Research suggests human microbiome studies should include a wider diversity of populations

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Microbial samples taken from populations living in the U.S. and Tanzania reveal that the microbiome of the human hand is more varied than previously thought, according to new research published in the journal *Microbiology*. These findings suggest that the 'standard' hand microbiome varies depending on location and lifestyle.

Results compared the microbes on the hands of women in the U.S. and Tanzania and found that organisms that have commonly been identified in prior human skin microbiome studies were highly abundant on U.S. hands, while the most abundant bacterial species on Tanzanian hands were associated with the environment, particularly soil.

The team of researchers from Yale University, Stanford University and Johns Hopkins University Bloomberg School of Public Health, took hand wash samples from 15 adult American women and 29 adult Tanzanian women to compare the species of microorganisms present. In the U.S. group, all participants were graduate students, 13 of white European origin, while two were Chinese-American. In the Tanzanian group, all women were caregivers to children under 5 years of age, living in a low-income urban environment.

Dr Jordan Peccia from Yale University, who led the work, said: "If we ever hope to understand how the microbiome affects health and how environmental interactions alter it, we have to expand research to cover

different populations.

"The microbial population on the graduate students' hands looks like what we think the hand microbiome 'should look like', but we can't assume that the human microbiome is a standard thing. Our research has shown that the microbial population on the things people use to interact with the environment the most – their hands – is dramatically different between groups."

The predominant microbial groups found on the US hands included members of the Propionibacteriaceae, Staphylococcaceae and Streptococcaceae groups of bacteria, similar to those previously found in hand microbiome studies. In contrast, the Tanzanian samples included members of the Rhodobacteraceae and Nocardiodaceae not previously thought to be common colonisers of human skin. These groups are commonly associated with soil and aquatic environments.

The lifestyle differences between the groups are notable. None of the U.S. group was a caregiver for young children and the group spent the majority of their time indoors. The Tanzanian women live in open-air dwellings in Dar es Salaam, Tanzania, and spend large amounts of time outdoors.

These results help to expand human microbiome results beyond U.S. and European populations, demonstrating the important role that the environment plays in shaping the microbes on people's hands.

More information: 'Hand Bacterial Communities Vary Across Two Different Human Populations' published online ahead of print in *Microbiology*.