Baseline Human Health Summary

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BASELINE HUMAN HEALTH SUMMARY

FINAL

LIBERTY PROJECT

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LIBERTY BASELINE HUMAN HEALTH SUMMARY

Introduction

This baseline human health summary presents an overview of the current health status of the communities within the North Slope Borough (NSB). This baseline health summary included Anaktuvuk Pass, Atqasuk, Kaktovik, Nuiqsut, Point Hope, Point Lay, Utqiaġvik [formerly known as Barrow], and Wainwright. This baseline health summary refers to these communities as potentially affected communities (PACs) in accordance with the HIA Toolkit (ADHSS, 2015). The summary focused on Nuiqsut because it is the closest PAC to the proposed Liberty Project.

Baseline health conditions form a fundamental context for the overall health impact assessment (HIA) process. The baseline health summary creates a point of reference for the health status of a community prior to development of a proposed project and also describes an overall health profile for an area. The baseline health summary will inform decision-makers about health vulnerabilities and strengths of PACs. This information, used in conjunction with their knowledge of the features of a project, will help them better understand the potential health implications of the project and better inform deliberations.

For Alaska, baseline health information can be found in public health surveillance systems maintained by the State of Alaska, the Alaska Native Tribal Health Consortium (ANTHC), and occasionally local borough and tribal entities. This document focuses on a review of existing public health surveillance data. The Liberty Baseline Human Health Summary presents personal health information (PHI) according to the requirements of the Health Insurance Portability and Privacy Act of 1996 (HIPPA). The State of Alaska's approach to PHI is detailed in the HIA Toolkit (ADHSS, 2015).

Alaska public health agencies routinely report public health surveillance data at the statewide or regional level. These agencies do not typically report village or community-level data to avoid privacy violations (e.g., stigmatization) and problems with statistical analysis when case numbers are small. In general, the State of Alaska does not release disaggregated results for small numbers (e.g., <6). As a result, the majority of the data presented in this baseline health summary represents the entire NSB, rather than community-level data.

Baseline community health data are organized and presented by specific Health Effect Categories (HECs). The report focuses on health data that, based on experience with similar types of projects, are likely to be most relevant to the proposed Liberty Project.

HEC1: Social Determinants of Health

The World Health Organization (WHO) defines the social determinants of health as, "the circumstances in which people are born, grow up, live, work, and age, and the systems put in place to deal with illness" and asserts that "the social determinants of health are mostly responsible for health inequities—the unfair and avoidable differences in health status seen within and between countries" (WHO, 2008).

Both health outcome data and health determinant data are used to establish baseline health status according to the social determinants of health. An outcome is a health event that has actually occurred, while a determinant is a setting or context that strongly influences health status.

Life expectancy, maternal and child health, intimate partner violence and sexual violence, oral health, suicide rates, and substance dependence are health outcomes used as general indicators of physical and social wellness. Family structure, economic status, educational attainment, family stability, and cultural continuity are health determinants that are associated with positive and negative health outcomes. For the purpose of the baseline health summary, regional information about the aforementioned criteria is compared to information for all Alaska Native peoples (AN), Alaskans statewide, and to the U.S. population, where possible.

Demographics

Population

The PACs described in this baseline summary are communities whose residents may be affected by the proposed Liberty Project. This includes the eight villages of the NSB (Anaktuvuk Pass, Atqasuk, Utqiaġvik, Kaktovik, Nuiqsut, Point Hope, Point Lay and Wainwright). Additional data will be provided, where possible, for the community of Nuiqsut, due to its proximity to the proposed project.

The population of the villages in the PACs is described in Table 1. The majority of villages are small, with populations fewer than 500 residents. The majority of residents in all communities (roughly 90%, except in Utqiaġvik) are American Indian/AN. The population is young (median age: 24-31 years old; Table 1).

Table 1. Population demographics in PACs

Village	Population size	American Indian/Alaska Native[a]	Median age (years)	Proportion of residents ≥ 65 years of age	Proportion of residents < 18 years of age
Anaktuvuk Pass	324	92%	27	4%	33%
Atqasuk	233	93%	24	6%	39%
Kaktovik	239	90%	31	8%	30%
Nuiqsut	402	90%	25	6%	28%
Point Hope	674	93%	25	6%	35%
Point Lay	189	89%	25	4%	31%
Utqiaġvik	4,212	69%	28	5%	33%
Wainwright	556	92%	28	5%	34%

Source: U.S. Census, 2014

[a]Race reported alone or in combination with one or more other races

Income

The U.S. Census Bureau collects data on median household income via the American Communities Survey (ACS). Income includes all monetary sources of income including wages, the Permanent Fund Dividend, corporation dividends, and public assistance (ADCRA, 2016). Income does not include any dollar equivalent of subsistence resources (resources from the harvesting and processing of wild foods and raw materials). For 2014, the estimated median household income in the NSB was $74,609; for Alaska it was $71,829. Median household income in the PACs ranged from $49,375 (Anaktuvuk Pass) to $85,883 (Nuiqsut; Table 2). In the majority of NSB households, permanent fund dividends account for 7-17% of the household's total income. The three most important sources of income for Iñupiat households in the NSB are wage work (57%), corporation dividend income (20%) and permanent fund dividends from the state (NSB Census, 2015)

According to the 2010-2014 ACS estimates, the per capita income in the NSB ($50,267) was one and a half times higher than in the State of Alaska ($33,129). Each PAC had a per capita income lower than the state average, with Utqiaġvik having the highest at $27,696 (U.S. Census ACS, 2014; Table 2).

Employment

Employment is another key demographic factor that influences health. Unemployment includes anyone who has made an active attempt to find work in the four-week period up to and including the week that includes the 12th of the referenced month. Due to the scarcity of employment opportunities in rural Alaska, many individuals do not meet the official definition of unemployed because they are not conducting active job searches. In January of 2018 (the most recently available data), the unemployment rate for the entire NSB was 6.8%, which was lower than the statewide unemployment rate of 8.1%, but higher than the nation-wide rate of 4.5% (not seasonally adjusted, ADLWD, 2018). According to the 2015 NSB Census, the unemployment rate for the NSB was 27.7%; this rate was determined through interviews and census respondents, rather than from unemployment insurance claims and accounts for the lack of employment opportunities and seasonal unemployment in the NSB. Communities outside of Utqiaġvik bear the largest burden of unemployment in the NSB (NSB Census, 2015).

Percent living below poverty level

Poverty is a powerful determinant of human health (Braveman et al., 2011). The U.S. Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty nationwide (U.S. Census, 2016). However, the U.S. Census defines poverty in a way that does not take into account the higher cost of living in Alaska. The U.S. Department of Health and Human Services adjusts poverty guidelines for entitlement programs such as Women, Infants and Children, and Temporary Assistance for Needy Families for local factors. For the 48-contiguous U.S. states, the 2018 poverty level for a 1-person household was $12,140 and for a 4-person household it was $25,100. Comparatively, the 2018 poverty level in Alaska for a 1-person household was $15,180 and for a 4-person household was $31,380 (ASPE, 2018). However, the poverty measure may still not accurately predict the well-being of a family in rural Alaska, due to the contributions from subsistence and sharing resources within the community (Goldsmith, 2007; Kofinas et al., 2016).

In 2014, the percent of residents living below the federal poverty level in the NSB was very similar to the percentage for all of Alaska (10.2% for NSB, 10.1% for Alaska; Table 2). The variation between villages is high, ranging from 3% in Nuiqsut to over 21% in Atqasuk. All villages, except Nuiqsut, had a higher

percentage of residents living below the poverty line than the State of Alaska as a whole (U.S. Census ACS, 2014).

Table 2. Economic indicators

Location	Per Capita Income ($)	Median Household Income ($)	% of People Living Below the Poverty Limit
State of Alaska	33,129	71,859	10.1%
North Slope Borough	50,267	74,609	10.2%
Anaktuvuk Pass	19,122	49,375	18.9%
Atqasuk	19,968	51,500	21.5%
Kaktovik	20,782	58,125	14.8%
Nuiqsut	26,861	85,833	3.0%
Point Hope	19,497	67,500	11.9%
Point Lay	18,819	60,000	16.7%
Utqiaġvik	27,696	82,976	12.3%
Wainwright	20,551	64,861	19.3%

Source: U.S. Census ACS, 2014

Educational attainment

The highest level of household educational attainment is positively associated with improved overall family health status (Muennig, 2006). High school graduates have been found to live an average of 6 to 9 years longer than high school dropouts (Wong et al., 2002). Adults with low educational attainment are more likely to die from cardiovascular disease, cancer, and lung disease (Muennig, 2005). Multiple mechanisms have been proposed to account for this trend. Education positively impacts lifestyle choices and health-related decisions, and better-educated people are also less likely to be employed in dangerous jobs (Muennig, 2006).

Compared to the State of Alaska, the NSB has a slightly lower percentage of adults with a high school diploma and with a bachelor's degree or higher (Table 3). The percentage of adults who are high school graduates varies considerably among the communities, from a low of 69.7% in Atqasuk to a high of 82.7% in Utqiaġvik (U.S. Census ACS, 2014).

Table 3. Educational attainment

Location	Percent high school graduate or higher
Alaska	91.8%
North Slope Borough	87.1%
Anaktuvuk Pass	75.4%
Atqasuk	69.7%
Utqiaġvik	82.7%
Kaktovik	70.4%
Nuiqsut	70.4%
Point Hope	81.5%
Point Lay	80.0%
Wainwright	75.2%

Source: U.S. Census ACS, 2014

General Health

Self-rated health is one of the most consistent predictors of illness, premature death, health care utilization, and hospitalization. In 2010, more than three-quarters (79%) of Nuiqsut heads of household reported their health to be at least good, and 21% reported fair to poor health, which is generally consistent with the other NSB villages. The percentage of adults reporting to have very good to excellent health was lower in Nuiqsut (39%) than it was statewide (56%; BLM, 2013). Comparatively, in 2015, 95% of Nuiqsut heads of household reported their health to be at least good. With the exception of Anaktuvuk Pass, the percentage of household heads reporting poor to fair health in all NSB communities decreased (NSB Census, 2015).

Maternal and Child Health

Infant mortality

Infant mortality is an important indicator for population health and is influenced by living conditions, food security, domestic conflict, socio-economic well-being, and access to health services. Infant mortality can be separated into neonatal deaths, which occur during the first 28 days of life, and post-neonatal deaths, which occur from the 28th day to 1 year of life. Whereas neonatal deaths are associated with the quality of prenatal and perinatal health care, post-neonatal deaths are more closely associated with socio-economic conditions (AMAP, 2009).

The infant mortality rate in the NSB (11.6 per 1,000 live births) was 2 times higher than the rate for the State of Alaska (5.7 per 1,000 live births) from 2011-2015. In 2014, the infant mortality rate for the U.S. was 5.8 deaths per 1,000 live births. These data suggest that the post-natal experience, which is affected by socio-economic conditions, is of concern in the NSB compared to Alaska overall and the U.S., though it is important to note that infant mortality rates in the NSB have been declining in recent decades (NSB, 2012).

Low birth weight

Low birth weight is defined by the WHO as a weight at birth of less than 2,500 grams (5.5 lbs) and most often results from poor delivery of nutrients and oxygen to the fetus, which is directly related to the

health of the mother (WHO, 2005). Low birth weight is associated with an increased risk of lifelong disability and a 20-fold increased risk of premature death (NCHS, 2011). Low birth weight is therefore an indicator of health in maternal and infant populations.

In 2015, the percent of low birthweight infants (all races) in the NSB was 6.4%, compared to 5.7% low birthweight infants statewide. The percent of low birthweight infants in the NSB has remained relatively stable and comparable to Alaska rates since 1995 (NSB, 2014).

Substance use during pregnancy

Substance use during pregnancy refers to the consumption of alcohol, tobacco, and/or drugs while pregnant. Substance use is a risk for both the mother and the fetus and can lead to premature detachment of the placenta, sudden infant death syndrome, and developmental problems in childhood (WHO, 2005). Alcohol use during pregnancy puts infants at risk for fetal alcohol spectrum disorders (FASD), the leading preventable cause of birth defects and developmental disabilities nationwide (CDC, 2011).

In the NSB during 2012, the percentage of infants born to all mothers who reported drinking alcohol (0.6%) during pregnancy was much less than that reported for Alaska mothers statewide (2.6%; ABVS, 2015). The NSB Baseline Community Health Analysis (NSB, 2012) reported that the prevalence of FASD in the NSB was >3 times the state average and 16 times the rate in non-Natives statewide, but was similar to the rate for AN people statewide. Variation in screening practices, diagnosis, and reporting may account for some of the regional differences (NSB, 2012).

Smoking during pregnancy is the single most important contributor to low birth weight (CDC, 2004). In the NSB in 2015, 47.8% of infants were born to mothers who reported smoking during pregnancy. This was almost 3 times higher than the statewide rate of 18.5% (ABVS, 2016).

Mental Health

Mental health is a "state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively, and is able to make a contribution to his or her community (WHO, 2014)". Mental health, or behavioral health, is increasingly considered a critical component of overall health and is linked to physical health and well-being for people at all ages. Mental health can be affected by factors such as employment, working conditions, income, living environment, housing quality, food security, physical health, and cultural support (NSB, 2014).

Assessing mental health at the population level is often challenging, in part because diagnosis can be low (e.g., people may not seek medical care for depression). Also, Iñupiat cultural traditions sometimes prevent the open recognition and discussion of emotional suffering (NSB, 2012). These factors can result in under reporting and diagnosis of mental health issues. Often, researchers must rely on self-reported data to gain a clearer picture of mental health in a community.

Mentally unhealthy days

The Behavioral Risk Factor Surveillance System (BRFSS) asked participants 'thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?'. From 2014-2016, NSB residents (all races) reported 2.8

mentally unhealthy days per month, compared to 3.1 mentally unhealthy days reported statewide. NSB residents reported fewer mentally unhealthy days than AN people statewide (3.7 days) and all Alaskans (3.4 days). The average number of mentally unhealthy days in the NSB has more than doubled from a low of 1.5 days in 1995-1997 (BRFSS, 2018). Additionally, from 2008-2010, residents in the NSB less commonly reported always or usually receiving the social and emotional support they needed (53%) than AN people statewide (66.8%) or all Alaskans (80.0%; NSB, 2012).

Suicide

Suicide is an important health outcome that can indicate mental health illness in a population and has devastating effects on families and communities. Age-adjusted suicide mortality rates are consistently higher in the NSB compared to the State of Alaska (NSB, 2014). Suicide was the fifth leading cause of death in the NSB and the sixth leading cause of death in the State of Alaska from 2013-2015. The age-adjusted suicide rate in the NSB from 2013-2015 (30.1 per 100,000 U.S. year 2000 standard population) was similar to the age-adjusted rate for the State of Alaska (24.2 per 100,000 U.S. year 2000 standard population), though it is important to note that the NSB rate was based on fewer than 20 occurrences and may therefore be statistically unreliable and should be interpreted with caution. Suicide has remained a leading cause of death in the NSB for over 2 decades, ranked as either the fourth or fifth leading cause of death since 1992 (ABVS, 2015).

Substance Dependence

Substance abuse is an indication of poor mental health, can cause additional health problems, and strongly influences many related health outcomes, such as accidents and injuries, suicide, and mental health. Substance abuse includes illicit use of drugs (such as marijuana and heroin), alcohol addiction, and binge drinking. Current substance use is defined as having used (e.g., alcohol, marijuana, or cocaine) in the past 30 days.

According to the NSB 2010 Census, 33% to 57% of household heads reported that they felt a household member had been hurt often by the effects of drugs or alcohol in the previous year. This illustrates the wide-ranging effects of alcohol and drug abuse on the individual, household, and community levels (NSB, 2012).

Alcohol

Alcohol abuse is linked to chronic disease, risky and violent behavior, injuries, suicide, homicide, disintegration of family structure and well-being, and adverse home environments for children. In particular, interpersonal violence and injury are associated with “binge,” or episodic, heavy drinking (WHO, 2006; IAP, 2013). Binge drinking is defined as a pattern of drinking that brings a person’s blood alcohol concentration to 0.08 grams percent or above. Typically, this happens when men consume 5 or more drinks, and when women consume 4 or more drinks, in about 2 hours (CDC, 2015).

In the NSB, 34% of all injury hospitalizations, and 63% of assault injuries among AN people were recorded as alcohol-related (NSB, 2012). According to BLM 2013, “alcohol is involved in an estimated 40% of snow machine-related injury hospitalizations, 70% of assault injuries, 57% of suicide attempts, and 45% of motor vehicle-related injury hospitalizations” (BLM, 2013).

According to data from the Alaska BRFSS, from 2014-2016, the self-reported prevalence of current alcohol use was lower in the NSB (24.3%) than among AN people statewide (42.0%) and among all Alaskans (56.5%). For that time period, the NSB had one of the lowest self-reported prevalences of current alcohol use when compared to other regions in the state. Also for the same time period, the self-reported prevalence of binge drinking in the NSB (16.2%) was lower than the binge drinking prevalence for all AN people statewide (20.9%) and for all Alaskans (19.4%; BRFSS, 2018).

Marijuana

In 2015, current marijuana use among high school students was higher in the Northwest region (35.7%; includes NSB, Northwest Arctic Borough, and the Nome Census Area) than high school students statewide (26.1% AN people statewide, 19.0% all Alaskans statewide; BRFSS, 2018). Marijuana use statistics for adults at the regional level are limited.

Tobacco

Tobacco use and exposure to second-hand smoke have been associated with many different health conditions, including lung cancer and heart disease (CDC, 2016). Rates of tobacco use in NSB are very high compared to most other areas of Alaska, with almost half of adults engaged in regular smoking. The prevalence of current tobacco users in the NSB from 2014-2016 was 53% (BRFSS, 2018). The 2015 NSB census also found that 53% of the Iñupiat population reported smoking as least some days each week (NSB Census, 2015). Comparatively, 42.2% of AN people statewide and 21.3% of all Alaskans reported current tobacco use (BRFSS, 2018). Adolescents in the Northwest region also had a high prevalence of current smokers. In 2015, 24.1% of high school students in the Northwest region reported smoking a cigarette in the past 30 days. Comparatively, 19.7% of AN HS students statewide and 11.1% of all high students statewide reported current cigarette-smoking status (BRFSS, 2018).

Cultural Continuity

Cultural continuity has been linked to numerous positive health outcomes, including reduced rates of suicide (Chandler, 1998; Chandler, 2004). Speaking a native language and participating in subsistence activities have been highlighted by circumpolar communities as important signifiers of community health and cultural continuity (Stevenson, 2009). Subsistence participation can include use of subsistence resources, harvest activities, sharing, and receiving subsistence resources.

In 2014, 34% of NSB residents spoke a language other than English at home (most commonly Iñupiaq; range: 36-58%). For that same year, 58% of Nuiqsut residents reported speaking a language other than English at home (U.S. Census ACS, 2014).

Participation in subsistence preserves cultural continuity and ensures cultural survival. Participation in subsistence activities is high throughout the region; in 2015, nearly 99% of households in all NSB communities participated in subsistence activities and at least 95% of NSB Iñupiat households reported consuming subsistence foods (NSB Census, 2015).

Summary

Areas of Vulnerability

- The per capita income of residents in the PACs is lower than the per capita income of the state.
- All villages, except Nuiqsut, had a higher percentage of residents living below the poverty line than the State of Alaska as a whole.
- Infant mortality rate is higher in the NSB. Even though infant mortality is steadily decreasing in the state, prenatal care remains a critical topic in the NSB.
- A greater percentage of women in the NSB reported smoking during pregnancy than in the state.
- Prevalence of smoking is higher in the NSB than many regions in the state.

Areas of Resilience/Success

- Self-reported prevalence of heavy drinking and binge drinking in the NSB is lower than most regions in the state.
- All NSB communities exhibit a high level of participation in subsistence harvests and other subsistence activities (such as sharing and receiving subsistence resources).

HEC 2: Accidents and Injuries

Accidents and Injuries are an important cause of morbidity and mortality in Alaska. The term unintentional injury refers to causes of injury or death other than suicide and homicide. Fatal injury information is drawn from death certificates and the Alaska Violent Death Reporting System (VDRS), while non-fatal injuries are typically obtained from the Alaska Trauma Registry (ATR).

Fatal Injuries

Fatal unintentional injuries

From 2013-2015, unintentional injuries were the third leading cause of death among all residents of the NSB and among Alaska residents statewide. Motor vehicle accidents were the leading cause of unintentional injury death in the NSB (6 deaths), followed by poisoning (5 deaths), which is typically caused by alcohol ingestion, though an age-adjusted rate was not reported due to the small number of cases. Poisoning was the leading cause of unintentional injury death statewide, followed by motor vehicle accidents (Table 4; ABVS, 2016).

Table 4. Unintentional Injury Deaths by Cause, North Slope Borough and State of Alaska, 2013-2015

Cause of Death	North Slope Borough		State of Alaska	
	Number of Deaths	Age-adjusted Rate[a]	Number of Deaths	Age-adjusted Rate[a]
Unintentional Injuries	**15**	**68.2***	**1117**	**54.7**
Transport accidents				
Motor vehicle accidents	6	22.4*	228	10.2
Snow machine[b]	2	**	23	0.9
ATV[c]	1	**	40	1.7
Nontransport accidents				
Falls	0	**	113	7.2
Poisoning	5	**	398	18.1

Source: ABVS, 2016

[a] Age-adjusted rates are per 100,000 U.S. year 2000 standard population

[b] Deaths to an operator or passenger related to the use of a snow machine

[c] Deaths to an operator or passenger related to the use of an ATV

* Rates based on fewer than 20 occurrences are statistically unreliable and should be used with caution

**Rates based on fewer than 6 occurrences are not reported

Fatal intentional injuries (suicide)

Suicide was the fifth leading cause of death in the NSB from 2013-2015 (ABVS, 2016). Suicide has remained a leading cause of death in the NSB for over 2 decades. More than two-thirds of suicides occurring in the NSB since 2000 have involved firearms (NSB, 2012).

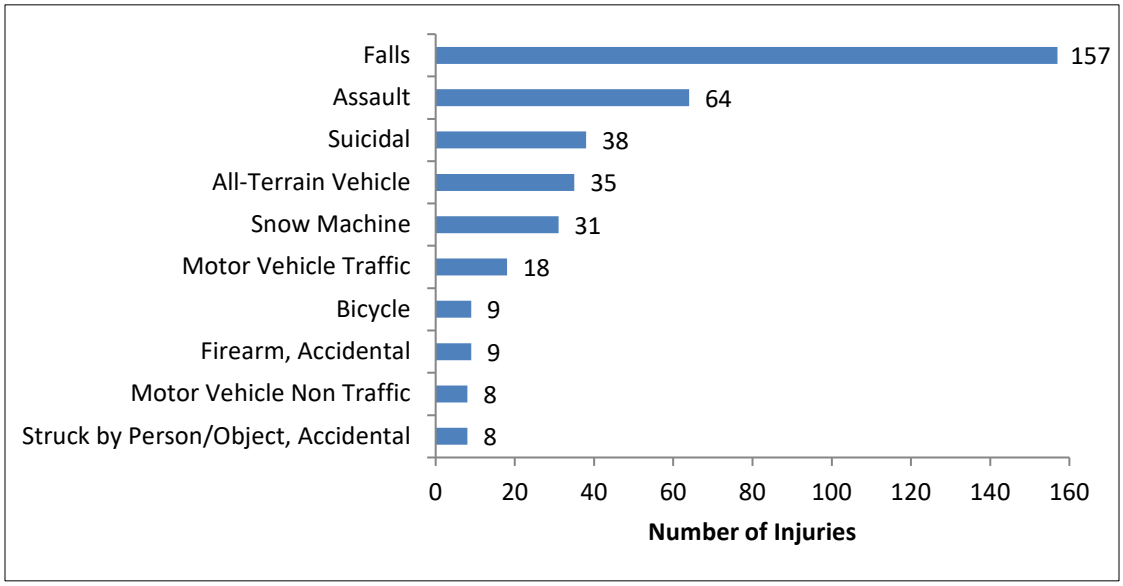
Non-fatal injuries

According to the NSB Baseline Community Health Analysis Report, from 1999-2008, there were 736 non-fatal injury hospitalizations among NSB residents. The leading causes of injury hospitalization for this time period were falls, suicide attempts, assault, and snow machine-related injuries. With the exception of motor vehicle traffic-related injuries, injury hospitalization rates in the NSB were higher than the statewide rates. In particular, the NSB rate of snow machine-related injury hospitalizations was four times higher than the statewide rate for all Alaskans and twice as high as the rate for AN people statewide (NSB, 2012).

The Alaska Trauma Registry (ATR) records non-fatal injuries that are serious enough to require admission to a health care facility. According to the ATR data, from 2009-2015, the most common cause

of non-fatal injury requiring hospitalization in the NSB was falls (35% of all non-fatal injuries), followed by assault (14%), and attempted suicide (8%). These three causes of injury alone accounted for 57% of all non-fatal injuries from 2009-2015 (Figure 1). Males accounted for 57% of all injuries in this time period (ATR, 2016).

Figure 1. Leading causes of North Slope Borough non-fatal injury hospitalizations, 2009-2015



Source: ATR, 2016

* Starting 1/1/2013: Adults (18 years and older) were no longer included in the ATR due to intentional, self-inflicted, suicidal overdoses

Summary

Areas of Vulnerability

- Accidents and injuries were the third leading cause of death in the NSB from 2013-2015. The most common causes of unintentional injury deaths among all NSB residents were motor vehicle accidents (the majority of which are snow machine accidents) and poisoning (typically caused by alcohol ingestion).
- Falls, assaults, and suicide attempts were the most common causes of non-fatal injury hospitalization in the NSB from 2009-2015.

HEC 3: Exposure to Potentially Hazardous Materials

When reviewing data on exposure to potentially hazardous materials, it is important to consider health outcomes, such as the prevalence of illnesses that result from exposures to hazardous materials (including asthma and cancer), and health determinants, such as soil, water, and air quality (when data are available).

Air Quality—Expanded Discussion

Air pollution has been shown to increase the risk of a number of respiratory and cardiac conditions. Air pollution is also associated with increased daily mortality rates (Dockery et al., 1993). The elderly, children, and those with underlying health problems are particularly vulnerable to the effects of air pollution (CDC, 2016b).

According to the U.S. Environmental Protection Agency (USEPA), "tribes in Alaska face unique challenges to protecting air quality and reducing health risks in their communities:

- Most Tribes do not have a reservation or defined lands where they can assert jurisdiction to address air quality issues.
- Frozen ground prevents burying waste in landfills, and many communities resort to burning trash that creates air pollution.
- Electricity primarily comes from diesel generators that produce particulate and other air pollutants.
- The cold climate means people spend significant time indoors in homes and buildings where indoor air pollution can accumulate.
- Many homes have older wood stoves that can be inefficient and create air pollution.
- Dust from unpaved roads may contain pollutants that can be inhaled or deposited on subsistence food sources." (USEPA, 2016)

Air quality concerns in rural Alaska villages include diesel emissions, indoor air quality, road dust, solid waste burning, and wood smoke. Residents in the NSB have also expressed concern about air pollution generated by nearby oil and gas extraction activities.

In response to concerns about air pollution generated from oil and gas extraction activities, the Alaska Native Tribal Health Consortium (ANTHC) partnered with the Native Village of Nuiqsut to conduct an independent assessment of the air quality in Nuiqsut. The study included a review of 2008-2010 air monitoring data from the ConocoPhillips Alaska, Inc. (CPAI) air monitoring station. This station is located on the northern edge of Nuiqsut, 6 miles east of the Alpine Central Processing Facility (which processes oil and natural gas from the surrounding production pads), and collects data on the following pollutants: carbon monoxide (CO), nitrogen oxides (NO_X), ozone (O_3), sulfur dioxide (SO_2), particulate matter ≤10 µm (PM_{10}), and particulate matter ≤2.5 µm ($PM_{2.5}$). Data from the air monitoring station showed pollutant concentrations generally well below the national ambient air quality standards (NAAQS). PM_{10} exceeded the 24-hour average NAAQS twice from 2008-2010 and both instances were believed to be caused by dust from natural sources. $PM_{2.5}$ exceeded the 24-hour NAAQS once from 2008-2010 and may have been due to a large forest fire plume. CO, NO_X, O_3, and SO_2 all remained below the NAAQS from 2008-2010 (ANTHC, 2011).

Researchers also collected air and water samples to assess for volatile organic compounds (VOCs). Of the 45 samples collected, 28 contained VOCs, though none of the VOC concentrations exceeded the air quality standards and screening levels set by multiple federal agencies (U.S. Environmental Protection Agency, Agency for Toxic Substances and Disease Registry, National Institute for Occupational Safety and Health, and Occupational Safety and Health Administration). VOCs specifically associated with crude oil development were either not detected or were found at very low concentrations (below all standards and screening levels) for all of the collected samples. None of the water samples had VOC concentrations that exceeded the ADEC water quality standards (ANTHC, 2011).

The most frequently identified source of air pollution during key informant interviews in Nuiqsut was oil and gas development (ANTHC, 2011). The available air monitoring data do not support this observation, as measured air pollutant concentrations are consistently low. It will be crucial to continue to monitor air quality in Nuiqsut over time.

In 2013, ADEC reviewed pollutant data from the CPAI Nuiqsut monitoring station. ADEC found that all pollutants measured by the CPAI monitor were below the Alaska Ambient Air Quality Standards (AAAQS), which were developed to protect public health in Alaska (ADEC, 2015).

Additionally, ADHSS investigated air pollution and respiratory illness in Nuiqsut in response to community concerns in 2003 and 2012. In both investigations, health data were collected from inpatient and outpatient visits for respiratory illness. The 2003 ADHSS study found no significant differences for respiratory visits in Nuiqsut compared to a similarly sized North Slope village for the years 1998-2002, except for the 10-19 years old age group. Because only one age group had a statistically higher rate of respiratory visits than the control village, it is unlikely that an air pollution source is the cause. If air pollution or another type of environmental contaminant were associated with clinic visits for respiratory conditions, most age groups would likely be impacted similarly. The study concluded that the increase in respiratory visits in Nuiqsut for 10-19 year olds was likely due to a few individuals with numerous clinic visits to address asthma-related problems (ADHSS SOE 2003). In the 2012 ADHSS study, which was conducted after the Repsol blowout event, air pollution data were collected from the CPAI monitoring station, as well as clinic visit data. The study concluded that there was a large number of visits to the Nuiqsut clinic related to respiratory conditions, but air pollution was not associated with respiratory illness in this investigation; instead, the increase in clinic visits was likely due to increased influenza and respiratory syncytial virus (RSV) activity, which was reported throughout the state during the same time period (ADHSS SOE, 2003; ADHSS SOE, 2012).

Water Quality

Overall, available water quality data for Nuiqsut indicate that, with few exceptions, water quality standards for human consumption are being met (BLM, 2014). See HEC 6: Water and Sanitation for a related discussion on water and sanitation in the NSB.

Summary

Areas of Vulnerability

- Residents of Nuiqsut have expressed concerns that the air quality in the community is poor, and have indicated that this is causing high rates of respiratory diseases; the available air monitoring data do not support this observation, as measured air pollutant concentrations are consistently low. It will be crucial to continue to monitor air quality in Nuiqsut over time.

Areas of Resilience/Success

- Available air quality monitoring data indicate that pollutants are at levels that are not expected to cause adverse health outcomes.
- Results indicate little evidence of significant air- or water-quality problems associated with oil and gas development.

HEC 4: Food, Nutrition, and Subsistence

The Alaska Federation of Natives (AFN) describes subsistence as "the hunting, fishing, and gathering activities, which traditionally constituted the economic base of life for Alaska's Native peoples and which continue to flourish in many areas of the state today" (AFN, 1993).

Subsistence is part of a rural economic system, called a "mixed, subsistence-market" economy, wherein families invest money into small-scale, efficient technologies to harvest wild foods. Fishing and hunting for subsistence resources provides a reliable economic base for many rural regions. Subsistence is focused toward meeting the needs of families and small communities. Participants in this mixed economy in rural Alaska often augment their subsistence production by cash employment. Cash (from commercial fishing, trapping, or wages from public sector employment, construction, firefighting, oil and gas industry, or other services) provides the means to purchase the equipment, supplies, and fuel used in subsistence activities. The combination of traditional and commercial-wage activities provides the economic basis for the way of life valued in rural communities (Wolfe and Walker, 1987).

Subsistence fishing and hunting are important sources of employment and nutrition in almost all rural communities. Traditional fishing, hunting, and gathering are critical sources of nutrition for many residents in areas of Alaska where food prices are high. While some people earn income from employment, these and other residents rely on subsistence to supplement their diets throughout the year. Furthermore, traditional and cultural activities support a healthy diet, cultural continuity, and contribute to residents' overall well-being (Ballew et al., 2004; Kofinas et al., 2016).

Food Security

Food security is defined by the Food and Agricultural Organization of the United Nations as "a situation that exists when all people at all times have physical, social, and economic access to sufficient, safe, nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 2002). Food security is based on the availability, access (both physical and economical; also includes access via sharing networks), and use of food, and is related to health through malnutrition. Food insecurity, the inability to access enough food at all times to meet basic needs, is tied to poor health status among children, including: more frequent colds, ear infections, and other health problems; aggression, hyperactivity, and anxiety; increased need for mental health services; impaired cognitive functioning, lower test scores, and poorer overall school achievement (NSB, 2012; ADHSS, 2008). Food insecurity is associated with malnutrition and is also associated with increased obesity and diabetes because those who do not always have enough food often consume high-calorie foods with low nutrient value (ADHSS, 2008).

NSB households, particularly Iñupiat households, reported high levels of food insecurity in the NSB 2015 Census. In the NSB, 37% of household heads reported that there were times last year when they found it difficult to get the food needed to make healthy meals and 25% of household heads reported that there were times in the previous year when household members did not have enough to eat. Food insecurity varied greatly between communities and ranged 9-54% of households (NSB Census, 2015; Table 5).

Statewide and national food insecurity data are not easily comparable with NSB data because the state and national surveys do not ask about subsistence food security or take into account the lack of availability of many foods in remote communities. For reference, in 2010, 10.8% of Alaska households surveyed were found to have some degree of food insecurity, and 4.4% were found to have "very low

food security," with disrupted eating patterns or reduced food intake (USDA, 2010). Although the NSB 2015 census data are not directly comparable with statewide estimates, the results suggest that food insecurity is a serious problem across the NSB and, like other rural areas, exists at levels higher than statewide estimates.

Table 5. Percentage of food insecure households in the NSB, 2015

Community	% of Food Insecure Households
North Slope Borough	24
Anaktuvuk Pass	54
Atqasuk	31
Kaktovik	10
Nuiqsut	9
Point Hope	25
Point Lay	9
Utqiaġvik	25
Wainwright	24

Source: NSB Census, 2015

The Alaska Department of Fish and Game (ADF&G) conducted a harvest study in Nuiqsut during 2015. In the study, which has several questions focused on food security, 12% of Nuiqsut households worried about having enough food at one or more times during 2014. Approximately 26% of households reported that they lacked the resources (i.e., time, money, and equipment) to obtain either subsistence or store-bought foods (ADFG, 2016). In this study, Nuiqsut had a slightly higher percentage of food secure households (90%) and slightly lower very food insecure households (2%), compared to 2014 estimates for the entire state (88% food secure, 4% very food insecure; ADF&G, 2016).

Subsistence Resources

Participation in subsistence

Data from the NSB 2015 Census indicate that there is a high level of participation in subsistence activities in NSB households (nearly 99% in all NSB communities). In 2015, 95% or more of NSB Iñupiat households reported consuming subsistence foods. The 2010 NSB Census found that participation was high among both men and women (Table 6). Subsistence foods also make up a significant portion of food consumed in NSB communities.

Table 6. NSB Iñupiat household head's participation in subsistence activities

	Men	Women
Participation in spring whaling	44%	27%
Participate in fall whaling	31%	23%
Hunt sea mammals	55%	17%
Hunt land mammals	69%	30%
Fish	70%	49%
Hunt birds	61%	22%
Gather bird eggs	14%	7%
Pick berries and plants	44%	45%
Share, cook, and process wild foods	79%	82%
Sew skins and clothes	10%	42%
Make sleds and boats	38%	6%
Trap fur bearers	9%	1%

Source: NSB, 2012; NSB Census, 2010

The annual wild food harvest in 2014 for Nuiqsut was approximately 371,992 pounds in useable weight for the entire community, an average of 3,444 pounds per household and 896 pounds per person (ADF&G, 2016). In terms of usable weight, marine mammals provided 46 percent of the harvest while large land animals (29 percent of harvest), non-salmon fish (23 percent of harvest), salmon (1% of harvest), birds and eggs (1 percent of harvest), and berries and edible plants (<1 percent of harvest) contributed the rest. Table 7 shows the resources most commonly used by Nuiqsut households in 2014. Marine mammals and non-salmon fish were particularly important resources for Nuiqsut. In terms of edible weight, marine mammals (bowhead whale; bearded, ringed, and spotted seals) accounted for 46% of the total wild foods harvested. Non-salmon fish (primarily Arctic cisco, broad whitefish, least cisco, Arctic grayling, and burbot) accounted for nearly one quarter of the 2014 Nuiqsut subsistence harvest (ADF&G, 2016).

Table 7. Subsistence resources most commonly used by Nuiqsut households, 2014

Resource	Percentage of households using resource
Bowhead whale	93%
Caribou	90%
Arctic cisco	83%
White-fronted goose	74%
Broad whitefish	72%
Bearded seal	67%
Cloudberry	62%
Ringed seal	52%
Moose	43%
Blueberry	40%

Source: ADFG, 2016

NSB communities also have strong sharing networks for subsistence resources. Typically, about 30% of rural households in Alaska harvest about 70% of subsistence resources used in a community (Wolfe, 2004). A 2015 study found that in two North Slope communities, Kaktovik and Wainwright, only 25% of subsistence resources in a household were from the households' own harvesting efforts, which indicates

substantial sharing of subsistence resources. Strong sharing networks within and between communities are crucial for social, cultural, health, and economic well-being. Strong sharing networks can also encourage community members, such as young adults, to take pride in harvest subsistence resources and participate in the cooperative traditions within their community; this is important for maintaining cultural continuity in a community.

Summary

Areas of Vulnerability

- NSB households, particularly Anaktuvuk Pass, reported high levels of food insecurity. More than one in three NSB household heads reported difficulty getting the food needed to eat healthy meals, and approximately 24% of household heads reported that at times in the previous year, household members did not have enough to eat.

Areas of Resilience/Success

- There is a high level of participation in subsistence activities and sharing subsistence resources among NSB households. Subsistence foods also make up a substantial portion of food consumed in NSB communities. These determinants are crucial to an individual's health and well-being, as well as ensuring cultural continuity within a community.

HEC 5: Infectious Diseases

Reportable communicable (infectious) diseases include infectious and parasitic diseases, such as tuberculosis, viral hepatitis, sexually transmitted infectious (STIs), influenza, and pneumonia.

With the exception of STIs, the number of cases of reportable infectious diseases in the NSB is very low. Because of the small number of cases of reportable infectious diseases each year, reliable prevalence rates for the NSB cannot be calculated for most individual reportable diseases. Trends in reportable infectious diseases in the NSB are generally comparable to those occurring statewide (NSB, 2012).

Reportable communicable diseases were not among the leading causes of death in the NSB. Pneumonia (2 deaths) and septicemia (1 death) were the only causes of death due to infectious diseases, accounting for less than 2% of all deaths from 2011-2013 (ABVS, 2015). No influenza deaths were reported during the same time period.

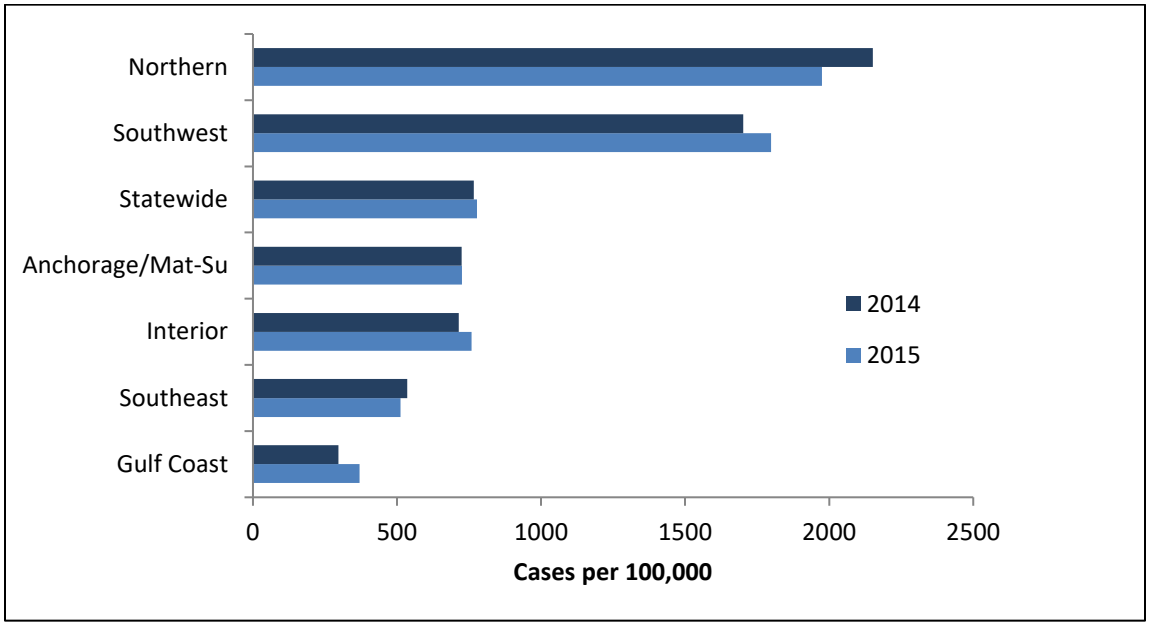
Sexually Transmitted Infections

Chlamydia rates

Chlamydia is a common STI and is caused by the bacterium *Chlamydia trachomatis* (CT). CT can cause pelvic inflammatory disease (PID), ectopic pregnancy, infertility, and preterm labor. Infants born to infected women are at risk for neonatal conjunctivitis and pneumonia. Untreated CT infections in men can cause epididymitis, Reiter syndrome, and infertility.

Alaska ranked first for CT rates nationwide from 2010-2014; rates disproportionately affect northern regions and AN. In 2015, the age-adjusted CT infection rate for the Northern Region (2,151 cases per 100,000 population; includes NSB, Northwest Arctic Borough, and Nome Census Area) was nearly three times higher than the rate statewide (766 cases per 100,000 population) and higher than any other region in Alaska (Figure 2; ADHSS, 2016b).

Figure 2. Chlamydia infection rates, by Region – Alaska 2014 and 2015

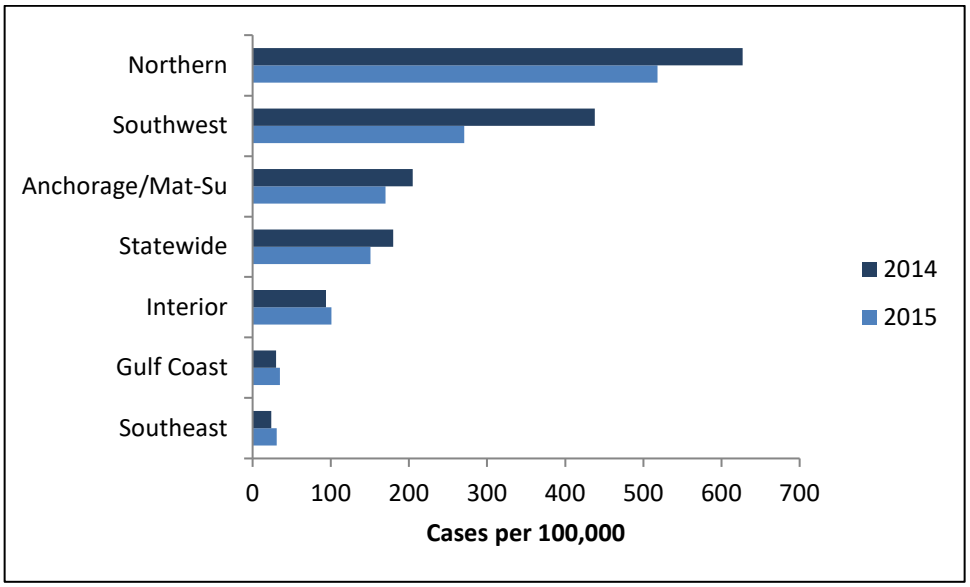


Source: ADHSS, 2016c

Gonorrhea rates

Gonorrhea is an STI caused by the bacterium *Neisseria gonorrhea*. Alaska had the third highest gonococcal infection rate in the nation in 2014 (ADHSS 2016a). The rate of gonorrhea in 2015 was 518 cases per 100,000 population for all races in the Northern Region, which was nearly 3.5 times the rate for Alaska statewide (151 cases per 100,000 population; Figure 3, ADHSS, 2016c).

Figure 3. Gonorrhea infection rates, by Region – Alaska 2014 and 2015



Source: ADHSS 2016c

Summary

Areas of Vulnerability

- The Northern region, which includes NSB communities, is disproportionately affected by chlamydia and gonorrhea.

Areas of Resilience/Success

- The number of cases of reportable, non-STI, infectious diseases in the NSB is very low.

HEC 6: Water and Sanitation

A high proportion of rural Alaska households (approximately 20%) are without basic sanitation facilities and adequate in-home water sources. Relying primarily on community-based water points can lead to inadequate amounts of water collected and increases the likelihood for disease transmission.

The lack of clean running water and proper sewage disposal is a leading cause of preventable diseases in rural Alaskan villages and is directly linked to infectious disease morbidity and mortality. Respiratory, gastrointestinal, and skin diseases are common in areas without safe or easily accessible water supplies.

In a study conducted in 6 regions in Alaska, regions with a lower proportion of in-home water service had 2.5 times the hospitalization rate of pneumonia and influenza and 2 times the rate of skin or soft tissue infection, and over 3 times the rate of respiratory syncytial virus among those younger than 5 years, when compared to higher-service regions (Hennessy et al., 2008).

Water and Sewer Service Rates

In 2015, 92% of NSB households had access to running water (NSB Census, 2015). This indicates that the majority of households drink treated water rather than unfiltered surface water, which typically results in better water quality. This compares to almost 78% of households with modern water and sewer service for rural communities within the State of Alaska.

According to the U.S. Census Bureau, 2010-2014 American Community Survey 5-Year Estimates, the proportion of households that lacked complete plumbing facilities were as follows: 10.6% in NSB, 6.9% in Utqiaġvik, 5.3% in Kaktovik, and 2.0% in Nuiqsut (U.S. Census ACS, 2014).

According to the NSB, 90% of Nuiqsut households had sewage facilities and the remaining 10% used holding tanks. Similarly, 94% of drinking water was piped to Nuiqsut households and 6% was trucked (NSB, 2015).

Nuiqsut's water and sewer system is run with a vacuum pump, creating constant flow and reducing vulnerabilities to freezing pipes. Water operators in 2014 reported few issues with frozen lines. Community water is acquired during an approximate 40-day water making season from July to August, and the water source is a tundra lake located one mile south of town (Brubaker et al., 2014). While water operators noted few issues with freezing pipes, some water and sanitation infrastructure has been impacted by changing permafrost conditions; in 2014, operators reported small-scale permafrost erosion near an outflow pipe from the water tanks. Annual erosion also threatens the sewage outflow line (Brubaker et al., 2014).

Summary

Areas of Vulnerability

- Water and sanitation infrastructure is vulnerable to changing permafrost conditions.

Areas of Resilience/Success

- More than 94% of NSB household have modern water and sewer service.

HEC 7: Non-communicable and Chronic Diseases

Diabetes

Diabetes mellitus is a metabolic disease characterized by high blood sugar levels, which result from defects in insulin secretion, insulin resistance, or both. There are two types of diabetes, Type 1 and Type 2. Type 2 is the most common type of diabetes, is associated with obesity, and is considered a preventable illness. Uncontrolled diabetes can result in serious medical consequences.

From 2011-2013, there were 3 deaths attributed to diabetes in the NSB. Due to the small numbers, an associated rate was not reported. For the same time period, there were 324 deaths related to diabetes mellitus in Alaska (age-adjusted rate of 19.4 per 100,000 U.S. year 2000 population; ABVS, 2015).

The self-reported prevalence of adult diabetes among NSB residents from 2014-2016 was 7.1%, which was similar to the prevalence for AN people statewide (7.6%) and all of Alaska (7.6%). Comparatively, the prevalence of self-reported prediabetes in adults from 2014-2016 was 9.3% in the NSB, which was lower than the prevalence for AN people statewide (12.3%) and similar to all of Alaska (9.1%; BRFSS, 2018).

Overweight and Obesity

Obesity and overweight are terms that define an accumulation of fat that is greater than what is considered healthy. Body mass index (BMI) is a common indicator of obesity and overweight status. Overweight refers to persons who have a current BMI assessment with a BMI of 25 to 29.9 and obese refers to persons who have a current BMI assessment of 30 or greater. Being overweight or obese increases the risk of diabetes, diseases of the heart (mainly stroke and heart disease), cancer, and premature death (WHO, 2016).

The prevalence of adult overweight or obesity among NSB residents from 2014-2016 was 72.7%, which was higher than the prevalence for AN people statewide (66.5%) and for all of Alaska (66.5%; BRFSS, 2018). Among NSB communities, the percent of overweight residents in 2012 ranged from 17%-36% and the percent of obese residents ranged from 23%-48% (Table 8; NSB, 2012).

Table 8. Overweight and obesity among NSB households, 2012

	Overweight	Obese
Anaktuvuk Pass	32%	23%
Atqasuk	26%	38%
Kaktovik	34%	32%
Nuiqsut	28%	33%
Point Hope	29%	48%
Point Lay	17%	46%
Utqiaġvik	34%	40%
Wainwright	36%	41%
North Slope Borough	33%	39%
Alaska	37%	28%

Source: NSB, 2012

Cancer

The prevalence of self-reported cancer in the NSB was lower than the prevalence statewide from 2011-2013. For this time period, the prevalence of cancer in the NSB was 4.1% compared to 4.8% for AN people statewide and 7.8% for all of Alaska (BRFSS, 2018). The NSB had the second lowest self-reported cancer prevalence of Alaska boroughs and census areas.

During 2013-2015, cancer was the leading cause of death among NSB residents and among Alaskans statewide. Table 9 presents data from the Alaska Bureau of Vital Statistics that shows the age-adjusted rates for cancer deaths in the NSB are higher than those in the state as a whole. Lung cancer was the

leading cause of death due to cancer (50.8 deaths per 100,000 persons, though this rate is based on small numbers and should be interpreted with caution; ABVS, 2016).

Table 9. Cancer Deaths by Type, North Slope Borough and the State of Alaska, 2013-2016

Cause of Death	North Slope Borough		State of Alaska	
	Number of Deaths	Age-Adjusted Rate[1]	Number of Deaths	Age-Adjusted Rates[1]
Malignant Neoplasms	**44**	**327.8**	**2942**	**159.5**
Lip, Oral Cavity, and Pharynx	0	0	41	1.9
Esophagus	1	**	94	5.0
Stomach	7	23.7*	89	4.6
Colon, Rectum, and Anus	9	30.4*	273	15.0
Liver and Intrahepatic Bile Ducts	2	**	143	6.5
Pancreas	1	**	195	10.3
Larynx	0	0	12	0.6*
Trachea, Bronchus, and Lung	15	50.8*	765	41.4
Skin	0	0	49	2.8
Breast [2]	2	**	195	19.6
Cervical[2]	15	**	19	1.6
Uterine[2]	0	0	36	3.6
Ovarian[2]	15	**	58	5.7
Prostate[2]	1	**	126	17.8
Kidney and Renal Pelvis	0	0	79	4.5
Bladder	0	0	54	3.3
Brain	0	0	74	3.5
Lymphoid & Hematopoietic	2	**	236	13.5
Hodgkin's Disease	0	0	2	**
Non-Hodgkin's Lymphoma	0	0	86	4.9
Leukemia	2	**	91	5.3
Multiple Myeloma	0	0	56	3.0
All Other Lymphoid & hematopoietic	0	0	1	**
All Other and Unspecified Cancers	3	**	404	22.5

Source: ABVS, 2016

[1]Age-Adjusted rates are per 100,000 U.S. year 2000 standard population

[2] Breast, cervical, uterine and ovarian cancer rates are for females only and prostate cancer rates are for males only

* Rates based on fewer than 20 occurrences are statistically unreliable and should be used with caution

**Rates based on fewer than 6 occurrences are not reported

Cardiovascular and cerebrovascular disease mortality

The prevalence of self-reported diseases of the circulatory system (heart attack, angina, or stroke) in the NSB had been consistently been lower than the prevalence statewide until approximately 2012. In 2014-2016, the prevalence of cardiovascular disease was 6.2% compared to 5.1% for all of Alaska (BRFSS, 2018). When circulatory diseases were further categorized as heart attack, stroke, cardiovascular disease, or coronary disease, the prevalence was still lower in the NSB compared to statewide (BRFSS, 2018).

The mortality rate of major cardiovascular diseases from 2011-2013 was slightly lower in the NSB than all of Alaska (Table 10; ABVS, 2015).

Table 10. Major Cardiovascular Disease Deaths, North Slope Borough and the State of Alaska, 2011 - 2013

Cause of Death	North Slope Borough		State of Alaska	
	Number of Deaths	Age-Adjusted Rate[1]	Number of Deaths	Age-Adjusted Rate[1]
Major Cardiovascular Diseases	20	165.8	2866	189.9
Heart disease	14	84.7*	2146	137.7
Ischemic heart disease	7	24.8*	1225	74.3
Acute myocardial infarction	0	0.0	246	15.7
Atherosclerotic cardiovascular disease	5	**	450	22.8
All other ischemic heart disease	2	**	529	35.9
All other heart disease	7	60.0*	921	63.4
Cerebrovascular disease	5	**	544	40.4
All other cardiovascular diseases	1	**	176	11.8

Source: ABVS, 2015

[1] Age-adjusted rates are per 100,000 U.S. year 2000 standard population

* Rates based on fewer than 20 occurrences are statistically unreliable and should be used with caution

**Rates based on fewer than 6 occurrences are not reported

Chronic respiratory disease rates

Historically, chronic respiratory diseases have been a major cause of morbidity and mortality in rural Alaska, and respiratory problems remain a frequently cited health concern in NSB communities. The NSB 2010 Census asked household heads whether they or other household members had, in the last 12 months, experienced any breathing problems such as asthma, emphysema, or a cough that does not go away. Thirteen percent of household heads and 8% of all adults in the NSB reported or were reported to have experienced any of these problems. The estimated prevalence of these respiratory problems did not vary significantly by ethnic group, gender, or community of residence. Of children aged 0–17 years, 5% were reported by the household head to have had breathing problems such as asthma, emphysema, or a chronic cough in the past 12 months. There was not a statistically significant difference in the relationship between village of residence and the prevalence of breathing problems among children (NSB, 2012).

Chronic lower respiratory disease mortality

Chronic lower respiratory disease (such as asthma or emphysema) is one of the most frequently stated concerns in the NSB. In the NSB, chronic lower respiratory disease has been the fourth or fifth leading cause of death for most years since at least 1992, which is comparable to the state of Alaska in recent years. From 2013-2015, the age-adjusted chronic lower respiratory disease mortality rate was higher in the NSB compared to the rate statewide (Table 11). However, the NSB mortality rates were based on fewer than 20 deaths, and should therefore be interpreted with caution as the rate may be statistically unreliable (ABVS, 2016).

Table 11. Chronic lower respiratory disease rates, NSB, 2013-2016

Detailed Cause of Death	NSB Deaths	Crude Rate[1]	Age-Adjusted Rate[2]	Alaska Deaths	Alaska Crude Rate[1]	Alaska Age-Adjusted Rate[2]
Chronic lower respiratory disease	11	37.2*	129.0*	593	26.8	37.2

Source: ABVS, 2016

[1] Crude rates are per 100,000 population

[2] Age-adjusted rates are per 100,000 U.S. year 2000 standard population

* Rates based on fewer than 20 occurrences are statistically unreliable and should be used with caution

Asthma

Asthma is a disease that affects the lungs and can cause repeated episodes of wheezing, breathlessness, chest tightness, and nighttime or early morning coughing (CDC, 2016a). There are multiple environmental factors known to trigger or exacerbate asthma symptoms, including tobacco smoke, exhaust from heating sources and vehicles, and poor air quality (both outdoor and indoor air). Indoor air pollution is a particular concern in rural Alaska, primarily due to tightly sealed houses with inadequate ventilation and prolonged time spent indoors (NSB, 2012). In 2011-2013, the prevalence of self-reported asthma (13.3%) was similar to the prevalence for asthma for all of Alaska (13.0%; BRFSS, 2018).

In response to community concerns about asthma and pollution from nearby oil and gas development activities, ADHSS investigated air pollution and respiratory illness in Nuiqsut in 2003. The 2003 ADHSS study found no significant differences for respiratory visits and asthma in Nuiqsut compared to a similarly sized North Slope village for the years 1998-2002, except for the 10-19 years old age group. Because only one age group had a statistically higher rate of respiratory visits than the control village, it is unlikely that an air pollution source is the cause. If air pollution or another type of environmental contaminant were associated with clinic visits for respiratory conditions, most age groups would likely also see increased rates of respiratory visits. The study concluded that the increase in respiratory visits in Nuiqsut for 10-19 year olds was likely due to a few individuals with numerous clinic visits to address asthma-related problems. (ADHSS SOE, 2003).

COPD

Chronic obstructive pulmonary disease (COPD) is a disease that includes emphysema and chronic bronchitis. It is the most common form of chronic lower respiratory disease in adults. Cigarette smoking is the most common risk factor for COPD, but environmental and genetic factors can also contribute to the development of COPD.

In Alaska, COPD mortality rates have historically been higher among AN people than Caucasians. COPD mortality rates have also increased among AN people and have remained stable among whites in Alaska. The prevalence of self-reported COPD in the NSB was similar to the prevalence statewide from 2014-2016. For this time period, the prevalence of COPD in the NSB was 4.7% compared to 6.2% for AN people statewide and 4.8% for all of Alaska (BRFSS, 2018).

HEC 8: Health Services Infrastructure and Capacity

The NSB and the Arctic Slope Native Association are jointly responsible for delivering health services to NSB residents (NSB, 2012). With the exception of Utqiaġvik, all NSB communities maintain a clinic that is staffed by medical personnel via the Community Health Aide Program (CHAP). These clinics do not have a physician or physician's assistant in residence. The Samuel Simmonds Memorial Hospital (SSMH) is located in Utqiaġvik and is a 14-bed hospital with an outpatient unit that consists of a 6-room clinic and a 2-bed emergency room (Arctic Slope Native Association, 2010). Utqiaġvik is the tertiary care center for the NSB villages; cases are referred to Fairbanks or Anchorage if they cannot be admitted by SSMH. Utqiaġvik also has a community mental health center, a dental clinic, and is the location of the NSB Department of Health and Social Services (NSB, 2012).

Access to services is limited by the remote location of the villages, cost of travel, and severity of the climate (NSB, 2010). Many of the communities in the NSB suffer from chronic health care workforce shortages and turnover (NSB, 2012). The U.S. Health Resources and Services Administration characterizes the NSB as a medically underserved and health professional shortage area (NSB, 2012). In 2016, there were only 0.4 licensed physicians per 1,000 population in the NSB, compared to 2.6 licensed physicians per 1,000 population statewide (ADPH, 2016).

Summary

Areas of Vulnerability

- Access to adequate health services can be limited by cost, difficulty of travel (i.e., weather, logistics), and the capacity of clinics.

Areas of Resilience/Success

- Comprehensive health services are available in Utqiaġvik for residents throughout the NSB service area.

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