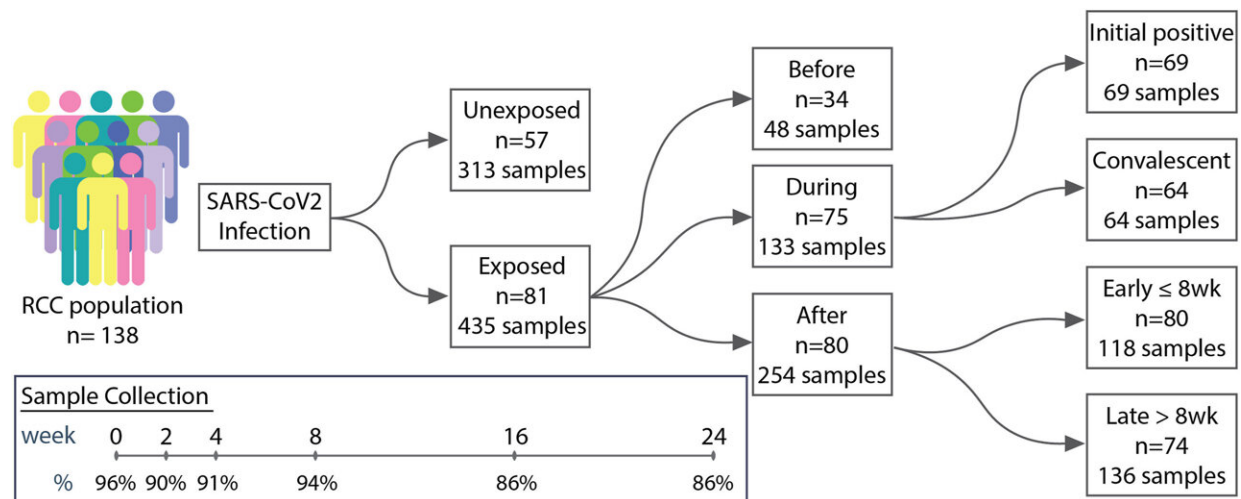


# Q&A: Only severe COVID cases found to have disrupted oral microbiome

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Study design schematic. Study participants are a subset from the larger population (n = 829) of the Rutgers Corona Cohort (RCC).<sup>1</sup> COVID-negative subjects were selected from a larger pool of negative participants and matched 2:1 with the cases based on age, sex, BMI, and presence of co-morbidities.

Credit: *eBioMedicine* (2023). DOI: 10.1016/j.ebiom.2023.104731

The gut microbiome dominates the headlines, but it's not the only collection of tiny organisms that live inside you and affect your health. The oral microbiome—which populates the mouth and connects with the sinuses, larynx, trachea and lungs—harbors more than 700 species of bacteria.

How do those bacteria get there, what do they do, and why should you be glad they mostly survived COVID-19? Abigail Armstrong, a postdoctoral researcher at the Rutgers Center for Advanced Biotechnology and Medicine, explains some findings from her team's new paper in *eBioMedicine*.

## **Where do the bacteria in the oral microbiome originate?**

Many of the organisms have been with you since you were a young child. Food is definitely a factor, but there are many others: the people you kiss, the stuff you touch before bringing your hand to your mouth, the strains that grow on your old lip gloss. Nearly everything that enters your mouth has bacteria.

## **Why don't toothpaste and mouthwash kill the oral microbiome?**

You can kill surface bacteria with a thorough brush and gargle, but bacteria lodged deep in the gums, tongue and other soft tissue survive to replace them, which is why you go to bed minty and wake up with morning breath. And that's OK. Those [good bacteria](#) are vital to maintaining [oral health](#) and for the health of the lungs.

## **How does that bacteria get from the mouth to the lungs?**

You inhale small amounts of saliva throughout your day.

This isn't necessarily bad. While we don't fully understand the impact on health, we do know the bacteria that enter your lungs impact your

immune system, sometimes detrimentally but sometimes beneficially. This is still an active area of research.

## **What was your goal with the COVID study?**

We wanted to answer two main questions. The first of those was whether variations in the oral microbiome affected susceptibility to getting COVID. Was there something different in the oral bacteria of people who got COVID versus those who didn't?

The second main question we wanted to answer was how SARS-CoV-2 affected the oral microbiome and whether greater changes predicted bigger changes down the road with problems like long COVID.

## **How did you get the samples to analyze?**

We tapped materials from the Rutgers Corona Cohort. Researchers followed 831 health care workers and other [community members](#) for six months during the early days of the pandemic. They took regular saliva samples to test for infection, and they kept all the samples so we could analyze the pre-COVID oral bacteria—most other cohorts only had samples from after infection was detected—and see how infection changed it.

## **What did you find?**

There were no significant differences in the oral microbiomes of people who did and did not get infected with SARS-CoV-2, so there was no evidence that some particular type of bacteria in the mouth and lungs—or some particular combination of [bacteria](#) types—offered protection against COVID. We also saw very few changes after COVID for those who had mild to moderate cases.

There were, however, significant reductions in microbiome diversity among people with severe symptoms soon after infection.

## Why is that important?

This means that major events like serious illness and treatments are needed to change this resilient [microbiome](#), and that's a good thing for the average COVID case, which is usually mild.

## What about the duration of illness?

We saw significant differences when we compared people who had less than 30 days of symptoms with those who had more than 60. We found that the oral microbiomes of people with shorter cases all changed in consistent ways during infection, while those with long cases changed in many different ways. That suggests there might be a specific way that your [oral microbiome](#) shifts during infection that helps protect you and shorten your symptoms.

**More information:** Abigail J.S. Armstrong et al, Saliva microbiome in relation to SARS-CoV-2 infection in a prospective cohort of healthy US adults, *eBioMedicine* (2023). [DOI: 10.1016/j.ebiom.2023.104731](https://doi.org/10.1016/j.ebiom.2023.104731)

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