber bullying	

## DEMOGRAPHICS

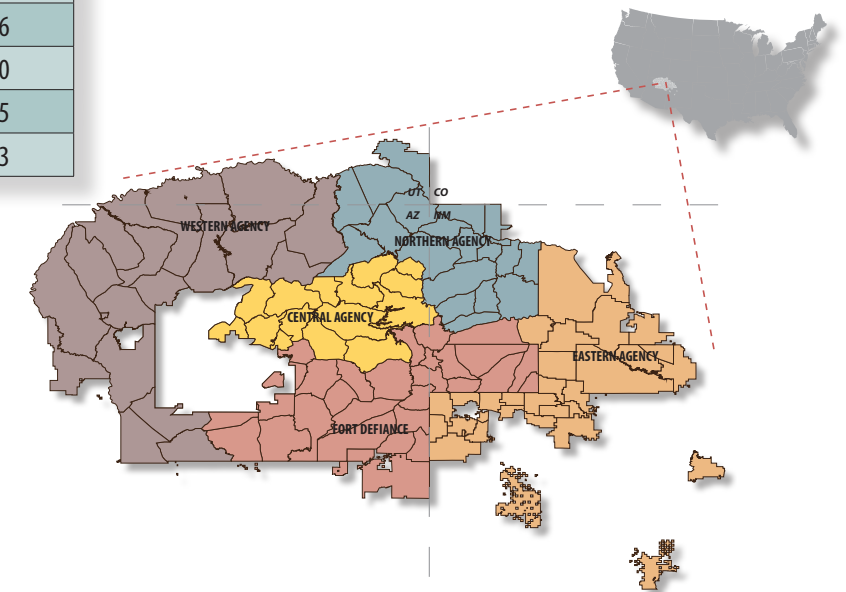
### Population Characteristics

The Navajo Nation is one of the largest American Indian tribes in the United States. Geographically, it is the largest tribal reservation, stretching 27,425 square miles across three states, Arizona, New Mexico, and Utah. In population, the Navajo Nation is the second largest tribe with more than 300,000 enrolled members exceeded only by the Cherokee Nation. According to the 2010 U.S. Census, 332,129 individuals claimed to have Navajo ancestry. This includes both enrolled and unenrolled members. More than half (53%) of individuals claiming Navajo ancestry do not live on the Navajo Reservation but in metropolitan areas (26%), nearby border towns (10%), or other locations in the U.S. (17%). The following information pertains to individuals specifically living on the Navajo Nation Reservation.

### Total Population on the Navajo Nation

According to 2018 American Community Survey (ACS) estimates, the total population living on the Navajo Nation Reservation was 172,875, including all races. There is a slight gender gap between females (52%) and males (48%). The median age of individuals is 31.9 years, with the largest age group being 25 to 35 years old; 13.2% of the population. Adults (18 years and older) make up 71% of the population, with elderly persons (65 years and older) being 12% of the total population. 55,725 individuals were under the age of 20, or 32% of the total population. Of those under 20, 22% were under the age of 5, 26% were 5-9 years, 26% were 10-14 years, and 26% were 15-19 years.

Agency	Chapter count	Population
Central	14	27,823
Eastern	31	33,316
Fort Defiance	27	43,940
Northern	20	30,945
Western	18	37,613



### Agencies and Chapters on Navajo Nation

The Navajo Nation consists of five agencies: Central, Eastern, Fort Defiance, Northern, and Western Agencies. Each agency consists of smaller localities called Chapters. There are 110 Chapters across the Navajo Nation ranging in population from a high of 9,126 individuals (Shiprock) to a low of 76 (White Rock).

### Languages spoken

The Navajo people have their own language called Diné bizáád or the Navajo language. Most older generations speak Navajo fluently while younger generations primarily speak English, though some may speak Navajo proficiently or fluently. For many years, there have been efforts to revitalize the Navajo language among the younger generations through school, within the community, and at home. According to the 2018 ACS estimates, those living on the Navajo Nation over the age of 5 years old spoke the following at home:

- 69% spoke a language other than English (presumably Navajo)
- 30% spoke only English
- 0.5% spoke Spanish

### Language Spoken by Educational Attainment

The population estimate of educational attainment for those over 25 years of age is 108,365. From this group, the estimates of the languages spoken at home indicate:

- 82.8% spoke a language other than English, presumably Navajo
- 17% spoke English
- 0.5% spoke Spanish

The following tables show estimates for language spoken at home by educational attainment for those 25 years and older living on the Navajo Nation.

Less than a high school graduate	Estimate
Speak only English at home	9%
Speak a language other than English	90%
Speak Spanish	0.8%

High school graduate	Estimate
Speak only English at home	16.4%
Speak a language other than English	83%
Speak Spanish	0.5%

Some college or Associate degree	Estimate
Speak only English at home	21.5%
Speak a language other than English	78.5%

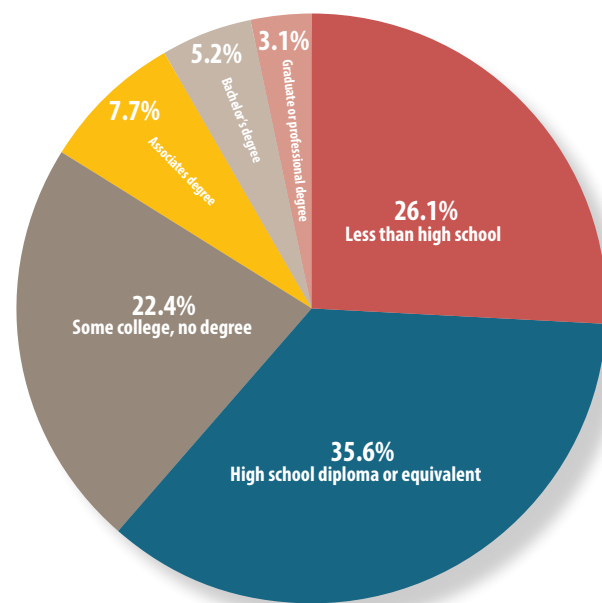
Bachelor's degree or higher	Estimate
Speak only English at home	29.7%
Speak a language other than English	70.3%

Estimates show more people speak a language other than English instead of solely English.

### Education

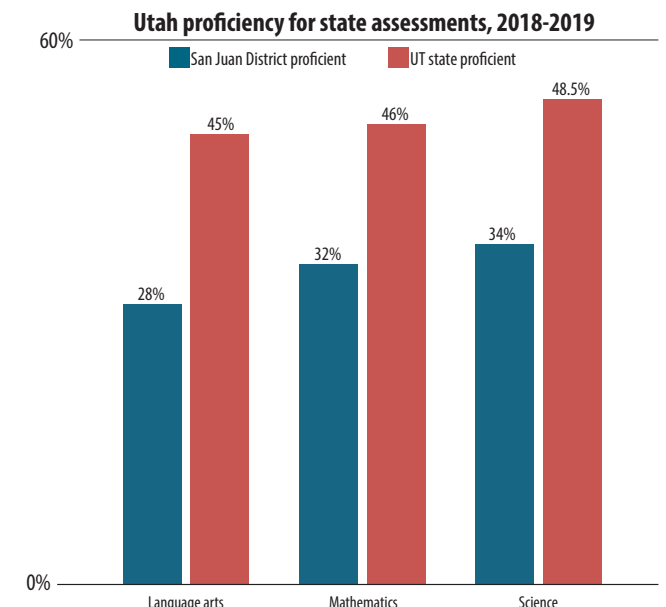
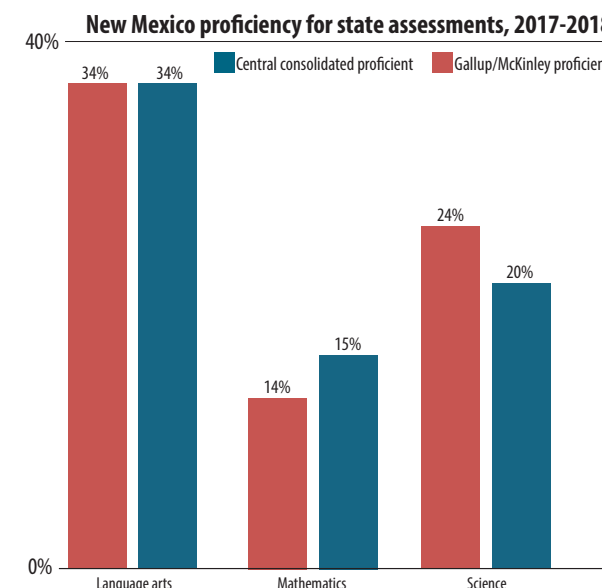
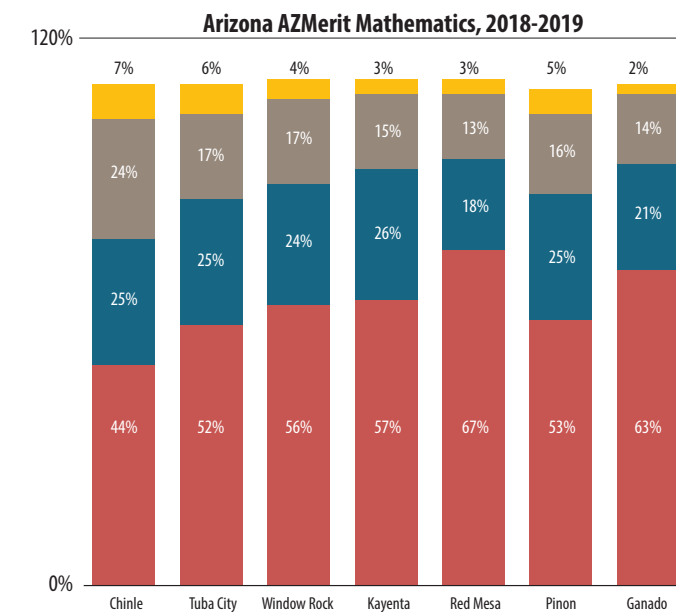
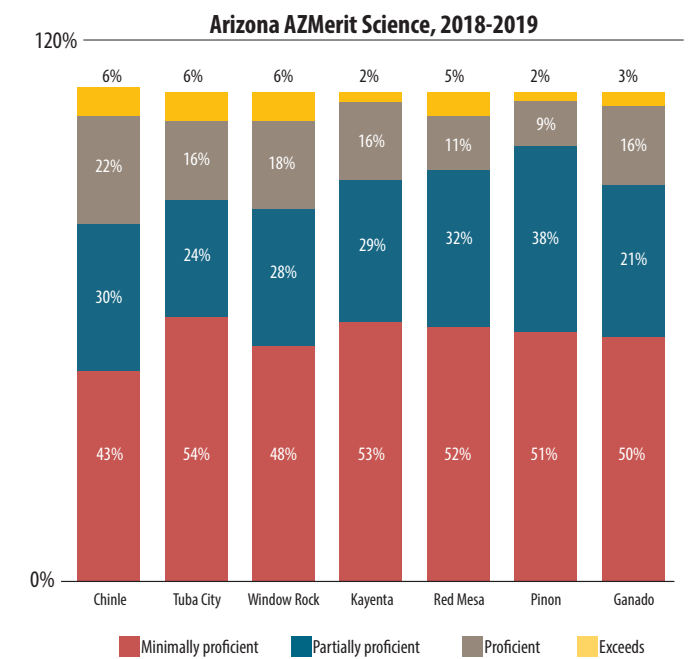
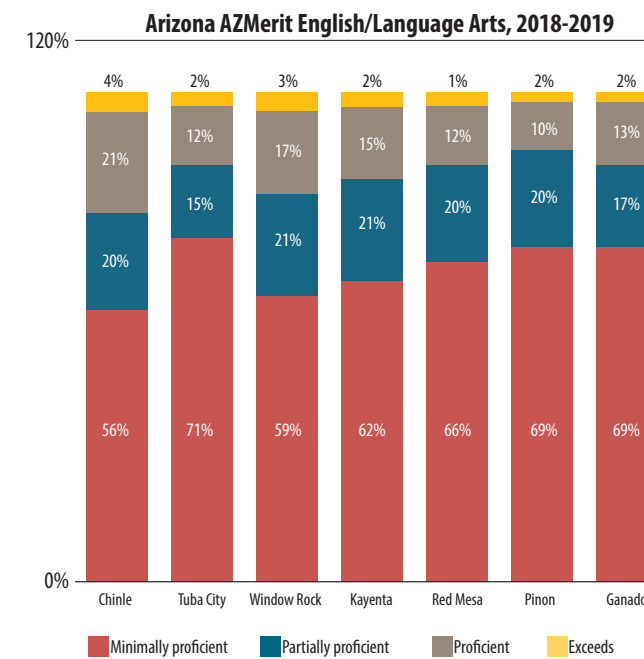
Over 100 elementary, middle, and high schools are located on the Navajo Nation Reservation, including Bureau of Indian Education (BIE) operated, public, private, and Navajo Nation Head Start programs. In border and surrounding towns many schools' student populations have a high proportion of Native Americans. Two colleges are located on the Navajo Nation, Diné College and Navajo Technical University, with a total of 10 instructional sites located across the Reservation. According to the 2014-2018 ACS estimates, 26.1% of people did not complete high school, 73.9% had at least a high school diploma or equivalent, and 8.3% hold a bachelor's degree or higher.

2014-2018 ACS Estimates for Navajo Nation Level of Education



Public school students are assessed yearly in reading and language arts, mathematics, and science. State-assessment results for most public schools located on the Navajo Nation Reservation in Arizona, Utah and New Mexico school districts are below.

The graphs show most Arizona school districts in 2018-2019, were between 10-20% proficient in English, science and mathematics. Chinle Unified School District demonstrated highly proficient scores across all three assessments. San Juan, Utah, school district in 2018-2019, had proficiency levels about a third lower than Utah overall. For 2017-2018, Central Consolidated and Gallup/McKinley County School Districts in New Mexico, assessments were similar in proficiency except for science in which CCSD was 4% higher.





## Economy

Rich in language and culture, the Navajo Nation Reservation faces many social and economic challenges. Created to support economic initiatives, the Navajo Nation Division of Economic Development (DED) objective is to “promote, support and encourage business development in the commercial, small business, tourism industrial and other sectors of the Navajo Nation economy thereby improving the overall quality of life for the Navajo people” (2018, p. 3).

As reported in the 2018 Comprehensive Economic Development Strategy (CEDS), the Gross Regional Product (GRP) “is a value of all goods and services being produced by firms, businesses and corporations within an economic area” (CEDS, 2018, p. 16). Comparing the Navajo Nation Reservation GRP to towns bordering the Navajo Nation Reservation for 2014-2017 shows a bigger decline for Reservation, -6.92% versus -0.36% for the border towns. These border towns include: Blanding, UT, Cortez, CO, Farmington, NM, Flagstaff, AZ, Gallup, NM, Grants, NM, Holbrook, AZ, Page, AZ, and Winslow, AZ. According to the report, “data was isolated per town and segregated from on the Navajo Nation versus off the Navajo Nation” (CEDS, 2018, p. 17).

GRP	2014	2015	2016	Growth/decline
Navajo Nation	2,923,552,585	2,868,639,317	2,721,386,309	-6.92%
Border town	12,326,762,361	12,615,637,751	12,282,633,425	-0.36%

Source: 2014 - 2016 IMPLAN

## Employment and Income

56,711 individuals on the Navajo Nation Reservation are in the civilian workforce, 10,282 of whom are unemployed, making the unemployment rate 18.1%; (ACS, 2018) sixteen points higher than the U.S. rate in June 2018 (Bureau of Labor Statistics). Of those employed, approximately 56.7% were private wage and salary workers, 39.9% were federal, state, and local government workers, and 3.3% were self-employed.

The Navajo Nation has 49,105 households with a median income over the past 12 months of \$26,180 (ACS, 2018). In comparison, the U.S. median household income was \$63,179. Median household income varied by household type on the Navajo Nation Reservation; for families it was \$34,340, for married-couple families it was \$41,506, for non-family household median income was \$11,548, for female householders with children under 18 years but no husband present it was \$21,207, and for families with children under 18 median income was \$30,547.

According to the 2014-2018 ACS estimates, household income came from various sources: 61.9% of households received earnings from a job, 30% received social security, 14.6% received retirement income, 17.5% received supplemental security income and 5.1% received cash public assistance income.

## Poverty

The Navajo Nation has worked toward providing adequate health and economic resources; however, almost half the reservation population live below the poverty level. This is significantly higher than the US population overall but approximately the same as the overall American Indian and Alaska Native population. Estimates from the 2018 American Community Survey show 38.7% of the total population on the Navajo Nation Reservation (n=174,369) live in poverty. According to the Bureau of Labor and Statistics (2018), the U.S. poverty rate was 11.8 but 39% of the American-Indian/Alaska-Natives-only racial group were living in poverty. According to the 2014-2018 ACS estimates, 48.3% of Navajo children 18 and under were living in poverty. For the U.S., 46% of children under 18 were living in poverty in 2018 (BLS).

2018 ACS estimates indicate 27,907 households with children 18 years and younger (56.8%) received some form of assistance, including supplemental security income (SSI), cash assistance, and/or supplemental nutrition assistance program (SNAP).

## Health Insurance and Access to Care

On the Navajo Nation Reservation, there are approximately 17 health care facilities including Indian Health Service (IHS) hospitals, 638 health care centers, and more local health care clinics. The Indian Health Service provides culturally-appropriate health services to American Indian and Alaska Native people across the United States under the US Department of Health and Human Services. Under the P.L. 93-638 or the Indian Self-Determination and Education Assistance Act (ISDEAA), 638 Health Care facilities are independent, nonprofit, tribally-organized corporations receiving funding from IHS to meet Native American healthcare needs.

Population	Count (n)	% insured
All Navajo	174,964	74.8
Females	89,239	77.0
Children under 6	14,750	77.2
Children 6 - 18	37,223	77.6
Individuals with a disability	18	37,613

Source: 2018 ACS

Although most Navajo people have access to IHS for health care, 2018 ACS estimates show about 74.8% of the population, regardless of age, are insured. The ACS reports 56.7% of people living on the Navajo Nation Reservation (n=174,964) had public health insurance, including Medicaid and Medicare, and 23.4% had private insurance. Medicaid coverage alone for those under 19 was 62.7%. About the same percentage is seen among public health insurance coverage for those under 6 (66%) and 6-18 years (63%). Estimates show Medicare coverage (alone or in combination) for those 65 years and over was 89.6%.

## Housing and Transportation

Housing across the Navajo Nation Reservation is located on plots of land or in government-subsidized homes where income requirements must be met. Several barriers make it hard for Navajo people to acquire land and housing including a costly and lengthy process of acquiring a home-site lease. Also, in very rural areas, where many older Navajo people reside, there is a lack of running water and electricity. Due to the lack of housing and difficulties of acquiring a home, many households are multigenerational, making it difficult for some families to create and sustain a healthy and safe home for children.

Five-year estimates from the 2014-2018 ACS report 67,947 houses (46,514 occupied), of which 74.6% were single family homes (i.e. not apartments); 21% of people lived in mobile homes, 4.4% lived in apartments, and 0.1% lived in an RV, boat, or car. Of the homes, 2.6% were built after 2010 and 1.1% were built prior to 1940. Almost 48% of these homes had 3 or more bedrooms while the median number of rooms was 4.2. Of the 46,514 occupied houses, 76.1% were owner occupied and 23.9% were rented. The median property value for homeowners was \$52,200 and 10.8% had a mortgage with a median of \$738 monthly. About 89% owned their homes outright and had a monthly housing cost of \$181. For renters, the median gross housing cost including monthly rent, electric, water, and sewage, was \$501. For homeowners, the average household size of 3.71 persons. For renters, the average household size was 3.65 persons. Households paying 30% or more of their income on housing are considered cost burdened, this included 25.5% of homeowners with a mortgage, 25.8% of renters, and 10.2% of owners without a mortgage.

Primary house heating fuels include gas at 18.4%, electricity at 12.6%, fuel, oil, kerosene at 0.1%, all other fuels, including wood, 68.3%, and 0.6% for no fuels used.

In 2018, 49,040 children under 18 were living in households; a majority in family households and fewer than 1% in nonfamily households (ACS). Estimates for those in family households show 43% were in a married-couple family, 45% were in female-headed households with no husband present, and 11% were in male-headed households with no wife present. Of those households, approximately 57% were biological children, 36% were grandchildren, 4% were other relatives, 1% were adopted children, 0.5% were a stepchild, and 0.3% were foster child or child unrelated to the householder (ACS).

### Grandparent Households

For numerous reasons, grandparents may become responsible for their grandchildren. 2018 ACS estimates report 10,166 of grandparents lived with their grandchildren under 18 years old. As seen above, 36% -- or approximately 17,860 children under 18 -- lived with their grandparent. About 4,000 grandparents were responsible for their grandchildren for some period of time (see table below), while the remainder lived with their grandchildren but were not responsible for them. The estimated children for whom grandparents were responsible is 7,622 and of those 27% had no parent present. Approximately 25% of grandparents who were responsible for their grandchildren had a disability (n=10,166).

Length of Time Responsible (errors)	
Less Than 6 Months	407 (274)
6 to 11 Months	184 (138)
1 or 2 Years	815 (341)
3 or 4 Years	460 (236)
5 Years or More	2302 (465)
Total	4168 (694)

### Transportation

According to estimates from the 2014-2018 ACS, of the 46,514 households, 14% had no vehicle for personal use and 18.9% had 3 or more vehicles for personal use. ACS estimates report 46,429 people over 16 were employed with 87.1% commuting to work. 75.7% of people drove to work alone, 10.7% carpoled, and 0.78% took public transportation. Of the remainder, 4.7% walked, 2% used other means and 6.2% worked from home.

### Social Characteristics

#### Child Welfare

On the Navajo Nation Reservation, the Navajo Department of Family Services (NDFS) addresses the needs of children, adults, and elders who may be experiencing abuse and neglect, and works to provide safety and security within homes. Existing within NDFS are the Department for Self-Reliance, Department of Family Services, Department of Child Care and Development, Developmental Disabilities Program, Navajo Child and Family Services Program, and Navajo Treatment for Children and Their Families Program. These programs are located across the reservation including at Pinon, Dilkon, Ganado, Fort Defiance, Kaibeto, Window Rock, Chinle, Kayenta, and Tuba City, Arizona and Crownpoint, Shiprock, Tohajiilee, and Gallup, New Mexico.

#### Justice System Involvement

The following is the Navajo Children's Code:

The Children's Code shall be liberally construed and interpreted to effectuate the following legislative purposes:

- A. To preserve and restore the unity of the family whenever possible to provide for the care, protection and wholesome mental and physical development of children coming within the provisions of the Children's Code;
- B. Consistent with the protection of the Navajo community, to prevent children from committing delinquent acts and to offer a program of supervision, care and rehabilitation;
- C. To achieve the purposes of the Children's Code in a family environment whenever possible, separating the child from parents and extended family only when necessary for the child's welfare or in the interest of public safety;
- D. To separate clearly in judicial and other processes affecting children under the Children's Code the dependent child, the child in need of supervision and the delinquent child, and to provide appropriate options for treatment and rehabilitation of these children;
- E. To provide a judicial division separate from the District Courts of the Navajo Nation with procedures through which the provisions of the Children's Code may be executed and enforced, in which the parties are assured of a fair hearing, and their constitutional and other legal rights recognized and enforced; and
- F. To provide a forum in which Navajo children charged to be delinquent or in need of supervision in other jurisdictions may be referred for adjudication and disposition, or for disposition alone.

This code provides legal outlines in cases of offenses against or by Navajo children. Furthermore, the Indian Child Welfare Act ensures that Navajo children are protected by:

- Preventing the removal and break-up of Native American families;
- Ensuring Native American tribes have jurisdiction over legal child welfare proceedings; and
- Protecting the existence of Native American cultures.

These tribal and federal guidelines enable the Navajo Nation to ensure Navajo children live and grow in safe environments.



## ENVIRONMENTAL HEALTH

### *Impacts of Uranium on Health*

Uranium, a radioactive metal, was found and mined on the Navajo Nation Reservation starting in the 1940s, resulting in adverse health outcomes among miners due to exposure. Traces of uranium continue to be found in soil, water, and air samples in research studies examining how the Navajo people and land are affected by uranium and other materials.



Photo credit: National Institute of Environmental Health Sciences

Uranium was mined on Navajo for nearly 50 years, beginning with the development of the atomic bomb in the 1940s and ending with the last mine closing in Sanostee in 1986. More than 500 mines were left abandoned, leaving more than 1100 associated individual waste sites of radioactive uranium, radium, and thorium as well as other mixtures of metals, metalloids, and rare earths behind. The waste piles were unstable, open to movement through air and water, and often unfenced, unmarked, and adjacent to communities and residences. No clear plan for remediation within the lifetime of current children exists, meaning exposures are likely to continue for generations to come and result in disparities in health in multiple generations (Lewis et al., 2017). Recent work at the University of New Mexico METALS Superfund Center has shown this waste material is now found in extremely small particle sizes (nanoparticles) that can readily move through air and be inhaled (Avasarala, 2019) can migrate into deep and surface water sources, and be taken up into plants (Gonzalez Estrella, & El Hayek, 2020) suggesting a wide potential for exposure through different routes. More than 85% of homes assessed by the Navajo Birth Cohort Study (see below) since 2013 have shown detectable uranium in indoor dusts, along with other metals known to co-occur in the waste as discussed below. While the early uranium miners had a high prevalence of radon-induced lung cancer, research on adults with community-level exposures by the UNM team have now shown evidence for exposures to this waste through both living in proximity to the waste sites, drinking contaminated water, or engaging in activities bringing people in contact with the waste leads to increased likelihood of hypertension, multiple chronic diseases including diabetes, kidney disease, and cardiovascular disease (Hund et al., 2015, Harmon et al., 2016, 2017), immune dysfunction associated with markers of inflammation as well as autoimmunity (Erdei et al., 2019), and increases in oxidative stress (Dashner et al., 2018). These human findings have been validated in animal models showing direct effects of uranium exposures on the immune system (Medina et al, 2020), as well as on vessels in the cardiovascular system (Zychowski et al., 2018).

Harmon et al. (2017) noted a clear association between heart disease and proximity to abandoned uranium mines on the Navajo Nation Reservation, suggesting inhalation of residual mine waste materials may contribute to cardiovascular disease.



### **Navajo Birth Cohort Study/ECHO: an evidence-based resource to improve MCH**

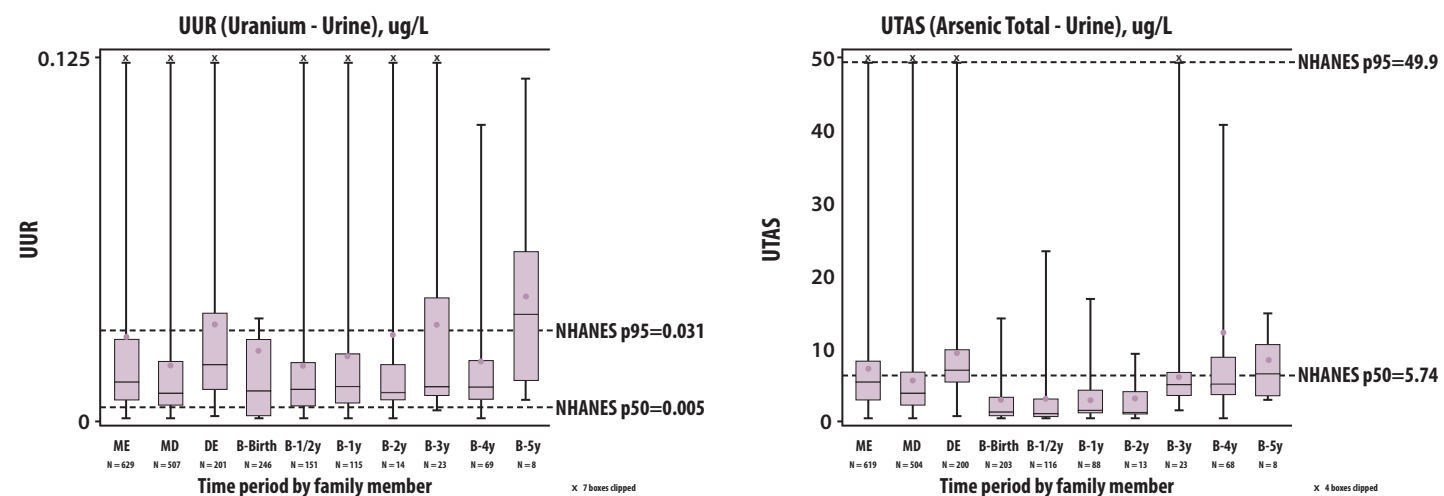
Initiated in 2010, the original Navajo Birth Cohort Study (NBCS) began as a congressionally mandated cooperative agreement between the University of New Mexico and the Centers for Disease Control and Prevention (CDC), in collaboration with Southwest Research and Information Center, the Agency for Toxic Substances Disease Registry, Navajo Area Indian Health Services, and Navajo Nation Department of Health to understand the impacts of exposures to uranium and more than 20 other heavy metals and metalloids (e.g. lead, mercury and arsenic) on birth outcomes and early developmental delays among Navajo children. The study was initiated from community requests to understand the impacts of exposures on future generations, and has now transitioned into a pediatric cohort funded by NIH Office of the Director, NBCS/Environmental influences on Child Health Outcomes (ECHO). NBCS/ECHO will continue enrollment of pregnant Navajo women and follow child development through at least age 8, providing a more comprehensive picture of the impact of a broad range of physical, social, behavioral, and toxic environmental contributors to develop in children on Navajo for the first time. Navajo Area IHS remains a critical partner in this work, as does Navajo DOH. Major findings published and in progress are summarized below in context with other available information.

### **NBCS/ECHO Nutrition Findings**

NBCS/ECHO has evaluated whether prenatal-diet was nutritious enough in pregnant moms for the first time since the early 1981 (DeLaRosa et al., 2020). More than 50% of pregnant women in the NBCS reported inadequate dietary intake of calcium, folic acid, iron, magnesium, vitamin D, and vitamin E irrespective of age, body mass index, education, income, or participation in food assistance programs. While fewer deficiencies were noted than in the 1980s (Butte et al., 1981), this was largely due to lowering of the reference levels for several micronutrients. The effectiveness of supplementation, however, was highlighted by finding more than 75% of participants reported taking prenatal vitamins, and although dietary folic acid (Vitamin B9) intake was 75% below the recommended intake, measured values reflected adequate folic acid. (A major public health promotion of folic acid on the Navajo Nation Reservation occurred during this period.) A major deficiency noted for the first time in pregnant Navajo women, however, was iodine. Virtually all women had measured levels of iodine well below the minimum sufficiency levels for pregnancy issued by the WHO, and more than 50% lower than reported for pregnant women in several NHANES cohorts. Primary sources of iodine in the diet are fish, wheat, and dairy products – with only wheat a common component of Navajo diets. However, a major source of wheat used on Navajo (Bluebird flour) is grown in iodine-poor soils on the Colorado plateau. As iodine is essential for adequate organ and nervous system development, this finding and others underscore the importance of nutritional supplements during pregnancy. Interestingly, the effectiveness of public health initiatives promoting better diets was reflected in high intake of grains and fruits, although sugar intake remains high as well.

### **Metal Exposures during Pregnancy and Early Childhood**

Urine concentrations in pregnant women 14-45 years old in the NBCS were elevated above those in NHANES pregnant and non-pregnant women for uranium, manganese, cadmium and lead. Uranium concentrations in pregnant Navajo women exceeded the NHANES observations by 2.6 – 3 fold (Hoover et al., 2020) reflecting the observation of mixtures of toxic metals in the environment with uranium as a primary concern. Some infants were born with uranium in urine greater than is seen in 95% of adults in the US NHANES cohorts, with subsequent samples, through the first year and limited numbers of annual samples analyzed to date through age 5, indicating exposures to at least arsenic and uranium continue to increase through early childhood (see Figure 1.)



Urine concentrations by family member in NBCS/ECHO for uranium (1A) and arsenic (1B) compared to 50th and 95th percentiles of NHANES cohorts. Legend as follows: ME (mom enrollment); MD (mom delivery); DE (dad enrollment); B (Baby with age indicated after hyphen). Enrollment continues, and while numbers of children from 2 to 5 yo remains small at this time, trends of continuing exposure through childhood are apparent, and the presence of some very high exposures are indicated by the extent of the error bars in the plots.

Participants in the younger generations reflected in the NBCS/ECHO cohort indicate less reliance on unregulated water sources than in older generations. Only 12% of participants in NBCS/ECHO are not connected to a public water source, compared to 36% in studies in older generations. Only 6% of NBCS/ECHO participants report drinking from unregulated water sources, while previous generations reported as many as 75% using unregulated sources. Unregulated water sources evaluated for bacterial contamination by CDC more than a decade ago indicated over 80% were positive for coliforms (fecal bacterial), with more than 20% positive for *E. coli*. While the increased use of public water supplies is a positive indicator of effective public health messaging over the past decade, ~13% of the regulated sources used by NBCS/ECHO participants had exceeded recommended health limits at least once (Figure 2).

### Air Quality and NBCS/ECHO

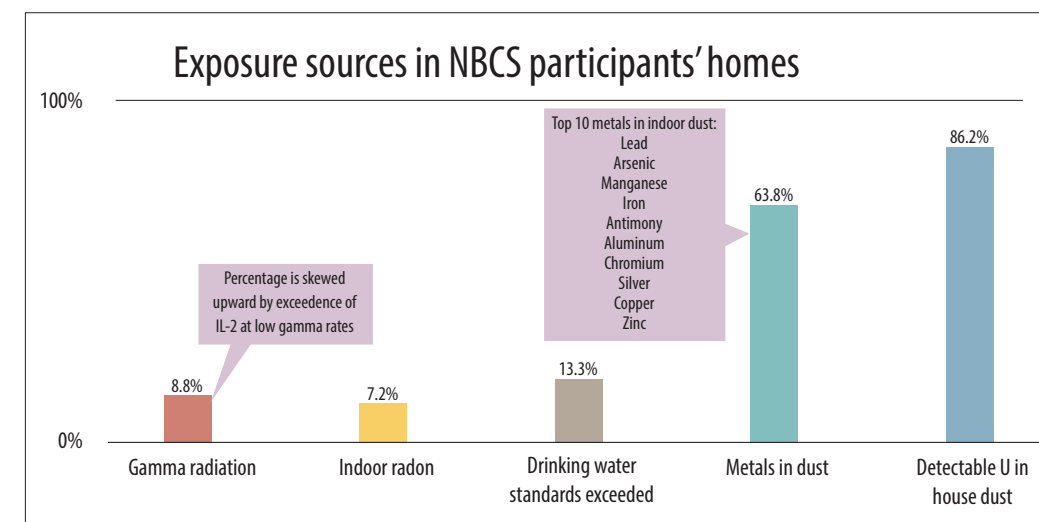
NBCS/ECHO has evaluated indoor home environments for metals in dust, gamma radiation (indoor and outdoor) which is a cancer risk, radon above action levels, metals in dust including uranium at any concentration (purpose of study), and other metals exceeding health-based standards used to evaluate dust at World Trade Center (WTC). The NBCS/ECHO team worked with the federal team that developed the WTC standards to adapt them to continuous, rather than 1-time, deposition. The data are shown in Figure 2. Of note, lead and arsenic, both known to adversely affect nervous-system development, are the most prevalent metals in home dust found to exceed health-based standards on the Navajo Nation Reservation, while very few homes (<10%) show concentrations of radon or radiation at levels of concern for health.

### Birth Outcomes and Developmental Findings to Date in NBCS/ECHO

NBCS/ECHO is an ongoing study with many findings in preparation for publication, neurodevelopmental assessments in progress, and comparative analyses with other participating cohorts just beginning. Results to date have shown several distinct patterns of exposures to metals occurring within participants. Nearly 25% of participants show NO exposures to any of 16 metals of primary concern. However, 40% show combined exposures in the highest observed quartiles for nearly all of these 16 in combination, with four other combination patterns reflected. Having high exposures to multiple metals increases the relative risk of preterm birth by 2.5-3 fold, although some evidence in NBCS data, as well as other studies, indicate mercury can, surprisingly, offset some of the risk. Overall, though, very few participants showed detectable exposures to mercury.

In-depth neurodevelopmental assessments are in progress, with only 125 children aging into the window for assessment prior to COVID-19 shutdown. Of those, significant delays in language development have been

observed, and evaluation of predictors for this in terms of environmental exposures, parenting, or other risk factors continue to be examined. In addition, evaluation of children 2 years following the initial assessment, when they are of school age, will begin this year to determine if negative issues persist or children age out of them. Early childhood screening assessments using instruments employed by Growing in Beauty indicated significant numbers of children with delays in gross and fine motor skills up to 10 months of age, but by one year, these numbers dropped substantially. Evaluation of the validity of the standard assessment tools, validated on the US population as a whole, remain a question the team is working to resolve. Of metals evaluated to date, lead, found frequently in home dusts, has been predictive of early delays. Much remains to be evaluated, however, and the results of NBCS/ECHO in determining how the now well-characterized environmental exposures may be affecting development will be available to inform public health initiatives over the next several years.



Results of Home Environmental Assessments in approximately 600 homes. Percentage of homes with contaminants exceeding screening guidelines and percentage of homes having detectable levels of uranium in indoor dust. (Results through December 2017.)

### Water Quality

Credo et al. (2019) examined the level of arsenic, uranium, and other contaminating elements in unregulated groundwater sources (n=296) on the Navajo Nation Reservation between 2014-2017. Water sample analysis indicated that, of the 21 elements found and tested, 14 were in concentrations higher than national averages. After the Gold King Mine Spill in 2015 by the Environmental Protection Agency workers, Settimo (2017) sampled lead, arsenic, and uranium concentrations in the river, canals, and agricultural topsoil along the Animas and San Juan Rivers from 3 to 9 months after the spill. Their findings indicate levels of lead and uranium stayed constant or increased across different seasons and by sample location, while arsenic slowly increased over time for all seasons and sample location.

### Air Quality

Due to the link between chronic radon exposure and lung cancer, Yazzie et al. (2020) measured indoor radon concentrations (n=110) in mobile homes, hogans, homes made of wood-cement, and homes made of concrete-cement, across the Navajo Nation Reservation between 2014-2015. Radon levels were highest in homes made of concrete-cement, hogans, homes made of cement-wood, and homes made up of primarily wood. Radon concentrations from highest to lowest were found in the Northern, Chinle and Eastern agencies.

Casey et al. (2018) measured carbon monoxide (CO) levels in and outside homes in Tsaile, AZ, and Shiprock, NM, from February to April in 2014. Highest CO concentrations were found in homes using wood and coal heavily for home heating. Also, higher CO concentrations were found in Shiprock than Tsaile homes. The study suggested homes install CO monitors in homes to alert household members when levels become too high.



### Characteristics of Fatal Car Crashes

A 2014 report about fatal car crashes on or near the Navajo Nation Reservation identified fatality risk factors. Examining crash level data on 927 fatal car crashes occurring between 2005-2014, 75% occurred on tribal lands, 54% were going straight, and 67% reported no weather conditions. There were 1,202 vehicles involved, of which 12% of which were not licensed and 7.3% had operators with suspended licenses. The top 3 driver-related factors were:

- Failure to stay in lane,
- Driving while under the influence of alcohol, and
- Careless or inattentive driving.



GPS data 2005 - 2014, coordinates for 723 of fatal 927 crashes.

2,641 people were involved (approximately 1,167 passengers and 1,114 drivers) with an average age of 33.6 years. 854 had a lap/shoulder belt, 63 used a lap belt, but 790 did not use a restraint. For those under 11 years of age, 91 had no restraint, 72 had a belt only, and 35 had a child restraint or booster. Although complete data was not available for car crashes, the report identified areas where fatal car crashes occur frequently.

### Food Access

Structural barriers to accessing healthy food contribute to health outcomes on the Navajo Nation Reservation. The reservation is classified as a food desert by the USDA (USDHHS, 2016). Only thirteen grocery stores operate within the reservation, a land mass of 27,000 square miles (Dine Food Sovereignty Report, 2014). Grocery stores and small retailers on the reservation predominately offer highly-processed foods with low nutritional value, and at higher prices than off-reservation stores (Kumar et al, 2014; Pareo-Tubbeh, 2000). Stores on the Navajo Nation Reservation stock limited varieties and quantities of fruits and vegetables. This combination of limited accessibility to grocery stores and high prices has tangible impacts on food security and health. Navajo food insecurity rates are the highest reported in the United States, at 76.7% (Coleman et al., 2014; Pardilla et al. 2014).



Piltch et al. (2020) interviewed 22 convenience store, trading post, and other store managers or owners on the Navajo Nation Reservation in April to July 2016. Managers reported the Healthy Diné Nation Act (HDNA) and the Women, Infants and Children (WIC) Program require stores to offer healthier food options that are in accordance with USDA requirements. Managers reported challenges and limitations to providing healthier food options, including vendor fees, distribution, and numbers of vendors available to transport fruits and vegetables. Although all stores accept Supplemental Nutrition Assistance (SNAP) and most accept WIC, there are different challenges that limit customers food choices at rural convenient stores when using SNAP and/or WIC.

Many community members describe driving more than an hour to purchase food, usually at larger grocery stores located off the reservation. At the same time, many people also utilize local convenience stores or trading posts for smaller “day to day” purchases yet it is not clear how their purchasing decisions are constrained by the limitations of healthy affordable options at these smaller stores. In a consumer intercept survey conducted in 2016, individuals exiting stores located on the Navajo Nation Reservation were interviewed to understand the factors influencing purchasing behavior from the community perspective. Most shoppers had traveled under 30 minutes to get to the store (76.1%) and shopped at that store at least once a week (72.2%). People were

more likely to purchase fruits and vegetables at their local store if they lived nearby, shopped there more frequently, were enrolled in a food assistance program, or reported a lower level of formal education. They were also more likely to buy produce from stores that stocked more healthy produce options.

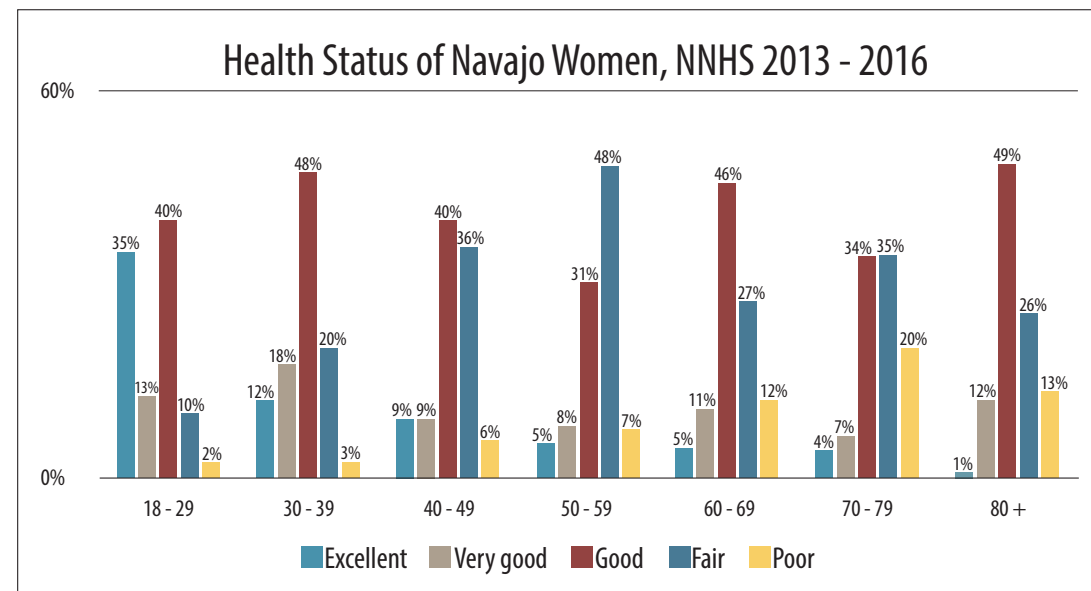
Taken as a whole, these findings suggest community members do rely on small stores to purchase groceries (including fresh produce). While managers described challenges stocking healthier options, these studies suggest more healthy choices at local stores can have a positive impact on healthy purchasing (and presumably consumption), particularly for families who rely on food assistance programs.

## WOMEN'S HEALTH

Background Information: Navajo women's health can strongly impact the health of the population including that of future generations. Although approximately 13 hospitals and clinics are located on the Navajo Nation Reservation, Navajo women seem to do better than men when it comes to regular check-ups and seeking care for health issues.

In this section, access to care, health screening, nutrition, physical activity, substance use and other risk behaviors are reported for women living on Navajo. The 2013-2016 Navajo Nation Health Survey (NNHS) modeled after the Behavioral Risk Factor Surveillance System (BRFSS) addresses these health indicators and was used to determine the health of women in general for this needs assessment. Other sources used in this section were mentioned earlier in the methods section of this document.

### General Health



For women between the ages of 18-49, 60-69, and 80 and over, more than half reported good to excellent health. While of those between the ages of 50-59 and 70-79, less than half reported good to excellent health.

### Body Mass Index and Nutrition

Body weight, nutrition, and physical activity indicate health and wellbeing. With approximately 13 grocery stores across the Navajo Nation Reservation, access to nutritious foods can be a barrier to maintaining health. Access to safe and adequate gyms, biking or running trails, or any support for physical activity are limited on the reservation. Despite this, 72.7% reported some physical activity within the past month. Additionally, efforts to implement workout centers including Zumba, Insanity, and yoga classes across the Navajo Nation Reservation have occurred. According to the NNHS, half reported being obese and 27% of women reported being overweight. A third of women reported eating five fruits and vegetables a day, though the mean fruit (1.27) and vegetable servings per day was 1 each; green vegetables (0.78), orange vegetables (0.57), and other vegetable (0.90) servings.

### Health Care Access and Screenings

Health care access and adequate care can be a challenge on the Navajo Nation Reservation with approximately 17 hospitals and more smaller clinics, some with limited capacity. Advances in prevention outreach and education have improved screening and early care of diabetes, sexually transmitted infections, and cancer. According to the NNHS, two thirds of women reported visiting a doctor within the past year. Forty-three percent of female respondents had one medical provider, 22% had more than one provider, with the remaining 35% indicating no usual provider. About half (53%) had at least one permanent tooth removed. Sixty-two percent reported having ever had a mammogram and 80% were ever screened for cervical cancer. Finally, about half reported ever being tested for the Human Immunodeficiency Virus (HIV), the cause of the Acquired Immunodeficiency Syndrome (AIDS).

### Substance Use

Substance use and abuse remains an ongoing issue on the Navajo Nation Reservation. Culturally appropriate and adequate treatment centers are available, however, funding and other strategies to keep Navajo people from abusing substances is challenging. This can be due to lack of family support, stigma, limited anti-drug/alcohol enforcement, or other structural challenges. Another challenge might be lack of prevalence data on substance use and abuse. According to the NNHS, 10% of women reported consuming alcohol within the past 30 days. The limited data on illicit substance use has been a concern for Navajo communities for some time. For tobacco use, about six percent reported smoking either every day (2.1%) or some days (3.4%) while 10.3% had quit. For chewing tobacco, 5.8% reported having chewed tobacco either every day (2.3%) or some days (3.5%), though most reported not chewing at all (94.2%).

### Violence

Violence in any form has been a concern recently on Navajo Nation Reservation. Laws relating to violence against a family member and cyberbullying are punishable by the Navajo Courts but enforcement is a challenge due to limited law enforcement capacity across the rural reservation. Support services for domestic violence and abuse face challenges in funding and providing access across the reservation. According to the NNHS, 12% of women reported ever being hit, slapped, pushed and kicked. Four and a half percent reported being forced to participate in unwanted sex. The data might be limited due to fear of reporting abuse or a lack of education on recognizing and reporting different forms of abuse. An evolving form of violence is Native women and girls who go missing or are murdered. With a number of cases unsolved, a Missing and Murdered Diné Relatives initiative has been started seeking to establish a database on cases; better address factors leading individuals to go missing due to violence and human/sex trafficking; and provide support to relatives.



## Disability

Disability can create significant hardship for women living on the Navajo Nation Reservation due to limited access to adequate health care and limited family support. Limited transportation and access to medical insurance make obtaining appropriate services, on and off the reservation, a challenge. Local IHS facilities provide care to a degree, however, some specialized services may only be met off the Navajo Nation Reservation. As seen in the table below, disability largely increases with age with a 10% jump between 30 and 40.

Age Group	Percent	Estimated Count
18 – 29	5.2%	764
30 – 39	9.3%	879
40 – 49	19.6%	2,193
50 – 59	34.9%	3,666
60 – 69	29.1%	1,975
70 – 79	49.9%	2,121
80+	62.9%	1,366

## Mortality

Using the Navajo Mortality Report for New Mexico and Arizona (2006-2009), the age-adjusted mortality rate per 100,000 for women from 2006-2009 is shown in the table below.

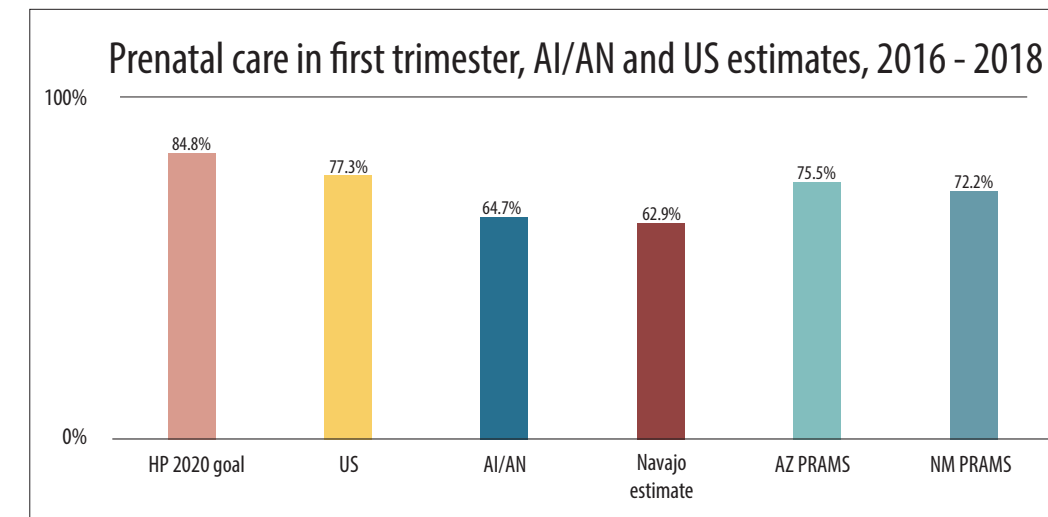
Cause	Per 100,000
Cancer	109.43
Unintentional Injuries	64.88
Heart Disease	57.33
Chronic Liver Disease and Cirrhosis	46.25
Diabetes	44.87
Influenza and Pneumonia	42.81
Dementia	32.65
Stroke	23.44
Septicemia	22.3
Renal Failure	20.3
Parkinson's	11.72
Alzheimer's	10.28
Hypertensive Disease	9.77
COPD	9.71
Suicide	4.62

## MATERNAL HEALTH

Background Information: During the prenatal and postpartum periods, women need access to health care because their health directly impacts their baby's health. Adequate prenatal care must start early, preferably in the first trimester, to ensure mothers have a healthy pregnancy, delivery, and child. Prenatal care ensures problems during the perinatal period are addressed for both mother and child. Many factors affect pregnancy and delivery outcomes including socioeconomic status.

### Prenatal Care

The Healthy People 2020 goal for women receiving adequate prenatal care is 83.2%. Almost half (49.4%) of Navajo women living in New Mexico on the Navajo Nation Reservation reported receiving adequate prenatal care according to the 2005-2011 NM PRAMS report and 75.5% in Arizona according to the AZ PRAMS 2017-2018; both below the HP 2020 goal. Prenatal care begun in the first trimester can be an indicator of adequate prenatal care so the Healthy People 2020 goal is 84.8%. According to the CDC WONDER database, 62.9% of births received prenatal care in the first trimester. Of those women, over half (55.1%) were enrolled in WIC, 44.7% were enrolled in Medicaid, and half were unmarried. Compared to women who started prenatal care later, 81.3% and 87.1% of women started in the second and third trimester were unmarried. The NM PRAMS reports 72.2% and the AZ PRAMS reports 75.5% of women began prenatal care in the first trimester, percentages falling below the goal and overall U.S. rate (77.3%). The overall AI/AN rate was 64.6%. In general, women receiving adequate prenatal care should be a constant priority.



### Prenatal Vitamin Usage

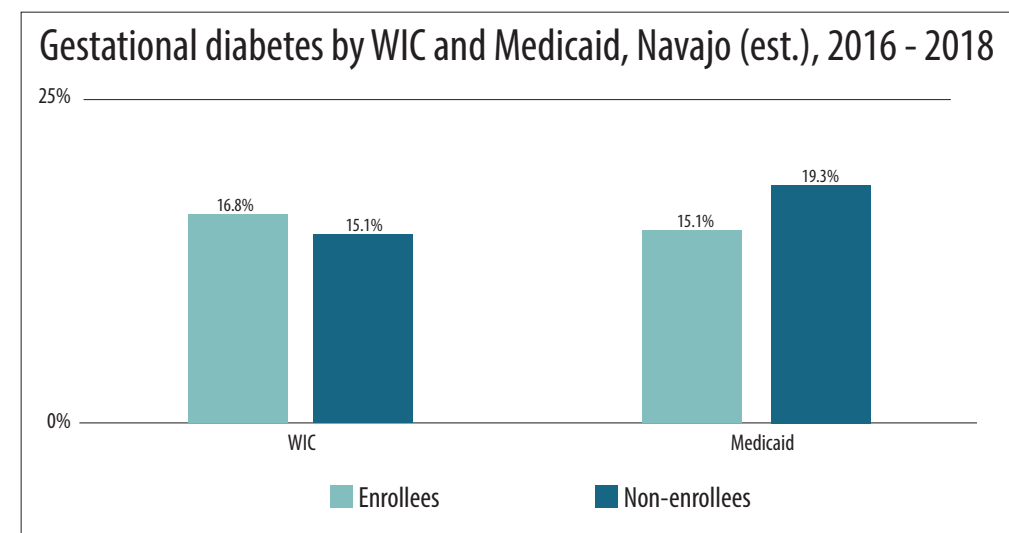
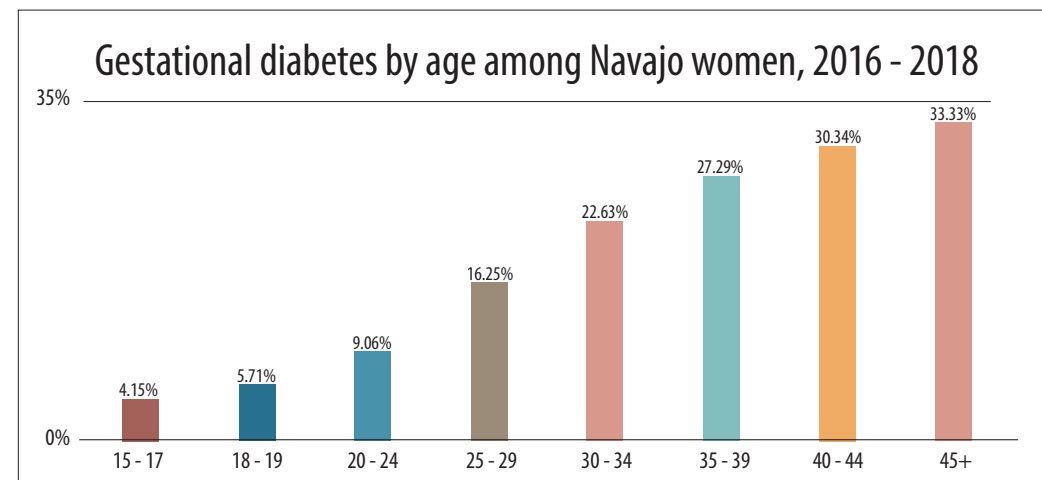
Vitamin usage during the prenatal and postpartum periods is important to both mother and child. Even before conception, vitamin usage, especially folic acid, is vital to women's health. The Healthy People 2020 goal for vitamin usage is 26.2%. The NM PRAMS reported everyday vitamin usage was 30.1%, a 24% increase from 2014, with 8% of women taking a vitamin 1-3 times a week and 4.6% reported 4-6 times a week. The AZ PRAMS reported everyday vitamin usage was 21.2%, with 8.7% of women reported taking a vitamin 1-3 times a week and 4.3% reported 4-6 times a week. Women also reported not taking vitamins, 57.2% according the NM PRAMS, a decrease from 61% in 2014, and 65% for the AZ PRAMS.

### Breastfeeding

According to the CDC (2019), breastfeeding has many benefits for mothers and children long after breastfeeding has ended. In women, breastfeeding can lower risk of developing ovarian cancer, breast cancer, type 2 diabetes, and high blood pressure. In babies, breastfeeding can lower the risk of asthma, obesity, type 2 diabetes, severe-lower-respiratory disease, ear infections, sudden unexpected infant death syndrome, diarrhea, and vomiting. For Navajo mothers, breastfeeding can be beneficial but also poses a challenge due to limited family and workplace support. Efforts toward promoting and supporting breastfeeding have been made by IHS facilities, becoming “Baby Friendly” certified, and workplaces providing space for women to breastfeed, pump, and refrigerate this milk. The Healthy People 2020 goal for ever breastfed is 81.9%, a goal exceeded according to the CDC WONDER database (97.3%) and the AZ PRAMS (94.5%). The challenge occurs in duration, the NM PRAMS reported 70.6% of mothers breastfed more than 2 months while the AZ PRAMS reported 62.7%. Furthermore, the AZ PRAMS reported 3.5% breastfeeding 5-8 weeks and 33.8% reported breastfeeding 4 weeks or less. Data from Navajo Women, Infants and Children (WIC) program show ~57% of women enrolled formula fed, a rate consistent from 2016-2018; ~23% partially breastfed while 21% fully breastfed between 2016-2018. For the AZ WIC program, a majority (69%) are formula feeding while ~20% are partially breastfed and 10% are fully breastfed. Breastfeeding, though providing the best nutrition for babies, can be a challenge, especially with support lacking to continue for longer periods of time.

### Pre-pregnancy and Gestational Diabetes

With high rates of diabetes among Navajo people, pre-pregnancy and gestational diabetes are concerns needing assessed and treated to ensure healthy pregnancies. According to the CDC WONDER database, 2.6% of women had pre-pregnancy diabetes, in line with the 2005-2011 NM PRAMS report (2.8%) and a reduction of more than 75% from the 2000-2004 report (12%). The CDC WONDER data show pre-pregnancy diabetes consistently increases with age. Sixteen percent had gestational diabetes according to the CDC WONDER database, similar to the NM PRAMS rate of 15.1%. According to CDC WONDER, of women with gestational diabetes, 16.8% were enrolled in WIC and 15.3% in Medicaid. The data show of those who had gestational diabetes, 19.3% were not enrolled in Medicaid and fewer were not enrolled in WIC (15.1%).



### Unintended and Unwanted Pregnancies

Unintended pregnancies occur when women wanted to get pregnant but not at that time. Unwanted pregnancies occur when women did not want to be pregnant then or any other time. Women with unintended or unwanted pregnancies may not seek early prenatal care. According to the NM PRAMS and AZ PRAMS, 49.7% and 50.9% of pregnancies were unintended pregnancies; ~4% decline for the NM PRAMS since 2000. For unwanted pregnancies, the NM and AZ PRAMS rates were 50.3% and 56.4%. In prior NM PRAMS reports, unwanted pregnancies were reported to be 16.1% and 16.4%, showing a significant increase since 2000.

### Contraception Use

Contraception use is important to prevent unintended pregnancies, potentially after pregnancy and especially postpartum. The Healthy People 2020 goal for lack of contraception use is 27% or less. The AZ PRAMS reported 22.3% not using contraception, better than the Healthy People 2020 goal. The NM and AZ PRAMS reported 76.9% and 77.7% used postpartum contraception exceeding the Healthy People 2020 goal of 58.5%.

### Postpartum Depression and Abuse

Depression before, during, or after pregnancy, needs diagnosed and treated to ensure women are healthy enough to care for themselves and their child. Postpartum depression may be overshadowed by becoming a new mother and with the related needs. Even with the proper care and support systems, unaddressed postpartum depression may lead women and their children to suffer serious consequences. According to the NM and AZ PRAMS, 14.7% and 5.5% of women reported postpartum depression, a decrease from prior NM PRAMS reports of 20.1%.

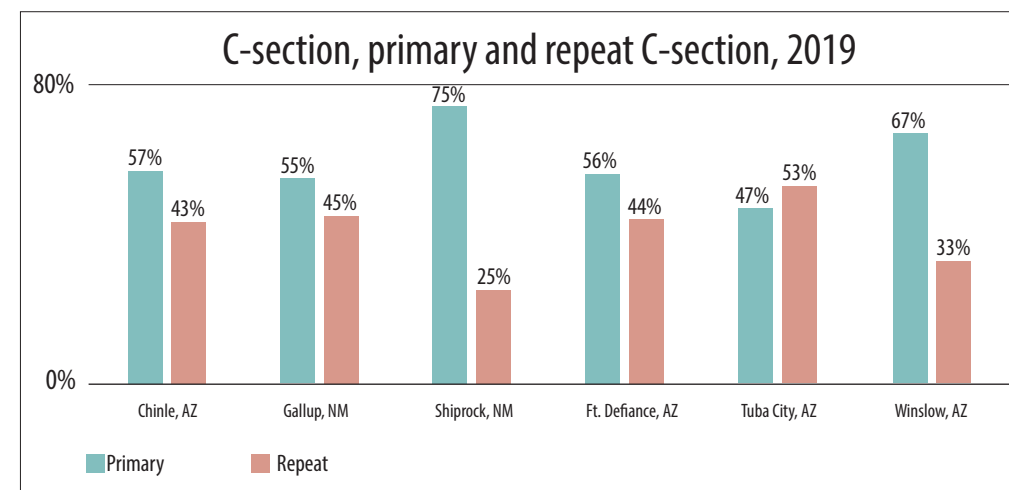
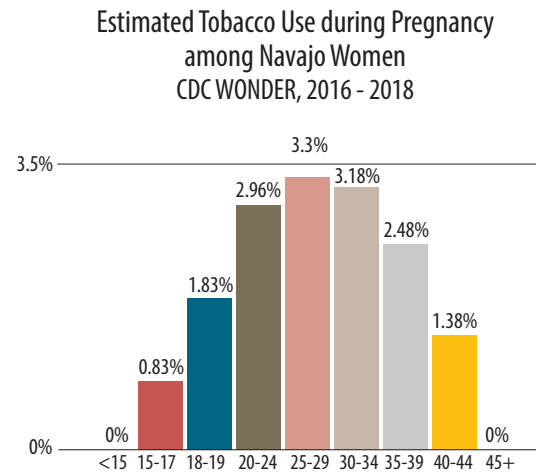
If abuse is involved, entire families will suffer. Data on violence and abuse are underreported for numerous reasons and breaking the cycle of violence and seeking help, especially in rural areas of the Navajo Nation Reservation, may be difficult. The NM PRAMS reports physical abuse by husband or partner to be 10.1%, 7% between 2002-2004 and the 11.4% between 2005-2011.

### Substance Use

Substance use during pregnancy can lead to lasting complications for mother and child. The Healthy People 2020 target for smoking abstinence during pregnancy is 98.6%. According to the CDC WONDER, 97% of women reported not smoking during pregnancy. Three percent of WIC users and

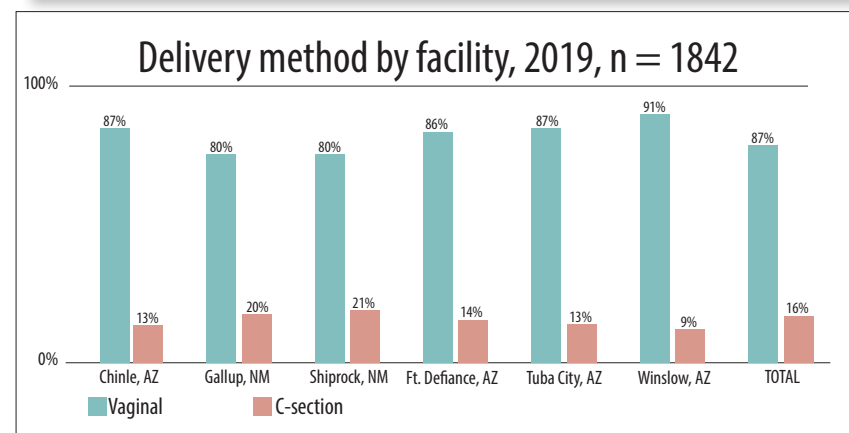
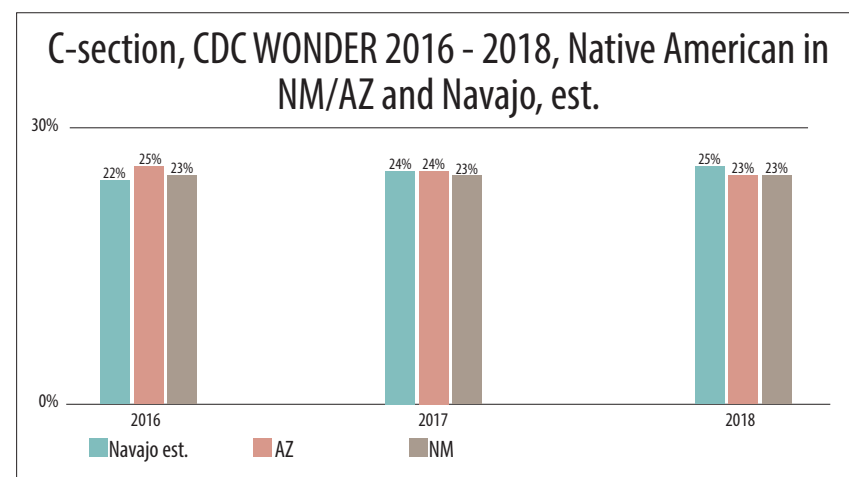


3.17% of Medicaid enrollees used tobacco. Tobacco use increased with age until 25-29 years, decreasing after. This may be due to more women having children around this age as shown in the graph below. According to the NM and AZ PRAMS, 97.16% and 91.8% respectively, reported not smoking in the last trimester, both below the Healthy People 2020 goal of 98.6%. As for alcohol usage, the Healthy People 2020 goal for alcohol abstinence over the past 30 days is 98.3%. The NM and AZ PRAMS data for alcohol consumption 3 months prior to conception are, 32.7% (NM) and 35.7% (AZ) consumed 1 to 3 drinks per week and 32% consumed less than 1 drink per week. These percentages exceeded the goal about 16 times.



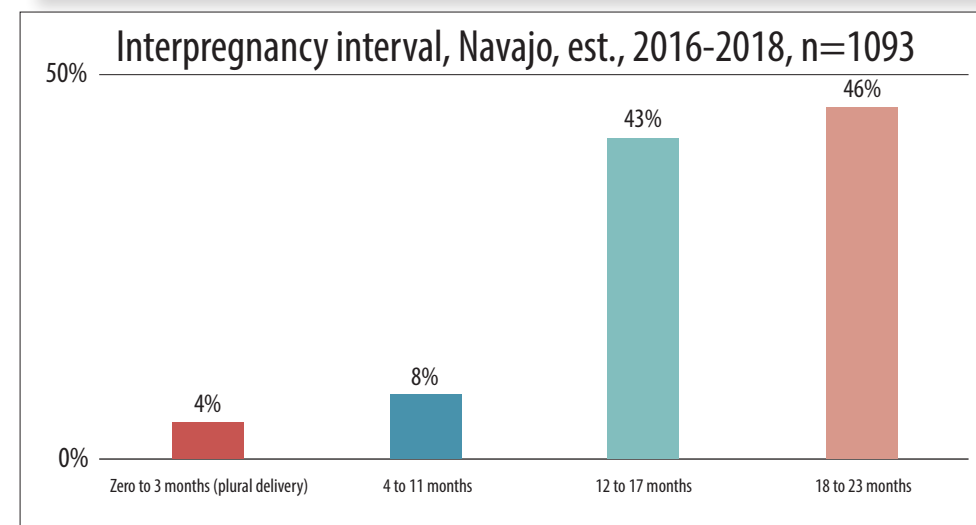
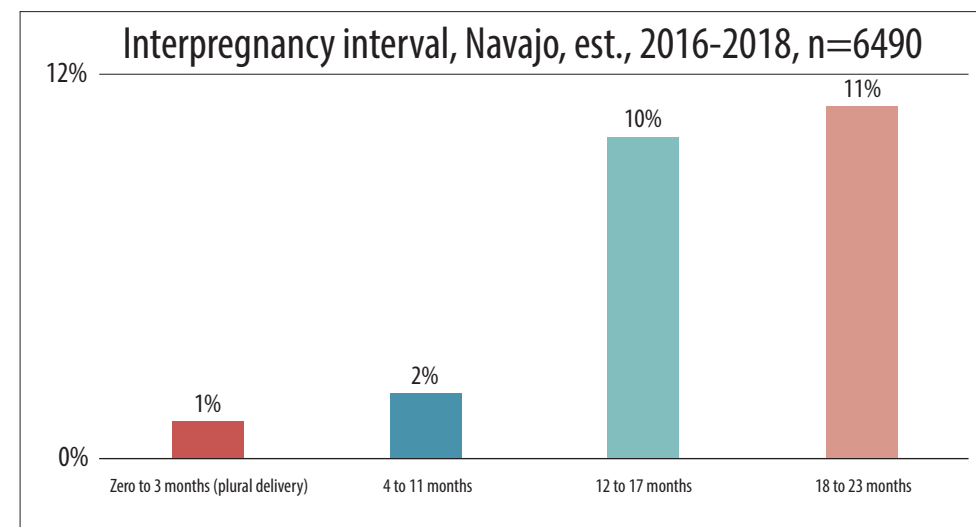
### Delivery Method

Even with a healthy pregnancy, birth may lead to complications for mothers and babies, some of which are termed maternal morbidities. Although most women desire a natural, vaginal delivery, at times a cesarean section is necessary to ensure a healthy mother and baby. According to the CDC WONDER database, the rate of c-sections across 2016-2018 was 23.3%, similar to the Arizona and New Mexico rates each year as seen in the graph below. According to 2019 IHS data, c-sections ranged by facility from 9%-21%. According to CDC WONDER, 41% of women having a c-section had a prior c-section. According to IHS data, more than half of women who gave birth had a primary c-section while a little less than half had a repeat c-section, as shown below.



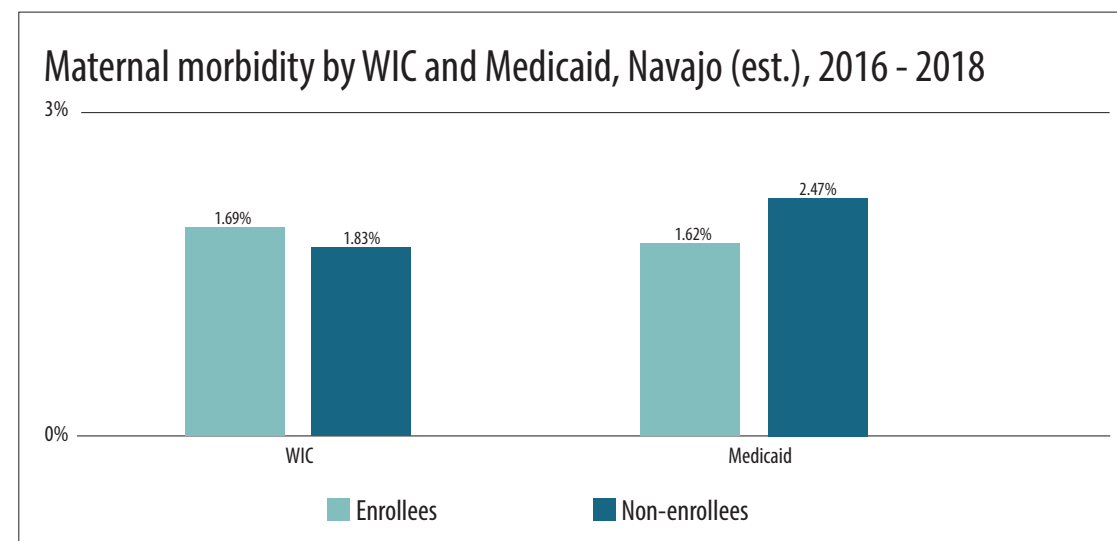
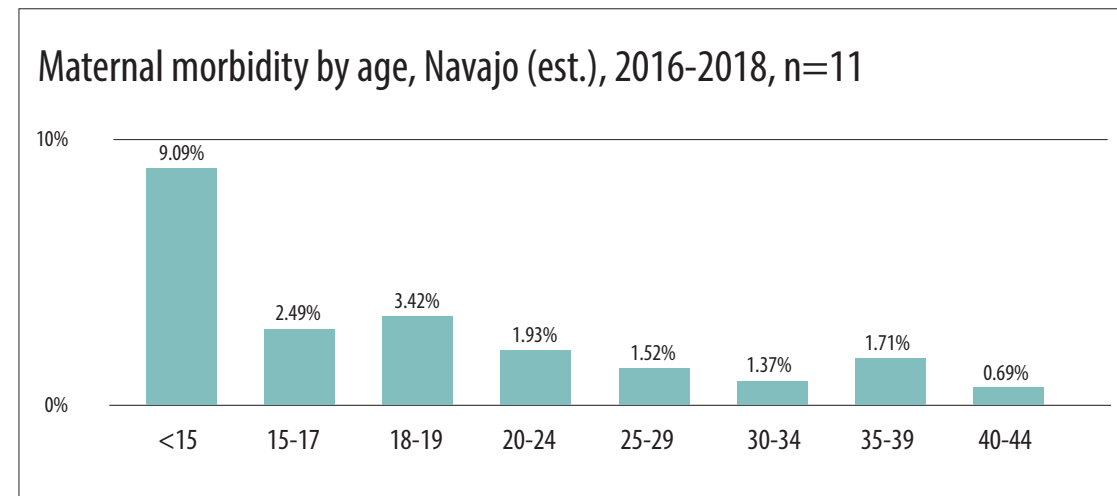
### Interpregnancy Interval

Interpregnancy interval is the time period between births. Shorter interpregnancy intervals, ranging from a year to two years, may cause health complications. According to the CDC WONDER database, 23% of births occurred between 0-23 months from 2016-2018 (n=6,490). The first graph below shows the distribution of all births occurring across those two years. Of the births occurring between 0-23 months, the second graph below shows most occurred between 12-23 months (n=1,093).



### Maternal Morbidity

Maternal morbidities can result from pregnancy or delivery and can be detrimental to a mother's health. Morbidities include maternal transfusions, third- or fourth-degree perineal lacerations, ruptured uterus, unplanned hysterectomy, and admission to intensive care unit. According to CDC WONDER, 1.7% of all births occurring between 2016-2018 had at least one risk factor for maternal morbidity checked (n=11). Among WIC enrollees, 1.69% had one maternal morbidity checked, 1.62% of Medicaid enrollees had one checked with the rate almost double among women not enrolled in Medicaid.



### Pregnancy-related Hospitalizations

The Navajo Hospitalizations and Emergency Room Rates report for 2013-2016, provides data on hospitalizations, emergency room visits, and all healthcare visits. The age-adjusted rate of emergency room visits for other pregnancy issues is 110.1 per 100,000 and for abortive pregnancy the age-adjusted rate is 16.73 per 100,000. For hospitalizations, the other-pregnancy-issues age-adjusted rate is 482.1 per 100,000 and abortive-pregnancy age-adjusted rate is 2.12 per 100,000. For all healthcare visits, the other-pregnancy-issues age-adjusted rate is 2409.7 per 100,000 and abortive-pregnancy age-adjusted rate is 92.14 per 100,000.

The following are age-adjusted rates by type of hospitalizations for women only:

- Anemia: 74.49 per 10,000
- Diabetes: 48.52 per 10,000
- Alcohol dependence: 10.61 per 10,000
- Harmful use of alcohol: 12.09 per 10,000
- All opioid types: 0.40 per 10,000
- Asthma: 12.60 per 10,000

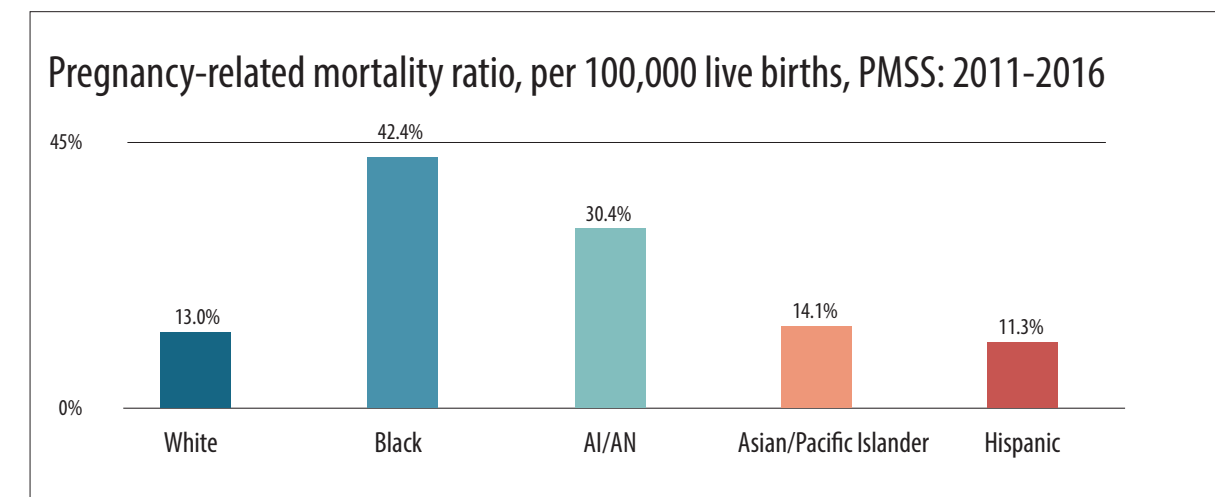
The leading causes of hospitalizations in 2016 are unintentional-injury, emergency room visits including:

- Other and unspecified non-transport: 300 per 10,000 age-adjusted
- Falls: 250 per 10,000 age-adjusted
- Motor vehicle crash: 80 per 10,000 age-adjusted

For intentional and undetermined intent emergency room visits for assault by other means, the age-adjusted rate is 148 per 10,000.

### Pregnancy-related mortality

According to the CDC reproductive health site (2019), pregnancy-related death, maternal mortality, is the death of a woman while pregnant or within 1 year of the end of a pregnancy -- regardless of outcome, duration, or site of pregnancy -- from any cause related to or aggravated by the pregnancy or its management. The Healthy People 2020 goal is 11.4 maternal deaths per 100,000 live births. According to the CDC Pregnancy Mortality Surveillance System (2020), American Indian and Alaskan Natives have the second highest rates of maternal mortality at 30.4 per 100,000 live births, as shown in the graph below. The overall U.S. rate in 2007, was 12.7 per 100,000 live births. The rates for maternal mortality increase with age for all races. Although no Navajo-specific data on maternal mortality is available, the overall AI/AN rate is alarming and must be addressed within the Navajo population.





## PERINATAL AND INFANT HEALTH

Background information: Perinatal and infant health covers the period before and after birth up to age one, though for this report data includes up to 5 years old. For infants and their mother, the perinatal period is the most important time to ensure both have the best possible health outcomes. This includes ensuring health insurance, healthcare access, and support from partners and family members.

### Insurance Access

According to the NM and AZ PRAMS, 73.6% and 77.9% reported having Medicaid insurance. The NM PRAMS found 15.06% used Medicaid with IHS, 2.9% used IHS only, and 8.3% used other insurance. The AZ PRAMS showed 37.3% had IHS, 16% had employer insurance, 5.3% had parent insurance and 0.93% had other insurance.

### Infant Mortality

Infant mortality, the death of a baby before its first birthday, is a population-health indicator. Presented as the number of infant deaths per 1,000 live births, the Navajo Mortality Report from 2006-2009 identified the top five causes of infant death to be sudden infant death syndrome, sepsis, homicide, respiratory and cardiovascular disorders specific to perinatal period, and unintentional injuries. These accounted for 35.6% of all infant deaths with sudden unexpected infant death being 10.4%. Steps can be taken to reduce the risks of the top 3 causes of death; however, this may be challenging for families lacking access to resources or support. The table below provides counts and percent of total deaths for infants.

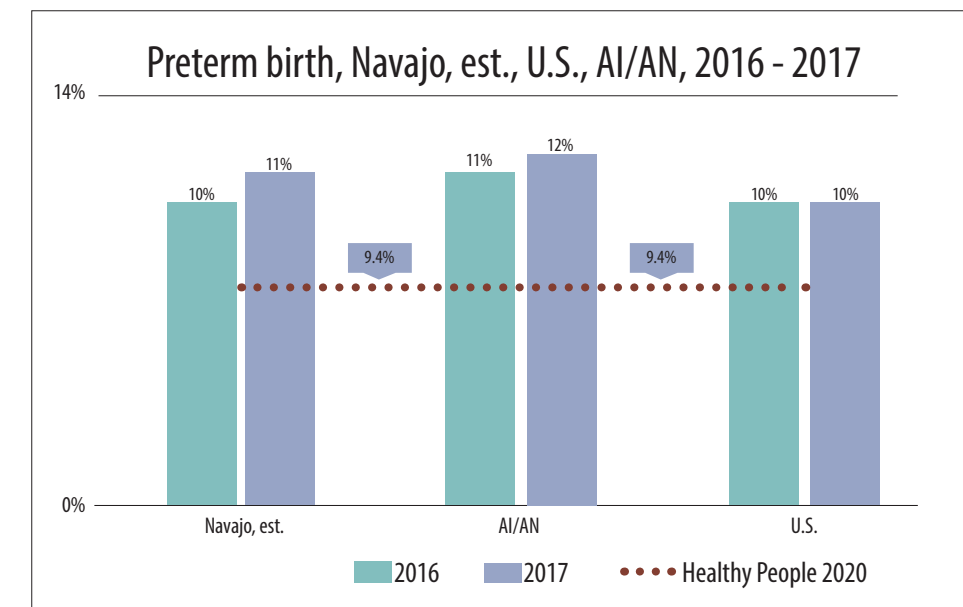
Cause	Count	Percent of total
Sudden Infant Death Syndrome	5	10.4%
Sepsis	3	6.3%
Homicide	3	6.3%
Respiratory and cardiovascular disorders, specific to perinatal period	3	6.3%
Unintentional Injuries	3	6.3%
Congenital malformations of the brain	2	4.2%
Congenital malformations Down's syndrome	2	4.2%
Congenital malformations of the heart	2	4.2%
Congenital malformations of the musculoskeletal system	2	4.2%
Disorder related to length of gestation and fetal growth	2	4.2%
Fetus and newborn affected by maternal factors and by complications of pregnancy, labor, and delivery	2	4.2%

### Birth Defects

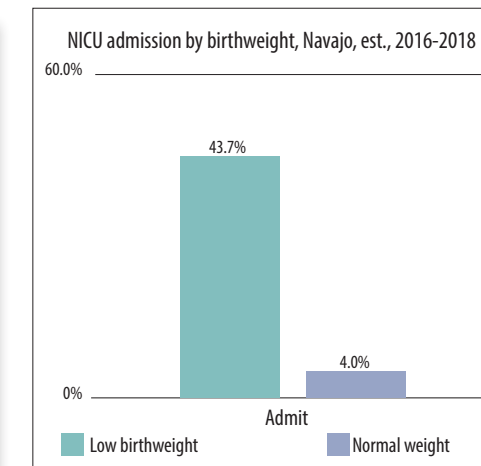
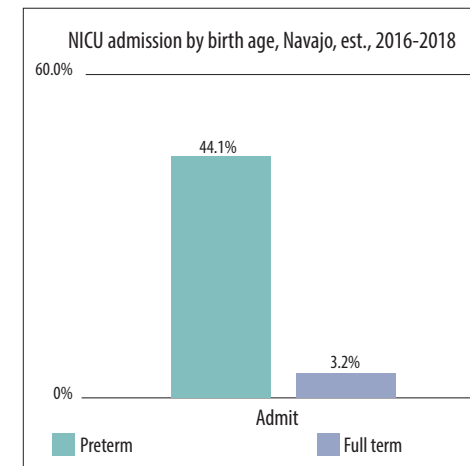
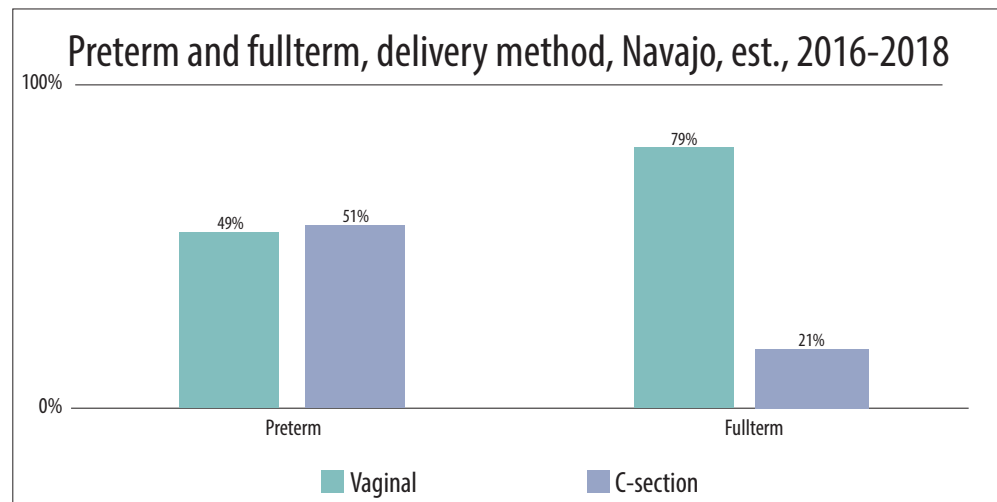
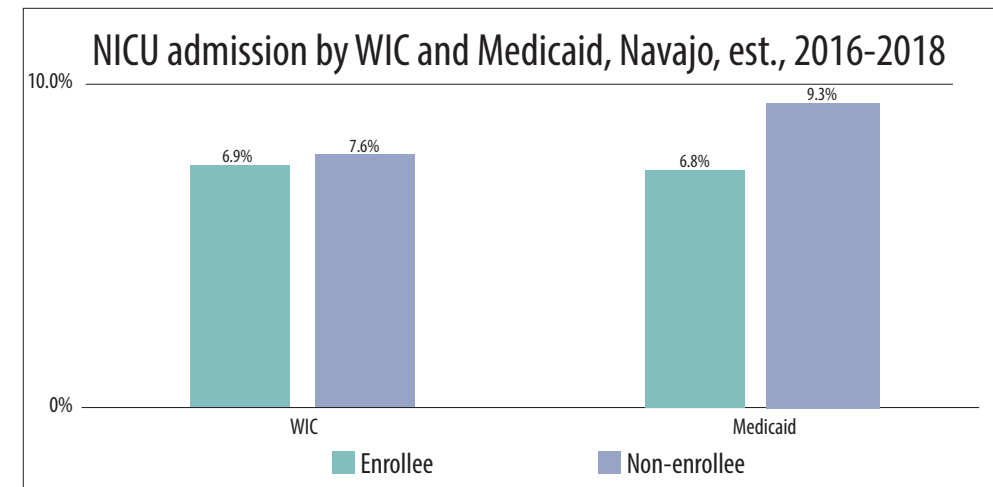
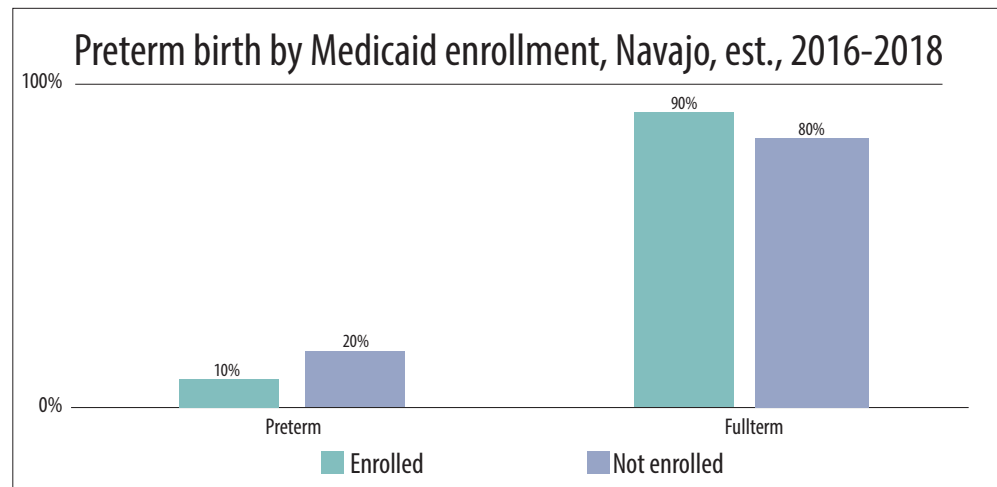
According to the Arizona Department of Health Services (ADHS) Birth Defects Monitoring Program Report (2020), the number of birth defects among AI/AN between 2006-2015, is 9.4/10,000 live births, highest of any population in 2020. Neural tube defects (NTD), such as Spina bifida and anencephaly, are higher for Native American/Alaska Native populations at 8.4 per 10,000. NTD can be prevented if a woman of childbearing age takes vitamin B9 (folic acid) daily during pre-conception (2 months before conception). Another strategy is encouraging obese women to exercise, eat right, and achieve a healthy body weight prior to pregnancy, as well as to continue seeking care after delivery. According to Navajo PRAMS 2005-2011, 61% of Navajo mothers were not taking multivitamins or prenatal vitamins, increasing the risk of NTD and long-term health effects on the spine, brain, and spinal cord.

### Preterm Birth

Late preterm birth occurs between 36-37 weeks gestation with earlier births being preterm birth. Caused by a variety factors, preterm birth can lead to other health complications, such as birth defects, physical and neurological disabilities, and potentially infant death. The Healthy People 2020 goal is to reduce total preterm births to 9.4%. According to the CDC WONDER database estimate, in 2016 the preterm birth rate was 10% (n=225), between the U.S. rate of 9.8% and the overall American Indian/Alaska Native rate of 11%. In 2017 the Navajo estimate increased to 11%, the AI/AN rate increased to 11.6%, and the U.S. rate was 9.9%; though in 2018 the CDC WONDER estimate declined to 9.4%.



Forty-nine percent of preterm births were delivered vaginally while 51% were delivered by cesarean section. According to the CDC WONDER database, from 2016-2018 preterm births occurred to 10% of Medicaid enrollees, half the rate of non-enrolled women suggesting Medicaid enrollment may be protective against preterm birth.



### NICU Admission

The neonatal intensive care unit (NICU) specializes in caring for sick or premature infants. According to the CDC WONDER database, 7.1% of all births (n=6,490) resulted in a NICU admission. Forty-two percent of preterm births were admitted to the NICU compared to 3.2% of full-term births; shown in the table below. Of the 468 NICU-admitted births, the largest group was between 32-35 gestational weeks. Among low-birth-weight infants, those born weighing less than 2500 grams or 5.5 pounds, 43.7% were admitted to the NICU (shown in graph below), with those weighing 2000-2499 grams being the largest group admitted.

Of WIC enrollees, 6.9% were admitted to the NICU while 7.6% were not admitted. Also, 6.8% of Medicaid enrollees were admitted to the NICU while 9.3% were not admitted; shown in graph below. For NICU admissions, Medicaid was the most frequent source of payment at 77.9%, followed by Private Insurance at 9.8%, and self-pay at 2.4%.

### Low-Birth Weight

Low-birth-weight infants are those born weighing less than 2500 grams or 5.5 pounds. According to the CDC WONDER database, for all AI/AN births (n=6,490) between 2016-2018 among Coconino (AZ), Navajo (AZ), and San Juan Counties (NM), 8% had low birth weight. Of the low-birth-weight births, 67% weighed 2000-2499 grams. Of the 468 infants admitted to the NICU, 48.5% had low birth weight while only 4.6% of infants not admitted to the NICU were born with low birth weight. The majority of women who gave birth to low birth weight babies used Medicaid as their method of payment.

### Sudden Unexpected Infant Death

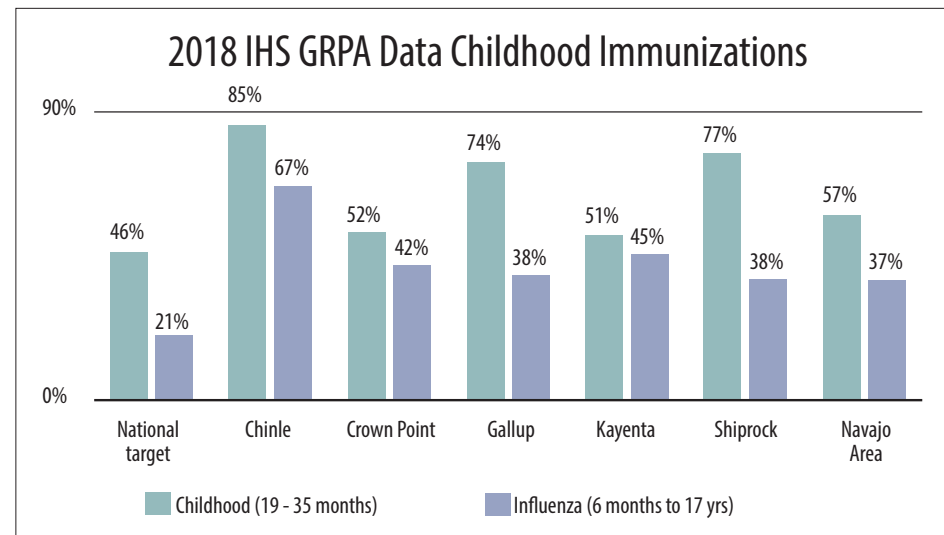
One of the important factors for Sudden Unexpected Infant Death (SUID) is infant sleep position in their sleep environment with infants placed on their backs less likely to die from SUID. According to the 2005-2011 New Mexico PRAMS Report, 84.8% of Navajo mothers reported placing their infant to sleep on their back, a rate significantly higher than the reported National percentage in 2008 of 67.1%.



## Immunizations

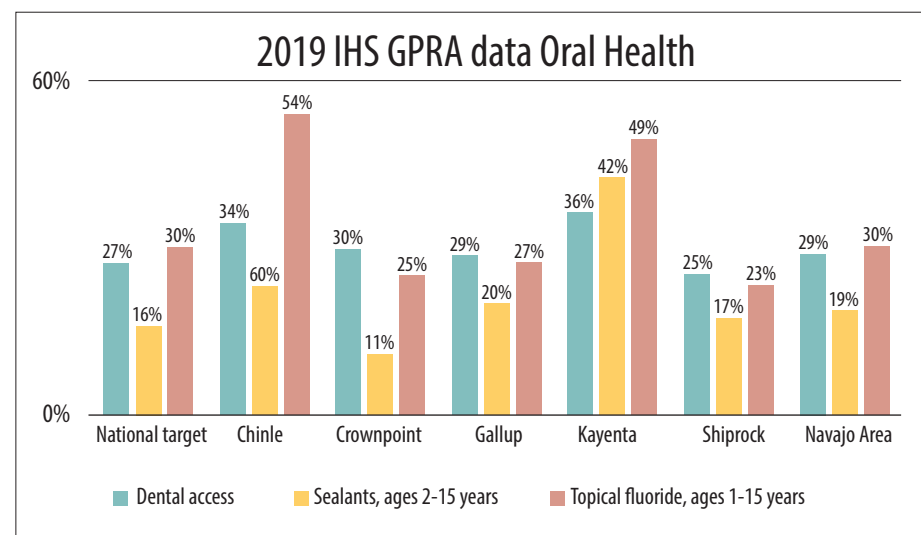
Early-life immunizations are important to the overall health and wellbeing of children and their families. Immunizations ensure children do not suffer from the flu or other illnesses that might otherwise be life threatening without proper treatment. According to the 2018 GPRA report, the IHS child immunizations goal for children 19-35 months was 45.6% and all five IHS units exceeded the goal. All five IHS units also exceeded the IHS national goal of 21% for influenza immunizations among children 6 months to 17 years old as seen in graph below.

Additionally, according to the IHS quarterly immunization report for infants 3-27 months old from October 1 – December 31, 2019, a total of 76% of children within this age group received the appropriate immunizations, with an exemption or refusal of vaccinations from 124 individuals. However, the data reported includes only 6 of 12 Indian Health Care Facilities: Chinle Hospital, Crownpoint Health Care Facility, Gallup Indian Medical Center, Kayenta Health Center, Northern Navajo Medical Center, and Winslow Indian Health Care Corporation.



## Oral Health

Oral health care in childhood is important for proper growth and speaking. According to the 2018 GPRA, the IHS goal for dental access was 27.2% which four IHS units, Chinle, Crownpoint, Gallup and Kayenta, exceeded. The national goal for IHS to apply sealants to children 2 to 15 years was 16% which was exceeded by the Chinle, Gallup, Kayenta, and Shiprock units. Only Chinle and Kayenta unit exceeded 30% IHS national goal for applying fluoride for children aged 1 to 15, as seen in the graph below.



## CHILD HEALTH

Background information: Child health examines children between 6 to 11 years old, the age when children begin school and start gaining social skills. At this stage, children start building relationships with people other than parents, siblings, and close relatives; building relationships with friends and teachers. Aside from the social aspect of child growth, it is important children maintain regular health check-ups, immunizations, and address any other health issues.

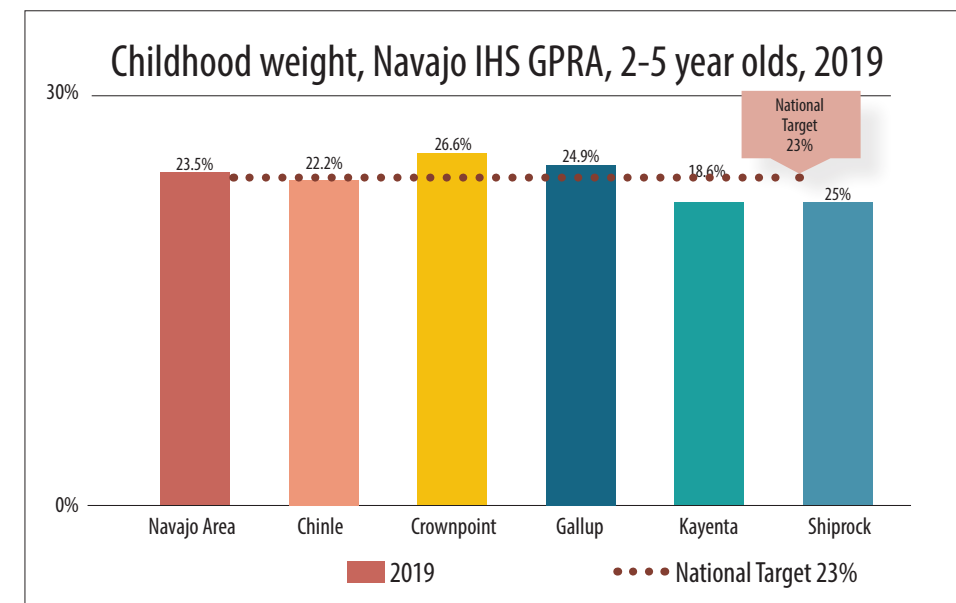
### Child Mortality

According to the 2010-2013 Navajo Mortality report for the New Mexico portion of the Navajo Nation Reservation, the leading causes of death for children ages 0-9 included: congenital malformations (average rate was 6.8 per 100,000 per year), conditions originating in the perinatal period (4.9), unintentional injuries (4.9), and all other causes (13.1). For males the leading causes of death included congenital malformations resulting in 4 total deaths (average rate was 6.5 per 100,000 per year), unintentional injuries resulting in 4 total deaths (6.5), and all other causes at 10 total deaths (16.3). For females, congenital malformations led to 4 total deaths (6.6) and all other causes resulted in 14 deaths (23).

Cause	Count	Average rate per 100,000 per year
Congenital malformations	8	6.8
Conditions resulting in the perinatal period	6	4.9
Unintentional injuries	6	4.9
All other causes	16	13.1

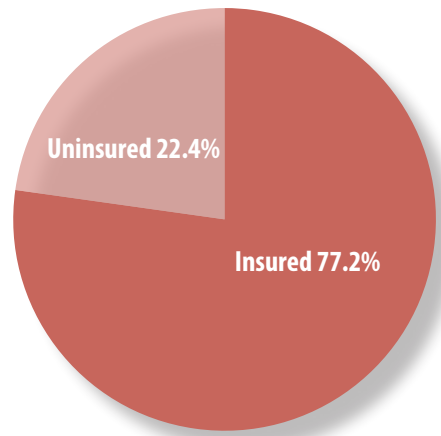
### Nutritional Status and Obesity

Children living on the Navajo Nation Reservation may not have consistent access to nutritious foods at home due to the limited number of grocery stores (~13). Fruits and vegetables tend to be more costly than highly processed foods, leading to higher rates of obesity and diabetes. According to the 2016 GPRA measures on childhood weight control, the national IHS goal for BMI in the 95th percentile or higher for children between 2-5 years was 23% or less. Only Kayenta, with 18.6%, and Chinle, at 22.2% fell below the goal, as shown in the graph below.



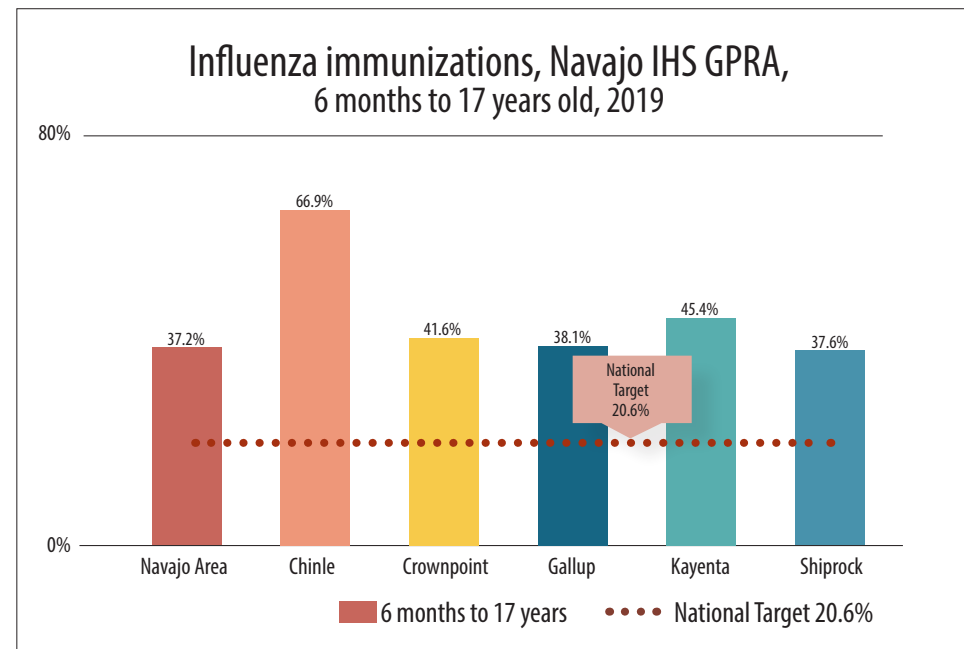
### Health Insurance

Families on the Navajo Nation Reservation have access to IHS, whether they have insurance or not. According to 2018 ACS estimates, 77.5% (n=40,267) of children between 6 to 18 years old had health insurance while 22.4% (n=11,706) were uninsured, as seen in the pie chart below.



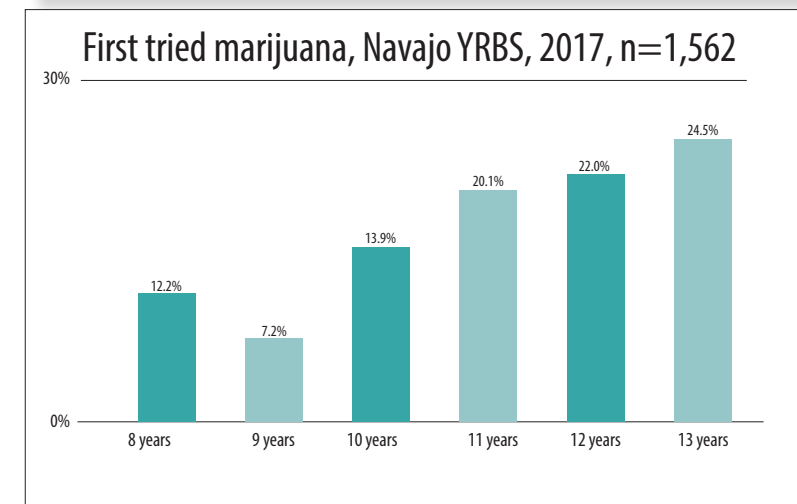
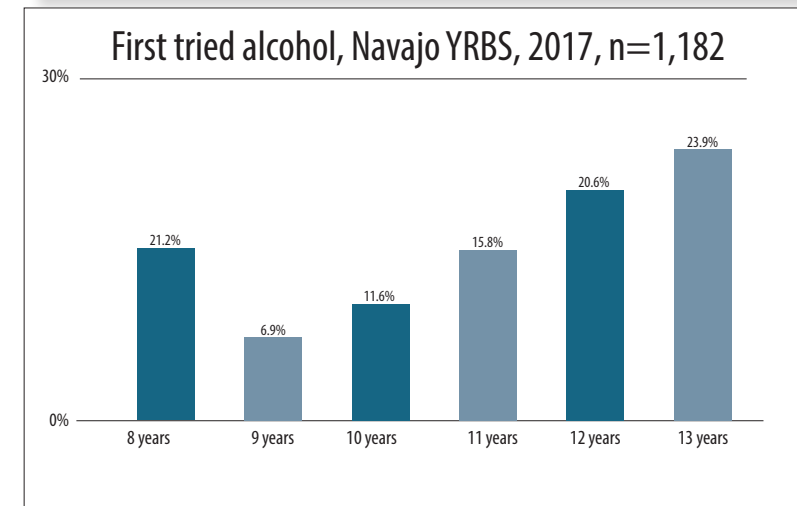
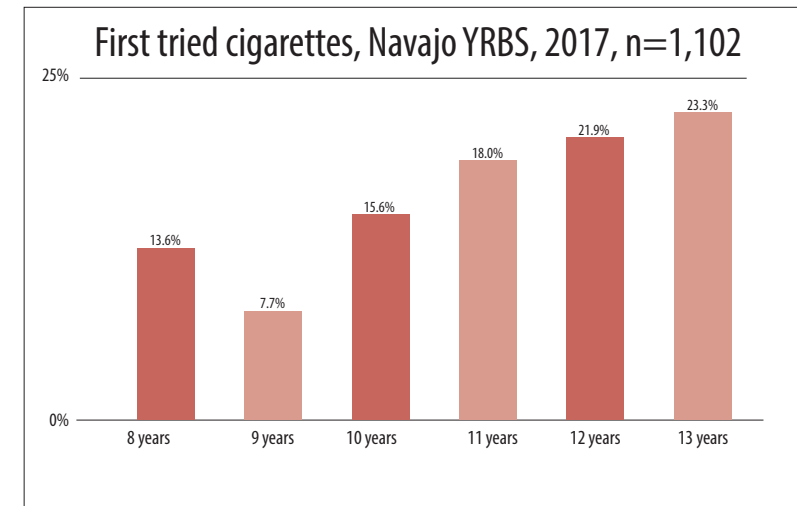
### Immunizations

Annual influenza immunizations are important for children to receive at the beginning of each flu season. According to the 2018 GPRA, the national IHS goal for influenza immunization for children ages 6 months to 17 years was 20.6%. All five IHS units exceeded the national goal, as seen in the graph below.



### Substance Use

Substance use at an early age puts children at higher risk for substance abuse and legal issues later in life. According to the 2017 High School Navajo Youth Risk and Behavior Survey (YRBS), students were asked when they first tried cigarettes; 13.3% reported trying cigarettes before the age of 13, lower than the New Mexico rate of 13.5% and the AI/AN rate of 16.3%. The 14.3% of students reporting first trying alcohol before the age of 13 was much lower than the New Mexico rate of 20.7% and the AI/AN rate of 15.6%. The 18.9% of students reporting first trying marijuana before age 13 was much higher compared to the New Mexico rate of 15.7%, but lower than the AI/AN rate of 26.7%.





## ADOLESCENT HEALTH

Background information: Adolescent health includes children between 12 to 17 years old, an important period of development. At this age, teens become aware of and need proper education about how to take care of themselves physically, emotionally, mentally, and spiritually before reaching adulthood. Most of all adolescents need a mentor, a trusted adult they can turn to, but it can be hard for them to reach out and find or ask for support. In this section, data on adolescent mortality, immunizations, nutrition, physical activity, sexual behaviors, and substance use behaviors are reported.

### Adolescent Mortality

According to the 2010-2013 Navajo Mortality report for the New Mexico portion of the Navajo Nation Reservation, the leading causes of death for adolescents ages 10-19 were: unintentional injuries (average rate was 13.11 per 100,000 per year), suicide (5.1), and all other causes (7.28). For males, the leading causes of death were unintentional injuries resulting in 8 deaths (average rate was 11.48 per 100,000 per year), suicide resulting in 6 deaths (8.61), and all other causes resulting in 8 deaths (11.48). For females, the leading causes of death were unintentional injuries, resulting in 10 deaths (14.8) and all other causes resulting in 3 deaths (4.44).

Cause	Count	Average rate per 100,000 per year
Unintentional injury	18	13.1
Suicide	7	5.1
All other causes	10	7.28

### Nutrition

Access to nutritious foods can be difficult on the Navajo Nation Reservation due to limited number of grocery stores and the prices of fruits and vegetables. Most children have access to nutritious breakfasts and lunches at school but might not have access to fruits and vegetables or nutritious meals at home. In Navajo schools, students typically have access to a breakfast. According to the Navajo Youth Risk Behavior Survey, a third of students (33%) reported having breakfast every day during the past 7 while 11%, 3% lower than the national YRBS rate, reported not having breakfast, as seen in the table below.

- During the past 7 days, 32% of students reported having eaten fruit 1-3 times, 22% reported 4-6 times but 9% reported not eating fruit (n=8,533).
- Eleven percent of students reported having the recommended amount of 4 or more fruits per day. (n=8,533).
- Sixty-six reported eating fruit and drinking 100% fruit juices one or more times per day (n=8,492).
- During the past 7 days, 72% ate vegetables one or more times per day with 24% eating vegetables 3 or more times per day (n=8,418).
- During the past 7 days, 32% reported drinking a glass of milk 1-3 times and 15% reported 4-6 times. Twenty-seven percent reported not drinking milk (n=8,428), the same rate as the national YRBS.
- Twenty-two percent drank a can, bottle, or glass of soda pop one or more times a day, 13% drank soda two or more times a day, while 6.6% drank soda 3 or more times a day (n=8,498). The Navajo rate of drinking soda 3 or more times a day was about the same as the national YRBS rate of 7.1%

During the past 7 days, how many days did you eat breakfast?		
0 days	941	11%
1 day	690	8%
2 days	946	11%
3 days	919	11%
4 days	824	10%
5 days	886	10%
6 days	510	6%
7 days	2792	33%
TOTAL	8508	100%

The national YRBS and Navajo YRBS rates were the same for not eating breakfast, not drinking milk and drinking soda 3 or more times a day.

### Weight and Body Mass Index

In adolescence, height and weight fluctuate which can have an impact on self-image. According to the Navajo YRBS, almost half (48%) of respondents thought their weight to be “about the right weight” while 37% indicated being slightly or very overweight, as shown in table below.

- Twenty percent of students reported being obese (n=8,162), up from 17% in 2011 and higher than the national YRBS rate of 14.8%.
- Nineteen percent reported being overweight, an increase from 17% in 2011 and higher than the national YRBS rate of 15.6%.
- Fifty-eight percent reported trying to lose weight, as shown in table below.

How would you describe your weight?		
Very underweight	287	3%
Slightly underweight	891	10%
About the right weight	4142	48%
Slightly overweight	2670	31%
very overweight	544	6%
TOTAL	8534	100%

Percentage of students who reported obesity (greater than 95th percentile for BMI based on sex and age-specific reference data from the 2000 CDC growth charts)		
YES	1663	20%
NO	6499	80%
TOTAL	8162	100%

Which of the following are you trying to do about your weight?		
Lose weight	4940	58%
Gain weight	967	11%
Stay the same weight	1197	14%
I am not trying to do anything about my weight	1441	17%
TOTAL	8545	100%

The Navajo rate was higher than the national YRBS rate for students reporting being obese or overweight.

### Physical Activity

Physical activity is important for the overall health and wellbeing for teens. According to the Navajo YRBS, 31% of students reported being physically active daily while 11% reported not being physically active; shown in the table below. In the national YRBS, 73.9% reported no daily physical activity.

- Fifty-eight percent of students reported not having a physical education (PE) class during an average week while the national YRBS rate was 70.1%. Twenty-nine percent reported attending PE 5 days on an average week, less than the Healthy People 2020 school-physical-activity goal of 36.6%.
- During the past 12 months, 42%, about 4% lower than the national YRBS rate, of students reported not being on any sports teams while 25% of students reported participating in at least one sports team as shown in the table below.
- Twelve percent of students reported playing a video or computer game for one hour while 18% reported playing 5 or more hours on an average school day.

During the past 12 months, on how many sports teams did you play?		
0 teams	3822	42%
1 team	2084	23%
2 teams	1205	13%
3 teams	1188	13%
Missing	724	8%
<b>TOTAL</b>	<b>9023</b>	<b>100%</b>

During the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day?		
0 days	945	11%
1 day	629	7%
2 days	817	10%
3 days	860	10%
4 days	766	9%
5 days	1,164	14%
6 days	642	7%
7 days	2,607	31%
<b>TOTAL</b>	<b>8430</b>	<b>100%</b>

In an average week when you are in school, on how many days do you go to physical education (PE) classes?		
0 days	4854	58%
1 day	297	4%
2 days	255	3%
3 days	283	3%
4 days	212	3%
5 days	2441	29%
<b>TOTAL</b>	<b>8430</b>	<b>100%</b>

On an average school day, how many hours do you play video or computer games or use a computer for something that is not school work?		
Does not on an average school day	1957	23%
Less than 1 hour	1216	14%
1 hour	986	12%
2 hours	1221	15%
3 hours	966	11%
4 hours	587	7%
5 or more hours	1485	18%
<b>TOTAL</b>	<b>8418</b>	<b>100%</b>

More Navajo students reported having a PE class, being on a sports team, and engaging in daily physical activity than the national YRBS rate.

### Oral Health Status

Oral health, practicing good dental hygiene and having regular dental check-ups, is important for children at any age. If a child is not receiving proper oral healthcare, they experience the negative health effects early in life. According to the Navajo YRBS, two-thirds of students, exceeding the Healthy People 2020 goal of 49%, had a dental checkup, exam, teeth cleaning, or other dental work in the past 12 months, though 13% were unsure of their most recent visit, as seen in the table below.

Last dental check-up, exam, teeth cleaning, or other dental work?		
During the past 12 months	5567	67%
Between 12 and 24 months ago	1041	13%
More than 24 months ago	431	5%
Never	172	2%
Not sure	1069	13%
<b>TOTAL</b>	<b>8280</b>	<b>100%</b>

Navajo adolescents are exceeding the Healthy People 2020 goal for regular dental check-up or exams.

### Health Exams and Screenings

Absent participation in sports or necessary vaccinations for school attendance, regular health exams and screenings may decrease in frequency through adolescence. Checkups like screenings for sexually transmitted infections (STIs) and the Human Immunodeficiency Virus (HIV) might be conducted at this age if individuals are sexually active. Seventy percent of students reported not being tested for HIV, 14% indicated being tested, and 16% were unsure. The Healthy People 2020 goal was 18.8% for adolescents to have been tested for HIV. Youth in middle and high school need sexual health education and encouraged to seek regular check-ups, especially if sexually active.

- Twenty-one percent of students have been diagnosed with asthma by a doctor or nurse as compared to the national YRBS rate of 22.5%.

Has a doctor or nurse ever told you that you have asthma?		
YES	1723	21%
NO	5980	72%
Not sure	555	7%
<b>TOTAL</b>	<b>9023</b>	<b>100%</b>

Ever been tested for HIV?		
YES	1129	14%
NO	5834	70%
Not sure	1335	16%
<b>TOTAL</b>	<b>9023</b>	<b>100%</b>

The Navajo rate for adolescent HIV testing was lower than the Healthy People 2020 goal and asthma diagnosis was lower than the national YRBS.



## Resiliency

For Navajo people, resiliency is a concept used to describe the survival of Diné (Navajo) through adversities forced upon them by colonization and assimilation. This is instilled and seen through the passing down and practice of Navajo cultural customs and teachings. A set of questions unique to Navajo students, they assess Navajo language, grades in school, sleep duration, ceremonial participation, and knowledge of their mother's and father's clan. According to the Navajo YRBS, 80% of students knew their mother's clan (n=8,934) and 72% knew their father's clan (n=7,577). It is important Navajo students receive cultural knowledge and accurate historical information to develop a cultural identity to help them navigate life.

- Sixty-two percent of students reported getting 7 hours of sleep on an average school night, nearly double the Healthy People 2020 goal.
- Examining language other than English spoken by someone in their home, 12% of students reported this always occurred, 32% occurred most of the time, and 37% reported sometimes.
- Twenty-two percent earned mostly A's and 25% earned mostly B's in school during the past 12 months (n=8,140).
- Fifty-six percent reported not attending a religious or spiritual service in the past 30 days while 44% of students attended at least once, as shown in the table below.
- Forty-seven percent participated in traditional ceremonies, i.e., puberty, blessing way, fire dance or Yeibichei (n=8,915).

On an average school night, how many hours of sleep do you get?		
4 or less hours	662	8%
5 hours	882	11%
6 hours	1612	19%
7 hours	2213	27%
8 hours	2013	24%
9 hours	675	8%
10 or more hours	232	3%
TOTAL	8289	100%

How often do the people in your home speak a language other than English?		
Never	635	7%
Rarely	1049	12%
Sometimes	3330	37%
Most of the time	2910	32%
Always	1059	12%
TOTAL	8983	100%

During the past 30 days, on how many days did you attend religious or spiritual services?		
0 days	4994	56%
1 or 2 days	1759	20%
3 to 5 days	1152	13%
6 to 9 days	453	5%
10 to 19 days	263	3%
20 to 29 days	74	1%
All 30 days	144	2%
Missing	1054	100%

A majority of students reported knowing their mother and father's clans and were able to get 7 hours of sleep. Often, people in their home spoke a language other than English, presumably Navajo. About half reported attending a spiritual or religious service and participating in traditional ceremonies.

## Tobacco Use

Substance use at an early age may persist in life. Young people may see substance use modeled in their household as a mechanism for coping with stress or trauma; a model they may follow. According to the Navajo YRBS, 40% of students reported having smoked a cigarette, even one or two puffs (n=8,426), 11% higher than the national YRBS rate of 28.9%.

- Within the past 30 days, 20% of students indicated using tobacco in some form, cigarettes, cigars, or smokeless, at least once (n=8,207). The Healthy People 2020 goal for cigarette usage within the past 30 days is 16%, which the Navajo rate exceeds by 4%. Also, the Navajo rate is much higher than the American Indian/Alaska Native rate of 9.8% and the overall US rate of 8.8%.
- Twenty-four percent of students reported using cigarettes, cigars, smokeless tobacco, or electronic vapor products on at least 1 day within the past 30 days (n=7,516).
- Twelve percent of students reported smoking at least one day out of the prior 30, ranging from <1 to >20 cigarettes smoked on days they smoked, while 88% did not smoke over the same period.
- Age when students reported first attempted, even a puff or two, cigarette smoking is shown in the table below.

During the past 30 days, on how many days did you smoke cigarettes?		
0 days	7261	88%
1 to 2 days	467	6%
3 to 5 days	215	3%
6 to 9 days	105	1%
10 to 19 days	93	1%
20 to 29 days	41	0%
All 30 days	89	1%
TOTAL	8271	100%

During the past 30 days, on the days that you smoked, how many cigarettes did you smoke per day?		
I did not smoke during the past 30 days	7245	88%
Less than 1 cigarette per day	384	5%
1 cigarette per day	272	3%
2 to 5 cigarettes per day	294	4%
6 to 10 cigarettes per day	29	0%
11 to 20 cigarettes per day	10	0%
More than 20 cigarettes per day	25	0%
TOTAL	8259	100%

For adults who already smoke, vaping or electronic cigarettes have been used to replace regular cigarettes because these products are known to have fewer toxic chemicals. However, youth or young adults are advised to avoid e-cigarettes. According to the Center for Disease Control and Prevention, Smoking and Tobacco Use - E-cigarettes Site (2019), among U.S. middle and high school students in 2014, e-cigarettes were the most commonly used tobacco products. Many risks exist for youth due to the neurological damage nicotine can inflict on still growing and developing brains. According to the Navajo YRBS, 40% of students reported having used an electronic vapor product (n=8,757) which is lower than the national YRBS rate of 42.2%. Twenty-four percent of students actively used cigarettes, cigars, vaping products, or smokeless tobacco at least one day within the prior 30 (n=7,516). National efforts exist to prevent youth and young adults from vaping using public service announcements across radio, television ads, and social media posts. School have also banned tobacco use, including vape pens or e-cigarettes, on school property.

Age when first tried cigarette smoking, even one or two puffs		
Never tried cigarette smoking	5022	60%
8 years old	313	4%
9 or 10 years old	322	4%
11 or 12 years old	570	6%
13 or 14 years old	1093	13%
15 or 16 years old	868	10%
17 years or older	249	3%
TOTAL	8347	100%

The Navajo rate for cigarette smoking exceeded the national YRBS rate for ever smoking and smoking within the past 30 days.

## Alcohol

Underage alcohol use can be harmful to the health and safety of youth. According to the CDC Alcohol and Public Health-Underage Drinking Site (2020), there are more than 3,200 deaths among youth and alcohol related injuries account for 119,000 emergency room visits across the U.S. According to the Navajo YRBS, 30% of students reported having had their first drink of alcohol other than a few sips (n=8,091). The Navajo rate is half the national YRBS rate of 60.4% for ever drank alcohol.

- Thirty percent of students reported having at least one drink of alcohol during their life as shown in the table below.
- Eighty-four percent of students reported not having at least one drink of alcohol in the past 30 days as shown in the table below. The Healthy People 2020 goal for reducing the proportion of adolescents reporting use of alcohol or any illicit drugs within the past 30 days is 12.8%. The Navajo rate did not meet the Healthy People 2020 goal.
- Six percent of students reported someone giving them alcohol and 3% reported giving money to someone else to buy alcohol for them and 5% reported getting it some other way, as shown in the table below.
- The age when students reported having an alcoholic drink, more than a few sips, is shown in the table below.

During your life, on how many days have you had at least one drink of alcohol?		
0 days	4883	60%
1 or 2 days	1456	18%
2 to 9 days	738	9%
10 to 19 days	382	5%
20 to 39 days	303	4%
40 to 99 days	164	2%
100 or more days	217	2%
TOTAL	8143	100%

During the past 30 days, on how many days did you have at least one drink of alcohol?		
0 days	6450	84%
1 or 2 days	669	9%
3 to 5 days	252	3%
6 to 9 days	86	2%
10 to 19 days	86	1%
20 to 29 days	21	0%
All 30 days	48	1%
TOTAL	7672	100%

During the past 30 days, how did you usually get the alcohol you drank?		
Did not drink alcohol in the past 30 days	6418	86%
Bought them in a store such as a liquor store, convenience store, supermarket, gas station	79	1%
Bought it at a restaurant, bar or club	19	0%
Bought it at a public event such as a concert or sporting event	36	0%
Gave someone else money to buy it for me	227	3%
Someone gave it to me	494	6%
Took them from a store or family member	91	1%
Got them some other way	409	5%
TOTAL	7773	100%

How old were you when you had your first drink of alcohol other than a few sips?		
Never had a drink of alcohol	4893	54%
8 years or younger	265	3%
9 or 10 years old	262	3%
11 or 12 years old	456	5%
13 or 14 years old	1019	11%
15 or 16 years old	960	11%
17 years or older	236	3%
TOTAL	9023	100%

The Navajo rate was half the national YRBS rate for having drank alcohol, though the Navajo rate did not meet the Healthy People 2020 goal for not drinking alcohol in the prior 30 days.

## Marijuana and Other Drugs

Marijuana use among young people can be harmful to the developing brain. According to the CDC Marijuana and Public Health (2019), youth who use marijuana and other drugs are at increased risk of addiction, mental health issues, declines in academic performance, and driving while impaired. According to the Navajo YRBS, about half of students (52%), over 15% more than the national YRBS rate, used marijuana at some point in their life, as shown in the table below. In the past 30 days, about a third (31%) of students reported using marijuana one or more times, as shown in the table below.

How old were you when you tried marijuana for the first time?		
Never tried marijuana	4030	47%
8 years old or younger	353	4%
9 or 10 years old	434	5%
11 or 12 years old	977	11%
13 or 14 years old	1632	19%
15 or 16 years old	981	11%
17 years or older	163	2%
TOTAL	8570	100%

During the past 30 days, how many times did you use marijuana?		
0 times	5993	69%
1 or 2 times	727	9%
3 to 9 times	661	8%
10 to 19 times	379	4%
20 to 39 times	258	3%
40 or more times	613	7%
TOTAL	8631	100%

The Navajo rate for marijuana use was higher than the national YRBS rate.

The Navajo rate for marijuana and methamphetamine usage exceeded the national rates.

## Other drugs

Other drugs include heroin, methamphetamines, medically-unnecessary prescription drugs, or sniffing glue, aerosols, or paints to get high. According to the CDC National Center for Health Statistics-Illicit Drug Use Site, in 2017, 11.2% of individuals 12 years and over used illicit drugs, putting them at risk of overdose and death. According to the Navajo YRBS, students reported the following:

- Ninety-three percent never sniffed glue, breathed the contents of aerosol-spray cans, or inhaled any paints or sprays to get high (n=8,733).
- Ninety-seven percent never used heroin (n=8,768).
- Ninety-five percent never used methamphetamines (n=8,756) meaning the Navajo rate is double the national rate of 2.5% for having ever used methamphetamines.
- Eighty-five percent reported never having used prescription medicine without a doctor's prescription or differently than how a doctor recommended (n=8,696).



## Injury

Unintentional injuries among children and adolescents have contributed to hospitalizations and deaths across the U.S. In adolescence, risky behaviors related to substance use and motor vehicle use lead to unintentional injuries. According to the Navajo YRBS, half of students (53%) reported always wearing a seatbelt when riding with someone else, far less than the Healthy People 2020 goal of 86%.

- Forty-eight percent of students reported not texting or e-mailing while driving in the prior 30 days, 21% had done so, while 31% reported not driving a car.
- Concerning drinking alcohol and driving, only 4% of respondents indicated doing so in the prior 30 days, 64% did not, and 32% reported not driving.
- Eighty-two percent of students reported never riding with someone who had been drinking alcohol, 7% higher than the Healthy People 2020 goal of 74.5%.

How often do you wear a seat belt when riding in a car driven by someone else?		
Never	327	4%
Rarely	502	6%
Sometimes	1058	12%
Most of the Time	2271	25%
Always	4791	53%
TOTAL	8949	100%

How many times did you drive a car or other vehicle when you had been drinking alcohol?		
Did NOT drive a car or other vehicle during the past 30 days	2501	32%
0 times	4986	64%
1 time	114	1%
2 to 3 times	84	1%
4 or 5 times	32	1%
6 or more times	56	1%
TOTAL	7773	100%

While the Navajo rate did not meet the Healthy People 2020 goal for wearing a seatbelt, it did meet the Healthy People 2020 goal for never riding with someone who had been drinking alcohol.

How many times did you text or e-mail while driving a car or other vehicle?		
I did not drive a car or other vehicle during the past 30 days	2502	31%
0 days	3857	43%
1 or 2 days	846	9%
3 to 5 days	290	3%
6 to 9 days	140	2%
10 to 19 days	102	1%
20 to 29 days	41	0%
All 30 days	191	2%
TOTAL	7969	100%

During the past 30 days, how many times did you ride in a car or other vehicle driven by someone who had been drinking alcohol?		
Did NOT ride in a car or other vehicle driven by someone who had been drinking alcohol	N/A	N/A
0 times	7370	82%
1 time	653	7%
2 to 3 times	490	5%
4 or 5 times	148	2%
6 or more times	332	4%
TOTAL	8993	100%

## Violence

Violence, in any form, may be traumatic for children so ensuring they feel safe and are safe at home and school is important. With school violence on the rise in recent years, efforts are being made to address concerns, including bullying, mental health issues, and violence at home. According to the Navajo YRBS, 10% of students reported avoiding going to school at least 1 day in the past 30 due to feeling unsafe on their way to or at school; about 3% higher than the national YRBS rate of 6.7%.

- Twenty-seven percent of students reported being in a physical fight within the past 12 months, more than three times the national YRBS rate of 8.5%.
- Nineteen percent of students reported carrying a weapon, a gun, knife, or club, on school property; five times the national YRBS rate of 3.8%.
- Six percent of students reported being threatened or injured with a weapon at least once on school property, as seen in the table below.
- One-fifth of students reported being bullied on school property within the past 12 months (n=8,835); 2% greater than the Healthy People 2020 goal for reducing bullying among adolescents of 17.9%.
- Fourteen percent reported being bullied electronically (n=8,965).

During the past 30 days, on how many days did you NOT go to school because you felt unsafe at school or on your way to school?		
0 days	8074	90%
1 day	446	5%
2 or 3 days	270	3%
4 or 5 days	77	0%
6 or more days	139	2%
TOTAL	9006	100%

During the past 30 days, on how many days did you carry a weapon such as a gun, knife, or club on school property?		
0 days	7201	81%
1 day	502	6%
2 or 3 days	417	5%
4 or 5 days	194	2%
6 or more days	572	6%
TOTAL	8886	100%

The Navajo rate was higher than the national YRBS rate for avoiding school at least school within the past 30 days due to feeling unsafe at or on their way to school, being in a physical fight in the prior year, and carrying a weapon on school property. The Navajo rate also exceeded the Healthy People 2020 goal for being bullied on school property within the past 12 months.

During the past 12 months, how many times were you in a physical fight?		
0 times	6356	73%
1 time	845	10%
2 or 3 times	823	9%
4 or 5 times	280	3%
6 or 7 times	104	1%
8 or 9 times	68	1%
10 or 11 times	33	1%
12 or more times	194	2%
TOTAL	8703	100%

During the past 12 months, how many times has someone threatened or injured you with a weapon (i.e., gun, knife, or club) on school property?		
0 times	8446	94%
1 time	261	3%
2 or 3 times	135	2%
4 or 5 times	50	1%
6 or 7 times	19	0%
8 or 9 times	12	0%
10 or 11 times	6	0%
12 or more times	56	0%
TOTAL	8985	100%

### Dating violence

Dating violence can be a traumatic experience for adolescents and young adults, especially if they lack family or other support systems. Dating violence can also become a cycle of violence, potentially leading to unintentional injuries and death. According to the Navajo YRBS, 7% reported their boyfriend or girlfriend having hit, slap, or physically hurt them on purpose (n=5,433), virtually identical to the national YRBS rate of 8%.

- Ninety-one percent of students reported never being physically forced to have sexual intercourse when they did not want to (n=8,931). Compared to the national YRBS, the Navajo rate was 1% lower.
- Three percent of students reported being forced to perform sexual activities they did not want to by someone they were dating or going out with, 59% indicated it never occurring, while 38% reported not dating or going out with anyone, as shown in the table below.

During the past 12 months, how many times did someone you were dating or going out with force you to do sexual things that you did not want to do?		
I did not date or go out with anyone	3145	38%
0 times	4879	59%
1 time	153	2%
2 or 3 times	78	1%
4 or 5 times	19	0%
6 or more times	46	0%
TOTAL	8320	100%

The Navajo rate for students reporting being physically hurt by their boyfriend or girlfriend was 1% lower than the national YRBS report but the Navajo rate of students being physically forced to have sexual intercourse was 1% higher.

### Depression

According to the CDC Children’s Mental Health- Anxiety and Depression Site (2019), depression in children includes feelings of sadness, hopelessness, worthlessness, uselessness, or irritability. Signs include children being uninterested in things they used to enjoy, changes in eating and sleep patterns, changes in energy, and having a hard time paying attention. Depression can also lead children to self-injure potentially incurring serious injury or suicide. According to the Navajo YRBS, at any point over the prior 12 months 38% of students reported having felt sad or hopeless almost every day for two weeks or more in a row stopping them from doing some usual activities, as shown in the table below.

During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?		
YES	3358	38%
NO	5570	62%
TOTAL	8928	100%

The Navajo rate was higher than the national YRBS rate of 31.5%.

### Suicide

Suicide, according to the CDC Violence Prevention Site (2020), is defined as death caused by self-directed violence with an intent to die. Suicide attempts result in the person surviving. Risk for suicide can result from violence or abuse in any form. Family support and access to mental health care, can decrease suicide risk thus the Navajo culture can be a protective factor by providing strong family support and cultural identity facilitating positive self-image development in children and adolescents. According to the Navajo YRBS, 23% of students reported seriously considered a suicide attempt in the past 12 months (n=8,889), about 5% higher than the national YRBS rate of 17.2%. About 21% made a plan in the last 12 months about how they would attempt suicide (n=8,889), or ~6% higher than the national YRBS rate of 13.6%.

- The majority of students did not attempt suicide; however, 20% tried at least once as seen in the table below.
- Seven percent of students reported attempted suicide resulting in injury, poisoning, or overdose within the past 12 months (n=7,098), more than double the national YRBS rate of 2.4%.
- Thirteen percent of students reported a suicide attempt not resulting in injury, poisoning, or overdose (n=7,098).

During the past 12 months, how many times did anyone you know actually attempt suicide?		
0 times	5749	80%
1 time	693	10%
2 or 3 times	481	7%
4 or 5 times	108	1%
6 or more times	122	2%
TOTAL	7153	100%

The Navajo rates of seriously considering suicide, making a plan to attempt suicide, and suicide attempts resulting in an injury are higher than national YRBS rates. Culturally appropriate suicide prevention programs in schools, communities, and other healthcare services are needed to reduce the risk of suicide across the Navajo Nation.



## Sexual behaviors

Sexual-health education is important for adolescents and should be presented by a trusted adult, parent, or health professional. If teens do not receive proper education, they may be at risk for contracting sexually transmitted infections (STIs), the Human Immunodeficiency Virus (HIV), and at risk of teenage pregnancy. According to the Navajo YRBS, 34% of students reported having sexual intercourse (n=7,540), lower than the national YRBS rate of 39.5%. Twenty-two percent reported being sexually active (n=7,503), also lower than the national YRBS rate of 28.7%. The Healthy People 2020 goal for adolescents reporting never had sexual intercourse is approximately 80% for both males and females.

- Seven percent of students reported having sexual intercourse before the age of 13, double the national YRBS rate of 3.4%. The table below shows other ages at which students reported having sexual intercourse for the first time.
- Nineteen percent of students reported drinking alcohol or using drugs before the last sexual encounter (n=7,510), the same rate as the national YRBS at 18.8%.
- At the last sexual encounter, 15% of students reported using condoms (n=7,395). In the table below, students reported other methods of birth control they used.
- Seventeen percent reported having sexual intercourse with 1 person while 16% of students reported intercourse with 2 or more people, as shown in the table below.
- Twelve percent of students identified as gay or bisexual, and the majority of students identified as heterosexual.

How old were you when you had sexual intercourse for the first time?		
I have never had sexual intercourse	4936	66%
11 years old or younger	149	2%
12 years old	117	2%
13 years old	259	3%
14 years old	520	7%
15 years old	677	9%
16 years old	578	7%
17 years old or older	290	4%
TOTAL	7526	100%

Which of the following best describe you?		
Heterosexual (straight)	7119	83%
Gay or lesbian	282	3%
Bisexual	746	9%
Not sure	431	5%
TOTAL	8578	100%

The Navajo findings for first time having sexual intercourse and currently sexually active were lower than the national YRBS rate. However, the Healthy People 2020 goal of 80% of adolescents never having sexual intercourse was not reached. Also, the Navajo rate for sexual intercourse before 13 years of age was higher than the national average. Substance use before last sexual encounter was about the same as the national rate of 19%.

Methods of birth control the last time you had sexual intercourse, what one method did you or your partner use to prevent pregnancy?		
Have never had sexual intercourse	4894	66%
No method was used to prevent pregnancy	493	7%
Birth control pills	163	2%
Condoms	1148	15%
IUD (i.e., Mirena or ParaGard) or implant (i.e., Implanon or Nexplanon)	209	3%
A shot (i.e., DepoProvera), patch (i.e., Ortho Evra), or birth control ring (i.e., NuvaRing)	86	1%
Withdrawal or some other method	215	3%
Not sure	187	3%
TOTAL	7395	100%

During your life, with how many people have you had sexual intercourse?		
I have never had sexual intercourse	4939	55%
1 person	1257	14%
2 people	552	6%
3 people	309	3%
4 people	177	2%
5 people	105	1%
6 or more people	180	2%
TOTAL	9023	100%

## Children with Special Health Care Needs

Child with special health care needs (CSHCN) require increased health-related services due to physical, developmental, behavioral or emotional conditions. According the Health Resources and Services Administration Maternal & Child Health - Children with Special Health Care Needs Site (2019), the Maternal and Child Health Bureau Goals reports 1 in 5 U.S. families, 20% of U.S. children, have a child with special health care needs. It can be difficult for families to navigate health care systems to ensure their child receives the care they need.

In ensuring optimal health and quality of life for CSHCN, the MCH Bureau goal is to create an effective system of care by making families partners in care, early and continuous screening, providing ease of use for community-based services for families, providing access to comprehensive and family-centered medical-home services, proper funding and insurance for needed services, and transition plans to adult care and services (HRSA, 2019). These goals are accomplished by providing resources and supporting programs that are evidence-based, ensure health equity, focus on the whole-person, and have innovative and collaborative approaches to improving quality of life for CSHCN.

## Disability Estimates

In 2018, there were an estimated 37,068 children under the age of 18 on the Navajo Nation Reservation. According to the American Community Survey estimates for 2018, 869 children have a disability; 3.1% of the age group. An estimated 80 children under 5 years of age have a disability. Estimated counts of disability types for children under 18 are:

- Vision difficulty: 211
- Cognitive difficulty: 694
- Ambulatory difficulty: 67
- Self-care difficulty: 91
- Overall hearing difficulty: 72

Existing intervention services and programs help identify CSHCN and provide resources and access to care on the Navajo Nation Reservation. For the next needs assessment, more comprehensive data needs collected on CSHCN.

## NAVAJO MATERNAL CHILD HEALTH PRIORITIES 2020

The Navajo Nation will work toward:

Decreasing:

- Infant, child, adolescent and maternal morbidities and mortalities
- Substance abuse, effects and risky behaviors
- Sex trafficking and violence

Increasing:

- Access to health care: family planning/education, prenatal care, infant, child and adolescent care
- Support for breastfeeding mothers
- Mental health care access
- Access to early intervention and support services for children with disabilities and special health care needs
- Services and support related to family composition, displacement, and homelessness.

Organizing:

- Database to improve data-driven decisions to focus on persons with special needs, experiencing violence, and environmental health issues.

## CONCLUSION

The Navajo Nation Maternal and Child Health Needs Assessment was informed by many Navajo Area stakeholders at the tribal, state, and federal levels. Incorporating the Sa'ah Naagháí Bik'eh Hózhóón (SNBH) framework in the needs-assessment process provided the unique Navajo cultural approach to health including the environmental health aspects. The qualitative and quantitative data collected and analyzed provide an important understanding of infant, child, and maternal health. Even though Covid-19 has impacted the Navajo Nation Reservation during this process, the conclusions and recommendations here provide useful guidance for future efforts to improve the health and wellbeing of Navajo mothers and children.

## APPENDICES



### Background

The Arizona Department of Health Services (ADHS) conducts a Maternal and Child Health (MCH) Needs Assessment every 5 years. Historically, this process has not included information from tribal communities. Diné College's Public Health Program with assistance from Northern Arizona University, the Navajo Nation Epidemiology Center, Indian Health Service and others, are working with ADHS to lead the 2020 Navajo Nation MCH Needs Assessment.

### Purpose

The primary goal of the Navajo MCH Needs Assessment is to collect information to guide federal, state and tribal agencies to improve services for children, families, and to strengthen federal, state, tribal, and community partnerships. Community and provider input is a critical part of this assessment to understand how families stay healthy and their challenges in raising healthy youth. Following complete data collection and analysis, a report will be widely disseminated to support the statewide effort to guide policy makers, service providers, and members of the Navajo Nation toward improvements in maternal and child health.

### Approach

A series of input events will be facilitated by in-person and remote public forums designed to gather your opinions, experiences and ideas on current and future MCH services, including but not limited to health care, education, food assistance, and other resources. These input events are not research and your statements will not be linked to your name or identity. The information documented in the input events will inform the health priorities for Arizona's Title V MCH Program. Input events will be conducted through the Qualtrics platform to reach providers and healthcare professionals across the Navajo Nation.

### If you have any questions or concerns, please contact:

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2172020 SASI Dorm: Maternal and Child Health Input

**SASI Dorm: Maternal and Child Health Input**

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The Arizona Department of Health Services (ADHS) conducts a Maternal and Child Health (MCH) Needs Assessment every 5 years. Historically, this process has not included information from tribal communities. Diné College's Public Health Program with assistance from Northern Arizona University, the Navajo Nation Epidemiology Center, Indian Health Service and others, are working with ADHS to lead the 2020 Navajo Nation MCH Needs Assessment. Information collected will support the statewide effort.

**\* Required**

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The primary goal of the Navajo MCH Needs Assessment is to collect information to guide federal, state and tribal agencies to improve services for children, families and to strengthen federal, state, tribal, and community partnerships. Community input is a critical part of this assessment to understand how families stay healthy and their challenges in raising healthy youth.

**Approach**  
These input events are public forums designed to hear your opinions, experiences and ideas on current and future MCH services, including but not limited to health care, education, food assistance, and other resources. These input events are not research and your statements will not be linked to your name or identity (anonymous). The information documented in the input events will inform the health priorities for Arizona's Title V MCH Program. Input events will be conducted across the Navajo Nation and will reach parents and other caregivers of children under 18 years of age, adolescents and clinic and agency-based providers.

1. What age group do you fall into? \*

Check all that apply:

12 - 17 years old  
 18 - 29 years old  
 30 - 39 years old  
 40 - 49 years old  
 50 - 59 years old  
 60 - 69 years old  
 70+ years  
 Prefer not to answer

2172020 SASI Dorm: Maternal and Child Health Input

2. What gender do you identify with? \*

Mark only one oval:

Female  
 Male  
 Non-Binary  
 Prefer not to answer

3. What role in child care do you play? \*

Check all that apply:

Mother  
 Father  
 Grandmother  
 Grandfather  
 Aunt  
 Uncle  
 Sister  
 Brother  
 Prefer not to answer

4. What Chapter are you affiliated with? \*

\_\_\_\_\_

5. If you are 18-17 years old: What traditions have you been taught to be healthy? \*

\_\_\_\_\_

6. What do you do on a regular basis to stay healthy? \*

\_\_\_\_\_

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7. What programs are you apart of that help you stay healthy? \*

\_\_\_\_\_

8. What kinds of problems make it hard for you to make healthy choices for you or your family? \*

\_\_\_\_\_

9. Do you have any problems with the programs or services that you use for yourself? \*

\_\_\_\_\_

10. What do you think is needed in the community/Navajo Nation that will help you take care of yourself and your family? \*

\_\_\_\_\_

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### Appendix B. Provider Survey Questions

1. What best describes the population you serve?
2. What best describes your work setting?
3. Can you list any interventions or strategies that are currently implemented on the Navajo Nation that are effective in supporting maternal and child health? Please explain in your own words.
4. Can you list any interventions or strategies that are not currently implemented on the Navajo Nation that would be effective in supporting maternal and child health?
5. Where do you think your mothers and other caregivers get health information?
6. What problems or barriers do you think make it hard for your mothers and caregivers to stay healthy?
7. What problems or barriers make it hard for you to support your mothers and caregivers to stay healthy?
8. What are the 5 most important health needs of the mothers, caregivers, and children of the Navajo Nation?

## REFERENCES

- Arizona Department of Health. (2016-2018). *Pregnancy Risk Assessment Monitoring System data for Arizona*.
- Arizona Department of Health Services Arizona Birth Defects Monitoring Program. (2020). *Birth Defects to Target in MCH Plan*.
- Avasarala S, Torres C, Ali AS, Thomson BM, Spilde MN, Peterson EJ, Artyushkova K, Dobrica E, Lezama-Pacheco JS, Cerrato JM. *Effect of Bicarbonate and Oxidizing Conditions on U(IV) and U(VI) Reactivity in Mineralized Deposits of New Mexico*. Chem Geol. 2019 Oct 5;524:345-355. doi: 10.1016/j.chemgeo.2019.07.007. Epub 2019 Jul 8. PubMed PMID: 31406388; Pubmed Central PMCID: PMC6690612.
- AZ School Report Cards. (2020). Arizona Public School Report Cards- AzMerit scores for English/Language Arts, Science and Math by district including Chinle, Tuba City, Window Rock, Kayenta, Red Mesa, Pinon, Ganado. Retrieved June 15, 2020 from <https://azreportcards.azed.gov/districts>
- Bureau of Labor and Statistics. (July 2020). Accessed July 2020 from [https://data.bls.gov/timeseries/LNS14000000?years\\_option=all\\_years](https://data.bls.gov/timeseries/LNS14000000?years_option=all_years)
- Butte, N. F., Calloway, D. H., & Van Duzen, J. L. (1981). Nutritional assessment of pregnant and lactating Navajo women. The American Journal of Clinical Nutrition, 34(10), 2216–2228. 10.1093/ajcn/34.10.2216
- Casey JG, Ortega J, Coffey E, Hannigan M. Low-cost measurement techniques to characterize the influence of home heating fuel on carbon monoxide in Navajo homes. *Sci Total Environ*. 2018;625:608-618. doi:10.1016/j.scitotenv.2017.12.312
- Center for Disease Control and Prevention. (2017a). *High School Youth Risk Behavior Survey*. Retrieved from January-June 2020 from <https://nccd.cdc.gov/Youthonline/App/Results.aspx?TT=A&OUT=0&SID=HS&QID=QQ&LID=XX&YID=2017&LID2=&YID2=&COL=S&ROW1=N&ROW2=N&HT=QQ&LCT=LL&FS=S1&FR=R1&FG=G1&FA=A1&FI=I1&FP=P1&FSL=S1&FRL=R1&FGL=G1&FAL=A1&FIL=I1&FPL=P1&PV=&TST=False&C1=&C2=&QP=G&DP=1&VA=CI&CS=Y&SYID=&EYID=&SC=DEFAULT&SO=ASC>
- Centers for Disease Control and Prevention. (2017b). *National Center for Health Statistics-Illicit Drug Use*. Retrieved August 2020 from <https://www.cdc.gov/nchs/fastats/drug-use-illicit.htm> Comprehensive Economic Development Strategy. (2018). Retrieved May 2020 from [https://advancedbusinessmatch.com/wp-content/uploads/2018/07/NNDED\\_CEDS\\_FINAL\\_041618-LOW-RES.pdf](https://advancedbusinessmatch.com/wp-content/uploads/2018/07/NNDED_CEDS_FINAL_041618-LOW-RES.pdf)
- Centers for Disease Control and Prevention. (2019a). *Marijuana and Public Health- Marijuana Use in Teens*. Retrieved August 2020 from <https://www.cdc.gov/marijuana/factsheets/teens.htm>
- Centers for Disease Control and Prevention. (2019b). *Nutrition- Recommendations and Benefits*. Retrieved July 2020 from <https://www.cdc.gov/nutrition/infantandtoddlernutrition/breastfeeding/recommendations-benefits.html>
- Centers for Disease Control and Prevention. (2019c). *Reproductive health*. Retrieved July 2020 from <https://www.cdc.gov/reproductive-health/maternalinfanthealth/pregnancy-relatedmortality.htm>
- Centers for Disease Control and Prevention. (2019d). *Smoking and Tobacco Use- E-cigarettes*. Retrieved August 2020 from <https://www.cdc.gov/tobacco/features/back-to-school/e-cigarettes-talk-to-youth-about-risks/index.html>
- Centers for Disease Control and Prevention. (2020a). *Alcohol and Public Health- Underage Drinking*. Retrieved August 2020 from <https://www.cdc.gov/alcohol/fact-sheets/underage-drinking.htm>
- Centers for Disease Control and Prevention. (2020b). *Children's Mental Health- Anxiety and Depression*. Retrieved August 2020 from <https://www.cdc.gov/childrensmentalhealth/depression.html>
- Centers for Disease Control and Prevention. (2020c). *Reproductive Health- Pregnancy Mortality Surveillance System*. Retrieved July 2020 from [https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm?CDC\\_AA\\_refVal=https%3A%2F%2Fwww.cdc.gov%2Freproductivehealth%2Fmaternalinfanthealth%2Fpregnancy-mortality-surveillance-system.htm](https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Freproductivehealth%2Fmaternalinfanthealth%2Fpregnancy-mortality-surveillance-system.htm)
- Centers for Disease Control and Prevention. (2020d). *Violence Prevention-Fast Facts*. Retrieved August 2020 from <https://www.cdc.gov/violenceprevention/suicide/fastfact.html>
- Centers for Disease Control and Prevention. (2020e). Wide-ranging ONline Data for Epidemiological Research. (2016-2018). Retrieved January-August 2020 from <https://wonder.cdc.gov/controller/datarequest/D149>
- Coleman-Jensen A, Gregory C, Singh A. Household Food Security in the United States in 2013 [Internet]. Rochester, NY: Social Science Research Network; 2014 Sep [cited 2016 Nov 22]. Report No.: ID 2504067. Available from: <https://papers.ssrn.com/abstract=2504067>
- Credo, J., Torkelson, J., Rock, T., & Ingram, J. C. (2019). Quantification of Elemental Contaminants in Unregulated Water across Western Navajo Nation. *International Journal of Environmental Research and Public Health*, 16(15), 2727. <https://doi.org/10.3390/ijerph16152727>

- Dashner-Titus EJ, Hoover J, Li L, Lee JH, Du R, Liu KJ, Traber MG, Ho E, Lewis J, Hudson LG. Metal exposure and oxidative stress markers in pregnant Navajo Birth Cohort Study participants. *Free Radic Biol Med*. 2018 Aug 20;124:484-492. doi: 10.1016/j.freeradbiomed.2018.04.579. Epub 2018 Apr 30. PubMed PMID: 29723666; PubMed Central PMCID: PMC6381929
- De La Rosa VY, Hoover J, Du R, Jimenez EY, MacKenzie D, Lewis J. Diet quality among pregnant women in the Navajo Birth Cohort Study. *Matern Child Nutr*. 2020 Jul;16(3):e12961. doi: 10.1111/mcn.12961. Epub 2020 Feb 5. PubMed PMID: 32026554; PubMed Central PMCID: PMC7296825
- Diné Policy Institute. Diné Food Sovereignty: A Report on the Navajo Nation Food System and the Case to Rebuild a Self-Sufficient Food System for the Diné People [Internet]. 2014 Apr. Available from: <http://www.dinecollege.edu/institutes/DPI/Docs/dpi-food-sovereignty-report.pdf>
- Erdei E, Shuey C, Pacheco B, Cajero M, Lewis J, Rubin RL. Elevated autoimmunity in residents living near abandoned uranium mine sites on the Navajo Nation. *J Autoimmun*. 2019 May;99:15-23. doi: 10.1016/j.jaut.2019.01.006. Epub 2019 Mar 14. PubMed PMID: 30878168; PubMed Central PMCID: PMC6489502
- Foley, D. (2020). *Navajo Health Survey 2013-2016*. Navajo Nation Epidemiology Center.
- Foley, D. (2019). *Navajo Hospitalizations and Emergency Room Rates Report 2013-2016*. Navajo Epidemiology Center.
- Foley, D. (2013). *Navajo Mortality 2010-2013 New Mexico Portion of the Navajo Nation*. Navajo Epidemiology Center. Retrieved January-May 2020 from [https://www.nec.navajo-nsn.gov/Portals/0/Reports/Navajo%20Mortality%20NM%20Portion%202010-2013\\_opt.pdf](https://www.nec.navajo-nsn.gov/Portals/0/Reports/Navajo%20Mortality%20NM%20Portion%202010-2013_opt.pdf)
- Foley, D. (2009) *Navajo Nation Mortality Report 2006-2009, Arizona & New Mexico Data*. Navajo Epidemiology Center. Retrieved January-May 2020 from <https://www.nec.navajo-nsn.gov/Portals/0/Reports/Vital%20Statistics%20Report%202006%20to%202009%20FINAL.pdf>
- Food and Nutrition Service U.S. Department of Agriculture. (2016-2018). *Women, Infants, & Children Breastfeeding Data Local Agency Report*. Retrieved January-May 2020 from <https://www.fns.usda.gov/wic/wic-breastfeeding-data-local-agency-report>
- Gonzalez-Estrella J, Meza I, Burns AJ, Ali AS, Lezama-Pacheco JS, Lichtner P, Shaikh N, Fendorf S, Cerrato JM. Effect of Bicarbonate, Calcium, and pH on the Reactivity of As(V) and U(VI) Mixtures. *Environ Sci Technol*. 2020 Apr 7;54(7):3979-3987. doi: 10.1021/acs.est.9b06063. Epub 2020 Mar 23. PubMed PMID: 32176846; PubMed Central PMCID: PMC7189768.
- Government Performance Results Act. (2020) *Report for Navajo Area Indian Health Services for 2016-2019*.
- Harmon ME, Lewis J, Miller C, Hoover J, Ali AS, Shuey C, Cajero M, Lucas S, Zychowski K, Pacheco B, Erdei E, Ramone S, Nez T, Gonzales M, Campen MJ. Residential proximity to abandoned uranium mines and serum inflammatory potential in chronically exposed Navajo communities. *J Expo Sci Environ Epidemiol*. 2017 Jul;27(4):365-371. doi: 10.1038/jes.2016.79. Epub 2017 Jan 25. PubMed PMID: 28120833; PubMed Central PMCID: PMC5781233
- Harmon ME, Lewis J, Miller C, Hoover J, Ali AS, Shuey C, Cajero M, Lucas S, Pacheco B, Erdei E, Ramone S, Nez T, Campen MJ, Gonzales M. Arsenic association with circulating oxidized low-density lipoprotein in a Native American community. *J Toxicol Environ Health A*. 2018;81(13):535-548. doi: 10.1080/15287394.2018.1443860. Epub 2018 Apr 11. PubMed PMID: 29641933; PubMed Central PMCID: PMC6042213
- Hayek EE, Brearley AJ, Howard T, Hudson P, Torres C, Spilde MN, Cabaniss S, Ali AS, Cerrato JM. Calcium in Carbonate Water Facilitates the Transport of U(VI) in Brassica juncea Roots and Enables Root-to-Shoot Translocation. *ACS Earth Space Chem*. 2019 Oct 17;3(10):2190-2196. doi: 10.1021/acsearthspacechem.9b00171. Epub 2019 Sep 26. PubMed PMID: 31742240; PubMed Central PMCID: PMC6859903.
- Human Resource Services Administration. (2019). *HRSA Maternal & Child Health- Children with Special Health Care Needs*. Retrieved August 15, 2020 from <https://mchb.hrsa.gov/maternal-child-health-topics/children-and-youth-special-health-needs>
- Hund, L., Bedrick, E. J., Miller, C., Huerta, G., Nez, T., Ramone, S., ... & Lewis, J. (2015). A Bayesian framework for estimating disease risk due to exposure to uranium mine and mill waste on the Navajo Nation. *Journal of the Royal Statistical Society. Series A (Statistics in Society)*, 1069-1091.
- Kumar G, Jim-Martin S, Piltch E, Onufrak S, McNeil C, Adams L, et al. Healthful Nutrition of Foods in Navajo Nation Stores: Availability and Pricing. *Am J Health Promot AJHP*. 2016 Sep;30(7):501-10
- Lewis J, Hoover J, MacKenzie D. Mining and Environmental Health Disparities in Native American Communities. *Curr Environ Health Rep*. 2017 Jun;4(2):130-141. doi: 10.1007/s40572-017-0140-5. Review. PubMed PMID: 28447316; PubMed Central PMCID: PMC5429369
- Maternal Child Health Epidemiology- New Mexico Department of Health. (2016-2017). *Pregnancy Risk Assessment Monitoring System data for New Mexico*.
- Medina S, Lauer FT, Castillo EF, Bolt AM, Ali AS, Liu KJ, Burchiel SW. Exposures to uranium and arsenic alter intraepithelial and innate immune cells in the small intestine of male and female mice. *Toxicol Appl Pharmacol*. 2020 Sep 15;403:115155. doi: 10.1016/j.taap.2020.115155. Epub 2020 Jul 22. PubMed PMID: 32710956; NIHMSID:NIHMS1615228
- National Immunization Reporting System for Navajo Area Indian Health Services. (2020). Retrieved January-August 2020 from <https://www.ihns.gov/NonMedicalPrograms/ihpes/immunizations/index.cfm?module=immunizations&option=reports>
- Navajo Courts. (n.d.). *Title 9 Navajo Nation Code Domestic Relations*. Retrieved August 15, 2020 from <http://www.navajocourts.org/Tit9.htm>.
- Navajo Epidemiology Center, Navajo Department of Health. (2014). A Description of Fatal Car Crashes Occurring Within the Navajo Nation and its Border Towns, 2005-2014. Retrieved from [www.nec.navajo-nsn.gov](http://www.nec.navajo-nsn.gov).
- Navajo Nation Department of Health. Health Education Program. (2017). *High School Navajo Nation Youth Risk Behavior Survey Results*.
- New Mexico Public Education Department. (2020). *School District Report card 2017-2018*. Retrieved June 15, 2020 from [http://webed.ped.state.nm.us/sites/conference/2018%20District%20Report%20Cards/067\\_CENTRAL\\_CONSOLIDATED\\_SCHOOLS\\_DRC2018\\_.pdf](http://webed.ped.state.nm.us/sites/conference/2018%20District%20Report%20Cards/067_CENTRAL_CONSOLIDATED_SCHOOLS_DRC2018_.pdf)
- New Mexico Public Education Department. (2020). *School District Report card 2017-2018*. Retrieved June 15, 2020 from [http://webed.ped.state.nm.us/sites/conference/2018%20District%20Report%20Cards/043\\_GALLUP\\_MCKINLEY\\_COUNTY\\_SCHOOLS\\_DRC2018\\_.pdf](http://webed.ped.state.nm.us/sites/conference/2018%20District%20Report%20Cards/043_GALLUP_MCKINLEY_COUNTY_SCHOOLS_DRC2018_.pdf)
- Northern Navajo Medical Center. (2019). Navajo Area hospital data on women who gave birth at Indian Health Services and 638 hospitals. Retrieved May 2020.
- Office of Disease Prevention and Health Promotion. (2020). *Healthy People 2020 Topics and Objectives*. Retrieved April-July 2020 from <https://www.healthypeople.gov/2020/topics-objectives>
- Onagh W MacKenzie, Carmen V George, Rafael Pérez-Escamilla, Jessica Lasky-Fink, Emily M Piltch, Sharon M Sandman, Clarina Clark, Que'sha J Avalos, Danya S Carroll, Taylor M Wilmore, Sonya S Shin, Healthy Stores Initiative Associated with Produce Purchasing on Navajo Nation, *Current Developments in Nutrition*, Volume 3, Issue 12, December 2019, nzz125, <https://doi.org/10.1093/cdn/nzz125>
- Pardilla M, Prasad D, Suratkar S, Gittelsohn J. High levels of household food insecurity on the Navajo Nation. *Public Health Nutr*. 2014 Jan;17(1):58-65.
- Pareo-Tubbeh S, Shorty M, Bauer M, Agbolosoo E. The Variety, Affordability, and Availability of Healthful Foods at Convenience Stores and Trading Posts on the Navajo Reservation [Internet]. Diné College; 2000. Available from: <http://npta.a2d.arizona.edu/sites/npta/files/thevarietyaffordabilityandavailabilityofhealthfulfoods.pdf>
- Piltch, E. M., Shin, S. S., Houser, R. F., & Griffin, T. (2020). The complexities of selling fruits and vegetables in remote Navajo Nation retail outlets: perspectives from owners and managers of small stores. *Public health nutrition*, 23(9), 1638-1646. <https://doi.org/10.1017/S1368980019003720>
- Settimo, A. K. 2017. Spatial and Temporal Study of Arsenic and Lead in Soil and Sediment Samples Collected from the San Juan River on the Navajo Nation After the Gold King Mine Spill. Northern Arizona University. MA thesis. Flagstaff.
- United States Census Bureau. (2018). *American Community Survey: 1-year and 5-year estimates for the Navajo Nation Reservation, AZ-NM-UT; Navajo Nation Reservation and Off-Reservation Trust Land AZ-NM-UT*. Retrieved January-April 2020 from <https://data.census.gov/cedsci/advanced> <https://www.census.gov/acs/www/data/data-tables-and-tools/narrative-profiles/2018/>
- U.S. Department of Health and Human Services Office of Minority Health. Obesity and American Indians/Alaska Natives [Internet]. 2016 [cited 2016 Nov 23]. Available from: <http://minorityhealth.hhs.gov/omh/browse.aspx?lvl=4&lvlid=40>
- U.S. Census Bureau. (2019). Income and Poverty in the United States. Retrieved May 2020 from <https://www.census.gov/library/publications/2019/demo/p60-266.html#:~:text=The%20official%20poverty%20rate%20in,14.8%20percent%20to%2011.8%20percent>.
- Utah State Board of Education. (2020). *Data Gateway for state assessment scores for language arts, mathematics, and science for San Juan School District*. (2018-2019). Retrieved June 15, 2020 from <https://datagateway.schools.utah.gov/Assessment/StudentProficiency/2018?leaNum=25>
- Yazzie, S. A., Davis, S., Seixas, N., & Yost, M. G. (2020). Assessing the Impact of Housing Features and Environmental Factors on Home Indoor Radon Concentration Levels on the Navajo Nation. *International journal of environmental research and public health*, 17(8), 2813. <https://doi.org/10.3390/ijerph17082813>
- Zychowski KE, Kodali V, Harmon M, Tyler CR, Sanchez B, Ordenez Suarez Y, Herbert G, Wheeler A, Avasarala S, Cerrato JM, Kunda NK, Muttil P, Shuey C, Brearley A, Ali AM, Lin Y, Shoeb M, Erdely A, Campen MJ. Respirable Uranyl-Vanadate-Containing Particulate Matter Derived From a Legacy Uranium Mine Site Exhibits Potentiated Cardiopulmonary Toxicity. *Toxicol Sci*. 2018 Jul 1;164(1):101-114. doi: 10.1093/toxsci/kfy064. PubMed PMID: 29660078; PubMed Central PMCID: PMC6016706



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