Inter Tribal Council of Arizona, Inc.

Infectious Disease Surveillance among American Indians in Arizona, Nevada, and Utah

Tribal Epidemiology Center

Infectious Disease Surveillance among American Indians in Arizona, Nevada, and Utah

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TO: Tribal Leaders and Tribal Health Directors

FROM: Inter Tribal Council of Arizona, Inc.
Tribal Epidemiology Center
Patrick McMullen, PhD, Acting Executive Director

RE: *Infectious Disease Surveillance among American Indians in Arizona, Nevada, and Utah*

The Inter Tribal Council of Arizona, Inc. (ITCA) Tribal Epidemiology Center (TEC) is pleased to present the *Infectious Disease Surveillance among American Indians in Arizona, Nevada, and Utah* Report.

This surveillance report was prepared in response to infectious disease concerns among Tribal communities within the Phoenix and Tucson Indian Health Service Areas. The TEC utilized data from the Arizona Department of Health Services, Office of Infectious Disease Services; Nevada Division of Public and Behavioral Health, State Biostatistician; and Utah Department of Health, Bureau of Epidemiology to construct the report.

This surveillance report highlights incidence of infectious diseases among the American Indian population within Arizona, Nevada, and Utah. For some infectious diseases, results should be interpreted with caution due to missing data. In addition, bear in mind that only reported disease cases are represented here, and it is well known that many infectious diseases are under reported, including in Tribal communities.

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PURPOSE

The purpose of the *Infectious Disease Surveillance among American Indians in Arizona, Nevada, and Utah* report is to provide information about infectious diseases affecting American Indians in Arizona, Nevada, and Utah. The target audience for this report includes: Tribal Health Directors and public health professionals, tribal leadership, and health researchers. This report focuses on the incidence of infectious diseases in American Indian and Alaska Native (AI/AN) communities. This surveillance report demonstrates the current trends in infectious disease incidence using data requested from state notifiable disease surveillance systems.

INTRODUCTION

This is the first publication of the report, *Infectious Disease Surveillance among American Indians in Arizona, Nevada, and Utah,* by the Inter Tribal Council of Arizona, Inc. (ITCA) Tribal Epidemiology Center (TEC). Using data requested from state notifiable surveillance systems, this infectious disease surveillance report demonstrates the current trends in infectious disease AI/AN in Arizona, Nevada, and Utah.

The infectious disease surveillance data analyzed in this report is extracted from the Centers for Disease Control and Prevention (CDC) National Notifiable Disease Surveillance System (NNDSS) compliant surveillance systems of Arizona, Nevada, and Utah. A notifiable disease is any disease that is required by law to be reported to government authorities. The collation of information allows the authorities to monitor the disease, and provides early warning of possible outbreaks.

Infectious disease surveillance data for AI/AN can be used by Tribal Leaders, Tribal Health Directors, community health representatives (CHRs), health care providers (e.g., IHS), other clinicians and nurses, and researchers to identify outbreaks, focus prevention efforts, plan programs, allocate resources, and develop public health policies.

The identification and classification of infectious disease cases is based on case definitions. A case definition is a set of uniform criteria used to define a disease for public health surveillance. Case definitions enable public health to classify and count cases consistently across reporting jurisdictions. They should not be used by healthcare providers to determine how to meet an individual patient's health needs.

Reportable diseases and conditions vary by state. The Council of State and Territorial Epidemiologists (CSTE) has recommended that state health departments report cases of selected diseases to NNDSS. Every year, case definitions are updated using CSTE's Position Statements.

This publication includes age-adjusted incidence rates for several common infectious diseases among AI/AN from Arizona, Nevada, and Utah. Incidence rates tell us about the new cases of disease and the risk of disease in a population. Age-adjusted incidence rates can be compared across states when data collection methods are similar. Not all states had high enough case counts to report accurate results for each condition and those infectious diseases were therefore left unreported.

Race and ethnicity data was lacking in the Arizona data set. Results should be interpreted with caution. Some of the data was incomplete

to be comparable to AI/AN for several diseases, including coccidioidomycosis, hepatitis C, and vancomycin-resistant *Enterococcus*. Even though these are considered top infectious diseases with Arizona, the data was unable to represent real numbers. Coccidioidomycosis data was missing 76% of race ethnicity data. Hepatitis C was only reported from health care facilities using electronic laboratory reporting (ELR) systems, and therefore did not accurately depict a complete surveillance system. Vancomycin-resistant Enterococcus was not reportable after 2007, although some facilities still reported in 2008, which gave the appearance of a decline in case counts.

Since 1878, the occurrence of selected diseases such as cholera, smallpox, plague, and yellow fever has been reportable. Initially the information was used to institute quarantine measures to prevent introducing or spreading these diseases in the United States. In 1912, state and territorial health authorities – in conjunction with the Public Health Service – recommended immediate telegraphic reporting of five infectious diseases and the monthly reporting by letter of ten additional diseases. That year, the first annual summary of *The Notifiable Diseases* included reports of ten diseases from 19 states, the District of Columbia (DC), and Hawaii. By 1928, all states, DC, Hawaii, and Puerto Rico, were participants in the national reporting of 29 specified diseases. In 1950, the importance of state input in reporting communicable diseases became apparent. The Association of State and Territorial Health Officials to convened the state epidemiologists and charged them with the responsibility of deciding which diseases should be reported nationally. A year later, in 1951, a fully documented list of nationally notifiable diseases was generated by a conference of state and territorial epidemiologists which later became CSTE. CSTE continues to hold the responsibility for defining and recommending which diseases and conditions are reportable within states and which of these diseases and conditions will be voluntarily reported to CDC.

CDC receives case notifications from 57 reporting jurisdictions. Each state has laws requiring certain diseases be reported at the state level, but it is voluntary for states to provide information or notifications to CDC at the federal level. It is also voluntary for tribes to report into state surveillance systems. The notifiable diseases data voluntarily shared by these 57 jurisdictions represents a small portion of the public health surveillance data that jurisdictions collect and use to make decisions and conduct public health activities in their communities (e.g., outbreak detection and control). There are several important distinctions between a reportable disease and a notifiable disease.

It is mandatory that reportable disease cases be reported to state and territorial jurisdictions when identified by a non-tribal health provider, hospital, or laboratory. This type of required reporting uses personal identifiers and enables the states to identify cases where immediate disease control and prevention is needed. Each state has its own laws and regulations defining what diseases are reportable. The list of reportable diseases varies among states and over time. Some tribes have established public health codes that allow such reporting of individually identifiable data to state health departments from tribal health providers and hospitals. IHS facilities report diseases to state health departments.

It is voluntary that notifiable disease cases be reported to CDC by state and territorial

jurisdictions without direct personal identifiers for nationwide aggregation and monitoring of disease data. Regular, frequent, timely information on individual cases is considered necessary to monitor disease trends, identify populations or geographic areas at high risk, formulate and assess prevention and control strategies, and formulate public health policies. The list of notifiable diseases varies over time and by state. The list of nationally notifiable diseases is reviewed and modified annually by the CSTE and CDC. Every nationally notifiable disease is not necessarily reportable in each state.

This report is organized into eight main sections:

- Purpose
- Introduction
- Executive Summary
- Analysis Highlights
- Action Items
- Technical Notes
- Glossary
- Statistical Notes Table

The Analysis Highlights section includes the top infectious diseases among American Indians in Arizona, Nevada, and Utah. Diseases that were reported in multiple states have comparison graphs detailing the incidence rates within each state. This report focuses solely on the top infectious diseases among American Indians. Additional analyses of other infectious diseases may be provided to ITCA TEC Tribal partners upon request by contacting us directly at: TECinfo@itcaonline.com.

EXECUTIVE SUMMARY

The purpose of the *Infectious Disease Surveillance among American Indians in Arizona, Nevada, and Utah* report is to provide infectious disease information on American Indians in the Arizona, Nevada, and Utah. This report focuses on the incidence of infectious diseases for AI/AN. Due to confidentiality reasons, it was decided that if there were more than ten cases in a state for AI/AN, data would be presented in this report. Where available, the top infectious diseases most commonly reported in Arizona, Nevada, and Utah, in order of most commonly reported, are located in the Analysis Highlights section. Results should be interpreted with caution, since race/ethnicity data completeness varies by disease. For instance, hepatitis C and vancomycin-resistant *Enterococcus* are not included in the report due to insufficient data, even though these diseases are considered top infectious diseases in the states of Arizona, Nevada, and Utah.

Notable increased incidence rates among AI/AN in Arizona occurred with Rocky Mountain spotted fever (RMSF), pertussis, and coccidioidomycosis. The increased rate of RMSF was specific to the AI/AN population. When evaluating incidence rate ratios among AI/AN and non AI/AN, health disparities may have existed for Respiratory Syncytial Virus (RSV), campylobacteriosis, salmonellosis, invasive *Streptococcus pneumoniae*, shigellosis, hepatitis C, invasive *Streptococcus* Group A, RMSF, and invasive *Haemophilus influenza*. Outbreaks occurred in 2010, for influenza, West Nile virus, RSV, and shigellosis. Notable decreased incidence rates among AI/AN in Arizona occurred with invasive Streptococcus pneumoniae, Methicillin-resistant Staphylococcus aureus (MRSA), invasive *Haemophilus influenza,* and hepatitis B.

Several action items can be initiated by individuals, tribal communities, tribal health care providers, tribal leaders, and researchers to prevent and detect the spread of infectious disease. Individuals can apply better hand washing techniques and adhere to vaccination requirements. Tribal communities may consider entering into a memorandum of agreement with state health departments to ensure more complete data for American Indians. Tribal health care providers can promote vaccination and hand washing within the community to decrease the acquired infection rate. Lastly, non-tribal public health organizations can work to improve AI/AN surveillance data quality and participate in data sharing between organizations to better serve the AI/AN population.

ANALYSIS HIGHLIGHTS

Top Infectious Diseases reported in Arizona for American Indian/Alaska Native (AI/AN)

- Influenza
- Respiratory syncytial virus
- Coccidioidomycosis
- Campylobacteriosis
- Salmonellosis
- Invasive *Streptococcus pneumoniae*
- Shigellosis
- Invasive Methicillin-resistant *Staphylococcus aureus*
- Invasive *Streptococcus* Group A
- Rocky Mountain spotted fever
- Pertussis
- Hepatitis B
- Aseptic viral meningitis
- Varicella (Chickenpox)
- Invasive *Haemophilus influenzae*
- Giardiasis
- West Nile virus
- Hepatitis A

Top Infectious Diseases reported in Nevada for AI/AN

- Influenza
- Invasive *Streptococcus pneumoniae*
- Campylobacteriosis
- Giardiasis
- Salmonellosis

Top Infectious Diseases reported in Utah for AI/AN

- Influenza
- Salmonellosis
- Invasive *Streptococcus pneumoniae*
- Varicella (Chickenpox)
- Campylobacteriosis
- Invasive *Streptococcus* Group A
- Pertussis

Influenza

Influenza is an infection caused by a virus resulting in fever, cough, sore throat, muscle aches, and fatigue.[1] Influenza was the most commonly reported infectious disease in all three states.

- An H1N1 influenza pandemic occurred from 2009-2010; therefore, case counts are higher in this five-year period than in prior five-year periods.
- The people most at risk of influenza complications are older people, young children, and people with certain health conditions [e.g. kidney disorders, liver disorders, weakened immune system due to disease or medication (such as people with HIV or AIDS, or cancer, or those on chronic steroids), Body Mass Index of 40 or greater].[1]
- The best way to prevent the flu is by getting vaccinated each year.

In Arizona, the age-adjusted incidence rate for influenza for AI/AN was 116 per 100,000 in 2012. The Incidence Rate Ratio (IRR) of AI/AN to non AI/AN indicated a disparity was present in 2008 (5.2), 2011 (1.4), and 2012 (1.5) (Table 1, Figure 1). The combined age-adjusted incidence rate for influenza from 2007-2012, was 113 per 100,000 and the IRR for AI/AN to non AI/AN was 1.2 indicating a disparity was present (Table 1, Figure 2).[2] Interpret these numbers with care, as influenza data from Arizona is missing 59% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for influenza from 2007-2012, was 21 per 100,000 and the IRR for AI/AN to non AI/AN was 0.3 indicating no disparity was present (Table 1, Figure 2).[3]

In Utah, the age-adjusted incidence rate for influenza from 2007-2012, was 15 per 100,000 and the IRR for AI/AN to non AI/AN was 0.8 indicating no disparity was present (Table 1, Figure 2).[4]

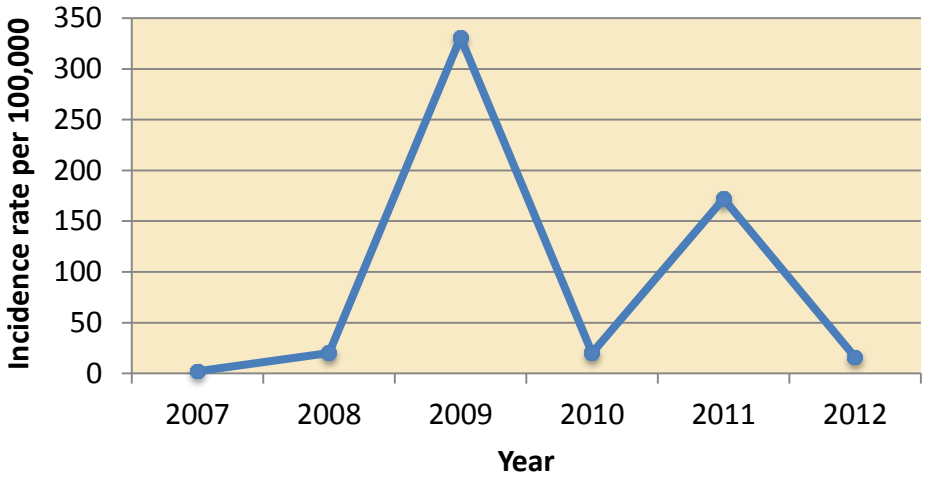
Table 1. Age-adjusted Influenza Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona, Utah, Nevada 2007-2012 (per 100,000) [a-e]

STATE (YEAR)	IR	95% CI	IRR AI/AN:non AI/AN
INFLUENZA			
Arizona [a, b]			
2007	2	1 – 4	0.8
2008	20	14 – 25	5.2
2009	331	312 – 350	1.0
2010	20	15 – 25	0.7
2011	172	158 – 185	1.4
2012	116	103 – 128	1.5
2007-2012	113	109 – 118	1.2
Nevada [a, c]			
2007-2012	21	16 – 26	0.3
Utah [a, d]			
2007-2012	15	10 – 20	0.8

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Nevada Division of Public and Behavioral Health, State Biostatistician, [d] Data from Utah Department of Health, Bureau of Epidemiology; [e] Interpret these numbers with caution, 59% of race ethnicity information is missing.

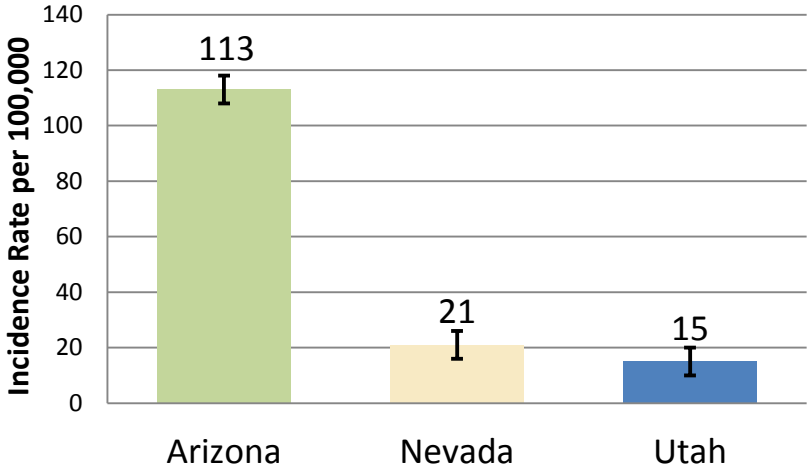
Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 1. Arizona AI/AN Incidence Rate of Influenza 2007-2012 [a-e]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Nevada Division of Public and Behavioral Health, State Biostatistician, [d] Data from Utah Department of Health, Bureau of Epidemiology; [e] Interpret these numbers with caution, 59% of race ethnicity information is missing.

Figure 2. Arizona/Nevada/Utah AI/AN Incidence Rate of Influenza 2007-2012 [a-e]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Nevada Division of Public and Behavioral Health, State Biostatistician, [d] Data from Utah Department of Health, Bureau of Epidemiology; [e] Interpret these numbers with caution, 59% of race ethnicity information is missing.

Respiratory syncytial virus

Respiratory syncytial virus (RSV) is the most common cause of bronchiolitis (inflammation of the small airways in the lung) and pneumonia in children under one year of age in the United States. Each year in the United States, 75,000 to 125,000 children in this age group are hospitalized due to RSV infection.[5]

- RSV is known to have a cyclical occurrence, with its last outbreak occurring in 2010, and cycling approximately every two years. Almost all children are infected with the virus by their second birthday, but only a small percentage develops severe disease.[5]
- Symptoms typically mimic influenza with coughing, sneezing, fever, and decreased activity in infants. There is no vaccination available for RSV.
- Prevention methods must rely on frequent hand washing and disinfectants to reduce the spread of infection.

In Arizona, the age-adjusted incidence rate for RSV for AI/AN was 75 per 100,000 in 2012. The IRR of AI/AN to non AI/AN indicated a disparity was present in 2007 (2.0), 2008 (2.6), 2009 (1.9), 2010 (3.1), 2011 (1.5), and 2012 (1.6) (Table 2, Figure 3).[2] Interpret these numbers with care, as RSV data from Arizona is missing 63% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for RSV from 2007-2012, was not reported due to low case counts.

In Utah, the age-adjusted incidence rate for RSV from 2007-2012, was not reported due to low case counts.

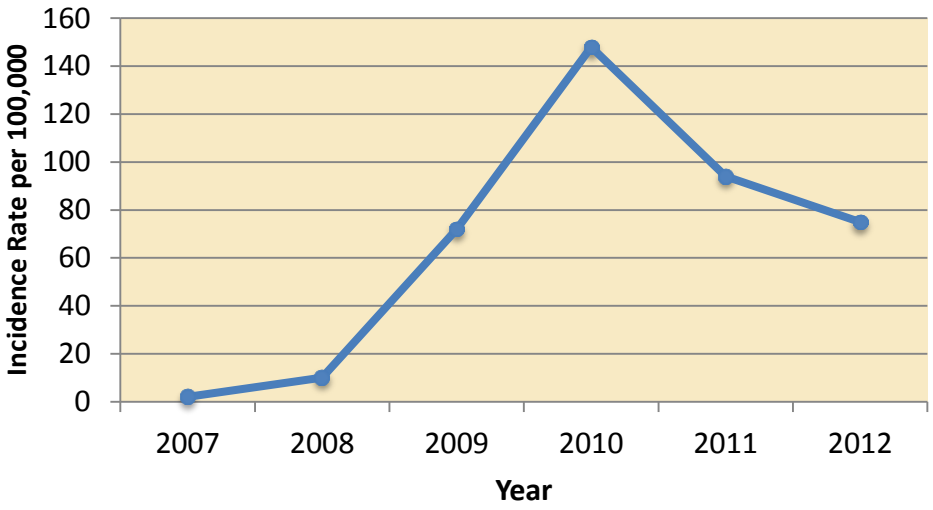
Table 2. Age-adjusted RSV Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona 2007-2012 (per 100,000) [a-c]

STATE (YEAR)	IR	95% CI	IRR AI/AN:Non-AI/NA
RESPIRATORY SYNCYTIAL VIRUS (RSV)			
Arizona [a, b]			
2007	2	1 – 4	2.0
2008	10	7 – 13	2.6
2009	72	64 – 80	1.9
2010	148	136 – 160	3.1
2011	94	86 – 102	1.5
2012	75	66 – 83	1.6

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 63% of race ethnicity information is missing.

Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 3. Arizona AI/AN Incidence Rate of RSV 2007-2012 [a-c]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 63% of race ethnicity information is missing.

Coccidioidomycosis

Coccidioidomycosis (Valley Fever or Cocci), is an infection caused by inhaling spores of the fungus *Coccidioides*, which lives in the soil of dry, low rainfall areas. It is endemic to the southwestern United States, Mexico, Central and South America.

- It is a common cause of pneumonia in endemic areas.
- Most people who are exposed to the fungus do not develop symptoms, or have mild flu-like symptoms that go away on their own.
- Some people may develop a more severe infection, especially those who have a weakened immune system or are pregnant in their third trimester. [6]

In Arizona, the age-adjusted incidence rate for coccidioidomycosis for AI/AN was 59 per 100,000 in 2012. The IRR of AI/AN to non AI/AN indicated a no disparity was present any year from 2007-2012. Increased incidence in coccidioidomycosis has been noted in recent years among both the AI/AN and non AI/AN populations (Table 3, Figure 4).[2] Interpret these numbers with care, as coccidioidomycosis data from Arizona is missing 76% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for coccidioidomycosis from 2007-2012, was not reported due to low case counts.

In Utah, the age-adjusted incidence rate for coccidioidomycosis from 2007-2012, was not reported due to low case counts.

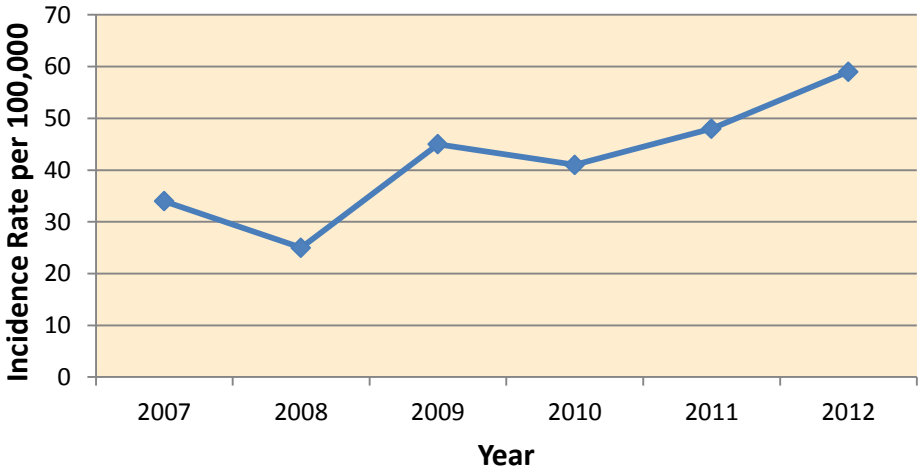
Table 3. Age-adjusted Coccidioidomycosis Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona 2007-2012 (per 100,000) [a-c]

STATE (YEAR)	IR	95% CI	IRR AI/AN:non AI/AN
COCCIDIOIDOMYCOSIS			
Arizona [a, b]			
2007	34	27 – 41	0.4
2008	25	18 – 31	0.3
2009	45	37 – 53	0.3
2010	41	33 – 49	0.2
2011	48	41 – 56	0.2
2012	59	49 – 68	0.3

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 76% of race ethnicity information is missing.

Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 4. Arizona AI/AN Incidence Rate of Coccidioidomycosis 2007-2012 [a-c]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 76% of race ethnicity information is missing.

Campylobacteriosis

Campylobacteriosis is an infectious disease caused by bacteria *Campylobacter,* generally acquired from contaminated food and water.

- Two to five days after exposure, most people who become ill get diarrhea, cramping, abdominal pain, and fever. Some infected persons do not have any symptoms.[7] The diarrhea may be bloody and the person may have nausea and vomiting.
- It is one of the most common causes of diarrheal illness in the United States.[7] The illness usually lasts about one week. In persons with compromised immune systems, *Campylobacter* occasionally spreads to the bloodstream and causes a serious infection.
- Prevention methods include cooking all food thoroughly, washing hands during food preparation, and cleaning of all cooking surfaces.

In Arizona, the age-adjusted incidence rate for campylobacteriosis for AI/AN was 27 per 100,000 in 2012. The IRR of AI/AN to non AI/AN indicated a disparity in 2007 (2.6), 2008 (2.3), 2009 (2.4), 2010 (2.6), 2011(1.5), and 2012 (2.0) (Table 4, Figure 5). The combined age-adjusted incidence rate for campylobacteriosis from 2007-2012, was 29 per 100,000 and the IRR for AI/AN to non AI/AN was 2.2 indicating a disparity was present (Table 4, Figure 6).[2] Interpret these numbers with care, as campylobacteriosis data from Arizona is missing 37% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for campylobacteriosis from 2007-2012, was 3 per 100,000 and the IRR for AI/AN to non AI/AN was 0.4 indicating no disparity was present (Table 4, Figure 6).[3]

In Utah, the age-adjusted incidence rate for campylobacteriosis from 2007-2012, was 6 per 100,000 and the IRR for AI/AN to non AI/AN was 0.5 indicating no disparity was present (Table 4, Figure 6).[4]

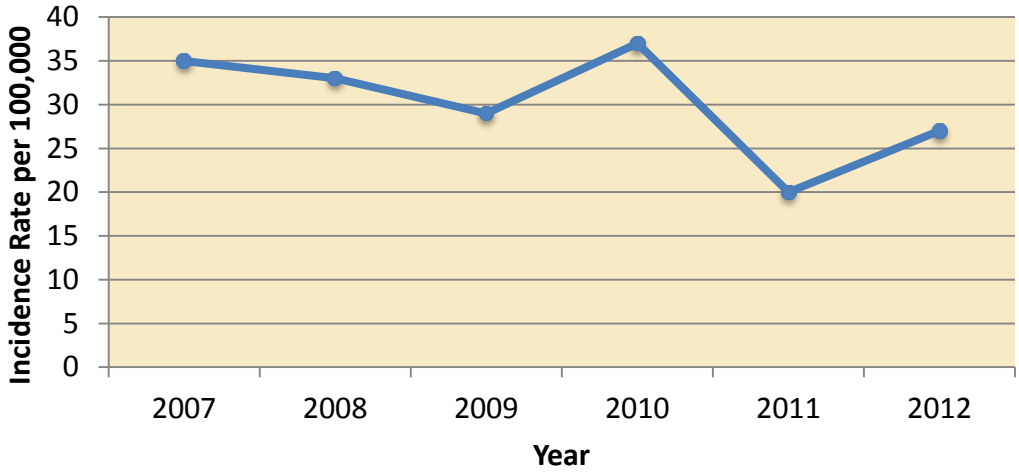
Table 4. Age-adjusted Campylobacteriosis Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona, Utah, Nevada 2007-2012 (per 100,000) [a-e]

STATE (YEAR)	IR	95% CI	IRR AI/AN:non AI/AN
CAMPYLOBACTERIOSIS			
Arizona [a, b]			
2007	35	28 – 42	2.6
2008	33	26 – 40	2.3
2009	29	23 – 34	2.4
2010	37	29 – 44	2.6
2011	20	15 – 24	1.5
2012	27	21 – 33	2.0
2007-2012	29	27 – 32	2.2
Nevada [a, c]			
2007-2012	3	1 – 5	0.4
Utah [a, d]			
2007-2012	6	2 – 10	0.5

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Nevada Division of Public and Behavioral Health, State Biostatistician, [d] Data from Utah Department of Health, Bureau of Epidemiology; [e] Interpret these numbers with caution, 37% of race ethnicity information is missing.

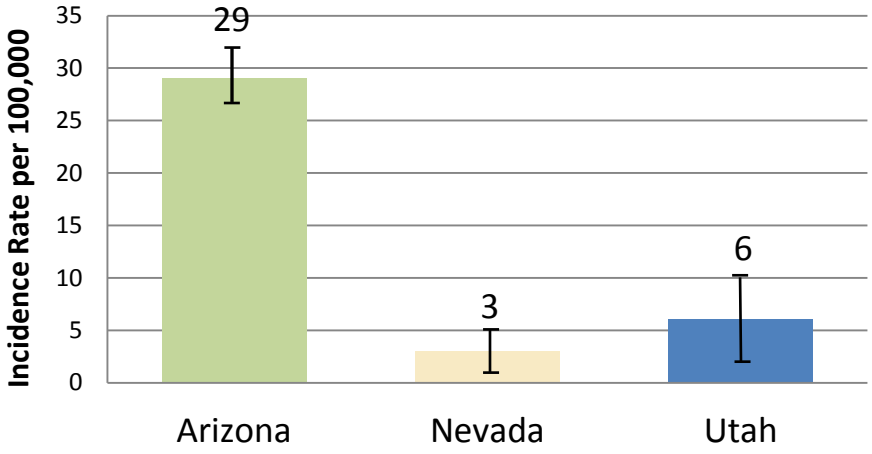
Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 5. Arizona AI/AN Incidence Rate of Campylobacteriosis 2007-2012 [a-e]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Nevada Division of Public and Behavioral Health, State Biostatistician, [d] Data from Utah Department of Health, Bureau of Epidemiology; [e] Interpret these numbers with caution, 37% of race ethnicity information is missing.

Figure 6. Arizona/Nevada/Utah AI/AN Incidence Rate of Campylobacteriosis 2007-2012 [a-e]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Nevada Division of Public and Behavioral Health, State Biostatistician, [d] Data from Utah Department of Health, Bureau of Epidemiology; [e] Interpret these numbers with caution, 37% of race ethnicity information is missing.

Salmonellosis

Salmonellosis is an infectious disease caused by bacteria *Salmonella*. The bacteria are usually transmitted to humans by eating food contaminated with animal feces.

- Symptoms of salmonellosis occur 12 to 72 hours after infection and typically last four to seven days following onset of illness.[8]
- Symptoms include diarrhea, fever, and abdominal pain. Most individuals recover without treatment, although severe cases can lead to hospitalization or death if the organism spreads to the blood stream.[8] Salmonella infections are more common in the summer than winter. Children under the age of five are most likely to become infected.[8]
- Prevention methods include cooking all food thoroughly, washing hands during food preparation, and cleaning of all cooking surfaces.

In Arizona, the age-adjusted incidence rate for salmonellosis for AI/AN was 28 per 100,000 in 2012. The IRR of AI/AN to non AI/AN indicated a disparity was present all years (Table 5, Figure 7). The combined age-adjusted incidence rate for salmonellosis from 2007-2012, was 29 per 100,000 and the IRR for AI/AN to non AI/AN was 2.1 indicating a disparity was present (Table 5, Figure 8).[2] Interpret these numbers with care, as salmonellosis data from Arizona is missing 26% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for salmonellosis from 2007-2012, was 3 per 100,000 and the IRR for AI/AN to non AI/AN was 0.3 indicating no disparity was present (Table 5, Figure 8).[3]

In Utah, the age-adjusted incidence rate for salmonellosis from 2007-2012, was 6 per 100,000 and the IRR for AI/AN to non AI/AN was 0.6 indicating no disparity was present (Table 5, Figure 8).[4]

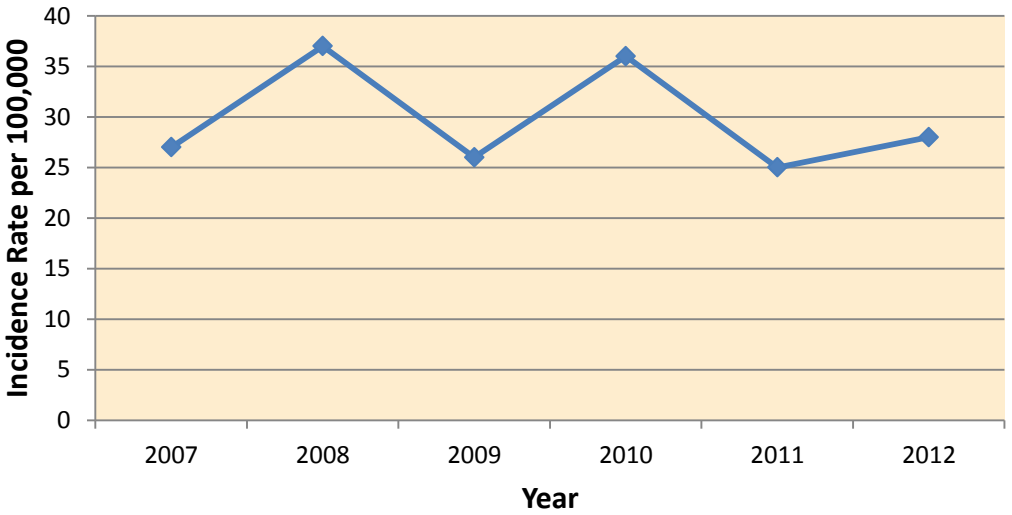
Table 5. Age-adjusted Salmonellosis Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona, Utah, Nevada 2007-2012 (per 100,000) [a-e]

STATE (YEAR)	IR	95% CI	IRR AI/AN:non AI/AN
SALMONELLOSIS			
Arizona [a, b]			
2007	27	21 – 33	1.9
2008	37	30 – 44	2.3
2009	26	21 – 32	1.7
2010	36	29 – 44	2.5
2011	25	20 – 30	2.0
2012	28	22 – 34	2.3
2007-2012	29	27 – 32	2.1
Nevada [a, c]			
2007-2012	3	1 – 5	0.3
Utah [a, d]			
2007-2012	6	3 – 9	0.6

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Nevada Division of Public and Behavioral Health, State Biostatistician; [d] Data from Utah Department of Health, Bureau of Epidemiology; [e] Interpret these numbers with caution, 26% of race ethnicity information is missing.

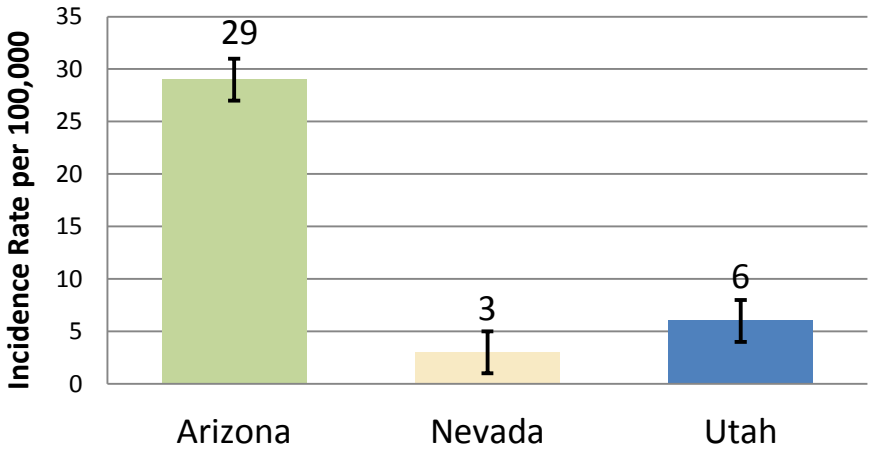
Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 7. Arizona AI/AN Incidence Rate of Salmonellosis 2007-2012 [a-d]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Nevada Division of Public and Behavioral Health, State Biostatistician, [d] Data from Utah Department of Health, Bureau of Epidemiology; [e] Interpret these numbers with caution, 26% of race ethnicity information is missing.

Figure 8. Arizona/Nevada/Utah AI/AN Incidence Rate of Salmonellosis 2007-2012 [a-e]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Nevada Division of Public and Behavioral Health, State Biostatistician, [d] Data from Utah Department of Health, Bureau of Epidemiology; [e] Interpret these numbers with caution, 26% of race ethnicity information is missing.

Invasive *Streptococcus pneumoniae*

Streptococcus pneumoniae is a bacteria that can be transmitted person-to-person via respiratory secretions from sneezing and coughing. Pneumococcal infections are more serious and become invasive when they spread to normally sterile sites, including the blood, lungs, and spinal fluid. The three major clinical syndromes of invasive *Streptococcus pneumoniae* are pneumonia, bacteremia, and meningitis.

- Pneumonia is most common among adults and with symptoms occurring within one to three days after infection.[9] Symptoms include an abrupt onset of fever, chills, rigors, and chest pain.
- Bacteremia is most common among children two years of age and younger and can result in death.[9] Meningitis is the least common, accounting for 13-19% of all cases.[9]
- Meningitis symptoms include headache, lethargy, vomiting, irritability, seizures, coma, and death. Vaccines are available and can be administered as early as two months of age.

In Arizona, the age-adjusted incidence rate for invasive *Streptococcus pneumoniae* for AI/AN was 16 per 100,000 in 2012. The IRR of AI/AN to non AI/AN indicated a disparity was present all years (Table 6, Figure 9). The combined age-adjusted incidence rate for invasive *Streptococcus pneumoniae* from 2007-2012, was 27 per 100,000 and the IRR for AI/AN to non AI/AN was 2.3 indicating a disparity was present (Table 6, Figure 10). Incidence rates for invasive *Streptococcus pneumoniae* have decreased among the AI/AN population since 2008 (Figure 9).[2] Interpret these numbers with care, as invasive *Streptococcus pneumoiae* data from Arizona is missing 27% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for invasive *Streptococcus pneumoniae* from 2007-2012, was 4 per 100,000 and the IRR for AI/AN to non AI/AN was 1.0 indicating no disparity was present (Table 6, Figure 10).[3]

In Utah, the age-adjusted incidence rate for invasive *Streptococcus pneumoniae* from 2007-2012, was 9 per 100,000 and the IRR for AI/AN to non AI/AN was 1.6 indicating a slight disparity was present (Table 6, Figure 10).[4]

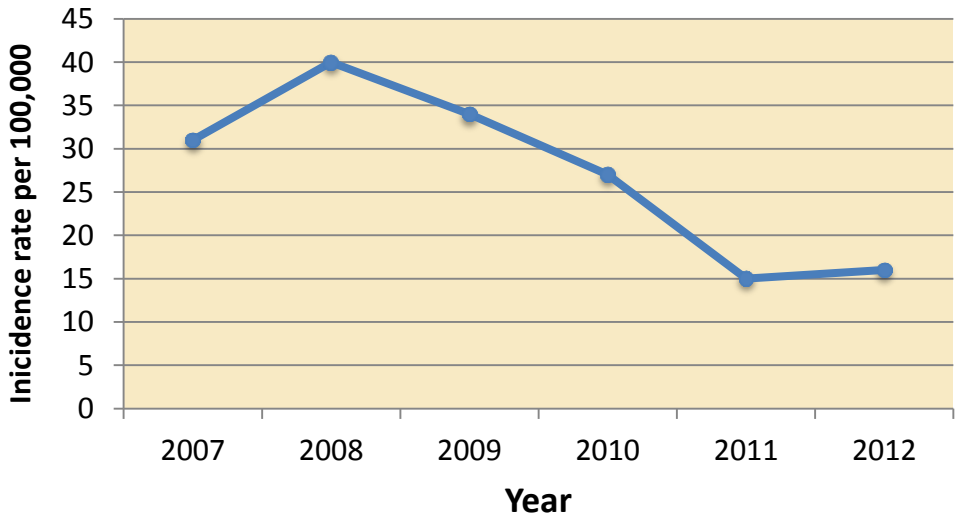
Table 6 Age-adjusted Invasive Streptococcus pneumoniae Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona, Utah, Nevada 2007-2012 (per 100,000) [a-e]

STATE (YEAR)	IR	95% CI	IRR AI/AN:non AI/AN
INVASIVE STREPTOCOCCUS PNEUMONIAE			
Arizona [a, b]			
2007	31	24 – 38	2.4
2008	40	32 – 47	2.7
2009	34	27 – 41	2.7
2010	27	20 – 34	2.4
2011	15	11 – 19	1.6
2012	16	11 – 21	1.8
2007-2012	27	24 – 29	2.3
Nevada [a, c]			
2007-2012	4	1 – 7	1.0
Utah [a, d]			
2007-2012	9	4 – 13	1.6

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Nevada Division of Public and Behavioral Health, State Biostatistician; [d] Data from Utah Department of Health, Bureau of Epidemiology; [e] Interpret these numbers with caution, 27% of race ethnicity information is missing..

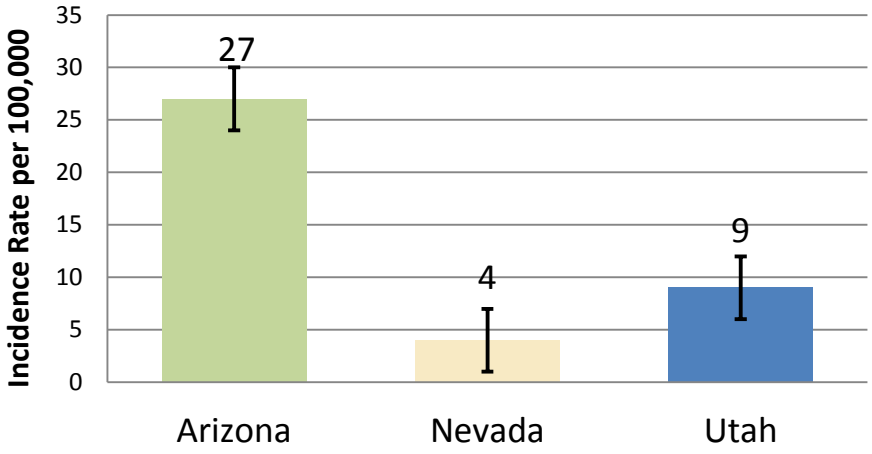
Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 9. Arizona AI/AN Incidence Rate of Invasive Streptococcus pneumoniae 2007-2012[a-e]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Nevada Division of Public and Behavioral Health, State Biostatistician, [d] Data from Utah Department of Health, Bureau of Epidemiology; [e] Inter Interpret these numbers with caution, 27% of race ethnicity information is missing.

Figure 10. *Arizona/Nevada/Utah AI/AN Incidence Rate of Invasive Streptococcus pneumoniae 2007-2012* [a-e]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Nevada Division of Public and Behavioral Health, State Biostatistician, [d] Data from Utah Department of Health, Bureau of Epidemiology; [e] Interpret these numbers with caution, 27% of race ethnicity information is missing.

Shigellosis

Shigellosis is an infectious disease caused by the bacteria *Shigella*. The bacteria are usually transmitted from the stools of an infected person. Poor hand washing and contaminated food spread the disease. Symptoms of shigellosis occur a day or two after infection and typically resolve within five to seven days.[10]

- Symptoms include diarrhea, fever, and abdominal pain, although some infected persons may develop no symptoms at all. Hospitalization is not required, except in rare cases with children less than two years who may develop fever and seizures.
- The highest risk group is among toddlers in child-care settings, where personal hygiene is difficult to maintain. Since only a small amount of the bacteria is needed to produce an infection, shigellosis is particularly common in the developing world and can cause recurrent problems where community hygiene is poor.[10]
- Prevention methods include cooking all food thoroughly, washing hands during food preparation, and cleaning of all cooking surfaces.

In Arizona, the age-adjusted incidence rate for shigellosis for AI/AN was 15 per 100,000 in 2012. The IRR of AI/AN to non AI/AN indicated a disparity was present all years (Table 7, Figure 11).[2] Interpret these numbers with care, as shigellosis data from Arizona is missing 20% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for shigellosis from 2007-2012, was not reported due to low case counts.

In Utah, the age-adjusted incidence rate for shigellosis from 2007-2012, was not reported due to low case counts.

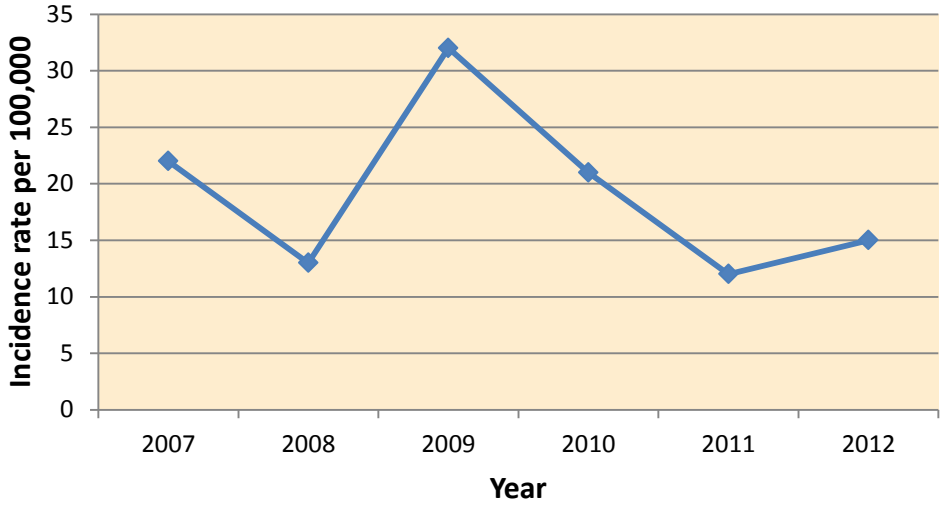
Table 7. Age-adjusted Shigellosis Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona 2007-2012 (per 100,000) [a-c]

STATE (YEAR)	IR	95% CI	IRR AI/AN:non AI/AN
SHIGELLOSIS			
Arizona [a, b]			
2007	22	17 – 27	2.9
2008	13	10 – 17	1.4
2009	32	26 – 38	3.1
2010	21	16 – 26	3.0
2011	12	8 – 15	1.9
2012	15	11 – 20	2.5

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 20% of race ethnicity information is missing.

Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 11. Arizona AI/AN Incidence Rate of Shigellosis 2007-2012 [a-c]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 20% of race ethnicity information is missing.

Methicillin Resistant *Staphylococcus aureus* (MRSA)

The methicillin-resistant *Staphylococcus aureus* (MRSA) bacteria is resistant to penicillin's, a common class of antibiotics.

- MRSA infections are commonly seen on the skin, but can potentially cause more severe problems, such as bloodstream infections, pneumonia, and infection of surgical site wounds.
- MRSA is typically spread by direct contact with an infected wound or shared personal items. MRSA infections on skin and soft tissue generally resemble spider bites with the area becoming red, swollen, painful, warm to the touch, or full of drainage.[11]
- Prevention methods are aimed to stop the spread of MRSA from people who are already infected. This means covering wounds, keeping them clean, not sharing personal items, and regularly washing sheets, towels, and clothing.[11]

In Arizona, the age-adjusted incidence rate for MRSA for AI/AN was 11 per 100,000 in 2012. The IRR of AI/AN to non AI/AN indicated a disparity was present in 2008 (1.4), 2009 (1.2), and 2010 (1.2) (Table 8, Figure 12). Incidence rates for MRSA have decreased among the AI/AN population since 2008 (Figure 12).[2] Interpret these numbers with care, as MRSA data from Arizona is missing 78% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for MRSA from 2007-2012, was not reported due to low case counts.

In Utah, the age-adjusted incidence rate for MRSA from 2007-2012, was not reported due to low case counts.

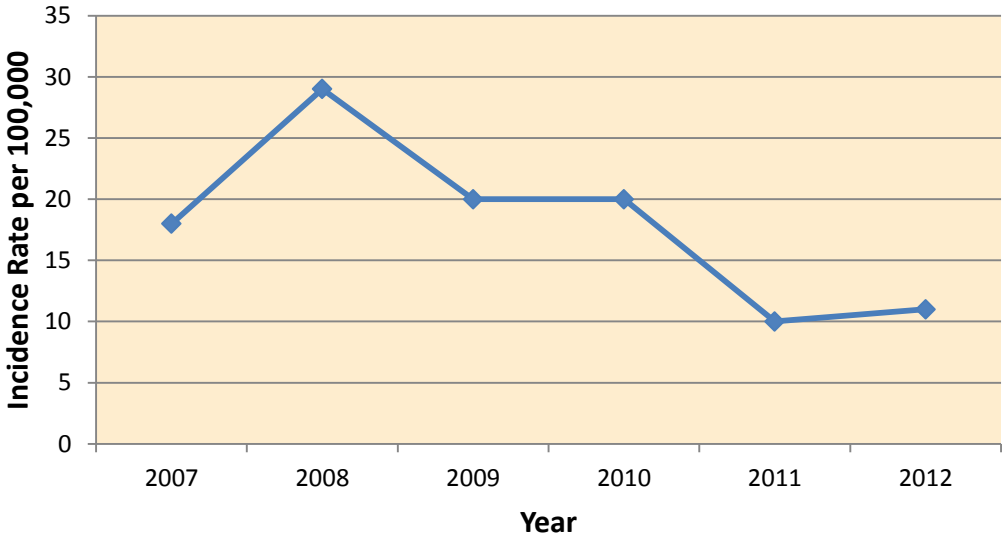
Table 8. Age-adjusted MRSA Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona 2007-2012 (per 100,000) [a-c]

STATE (YEAR)	IR	95% CI	IRR AI/AN:non AI/AN
		MRSA	
Arizona [a, b]			
2007	18	12 – 23	0.9
2008	29	22 – 36	1.4
2009	20	14 – 25	1.2
2010	20	14 – 26	1.2
2011	10	6 – 13	0.7
2012	11	7 – 16	0.8

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 78% of race ethnicity information is missing.

Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 12. *Arizona AI/AN Incidence Rate of MRSA 2007-2012* [a-c]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 78% of race ethnicity information is missing.

Invasive *Streptococcus* Group A

Invasive *Streptococcus* Group A is a potentially life-threatening infection that occurs when the bacteria found in the throat and on skin, gets into the bloodstream, muscles, or lungs. The severe forms of the disease are necrotizing fasciitis ("flesh-eating bacteria") and streptococcal toxic shock syndrome (STSS).[12]

- The bacteria are spread through direct contact with mucus from an infected person or through contact with an infected wound or sore.
- Early signs and symptoms for necrotizing fasciitis are severe pain and swelling, fever, and redness at the wound site.[12] Early symptoms for STSS are fever, abrupt onset of localized sever pain, dizziness, confusion, and a flat red rash over large areas of the body.[12]
- Prevention includes practicing good hand washing and properly treating strep throat infections.

In Arizona, the age-adjusted incidence rate for invasive *Streptococcus* Group A for AI/AN was 7 per 100,000 in 2012. The IRR of AI/AN to non AI/AN indicated a disparity was present all years (Table 10, Figure 14).[2] Interpret these numbers with care, as invasive *Streptococcus* Group A data from Arizona is missing 29% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for invasive *Streptococcus* Group A from 2007-2012, was not reported due to low case counts.

In Utah, the age-adjusted incidence rate for invasive *Streptococcus* Group A from 2007-2012, was 4 per 100,000 and the IRR for AI/AN to non AI/AN was 1.3 indicating a disparity was present (Table 10).[4]

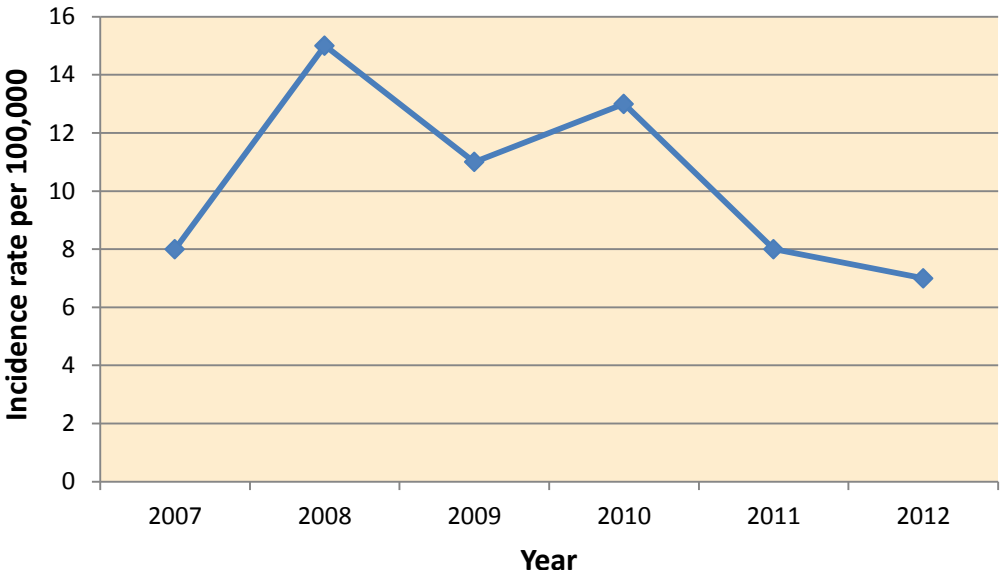
Table 9. Age-adjusted Invasive Streptococcus Group A Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona and Utah 2007-2012 (per 100,000) [a-d]

STATE (YEAR)	IR	95% CI	IRR AI/AN:non AI/AN
INVASIVE STREPTOCOCCUS GROUP A			
Arizona [a, b]			
2007	8	5 – 12	2.8
2008	15	10 – 19	6.1
2009	11	7 – 16	5.2
2010	13	8 – 18	5.6
2011	8	5 – 11	3.1
2012	7	4 – 11	2.9
Utah [a, c]			
2007-2012	4	2 – 7	1.3

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Utah Department of Health, Bureau of Epidemiology; [d] Interpret these numbers with caution, 29% of race ethnicity information is missing.

Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 13. Arizona AI/AN Incidence Rate of Invasive Streptococcus Group A 2007-2012 [a-d]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Utah Department of Health, Bureau of Epidemiology; [d] Interpret these numbers with caution, 29% of race ethnicity information is missing.

Rocky Mountain spotted fever

Rocky Mountain spotted fever (RMSF) is an illness transmitted to humans through the bite of an infected tick. The tick must be infected with *Rickettsia rickettsii* in order to cause the infection. Symptoms typically begin two to fourteen days after a tick bite. Many people do not remember being bitten prior to symptom onset.

- Symptoms are sudden onset of fever, headache, abdominal pain, vomiting, and muscle pain. A rash with small, flat, pink, non-itchy spots develops on the wrists, forearms, and ankles at some point during the infection in 90% of people with RMSF.[13] RMSF is potentially fatal.
- In Arizona, the brown dog tick is responsible for transmission of *Rickettsia rickettsii*, which is found on dogs and around homes.[13]
- RMSF can be prevented by using repellent with DEET, avoiding wooded and bushy areas, and examining your body and pets for ticks regularly.[13]

In Arizona, the age-adjusted incidence rate for RMSF for AI/AN was 11 per 100,000 in 2012. The IRR of AI/AN to non AI/AN indicated a large disparity was present all years. Increased incidence in RMSF in recent years has been noted as being specific to the AI/AN population (Table 12 Figure 16).[2] Interpret these numbers with care, as RMSF data from Arizona is missing 17% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for RMSF from 2007-2012, was not reported due to low case counts.

In Utah, the age-adjusted incidence rate for RMSF from 2007-2012, was not reported due to low case counts.

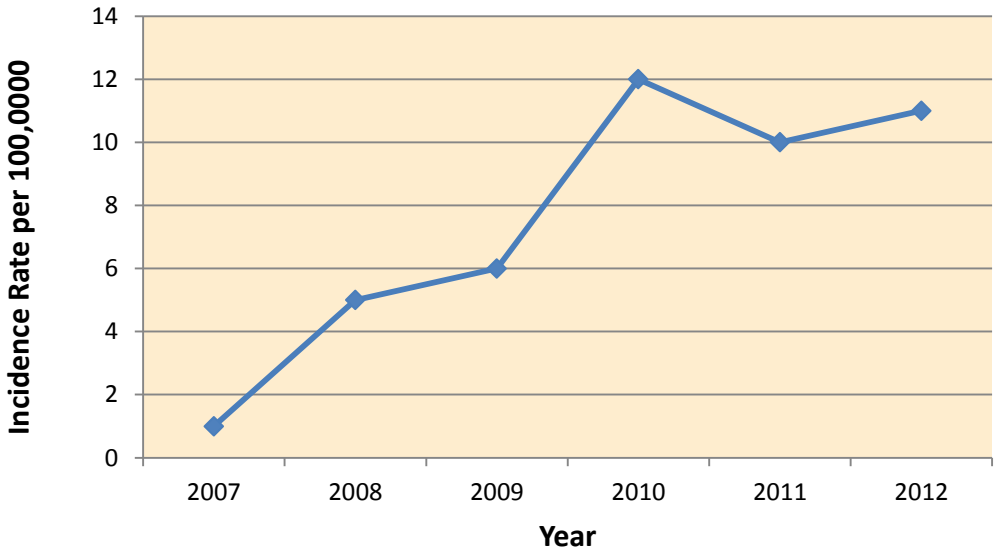
Table 10. Age-adjusted RMSF Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona 2007-2012 (per 100,000) [a-c]

STATE (YEAR)	IR	95% CI	IRR AI/AN:non AI/AN
		RMSF	
Arizona [a, b]			
2007	1	0 – 3	23.5
2008	5	2 – 7	143.0
2009	6	3 – 8	369.1
2010	12	8 – 16	335.1
2011	10	7 – 14	35.5
2012	11	7 – 15	42.3

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c d] Interpret these numbers with caution, 17% of race ethnicity information is missing.

Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 14. Arizona AI/AN Incidence Rate of RMSF 2007-2012 [a-c]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c d] Interpret these numbers with caution, 17% of race ethnicity information is missing.

Pertussis

Pertussis is a respiratory illness, commonly referred to as whooping cough, which is caused by the bacteria *Bordetella pertussis*.

- The disease is very contagious and is commonly spread from person to person through coughing or sneezing while in close contact with others.
- Symptoms usually develop within seven to ten days after exposure and consist of a runny nose, low-grade fever, and interrupted breathing (apnea) in infants.[14] The most noted symptom is a violent, rapid cough that creates a "whooping" sound.
- Currently, the United States recommends the pertussis vaccine called DTaP be administered to infants, which prevents against diphtheria, tetanus, and pertussis.[14] The Tdap vaccination is also used for vaccination in adults, particularly in pregnant women.

In Arizona, the age-adjusted incidence rate for pertussis for AI/AN was 11 per 100,000 in 2012. The IRR of AI/AN to non AI/AN indicated a disparity was present only in 2010 (1.2) (Table 13, Figure 17). Increased incidence in pertussis has been noted in recent years among both the AI/AN and non AI/AN populations (Table 13, Figure 17).[2] Interpret these numbers with care, as pertussis data from Arizona is missing 76% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for pertussis from 2007-2012, was not reported due to low case counts.

In Utah, the age-adjusted incidence rate for pertussis from 2007-2012, was 2 per 100,000 and the IRR for AI/AN to non AI/AN was 0.2 indicating no disparity was present (Table 13).[4]

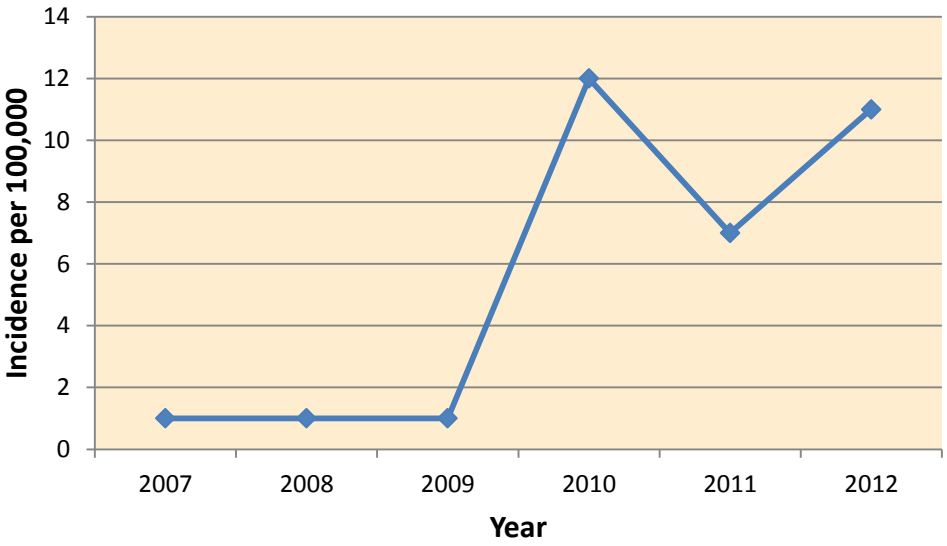
Table 11. Age-adjusted Pertussis Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona and Utah 2007-2012 (per 100,000) [a-d]

STATE (YEAR)	IR	95% CI	IRR AI/AN:non AI/AN
PERTUSSIS			
Arizona [a, b]			
2007	1	0 – 2	0.2
2008	1	0 – 2	0.2
2009	1	0 – 2	0.3
2010	12	8 – 15	1.2
2011	7	4 – 9	0.5
2012	11	7 – 15	0.7
Utah [a, c]			
2007-2012	2	1 – 4	0.2

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Utah Department of Health, Bureau of Epidemiology; [d] Interpret these numbers with caution, 76% of race ethnicity information is missing.

Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 15. Arizona AI/AN Incidence Rate of Pertussis 2007-2012 [a-d]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Utah Department of Health, Bureau of Epidemiology; [d] Interpret these numbers with caution, 76% of race ethnicity information is missing.

Hepatitis B Infection, Acute or Chronic

Hepatitis B disease is a serious infection that affects the liver resulting from infection with hepatitis B virus (HBV). HBV is easily spread through contact with blood or body fluids of an infected person. The virus can live on a contaminated object for up to seven days.[15]

- Common methods of contact are through bites or sores, objects with blood or body fluid contamination, unprotected sex, and injection drug use. HBV is similar to hepatitis C because it can also cause an acute or chronic infection. The risk of chronic infection is inversely related to age. Infants are most susceptible to chronic infection (90%) compared with adults (2%-6%).[15]
- The symptoms of acute HBV are loss of appetite, tiredness, muscle pain, diarrhea, and jaundice. Chronic HBV generally does not have symptoms but can lead to cirrhosis, liver cancer, and death.
- The hepatitis B vaccine is available and has been widely used in both children and adults. The vaccine consists of three doses and gives long term prevention to HBV, potentially lifelong.[15] The CDC recommends that pregnant women, injection drug users, HIV positive patients, persons born in countries where hepatitis B is endemic, and other high risk individuals get tested for hepatitis B.

In Arizona, the age-adjusted incidence rate for HBV for AI/AN was 3 per 100,000 in 2012. The IRR of AI/AN to non AI/AN indicated a disparity was not present all years (Table 14, Figure 18). Incidence rates for hepatitis B have decreased significantly among the AI/AN population since 2007 (Figure 18).[2] Interpret these numbers with care, as HBV data from Arizona is missing 66% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for HBV from 2007-2012, was not reported due to low case counts.

In Utah, the age-adjusted incidence rate for HBV from 2007-2012, was not reported due to low case counts.

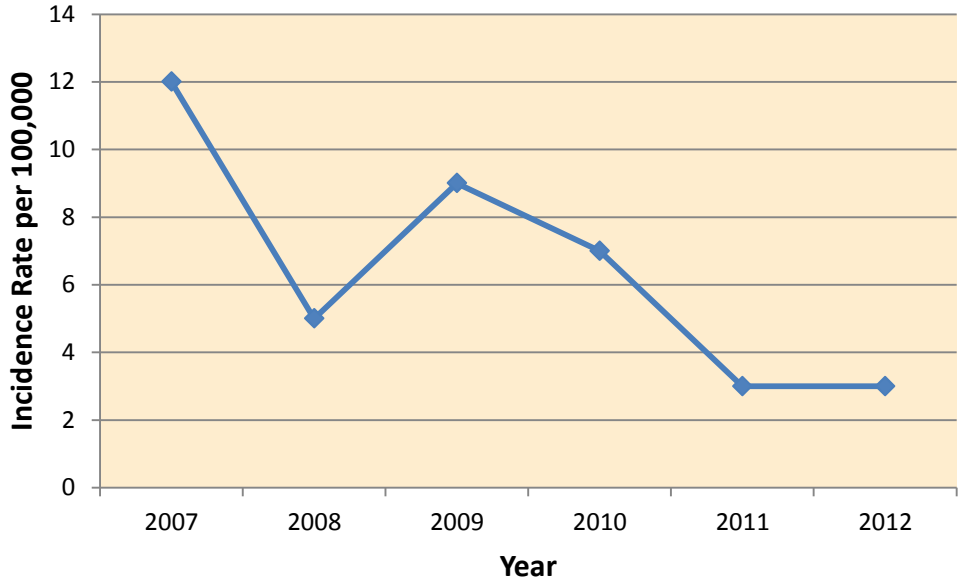
Table 12. Age-adjusted HBV Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona 2007-2012 (per 100,000) [a-c]

STATE (YEAR)	IR	95% CI	IRR AI/AN:non AI/AN
		HBV	
Arizona [a, b]			
2007	12	8 – 16	0.6
2008	5	3 – 8	0.3
2009	9	5 – 12	0.4
2010	7	4 – 11	0.4
2011	3	1 – 4	0.2
2012	3	1 – 5	0.2

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 66% of race ethnicity information is missing.

Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 16. Arizona AI/AN Incidence Rate of HBV 2007-2012 [a-c]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 66% of race ethnicity information is missing.

Aseptic viral meningitis

Aseptic viral meningitis is the most common form of meningitis, which is an illness characterized by inflammation in the linings of the brain and spinal cord known as the meninges.[16] Viral meningitis is typically less severe and gets better without treatment. Enteroviruses are the most common cause of viral meningitis, although other viruses, such as Epstein-Barr, Herpes, Varicella-zoster, measles, and influenza have been known to cause aseptic viral meningitis.[16] Enterovirus most commonly is spread through fecal contamination, respiratory secretions, or contact with an infected person.

- Individuals at increased risk for acquiring aseptic viral meningitis are children under the age of five and people with a weakened immune system.
- Symptoms include fever, headache, stiff neck, sensitivity to bright light, nausea, and lack of appetite. The symptoms usually last seven to ten days, and normal healthy people typically make a full recovery.[16]
- There are no vaccinations available for aseptic viral meningitis. Therefore, the only way to prevent spread is to focus on cleaning with proper solutions. If a person is in contact with an infected person, wash hands thoroughly, clean contaminated surfaces and avoid kissing or sharing a drinking glass.

In Arizona, the age-adjusted incidence rate for aseptic viral meningitis for AI/AN was 4 per 100,000 in 2012. The IRR of AI/AN to non AI/AN indicated no disparity was present all years (Table 15, Figure 19).[2 c] Interpret these numbers with care, as aseptic viral meningitis data from Arizona is missing 5% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for aseptic viral meningitis from 2007-2012, was not reported due to low case counts.

In Utah, the age-adjusted incidence rate for aseptic viral meningitis from 2007-2012, was not reported due to low case counts.

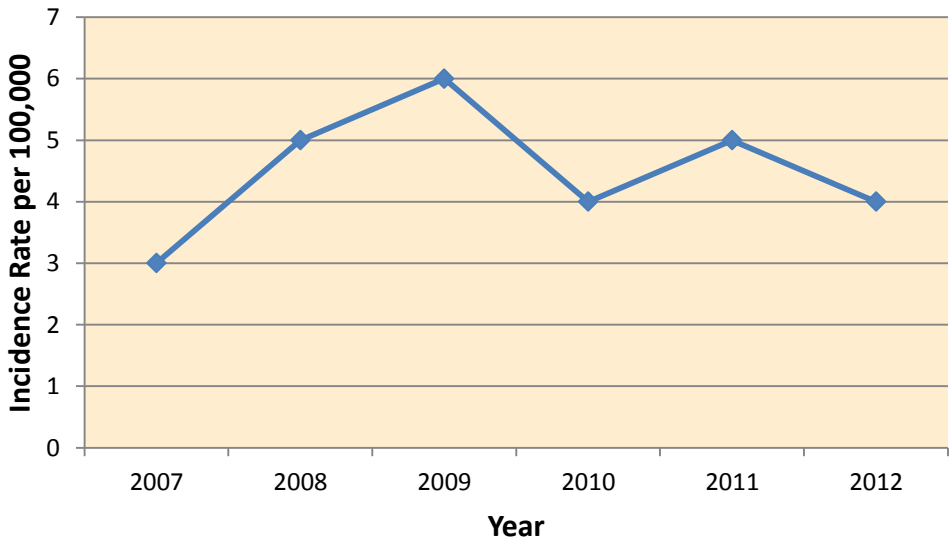
Table 13. Age-adjusted Aseptic Viral Meningitis Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona 2007-2012 (per 100,000) [a-c]

STATE (YEAR)	IR	95% CI	IRR AI/AN:non AI/AN
ASEPTIC VIRAL MENINGITIS			
Arizona [a, b]			
2007	3	1 – 5	0.3
2008	5	3 – 7	0.5
2009	6	3 – 9	0.8
2010	4	2 – 7	0.4
2011	5	3 – 7	0.8
2012	4	1 – 6	0.5

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 5% of race ethnicity information is missing.

Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 17. Arizona AI/AN Incidence Rate of Aseptic Viral Meningitis 2007-2012 [a-c]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 5% of race ethnicity information is missing.

Varicella (Chickenpox)

Varicella (chickenpox) is a highly contagious disease caused by the varicella-zoster virus.

- The most prominent symptoms are the development of a blister-like rash, itching, tiredness, and fever. Serious outcomes can occur in babies, adults, and people with weakened immune systems.
- It is extremely contagious and can easily spread from infected people to others who have not been vaccinated or who have never had chickenpox.
- The best prevention method is vaccination, which consists of two doses and can be administered to children, adolescents, and adults.[17]

In Arizona, the age-adjusted incidence rate for varicella in 2007, 2008, and 2009, for AI/AN was 4 per 100,000 in 2012. The IRR of AI/AN to non AI/AN indicated a disparity was present in 2007 (2.4), and 2008 (1.6) (Table 16, Figure 20).[2] Interpret these numbers with care, as varicella data from Arizona is missing 33% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for varicella from 2007-2012, was not reported due to low case counts.

In Utah, the age-adjusted incidence rate for varicella from 2007-2012, was 4 per 100,000 and the IRR for AI/AN to non AI/AN was 0.2 indicating no disparity was present (Table 16).[4]

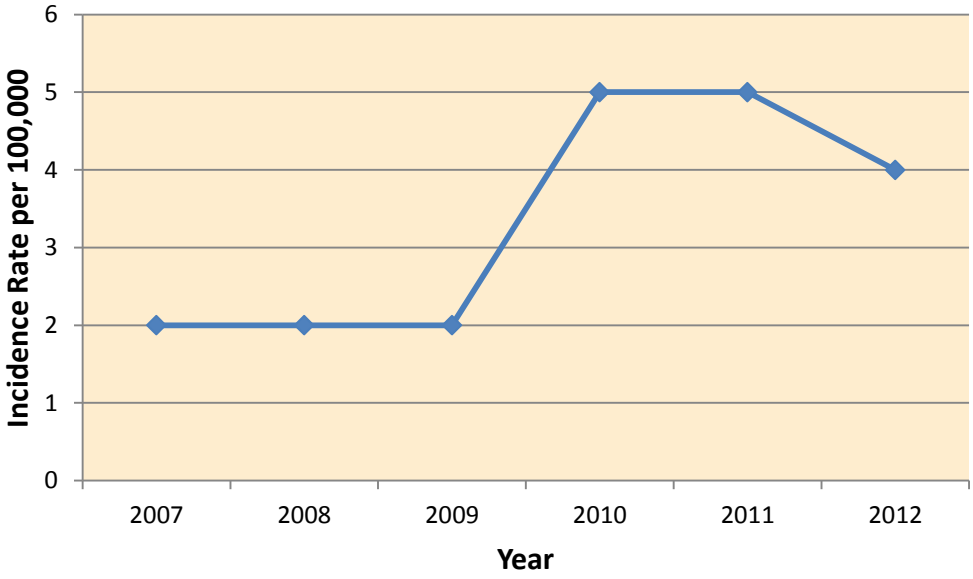
Table 14. Age-adjusted Varicella Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona and Utah 2007-2012 (per 100,000) [a-d]

STATE (YEAR)	IR	95% CI	IRR AI/AN:non AI/AN
VARICELLA (CHICKENPOX)			
Arizona [a, b]			
2007	2	1 – 3	2.4
2008	2	1 – 3	1.6
2009	2	1 – 4	0.3
2010	5	3 – 8	0.4
2011	5	3 – 6	0.4
2012	4	2 – 6	0.5
Utah [a, c]			
2007-2012	4	2 – 6	0.3

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Utah Department of Health, Bureau of Epidemiology; [d] Interpret these numbers with caution, 33% of race ethnicity information is missing.

Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 18. Arizona AI/AN Incidence Rate of Varicella 2007-2012 [a-d]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Utah Department of Health, Bureau of Epidemiology; [d] Interpret these numbers with caution, 33% of race ethnicity information is missing.

Invasive *Haemophilus influenzae*

Haemophilus influenzae is a bacteria that can cause several severe infections, including pneumonia, bacteremia (blood infection), and meningitis. In Arizona, the highest rates are seen among older adults. Previously, it was commonly seen in children under the age of five and had the potential to cause lifelong disability and death.

- *Haemophilus influenzae* is spread person-to person from direct contact or droplet transmission by coughing and sneezing.
    - Symptoms associated with pneumonia are fever, cough, shortness of breath, chills, sweating, headache, chest pain, and excessive tiredness.
    - Symptoms associated with bacteremia are fever, chills, excessive tiredness, abdominal pain, nausea, vomiting, diarrhea, anxiety, and altered mental status.
    - Symptoms associated with meningitis are fever, headache, stiff neck, nausea, vomiting, and increased sensitivity to light.[18]
- Only *Haemophilus influenzae* type b (Hib) is preventable by vaccination. The Hib vaccine is recommended for all children younger than five years of age and is usually given to infants starting at two months.[18]

In Arizona, the age-adjusted incidence rate for invasive *Haemophilus influenzae* for AI/AN was 2 per 100,000 in 2012. The IRR of AI/AN to non AI/AN indicated a disparity was present in all years but 2012 (Table 17, Figure 21).[2] Interpret these numbers with care, as invasive *Haemophilus influenzae* data from Arizona is missing 20% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for invasive *Haemophilus influenzae* for AI/AN from 2007-2012, was not reported due to low case counts.

In Utah, the age-adjusted incidence rate for invasive *Haemophilus influenzae* for AI/AN from 2007-2012, was not reported due to low case counts.

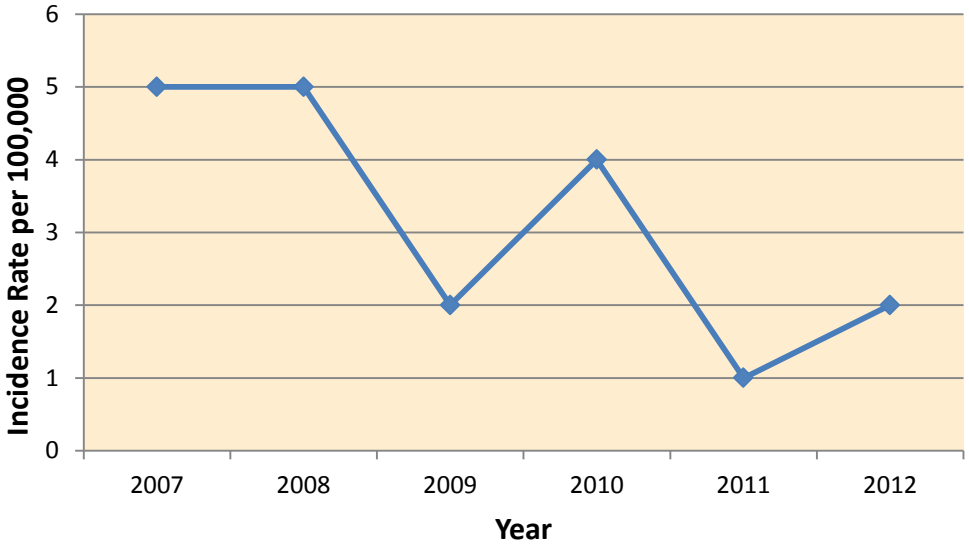
Table 15. Age-adjusted Invasive Haemophilus influenzae Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona 2007-2012 (per 100,000) [a-c]

STATE (YEAR)	IR	95% CI	IRR AI/AN:non AI/AN
INVASIVE HAEMOPHILUS INFLUENZAE			
Arizona [a, b]			
2007	5	2 – 8	4.7
2008	5	2 – 7	3.5
2009	2	0 – 3	1.5
2010	4	2 – 7	2.8
2011	1	0 – 3	1.3
2012	2	0 – 3	0.9

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 20% of race ethnicity information is missing.

Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 19. Arizona AI/AN Incidence Rate of Invasive Haemophilus influenza 2007-2012 [a-c]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 20% of race ethnicity information is missing.

Giardiasis

Giardiasis is a diarrheal illness caused by the parasite *Giardia*. *Giardia* can be found in food, water, and on other surfaces that have been contaminated with feces from infected humans or animals. *Giardia* cannot be killed by chlorine and it is most commonly transmitted through drinking and recreational water use.[19]

- Symptoms of the disease usually do not occur until one to three weeks after infection and consist of diarrhea, gas, greasy stool, stomach cramps, nausea, and dehydration.
- Individuals at the highest risk of getting giardiasis are campers or backpackers, and children in daycare settings along with their close contacts.[19]
- Preventive measures include practicing good hygiene and avoiding contaminated food and water.

In Arizona, the age-adjusted incidence rate for giardiasis for AI/AN was 2 per 100,000 in 2012. The IRR of AI/AN to non AI/AN indicated no disparity was present all years (Table 18, Figure 22).[2] Interpret these numbers with care, as giardiasis data from Arizona is missing 36% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for giardiasis for AI/AN from 2007-2012, was not reported due to low case counts.

In Utah, the age-adjusted incidence rate for giardiasis for AI/AN from 2007-2012, was 3 per 100,000 and the IRR for AI/AN to non AI/AN was 0.7 indicating no disparity was present (Table 18).[4]

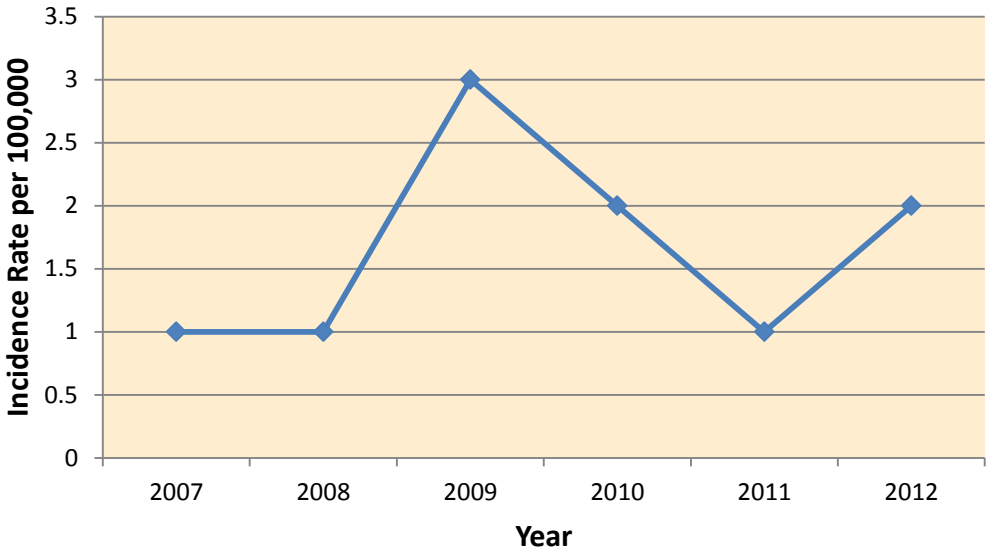
Table 16. Age-adjusted Giardiasis Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona and Utah 2007-2012 (per 100,000) [a-d]

STATE (YEAR)	IR	95% CI	IRR AI/AN:non AI/AN
GIARDIASIS			
Arizona [a, b]			
2007	1	0 – 2	0.4
2008	1	0 – 3	0.7
2009	3	1 – 5	1.0
2010	2	0 – 4	0.9
2011	1	0 – 2	0.6
2012	2	0 – 3	0.9
Utah [a, c]			
2007-2012	3	1 – 4	0.7

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Utah Department of Health, Bureau of Epidemiology; [d] Interpret these numbers with caution, 36% of race ethnicity information is missing.

Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 20. Arizona AI/AN Incidence Rate of Giardiasis 2007-2012 [a-d]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Data from Utah Department of Health, Bureau of Epidemiology; [d] Interpret these numbers with caution, 36% of race ethnicity information is missing.

West Nile Virus

West Nile virus is most commonly spread by the bite of an infected mosquito. Other methods of acquiring West Nile virus are through blood transfusions, and organ transplants. West Nile virus has been detected in all the lower 48 states. Outbreaks occur every summer when the mosquito populations are at their highest.[20]

- Risk of infection is greatest for people who work outside and participate in outdoor activities. The incubation period for the virus is two to fourteen days before symptoms begin.
- Most people (70-80%) who become infected do not develop any symptoms.[20] Some people will develop a more mild illness consisting of fever, headache, body aches, joint pain, vomiting, and rash. Rarely people will experience severe symptoms such as encephalitis or meningitis and occasionally death.
- There is currently no vaccine available to protect against West Nile virus infection. West Nile virus is prevented by mosquito-proofing the home by using screens and emptying any nearby standing water that could be a potential breeding ground for mosquitos.[20]

In Arizona, the age-adjusted incidence rate for West Nile virus for AI/AN 1 per 100,000 in 2012. The IRR of AI/AN to non AI/AN indicated a disparity was present in 2008 (2.0), 2009 (1.2), and 2010 (2.5) (Table 19, Figure 23).[2] Interpret these numbers with care, as West Nile virus data from Arizona is missing 15% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for West Nile virus for AI/AN from 2007-2012, was not reported due to low case counts.

In Utah, the age-adjusted incidence rate for West Nile virus for AI/AN from 2007-2012, was not reported due to low case counts.

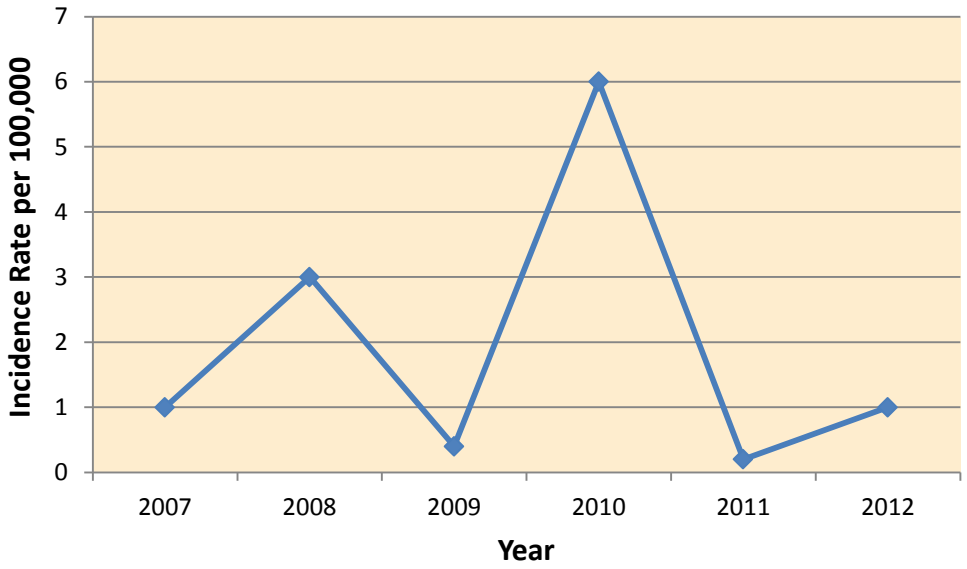
Table 17. Age-adjusted West Nile Virus Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona 2007-2012 (per 100,000) [a-c]

STATE (YEAR)	IR	95% CI	IRR AI/AN:non AI/AN
WEST NILE VIRUS			
Arizona [a, b]			
2007	1	0 – 1	0.4
2008	3	1 – 5	2.0
2009	0.4	0 – 1	1.2
2010	6	3 – 9	2.5
2011	0.2	0 – 1	0.2
2012	1	0 – 2	0.4

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 15% of race ethnicity information is missing.

Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 21. Arizona AI/AN Incidence Rate of West Nile Virus 2007-2012 [a-c]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 15% of race ethnicity information is missing.

Hepatitis A

Hepatitis A is a contagious liver disease resulting from infection with hepatitis A virus (HAV). HAV is spread when a person ingests fecal matter from contaminated food, drinks, objects, or infected persons. Common methods of contact are improper hand hygiene and sexual activity.

- Individuals who travel to countries where hepatitis A is common, have sexual contact or are caregivers with someone who has HAV, are recreational drug users, or have clotting-factor disorders are at a greater risk of acquiring Hepatitis A than others.[21]
- The symptoms of HAV can occur in two to six weeks after becoming infected, although some people never experience symptoms. Symptoms include fever, fatigue, vomiting, abdominal pain, dark urine, grey-colored stools, joint pain, and jaundice. Symptoms usually persist for two months although people can be ill for as long as six months.[21]
- The hepatitis A vaccine is available and is highly recommended for all children, some international travelers, and people with other risk factors for acquiring the disease. The vaccine consists of two doses and gives long term protection against hepatitis A.[21] However, frequent hand washing with soap and water also helps prevent the spread of hepatitis A.

In Arizona, the age-adjusted incidence rate for HAV for AI/AN was 1 per 100,000 in 2012. The IRR of AI/AN to non AI/AN indicated a disparity was present in 2008 (1.1), 2010 (1.1), and 2011(1.4) (Table 20, Figure 24).[2] Interpret these numbers with care, as HAV data from Arizona is missing 29% of race and ethnicity variables and may not be representative of the whole.

In Nevada, the age-adjusted incidence rate for HAV for AI/AN from 2007-2012, was not reported due to low case counts.

In Utah, the age-adjusted incidence rate for HAV for AI/AN from 2007-2012, was not reported due to low case counts.

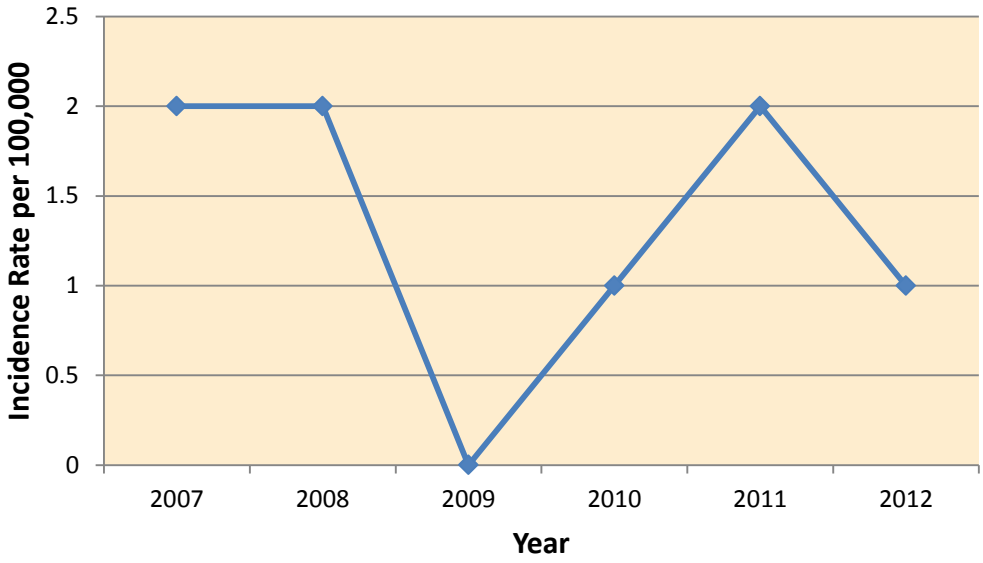
Table 18. Age-adjusted HAV Incidence Rates (IR), Confidence Intervals (CI), and Incidence Rate Ratios (IRR) for Arizona 2007-2012 (per 100,000) [a-c]

STATE (YEAR)	IR	95% CI	IRR AI/AN:non AI/AN
		HAV	
Arizona [a, b]			
2007	2	0 – 3	0.7
2008	2	0 – 4	1.1
2009	0	0 – 1	0.3
2010	1	0 – 2	1.1
2011	2	0 – 3	1.4
2012	1	0 – 2	0.6

[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 29% of race ethnicity information is missing.

Abbreviations:
AI/AN: American Indians/Alaska Natives; 95% CI: 95% confidence interval

Figure 22. Arizona AI/AN Incidence Rate of HAV 2007-2012 [a-c]



[a] Age-adjusted to the 2000 U.S. Standard Population; [b] Data from Arizona Department of Health Services, Office of Infectious Disease Services; [c] Interpret these numbers with caution, 29% of race ethnicity information is missing.

ACTION ITEMS

Below are points of action specifically geared to individuals, tribal communities, tribal health care providers, tribal leaders, and infectious disease researchers working in tribal communities in an effort to prevent and detect infectious diseases. These action items are mostly specific to infectious diseases that have high rates, or show disparities among American Indians in Arizona, Nevada, and Utah, although many action items may apply to several or all infectious diseases in general.

Individuals

- General Recommendations
    - Wash hands
    - Cover mouth and nose when coughing or sneezing
    - Use proper disinfectant for cleaning
- Foodborne diseases (Salmonella, Shigella, Campylobacter)
    - Practice safe food handling at home
    - Keep cold food cold and hot food hot
    - Cook food thoroughly
- Vaccine preventable diseases
    - Get vaccinated
    - Remember to get boosters
- Bloodborne and sexually transmitted diseases
    - Avoid contact with blood or body fluids
    - Practice safe sex and injection practices

Tribal Communities

- May consider entering to memorandum of agreement or data sharing agreement with state health departments to ensure more complete data
- Notify agencies of disease outbreaks
- Advocate for state and county health departments to investigate outbreaks and alert the community, in partnership with tribes.
- Educate the community on infection control and proper food handling

Tribal Health Care Providers

- Promote vaccination within the community
- Promote hand washing, especially in schools and public restrooms
- Decrease healthcare-associated infection rates through using proper infection control procedures

Tribal Leaders

- Support public health authority status for Tribal Health Departments
- May consider entering to memorandum of agreement or data sharing agreement with state health departments to ensure more complete data
- Support tribal codes that encourage proper food handling and infection control by tribally run facilities

Non-Tribal Public Health

- Work to improve AI/AN surveillance data with tribes, IHS, state registries and Tribal Epidemiology Centers
- Participate in data sharing

TECHNICAL NOTES

National Notifiable Disease Surveillance System

Effective public health surveillance begins at the local- and state-health department levels. The health departments work with a variety of healthcare providers, including laboratories, hospitals, and private providers to obtain case reports on many infectious and some non-infectious diseases. Each state has laws mandating that providers and laboratories report cases of certain diseases to state or local health departments. These data provide the direction and scope of many state and local health department activities, from detecting individual cases and controlling outbreaks to implementing prevention and intervention activities. State health departments support national public health surveillance by voluntarily sharing a portion of their case specific data with CDC through daily or weekly reporting, depending on the public health urgency of the disease.

CDC's NNDSS is a standardized reporting system that gives public health officials the capability to monitor the occurrence and spread of diseases. A key component of NNDSS is the National Electronic Disease Surveillance System (NEDSS).[22] NEDSS provides data and information technology standards, support, and leadership to state, local, and territorial health departments that, in turn, provide CDC with aggregate data on nationally notifiable diseases and conditions. NEDSS's capabilities are used to support reportable disease surveillance by improving information sharing between healthcare providers and health departments and between states and CDC. They support Electronic Laboratory Reporting as part of the *Meaningful Use initiative* to improve public health disease reporting, and increase information sharing and system interoperability between state health departments to improve multi-state disease detection and containment.

National Notifiable Disease Surveillance System Data Sources

NEDSS/NBS

NEDSS facilitates electronically transferring public health surveillance data from the healthcare system to public health departments.[22] It is a conduit for exchanging information that supports NNDSS. Today, when states and territories voluntarily submit notifiable disease surveillance data electronically to CDC, they use data standards and electronic disease information systems and resources supported in part by NEDSS. This ensures that state data shared with CDC are submitted quickly, securely and in an understandable form. NEDSS defines the content (i.e., disease diagnosis, risk factor information, lab confirmation results, and patient demographics) of messages sent using the HL7 messaging standard and implements content standards that the healthcare industry currently uses (e.g., LOINC as the standard for transmitting laboratory test names and SNOMED as the standard for transmitting test results) for increased interoperability between states. This standardization makes the disease reported by every state comparable with each other. The NEDSS Base System (NBS), a CDC-developed information system, helps jurisdictions manage reportable disease data and send notifiable diseases data to CDC using Public Health Information Network standards. Arizona, Nevada, and Utah use a

NEDSS-compatible system to send case notifications to NNDSS. To be considered NEDSS compatible, information systems must meet these requirements:

- Disease data is entered directly through an Internet browser-based system. This creates a database accessible by health investigators and public health professionals.

- Electronic Laboratory Reporting enables labs to report cases to health departments, integration of multiple health information databases into a single repository, and electronic messaging capabilities. This way states can share information efficiently with CDC and other health agencies.

Medical Electronic Disease Surveillance Intelligence System

Arizona is unique in its electronic transfer of public health surveillance data. Instead of using NEDSS, they use a like-minded program called Medical Electronic Disease Surveillance Intelligence System (MEDSIS). MEDSIS is a HIPPA-compliant system that meets the federal requirements of the Public Health Information Network (PHIN) and the NEDSS. This particular system is integrated into Arizona's Health Services Portal (HSP) and uses secure e-mail communications, secure data messaging and translation services, directories, and failover capacities. [23]

Electronic Laboratory Reporting

Electronic Laboratory Reporting (ELR) is the automated transmission of laboratory-related data from commercial, public health, hospital, and other labs to state and local public health departments through an electronic health records system or a Laboratory Information Management System.[22] ELR helps identify reportable conditions determined by confirmatory testing and supports case reporting at the state or local level. ELR is used by laboratory providers to help them meet state reportable diseases laws mandating that providers report cases of specified diseases to the health department. ELR supports overall public health surveillance by helping improve the timeliness and accuracy of case reporting and confirmation to state and local health departments. It supports national public health surveillance by improving the timeliness and accuracy of notifiable disease data voluntarily shared by states with CDC.

National Electronic Telecommunication Surveillance System

Before using NEDSS, the CDC developed and used the National Electronic Telecommunications System for Surveillance (NETSS).[22] NETSS is a computerized public health surveillance information system that provided CDC with weekly data regarding nationally notifiable diseases. NETSS continues to be used by reporting jurisdictions that are transitioning to the more robust NEDSS. A bare-bones approach for providing basic data and information, NETSS file content was not changed or updated substantially since NETSS launched in 1990. Most reporting prior to 2012, from Arizona, Nevada, and Utah, utilized NETSS.

Relationship between Tribes, State, and National Surveillance

Reporting by tribal healthcare providers and facilities to state and local health authorities is dependent on the tribal health codes and the tribal reporting requirements. IHS facilities will report notifiable conditions to state or local health departments under the provisions of state statutes, codes or regulations to the extent permitted by law.[24-26] Laboratories that receive specimens from tribal health care facilities are required to report positive tests to the state or local health authorities. All cases reported to local and state health departments are reported through NNDSS.

Case Definitions

A case definition is set of uniform criteria used to define a disease for public health surveillance. Case definitions enable public health agencies to classify and count cases consistently across reporting jurisdictions. Case definitions are not to be used by healthcare providers to determine how to meet an individual patient's health needs.[22] Therefore, not all clinically diagnosed cases are included. Any disease counts extracted from a surveillance system likely under-estimate the burden of disease in the population.

The list of reportable conditions varies by state. The CSTE has recommended that state health departments report cases of selected diseases to NNDSS. Some diseases, such as coccidioidomycosis are not nationally reportable, but case definitions have been developed to provide states with uniform reporting standards to monitor conditions of regional or local interest. Every year, case definitions are updated using CSTE's Position Statements. They provide uniform criteria of nationally notifiable infectious and non-infectious conditions for reporting purposes.

The case definitions for the conditions in this report are available here:
http://wwwn.cdc.gov/nndss/script/casedefDefault.aspx .

Data Barriers

There are several barriers that are important to this report. First, Arizona has been reporting hepatitis C since 1997, but the surveillance system has not received funding since 2006. Hepatitis C reports are still sent to the health department through ELR systems, but it does not provide accurate case counts since facilities not using ELR systems are unmonitored. Second, vancomycin-resistant Enterococcus stopped being reportable in Arizona in 2007. Some institutions still reported cases in 2008, but the numbers were not representative of the whole and therefore the data was left out of the analysis. Third, Varicella (VZV) case counts from Arizona did not represent a complete data set because there was inconsistent surveillance depending on school districts. Limitations with VZV can also arise from several other reasons such as, school vaccination campaigns which influence case counts, an increase school nurse turnover leading to inconsistent reporting, and there is no way to differentiate chickenpox from shingles among VZV cases. Fourth, coccidioidomycosis testing for Arizona varied from 2009 to 2012.

More sensitive testing methods were implemented in 2012, and may be cause for the dramatic increase in positive cases. Fifth, pertussis is a cyclical disease that increases every three to five years. The IRR is skewed from 2007 to 2012, in Arizona due to the high rates of pertussis in parts of Mohave County. Sixth, reporting requirements may vary between states in regards to the diseases that are not nationally notifiable. Therefore, the data comparing Arizona, Nevada, and Utah should be interpreted with care. Seventh, for the Arizona infectious disease data, it is not possible to extract cases only occurring in the Phoenix and Tucson IHS Areas, so the Navajo IHS Area is included. Eighth, the data in this report is not directly comparable to the state-reported and nationally-reported counts and rates for AI/ANs because Hispanic AI/ANs are included as AI/ANs in this report. In other reports, Hispanic AI/ANs are classified as Hispanic. This primarily affects the Arizona AI/AN counts and rates. It is known that race/ethnicity, particularly among American Indians is often misclassified, or American Indians are considered a different race/ethnicity group. The race/ethnicity misclassification likely under reports the number of cases among American Indians. The lower number of cases would then lower the incidence rate of among American Indians. At the time of writing, none of the surveillance systems had formally investigated misclassification of race/ethnicity among American Indians. Ninth, disease cases with a race classified as unknown, missing, other, or unspecified multiple race were considered non-AI in this report. Further, only five diseases in Nevada and seven in Utah had counts above ten for 2007-2012. For all diseases in both states, the years were collapsed into a single rate due to the small number of cases to protect confidentiality. Finally, bear in mind that this report only captures those cases reported to the state and the actual community rates are suspected to be higher.

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GLOSSARY

AIDS - acquired immunodeficiency syndrome is a group of diseases resulting from infection with the human immunodeficiency virus (HIV). A person infected with HIV gradually loses immune function, becoming less able to resist aliments and cancers, resulting in eventual death. As of 2009, all CDC HIV surveillance products and reports refer to AIDS as HIV infection, stage 3

Alaska Native – a member or descendant of indigenous peoples in Alaska.

American Indian – a member or descendant of indigenous people in the United States; this term is generally used for indigenous peoples who are members of tribes in all states except Alaska and Hawaii.

Campylobacteriosis - an infectious diarrheal disease caused by bacteria of the genus *Campylobacter*

Coccidioidomycosis - an infection caused by the fungus *Coccidioides*

Count – the number of disease, events, or other health-related occurrences.

Data – items of information expressed as measurements or statistics used to learn more about a disease or risk factor. Data are used for calculations, support of evidence, assessments, and often for decision making.

Electronic laboratory reporting – the electronic transmission from laboratories to public health of laboratory reports which identify reportable conditions.

Ethnicity – relating to cultural factors such as a shared creation narrative, ancestry, language, and beliefs. A social group characterized by ethnic affiliation or distinctiveness. Ethnicity is largely self-identified.

Incidence rate – the rate at which new cases of disease or health condition occur in a population. The incidence rate is calculated by the following formula in public health practice:

$$\textit{Incidence rate} = \frac{\text{Number of new cases in specified period}}{\text{Total number of persons at risk during this period}} \times 10^{n}$$

Indian Health Service (IHS) – U.S. Department for Health and Human Services funded agency responsible for providing health services to American Indians and Alaska Natives. The IHS provides health services for approximately 1.9 million American Indians and Alaska Natives who belong to 566 federally recognized Tribes, state recognized Tribes, and California Indians in 35 states. The IHS is divided into 12 geographic "Areas" of the United States: Alaska, Albuquerque, Aberdeen, Bemidji, Billings, California, Nashville, Navajo, Oklahoma, Phoenix, Portland, and Tucson.

Influenza - Influenza (flu) is a contagious respiratory illness caused by influenza viruses. It can cause mild to severe illness.

Invasive - an infection that occur when the bacteria get past the defenses of the person who is infected. This may occur when a person has sores or other breaks in the skin that allow the bacteria to get into the tissue

Methicillin-Resistant *Staphylococcus Aureus* (MRSA) - a type of staphylococcus bacteria that is resistant to several antibiotics. In the general community, MRSA can cause skin and other infections. In a healthcare setting, such as a hospital or nursing home, MRSA can cause severe problems such as bloodstream infections, pneumonia and surgical site infections

Misclassification – the incorrect assignment of a person, value, or item into a grouping which it should not be assigned.

National Electronic Disease Surveillance System (NEDSS) - facilitates electronically transferring public health surveillance data from the healthcare system to public health departments. It is a conduit for exchanging information that supports NNDSS.

National Notifiable Disease Surveillance System (NNDSS) - a public health disease surveillance system that gives public health officials powerful capabilities to monitor the occurrence and spread of diseases.

Navajo Service Area – the Navajo Service Area is one of 12 geographic "Areas" within the Indian Health Service (IHS). The Navajo IHS Area provides healthcare for members of the Navajo Nation and San Juan Southern Paiutes, but care to other Native Americans (Zuni, Hopi) is also provided.

Phoenix Service Area – the Phoenix Service Area is one of 12 geographic "Areas" within the Indian Health Service (IHS). The Phoenix Service Area serves the majority of its tri-state "Area" in Arizona, Nevada, and Utah.

Prevalence – the proportion of a population that is found to have a specified condition. This measure is often presented as a percentage, a fraction, or the number of cases per 10,000 or 100,000 people.

$$Prevalence = \frac{\text{Number of new and existing cases in specified period}}{\text{Population during the same time period}} \times 10^n$$

Race – a social construct created to categorize human beings into broad and generic groupings that are self-identified.

Rate – a measure of how fast a disease is occurring in the population. Rate is measured by the following formula:

$$Rate = \frac{\text{Number of events in specified period}}{\text{Total population during the same time period}} \times 10^n$$

Respiratory syncytial virus - a respiratory virus that infects the lungs and breathing passages.

Standard population – A set population that is used to standardize age-adjusted rates so rates in different populations are comparable.

Statistics – the act of collecting, summarizing, and analyzing data.

Surveillance – systematic (orderly) and continuous collection, analysis and interpretation of data, along with the timely dissemination (distribution) of the results to those who have the right to know so that action can be taken.

Tucson Service Area – the Tucson Service Area is one of 12 geographic "Areas" within the Indian Health Service (IHS). The Tucson IHS Area provides health care for two Tribes in southern Arizona: the Tohono O'odham Nation and the Pascua Yaqui Tribe.

Vancomycin resistant enterococci – Enterococci, bacteria that are naturally present in the intestinal tract of all people, that are resistant to vancomycin. When VRE infects the urinary tract, surgical wounds or the bloodstream of hospitalized patients, it may be difficult to treat and, occasionally, may be life threatening. Serious VRE infections usually occur in hospitalized patients with serious underlying illnesses such as cancer, blood disorders, kidney disease or immune deficiencies.

STATISTICAL NOTES TABLE

MEASUREMENT NAME	TECHNICAL DEFINITION OF MEASUREMENT	MEASUREMENT PUBLIC HEALTH USE	MEASUREMENT FORMULAS
Crude rate	The simplest rate for a population over a specific time period. The number of new cases of disease that occurred during a specific time period in a population at risk without accounting for the differences in the composition of the population.	A crude rate includes time so this is a measure of disease risk for the population.	$\left\langle \left. \frac{\text{Number of cases during a specific time period}}{\text{American Indian population during the same time period}} \right\rvert \times 100{,}000 \right\rangle$
Stratified Rate	A crude rate calculated for a specific subgroup or stratum of people within a population. The stratified rate includes the number of new cases of disease that occurred during a specific time period in a population at risk for each subgroup or stratum of interest without accounting for other differences in the composition of the population.	A stratified rate includes time, so this is a measure of disease risk for a specific subgroup in the population (age, race-ethnicity, gender).	$\left\langle \left. \frac{\text{Number of cases within a subgroup during a specific time period}}{\text{American Indian population within a subgroup during the same time period}} \right\rvert \times 100{,}000 \right\rangle$
Age-adjusted Rate	A direct age-adjusted rate is a rate that is calculated to "control" for any differences in the age structure of a population like the US population and American Indian/Alaska Native population.	A age-adjusted rate includes time so this is a measure of disease risk for the population.	1. Crude Rate x Standard Population = Expected Cases 2. $\left\langle \left. \frac{\text{Total Expected Cases}}{\text{Total Standard Population}} \right\rvert \times 100{,}000 \right\rangle$
95% Confidence Intervals (CI 95%)	A range of values defined so that there is a 95% probability that the value of the point estimate, or measure is within it	Used to compare two values to determine if they are different (statistically).	For rates $\text{Point estimate} \pm [1.96 \times \text{SE[point estimate]}]$ For matched odds ratios $\text{Log OR} \pm \left[1.96 \times \sqrt{\frac{1}{b} + \frac{1}{c}}\right]$
Incidence Rate	The number of new cases per population in a given time period.	Measure of the risk of developing a new condition within a specified period of time.	$\left\langle \left. \frac{\text{Number of new cases within a subgroup during a specific time period}}{\text{American Indian population within a subgroup during the same time period}} \right\rvert \times 100{,}000 \right\rangle$
Incidence Rate Ratios (IRR)	The ratio of two incidence rates. The incidence rate among the exposed proportion of the population, divided by the incidence rate in the unexposed portion of the population, gives a relative measure of the effect of a given exposure.	Incidence rate ratios (IRR) determine if racial disparities are observed in the rates of new cases.	$\frac{\text{Incidence Rate for American Indians}}{\text{Incidence Rate for for all other races/ethnicities}}$ IRR < 1, no disparity IRR > 1, disparity