THE HEALTHY DAIRY WORKER STUDY

YEAR 6 of 6 (2016-2022)
PI: Peter Rabinowitz, MD, MPH
Professor, University of Washington

https://deohs.washington.edu/pnash/healthy-dairy-worker-study

Challenge

Dairy workers are commonly exposed to microbes and allergens on the job. However, little is known about whether these exposures provide health benefits or contribute to an increased risk of illness. The 'hygiene hypothesis,' suggests that exposure to microbes on farms may have immune benefits.

Project Overview

Our study evaluates the impact of these factors on respiratory and gut health by measuring the nasal and gut bacteria present in the body and comparing it to respiratory function of workers. We will analyze changes in the microbiome and health status for newly hired dairy workers, existing dairy workers, and community members over a two-year period. Our goal is to determine if the quantity and type of bacteria in the microbiome of workers are related to the participant's health or leaving the job.

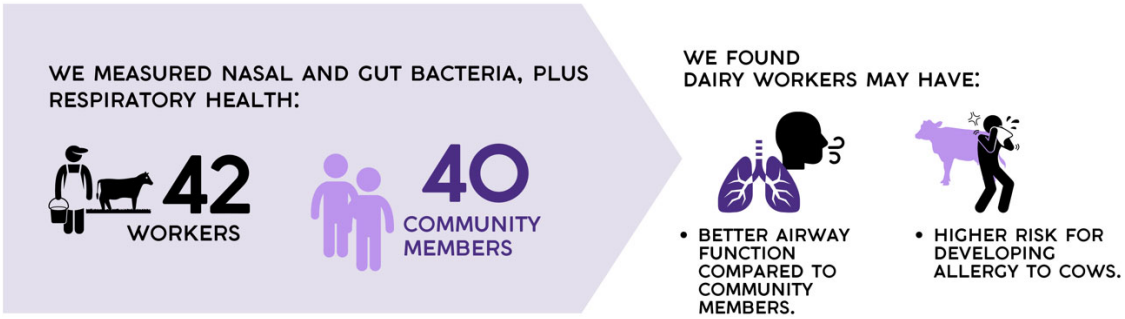
" As the owner of a dairy farm, I am interested in the health of workers and feel that your research could shed light on novel methods of maintaining worker health in this work environment where microbial exposure is unavoidable."

- WA Dairy Owner

Findings to Date

This project completed sample collection in 2022 and has further analysis underway. See 'Next Steps' on the following page.

- Dairy workers performed better on breathing tests and had an abundance of certain 'healthy' bacteria that protect against inflammation, as compared to community members. This benefit may be from the greater contact with cows.
- There appear to be differences between individuals in the amount of gut bacteria associated with inflammation.
- The study found some evidence that some dairy workers were developing an allergy to cow antigens.



Other Accomplishments

- Our sample collection ended in 2022, ending a rigorous 5-year field study of recruitment of four farms and enrollment of 53 farmworker participants for biological sampling.
- Dr. Pauline Trinh's PhD dissertation entitled "From Metagenomics to Pangenomics: Characterization of Dairy Worker Microbiomes and Development of Novel Statistical Methodology."

Next Steps

A manuscript entitled "A Cross Sectional Study of Respiratory and Allergy Status in Dairy Workers" has been accepted pending edits to the Journal of Agromedicine. In 2022-2023, we will look at microbiome differences and whether those are determinants of respiratory function.

We will be publishing the metagenomic analysis into several papers with Dr. Trinh. Additionally, we have recently completed sample DNA extractions and sequencing and are now preparing to do the longitudinal analysis, to be completed in 2022-2023.

Due to challenges recruiting new dairy workers early in the study, we were not previously able to complete a full comparison of the microbiome of new workers and controls. We now have enough samples from new dairy workers for continuing analysis and fill in this gap of knowledge.

In the 2022-2023 academic year, PhD Student Jorge Rivera-Gonzalez will analyze data and support the development of manuscripts on the following topics:
1. Compare microbiome diversity and components between workers and controls,
2. Determine whether microbiome components are associated with health status or early work cessation,
3. Assess the microbiome in asthmatic vs non-asthmatic study participants,
4. Change of microbiome diversity over time, and
5. Determine degree of microbiome sharing between humans and animals.

Based on our experience with the dairy workers, we created a training module for Infection Prevention and Control on Dairy Farms. We will be adapting this for farm audits by the Washington State Dept. of Labor and Industry.

"Este studio me ha dado la oportunidad de placticar con me hija y esposa sobre como puedo mejorar mi salud cuando trabajo con las vacas."

"This study has given me the opportunity to talk with my daughter and wife about how I can improve my health when I work with cows."

-WA Dairy Worker Participant

Resources

Partnership for Dairy Safety and Health | Pacific Northwest Agricultural Safety and Health Center (washington.edu)

Training

Free, Online Training Modules for Infection Prevention and Control (IPC) on Animal Farms | Center for One Health Research (washington.edu)

Research Papers

Trinh P. From Metagenomics to Pangenomics: Characterization of Dairy Worker Microbiomes and Development of Novel Statistical Methodology. 2022 Doctoral Dissertation. Department of Environmental and Occupational Health Sciences, University of Washington, Seattle, Washington. See Abstract. ResearchWorks.

de Marcken MG. 2020. Occupational Dairy Exposure and IgE-mediated Allergic Disease in Yakima, WA. 2020 Master's Thesis. Department of Environmental and Occupational Health Sciences, University of Washington. ResearchWorks.

Carmona JT. The Healthy Dairy Worker Study: A Longitudinal Cohort Study of Dairy Workers' Respiratory Health. 2020 Master's Thesis. Department of Environmental and Occupational Health Sciences, University of Washington. ResearchWorks.