

SUPPLEMENT SPECIFIC AIMS

In the US, Early Childhood Caries is the most prevalent chronic disease in children, occurring 5 times as frequently as asthma, and when left untreated costing \$1.6 billion in emergency dental care in 2012 alone. Nationwide, caries rates of Hispanic, Native American, and Native Hawaiian and Other Pacific Islander (NH/OPI) children, are almost double those of white children. Approximately 52% of pre-school aged Hispanic children (in Yuma County, Arizona) and 50% of NH/OPI children (on Hawai'i Island) have untreated caries. Traditional socioeconomic factors (poverty and access to dental care) explain only a portion of the elevated ECC incidence rates in ethnic minorities, with biological components likely having a strong impact. Infection by bacteria from mutans streptococci group (*S. mutans* and *S. sobrinus*), have been implicated as the cause of ECC. When established in the oral cavity, these bacteria metabolize carbohydrates and produce highly acidic byproducts that change the pH of the oral cavity, leading to demineralization of tooth enamel. The impact of the genomics, virulence (acid production), and bacterial load of mutans streptococci in the oral cavity on observed ethnic ECC incidence disparities are unknown but are likely significant. Similarly unknown is the role that preschool classrooms perform in selecting for highly acidic strains of mutans streptococci.

We have proposed to address these knowledge gaps in the existing U54 RCMI parent project entitled: "Defining Microbiological Drivers of Early Childhood Caries in Preschoolers in Southern Arizona" (5U54MD012388-03). However, while the parent study is well-poised to explore the biological component of ECC in Hispanic and, to a lesser extent, Native American children, Native Hawaiians and Pacific Islanders are insufficiently represented in Arizona (and elsewhere in the continental US) to draw statistically significant conclusions. Thus, we proposed to focus on disambiguating the biological drivers of dental decay in NH/OPI children through an administrative supplement that was successfully funded in December, 2019, entitled "Defining Microbiological Drivers of Early Childhood Caries in Preschoolers of Native Hawaiian and other Pacific Island Descent and (3U54MD012388-03S2). At 33.9%, the proposed catchment area for this supplement (Hawai'i County, HI), has one of the highest concentrations of Native Hawaiians, per capita, in the country, making it an ideal option to disambiguate NH/OPI from other ethnicities.

This Diversity Supplement aims to expand Aim 2 of the parent award to design a targeted intervention/education program that is based on the knowledge gained from familial versus classroom-based ECC-causing bacteria transmission patterns and to provide career development mentoring and support to Dr. Misty Pacheco, the only female and Native Hawaiian/Pacific Islander tenured faculty member in the University of Hawaii at Hilo's Kinesiology and Exercise Science Department. Dr. Pacheco has a diverse background in public health and health disparities research, focusing on NH/OPI. To achieve her career goal of becoming an independent scientist who utilizes social behavioral and biomedical methods to conduct health disparities research, Dr. Pacheco seeks to gain necessary skills in formative research, intervention design, basic molecular biology techniques for sample processing, programming, computation, data analysis, and grant writing. Through a combination of regular mentorship meetings, structured workshops, courses, and a detailed workplan, this supplement will greatly facilitate her career development and provide critical new information to the NH/OPI and scientific community. The Specific aims are:

AIM 1: To conduct qualitative, formative research to understand oral health knowledge, attitudes, and behaviors (KAB) amongst NH/OPI families and preschool teachers to inform the development of an oral health intervention focused on NH/OPI preschoolers and their families. We postulate that qualitative analysis of the KAB of NH/OPI families and preschool teachers will significantly inform an intervention to address the negative health disparities regarding oral health in this population.

AIM 2: To develop, pilot, and evaluate an oral health intervention for NH/OPI parents and/or staff of preschool aged children. Based on the data from the parent grant and administrative supplement, as well as the qualitative data collected from AIM 1, we will develop a culturally relevant intervention to address NH/OPI oral health disparities.

An experienced mentorship team will guide Dr. Pacheco via meetings focused on biological data collection, processing, and computational analyses; formative and culturally-centered research; and intervention design. Sessions will include bi-weekly meetings with lead mentors Drs. Viacheslav Fofanov and Julie Baldwin and bi-monthly meetings with the full mentoring team; structured workshops in qualitative and formative research, grant writing, and intervention development; and molecular biology and statistics classes. We believe these activities will greatly expand Dr. Pacheco's research skills and grant record (building on recent substantial progress) and cover a critical research topic with immediate potential to influence early childhood caries in Hawaii. This work will also allow her to collect preliminary data for a R01 award submission to continue to study long-term impacts of an oral health intervention for preschool aged children in Hawaii and ways to optimally support local Hawaii communities to promote healthy behaviors.