

Presentation Abstracts

Metrics for assessing the population health impact of wildfire smoke in Alaska

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Exposure to wildfire smoke is a growing health concern in Alaska, but sparse air quality data in this largely rural region limits understanding of its impacts. Smoke metrics that capture episodic and cumulative exposure, along with disproportionate impacts on sensitive populations, can support community preparedness and wildfire response.

We used a hybrid approach integrating atmospheric transport model outputs with air quality monitoring data. Daily concentrations of fine particulate matter (PM_{2.5}) attributable to wildfire smoke were estimated at a 0.625° x 0.5° resolution across Alaska from 2003-2020. Estimates were aggregated to the census tract level to derive a series of wildfire smoke metrics characterizing population exposure. We calculated a Wildfire Smoke Social Vulnerability Index (WSSVI) that accounts for prevalence of sensitive populations and potential adaptive capacity. We identified high-exposure census tracts and categorized them by the WSSVI.

In the 5 years when over 2 million acres burned in Alaska during the study period, between 86-98% of census tracts experienced at least one day of medium density smoke, and 19-73% of tracts experienced heavy smoke. Census tracts in Northern Interior Alaska experienced over 300 days of poor air quality due to wildfire smoke (~10% of summer days), with the longest smoke waves lasting between 30-43 days in 2004, 2005, and 2009. Compared to census tracts with low smoke exposure, high exposure tracts had a higher proportion of women of childbearing age (22.6% vs. 21%), individuals living below the 150% poverty line (19.1% vs 17.3%), people who are housing cost burdened (24.8% vs 19.1%), and individuals in single-parent households (6.2% vs 5.4%).

Our results demonstrate the widespread and cumulative health burden of wildfire smoke in Alaska. Smoke metrics facilitate comparisons of health impact across years/regions/events, support fire management strategies aligned with public health goals, and inform preparedness and resilience planning.

Community-centered tools to assess health impacts of wildfire smoke, climate hazards, and social disparities in Alaska

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Wildfire smoke is an increasing public health concern in Alaska, alongside other climate-driven hazards, including unstable winter transportation conditions and impacts on infrastructure from thawing permafrost. A community's vulnerability or resilience to these challenges depends on health and social factors like chronic disease rates, education, and access to the internet, which influence both sensitivity to impacts and the ability to adapt. Although national, state, and local

data sources can support community planning, they are often scattered across agencies and platforms and are not easily accessible to the public.

This project focused on developing data tools that curate relevant information for decision-making around wildfire smoke and climate and health adaptation planning in Alaska communities. Our project team included academics, Alaska Native community environmental professionals, state and local health departments, and state tribal health and wildfire organizations. We used a co-production approach to identify climate and health data needs and focused on enhancing two online tools – the Wildfire Explorer tool which provides up-to-date information about current active wildfires in the Alaska and Northern Climate Reports, a platform that compiles climate modeling data at the community level and allows users to search for specific locations in Alaska to access future climate projections.

Improvements in the tools included integrating real-time and forecasted air quality information and adding community-level data on demographics, chronic disease, and social determinants of health. These updates enable users to access information to support real-world decisions identified by our project team. We are developing story-based user guides to support outreach and training on how to use the tools. These enhancements ensure that Alaska communities have localized, real-time data they need to prepare for and respond to wildfire smoke and can view state-of-art climate projections alongside information about the populations most affected to support climate and health planning.

Integrating Indigenous values and community priorities into climate and health assessments

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Indigenous perspectives on health are rooted in a holistic worldview that recognizes the interdependence between individuals, their communities, and the natural world. Beyond physical health, well-being includes social, cultural, and spiritual dimensions. Conventional health assessments focused on biomedical health impacts can limit the ability of Tribal communities to address their fundamental health concerns and values. We will share our collaborative work with communities in the Copper River region who are integrating Ahtna values into climate and health assessments.

We co-developed the study design and data collection process through a series of collaborative workshops and meetings. Data were collected in five villages in the Copper River region during annual health fairs and at a regional youth environmental fair. Community members participated in a dot voting process to rank the Ahtna values that they felt best represent what it means to be healthy. In a second round of voting, they were asked to identify which values would be most affected by a wildfire in their region. Different color stickers were used to track voter demographics. We calculated the average rank of each value across the communities and assessed differences by age of respondent. At a subsequent community dinner, community members reviewed and reflected on the preliminary findings and discussed their interpretation in relation to their own experiences and cultural values, helping validate the results.

This community-driven process blends Indigenous and non-Indigenous methods to create a practical health assessment tool that ensures that Indigenous peoples' voices, knowledge, and priorities are at the forefront of decision-making processes. This inclusive approach provides an

opportunity for communities to take an active role in shaping their health and well-being, leading to more culturally relevant and effective health interventions.

The imminent threats to human and environmental health caused by the impacts of climate change in ten remote western Alaska Native Tribal communities

Author: Sheryl Musgrove, Ph.D., J.D.

The Alaska Climate Justice Program at Alaska Institute for Justice works in partnership with ten remote Alaska Native Tribes on climate adaptation, including capacity building, adaptation planning, obtaining technical and financial resources, and overcoming policy barriers. Our partner Tribes—Akiachak Native Community, Akiak Native Community, Chevak Native Village, Chinik Eskimo Community, Native Village of Kipnuk, Organized Village of Kwethluk, Native Village of Kwigillingok, Native Village of Kwinhagak, Native Village of Nelson Lagoon, and Native Village of Nunapitchuk—are facing unprecedented impacts from the climate crisis. These impacts, including accelerating erosion, increasing permafrost thaw, and more frequent and severe flooding and extreme weather events, create imminent threats to the health and safety of these communities. Brownfields, landfills, and sewage lagoons are eroding into rivers and oceans. Homes and other critical infrastructure are becoming unstable and are sinking into the ground as the permafrost underlying the Tribal communities thaws and causes the ground to become soft and unstable. Homes, landfills, and sewage and honey bucket lagoons are inundated with increasingly frequent and severe flooding events, contaminating the surrounding environment and fresh water sources, and causing mold to grow. The result is a human and environmental health crisis of growing proportions, as the homes, land, water, food, and other natural resources upon which these remote, subsistence-based communities rely become increasingly contaminated, unsafe, and dangerous.

Toxic Waters: The Rise of Harmful Algal Blooms in Alaska's Arctic

Author: Carie Eastaugh

In the summer 2022, a research vessel detected a large harmful algal bloom (HAB) of *Alexandrium catenella*, spreading approximately 370 miles from the northern Bering Sea to the southern Chukchi Sea [1]. This bloom exceeded the scale, density and toxicity of any previously reported HABs in the Arctic [2]. Climate warming has facilitated the spread of *A. catenella* into Alaskan Arctic waters, threatening human and marine wildlife health, indigenous subsistence harvesting practices and food security in the region. *A. catenella* is a cyst forming dinoflagellate which produces a suite of paralytic neurotoxins, the most potent of which is saxitoxin (STX) [3,4]. These neurotoxins enter the marine food web via filter feed invertebrates where they bioaccumulate [3]. As marine invertebrates are an important food source for many Arctic animals, STXs can spread to higher trophic level consumers causing severe illness or death of both wildlife and humans [3,5]. In humans, STX causes paralytic shellfish poisoning via the ingestion of contaminated seafood. STX has been detected in bowhead whales and walrus harvested for subsistence purposes in some Arctic regions, raising alarm about STX poisoning from these animals [6]. Currently, there is no state-led neurotoxin testing program for recreational or subsistence harvesting, putting Alaska Native communities at an increased risk for STX exposures [7]. A large *A. catenella* cyst bed covering approximately 145,000 km² was recently found in U.S. waters off the Chukchi Shelf [2]. The presence of this massive cyst bed coupled with ongoing Arctic warming increases the likelihood of annually recurrent *A. catenella* HABs. As the Alaskan Arctic does not have an offshore HAB monitoring program, large toxic blooms may escape detection until STX poisoning has already occurred [2]. Increased *A.*

catenella HAB activity could significantly affect Arctic ecosystems that are essential to the economic, nutritional and cultural health of Arctic communities.

Extreme Harsh Winter hurts physical and mental health in Mongolia

Author: Nansalmaa Conway MSc, PhD.

Mongolia has historically experienced very cold conditions during winter. This has included protracted periods of extreme harsh winters, or Dzuds. With global climate change, these events have become more severe. Most recently, the most severe Dzud was during period of November 2023 and May 2024 in Mongolia. During this period, Mongolian herder families lost many (5.2 million) household livestock animals including cows, sheep, goats, camels, and horses (WCS, 2024). The increasing frequency of Dzuds and resulting widespread deaths of animal herds and loss of livelihood for herder families has led to a massive rural to urban dislocation, to "ger districts", surrounding Ulaanbaatar. These now have over one-half of the metropolitan area's population, but largely lack urban amenities including water supplies and modern sanitation, and often rely on coal stoves for heat. Loss of family income due to harsh weather environments, dislocation to urban areas, and cultural disruption may lead to posttraumatic stress disorders and unhealthy behaviors including high alcohol consumption, smoking, and vaping. These challenges are also disruptive to family health and well-being (NConway, 2013). For example, the most recent Dzud, in 2024-2025, affected more than 188,000 people including 80,215 children and required nutritional, educational, mental health, and psychosocial assistance to over 14,000 children (UNICEF, 2024). The effected nomadic herder children may be more likely to suffer dislocation to urban areas, their family's loss of traditional livelihood and culture, and increased stress and suffering from these traumatic experiences.

Homelessness in the Circumpolar Region

Author: Jennifer Spencer

Homelessness in the Circumpolar region poses unique difficulties due to severe weather conditions, geographic isolation, and the disproportionate impact that affects Indigenous and marginalized communities. Studies consistently highlight how systemic obstacles, colonial histories, and insufficient public policies worsen housing instability. Prominent themes highlight structural inequities in Indigenous homelessness, gender-specific pathways into homelessness, the connection between mental health and substance abuse, and the different policy implications in both rural and urban northern areas. Due to the limited information available in circumpolar regions, other American cities with comparable weather conditions or more understanding of working with specific groups were referenced. The synthesis reviews key literature on housing insecurity, homelessness, and public health in rural and urban northern communities. Findings highlight how restrictive land policies, inadequate housing infrastructure, and discrimination contribute to persistent homelessness among vulnerable populations. Gendered pathways in homelessness show women face additional vulnerabilities due to domestic violence and lack of services. Mental health and substance use are prevalent among homeless populations; these issues are worsened by limited access to healthcare. Studies highlight the need for culturally responsive housing policies and trauma-informed healthcare approaches, and some studies call for an expansion of Housing First programs. Research gaps included insufficient long-term data and a narrow focus on circumpolar regions, including Sweden, Finland, Greenland, Denmark, and Alaska. It also lacked a focus on diversity in research. Some of the studies addressed gender and Indigenous people, but there was limited research on African, African-American, Latina, Hispanic, and other People of Color (POC). Data like sexual orientation, LGBTQIA+2, and age were missing. Including individuals who have been released

from incarceration. Recommendations about policy stress Indigenous led housing initiatives and improved healthcare. Addressing these challenges requires coordinating efforts among policymakers, healthcare providers, professionals, and Black, Indigenous, and People of Color (BIPOC) communities to ensure solutions.

Risk Seasonal Affective Disorder (SAD) Among Youth: Newly Established vs. Lifelong Residents of the Circumpolar Region

Authors: Sarah Kim (West Anchorage High School), Gabriel Garcia (UAA Division of Population Health Sciences)

Seasonal Affective Disorder (SAD) is a significant mental health issue in places with limited sunlight during the wintertime, such as Alaska and other Circumpolar areas. For her high school science project, Sarah Kim investigated whether youth who recently moved to Alaska are more prone to experiencing SAD compared to youth who have lived in Alaska or other Circumpolar regions their entire lives. Methods involved conducting a self-administered survey with two groups of 18-year old youth: the first group consisting of newly established residents of Alaska (i.e., living in Alaska less than 5 years) and the second group consisting of lifelong residents of Alaska or other Circumpolar regions. The survey included validated questions on SAD, as well as ways to cope with seasonal changes in mood or energy. A total of 32 youth participated in the survey from one Anchorage high school—16 were newly established Alaska residents and 16 were lifelong residents of Alaska or other Circumpolar region. Results show that newly established Alaska residents have significantly higher SAD scores than lifelong residents. All of the newly established Alaska residents in the sample indicated having symptoms of SAD during winter months. Most individuals in this group cope with seasonal changes in mood or energy by talking to family or friends. Additionally, half of the sample spends time alone or does physical activity (e.g., sports, exercise, outdoor activities). However, only a few cope and utilize professional help (therapy or counseling), medication, or light therapy (e.g., SAD lamps). These coping strategies have been shown to be effective in helping treat SAD symptoms, but are notably underutilized by newly established residents of Alaska. Thus, to help prevent and or symptoms of SAD among newly established residents in Alaska, we should consider promoting these effective coping strategies.

Themes and Lessons from the Alaska Lactation and Perinatal Nutrition (ALPeN) Project

Authors: Megan McIlmail, Ruby Fried, Julie Avery

Although Alaska has some of the highest U.S. rates of breastfeeding initiation (92.9%) and exclusive breastfeeding continuation to 6 months postpartum (35.3%), we are below the World Health Organization global target for 6-month exclusivity (50%) and have a larger than average racial/ethnic disparity in breastfeeding initiation (20.2%). Alaska also has the highest rates of food insecurity in the nation, with 10.7% of the state population classified as food insecure. Food insecurity increases the likelihood of poor nutrition for both mom and infant, impacting lifelong health, however there is little research on Alaska-specific breastfeeding and perinatal nutrition strengths and barriers.

The Alaska Lactation and Perinatal Nutrition (ALPeN) project is a collaborative endeavor between researchers at the University of Alaska Anchorage and University of Alaska Fairbanks with the goal of understanding the state of breastfeeding and maternal nutrition in Alaska. We conducted focus groups with 21 participants identifying as perinatal-related service providers across Alaska, with a heavy focus on Anchorage and Fairbanks areas. Participants were asked to share their views on the “big picture” of breastfeeding and maternal nutrition in Alaska; conversation topics explored breastfeeding initiation, breastfeeding continuation, and the nutrition needs for

average Alaskans and pregnant/breastfeeding individuals. Some preliminary themes that emerged were the need for increasing patient and provider education on evidence-based breastfeeding and nutrition practices, access to employer and financial resources as a potential strength and barrier, cultural differences in breastfeeding practices and access to various supports, and the need for timely support to navigate breastfeeding challenges. Participants were also asked to weigh in on the potential composition of a community advisory board to guide future research in this area of health in Alaska, during which potential key stakeholders were identified. Additional project insights will be shared, along with future practice implications.

Healthcare in Non-Traditional Spaces: Addressing Black Men's Health Through Barbershops

Authors: Amana Mbise, Nathan West, Megan, McIlmail., Rebecca Van Wyck

In the United States, Black men experience significant health disparities as well as some of the highest mortality rates when compared to all other racial groups. This is especially true in circumpolar communities where Black Alaskans, for example, may have unique challenges to health education, healthcare access, and community engagement. Research suggests multi-level barriers may be contributing to health disparities including: delayed screening, stigma, lack of trust in traditional healthcare settings, and a lack of awareness. Thus, to reach historically underserved and at-risk populations in these regions and increase access to health-related services, public health professionals must be creative in their research approach and look to non-traditional spaces as opportunities for collaboration (e.g., barbershops, faith-based organizations). Decades of research has shown the utility, feasibility, effectiveness of barbershop-based interventions promoting mental and physical health and wellness among Black men, specifically. Despite the significance of Black barbershops, however, our understanding of their impact on Black men in Alaska is lacking. Therefore, the purpose of this qualitative study is to employ community-based participatory research principles to explore and better understand the role barbershops play in promoting health and health behaviors among Black Alaskan men. In our presentation, we will discuss: 1) Navigating institutional barriers when conducting community-engaged research with hard-to-reach populations, 2) The process of building and maintaining trust with key community stakeholders, 3) Adaptations made to research goals and approaches based on community perspectives, and 4) The vision for utilizing non-traditional spaces to reach Black men for health promotion.

Diphtheria in Nome – 1925

Author: Eliza Ramsey

In January 1925, one of the most famous infectious disease outbreaks in American history unfolded in Nome, Alaska where the small, Arctic community was threatened with the spread of a contagious bacterial disease, Diphtheria, and a shortage of antitoxin necessary to treat infections. The plight of the remote community and the logistical heroism of the mushers and dog teams who ferried a critical supply of serum from Nenana to Nome – more than 600 miles over 5 wintery days – is a story that still inspires today. On the 100th anniversary of this event, we conducted an analysis of Alaska Department of Health vital records data to identify a case series of individuals who died in the Nome diphtheria outbreak as well as the prevailing causes of death of the era. Combining death records and documents from the Alaska State Archives, we will describe the epidemiologic facts of diphtheria deaths in the Nome area during the outbreak, as well as related documentation on the number of cases and available health care resources during the outbreak. Finally, we will highlight leading causes of death from 1924-25 across the then Territory of Alaska as well as describe changes in the age, race, and gender of decedents

compared to the present. We will discuss the opportunities and challenges of conducting historic public health analyses with vital records data.

HPV related cervical cancers in AI/AN women

Author: Ashley Sheetz

Human papillomavirus (HPV) is a highly contagious, sexually transmitted infection, with twelve genotypes classified as high-risk for causing cancer. These genotypes are responsible for approximately 95% of all cervical cancers. In Alaska Native and American Indian women, cervical cancer is the most common HPV-related cancer, with a mortality rate that is twice that of non-Hispanic white women. Despite this, cervical cancer screening rates in this population remain significantly lower. This literature review explores the incidence of high-risk human papillomavirus genotypes among Alaska Native and American Indian populations in Alaska, the extent to which the currently available HPV vaccine covers the most prevalent genotypes, and disparities in cervical cancer screening within this group. As public health professionals, it is our responsibility to educate Alaska Native and American Indian women about their elevated risk for HPV-related cervical cancer, while promoting both vaccination and regular screening to reduce the burden of disease.

The vaginal microbiome: How biomedical and lifestyle factors influence women's health

Author: Cornelia "Connie" Jessen, MA (ANTHC)