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**Title Household water and sanitation strategies impact pathogen exposure and serve as opportunities for infrastructure interventions t**

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Theme 2: Observing in Support of Adaptation and Mitigation

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Poster title (brief) Household water and sanitation strategies impact pathogen exposure and serve as opportunities for infrastructure interventions that are resilient to environmental change

Abstract - text box

Introduction: Indigenous communities in rural Alaska have been on their lands for thousands of years and have incorporated western practices and infrastructure into their communities more and more in recent generations. However, the difficulty of building infrastructure in remote, isolated areas and challenging climatic conditions, combined with the lack of funding for new technologies and services in rural Alaska has caused many communities to lag behind the rest of the United States in some sectors. For example, thousands of households in rural Alaska still lack access to safe drinking water and safely managed sanitation in their homes, and the gap between infrastructure needs and infrastructure funding is growing annually. Traditional water, sanitation and hygiene (WASH) strategies and adaptations, such as hauling water from natural sources and recycling wash water, are still important in these households.

Methods and Results: We conducted household interviews and water quality monitoring and modeled waste management seasonally in households in several rural communities that currently lack access to in-home water and sanitation services (“unserved communities”). Data were analyzed to understand water sources used by season, quality of water sources, water quantities used for various purposes in the home and around the community, household water quality, and waste management activities that are currently undertaken in these communities. WASH behaviors and strategies varied by season and made use of a variety of resources in the natural and built environments within the communities studied. Pathogen exposure pathways were identified and their expected impact on health and wellbeing is discussed.

Discussion: Understanding current behaviors in unserved communities is important for identifying technologies that can improve WASH access and reduce pathogen exposure within the cultural frames of communities and the current funding constraints facing rural Alaska water and sanitation projects. The current WASH activities in the study communities are examined in light of a new middle-tech water and toilet intervention, called the Portable Alternative Sanitation System (PASS). PASS units consist of a Cryptosporidium-rated filter and an electric pump that allows households to haul water from any source they chose, treat it and store it in a 100-gallon safe storage water tank in the home. The tank feeds a handwashing sink by gravity to encourage handwashing with clean water, and greywater from the sink flows into an unlined underground seepage pit. The system also includes a urine-diverting dry toilet that deposits urine in the seepage pit and fecal solids into a bucket where they are dried by an electric ventilation fan and disposed manually with other household solid waste. PASS units have had mixed reception during pilot studies but are likely to be more resilient to the impacts of changes in climate and community needs than traditionally engineered infrastructure. The challenges of and opportunities for adoption of PASS in rural Alaskan communities are discussed. Additional research to evaluate the health impacts of PASS units is ongoing.