

# Leftover blood tests lead to COVID revelation

By [Jane Roberts](#), Daily Memphian Updated: April 20, 2021 5:28 AM CT | Published: April 20, 2021 4:00 AM CT

More than half the population of Shelby County (51%) has antibodies to COVID-19, a critical bit of information in the race to herd immunity.

The figure is the sum of the vaccination rate (roughly a third) plus some good ol' gumshoe detective work by Xinhua Yu, a University of Memphis researcher who has been sifting through run-of-the-mill blood samples doctors have ordered in Shelby County to detect everything from cancer to infection.

Since November, Yu has analyzed 315 random samples a month, looking for antibodies to COVID-19. Without fail, he's found the antibodies in 19%-20% of them, more than twice the local positivity rate of 8.2%.

That means for every positive case in Shelby County as far back as last fall, at least one or two others were infected but likely with such mild cases, they went to bed, woke up feeling fine and never knew, Yu says.

To know where a jurisdiction is in an epidemic, every case – every immunity – counts.



**Xinhua Yu**

As a researcher, Yu started last fall trying to convince people to see their doctors to have blood drawn so they would know if they had antibodies or not.

Plenty were curious about whether they had had COVID, but not interested enough to actually roll up their sleeves.

When vaccinations started, the problem got worse.

“It was in the past,” he said. “People wondered, ‘Why do we need to know?’”

In February, American Esoteric Laboratories and Poplar Healthcare gave him access to hundreds of vials of leftover blood, anonymized to protect donor identities.

That also meant he no longer needed donor permission.

He went to work running the tests.

“We already know that there is a high percentage of people who are asymptomatic, who had milder symptoms and never reported it,” Yu said. “To know the magnitude of the epidemic, or the progress of epidemic, you have to actually have the firsthand, real data to see what’s going on in the community.”

Blood samples are tested from every ZIP code in the county commensurate to its population.

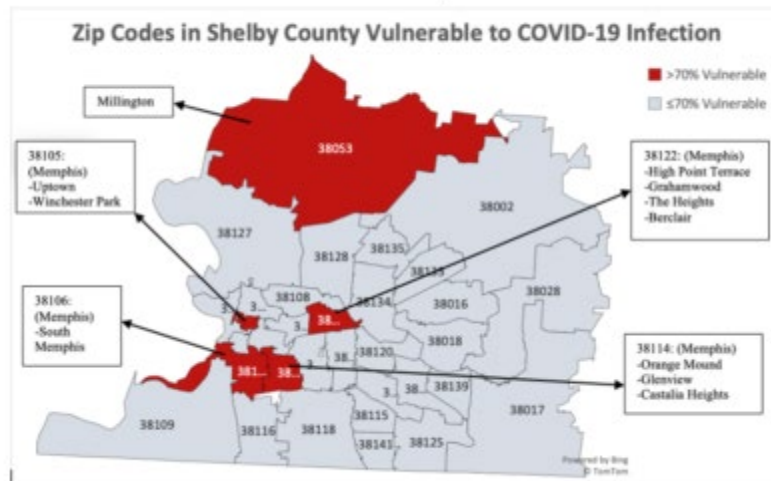
The City of Memphis funded the study with CARES Act money. Roche Diagnostics contributed testing supplies.

Seeing the data flow in is like watching the pandemic progress. In February, 40% of the population was immune, either because they had had COVID or had received the vaccine.

From February to March, the percentage with immunity grew by 11% as vaccinations increased.

“This is important work to help the city and county know how well we are doing with developing immunity and where vaccination efforts need to be focused,” said Jim Sweeney, CEO at Poplar Healthcare.

The figure shows the percentage of the population that is vulnerable to Covid-19 infection. Vulnerable individuals do not have antibodies from prior Covid-19 infection or vaccination.



For instance, while Shelby County had a general immunity of 40% in February, it was less than 30% in some ZIP codes in Memphis and Millington.

The figures in the graph above are from February.

Yu will run April numbers at the end of this month.

“The immunity rate will go up,” said Dr. Manoj Jain, infectious disease expert advising Mayor Jim Strickland on the city’s COVID response.

“I was very encouraged at the rate we are going with vaccine,” he said. “This allows us to reflect in real time and to see it terms of blood levels.



**Manoj Jain**

“We have antibody-level protection for half the population,” Jain said. “What is disappointing is that we have to reach a much higher level, up to 85% antibody positive in order to have herd immunity with the mutant strains we have.”

Yu, an assistant professor in epidemiology, biostatistics and environmental health, teaches herd immunity as a concept, but he’s not crazy about it.

For him, the best example is measles. The nation has herd immunity to measles but almost every year, there is a breakout.

“People who aren’t vaccinated are still vulnerable,” Yu said. “We don’t get to a point where the society is safe if we have 20% or 30% who are not vaccinated.”

More contagious variants have increased the percentage it will take to reach herd immunity, once estimated to be about 70%.

Yu worries how change in messages is perceived by everyday people trying to understand the pandemic.

“People may ask, ‘OK, a month ago you told me it was 70%. Now, you tell me we need 80%. Are you going to say next month it’s 90%?’

“It’s a moving target that from an epidemiological point of view, makes sense,” he said. “But for other people, it’s like your politicians and your scientists are eating their words.”

Yu expects to continue the blood tests through June, when by his guess, Shelby County will be through the pandemic.

“I don’t know exactly, but I’m pretty optimistic that by June, it’s going to be OK.”

The good news for Shelby County, he says, is that many other places have transmission rates higher than 20%.

When the nation reached 500,000 COVID deaths on Feb. 22, 2021, Yu took out a calculator and figured the national transmission rate was 22% to 23%.

“We are actually slightly better than the national average.”