



COVID-19 testing of homeless people is rare, but necessary.

CORONAVIRUS SPREADS UNDER THE RADAR IN US HOMELESS SHELTERS

Controlling the spread of COVID-19 in group settings is essential to ending the outbreak, researchers say.

By Amy Maxmen

Researchers are beginning to test homeless individuals in the United States for the virus that causes COVID-19, and are discovering that the situation is out of control: tests are rare and outbreaks are spreading below the radar.

The lack of testing and assistance for people living in group settings – such as those in homeless shelters, nursing homes and prisons – threatens their lives as well as the nation’s ability to curb COVID-19 because these communities can rapidly become the epicentres of new outbreaks that will spread, say researchers. Scientists are now scrambling to collect data and model the transmission of coronavirus under different group-living situations.

What they learn might protect not only the roughly 1.4 million people who use homeless shelters or transitional housing in the United States each year – a growing population as unemployment soars and prisons release people to ease crowding – but also other people who don’t have the luxury of separating themselves from others. “What we’re seeing in this first wave in the US is that the largest clusters are in populations where people don’t have a lot of agency,” says Gina Neff, a sociologist at the University of Oxford, UK.

“These populations will become the sources of new outbreaks, even when we feel like we kind of have it under control.”

Shelters given space

Before COVID-19 was reported in China, Helen Chu, an infectious-disease specialist at the University of Washington in Seattle, and her colleagues were studying how the influenza virus spreads through homeless communities. “We wanted to develop a strategy that could be implemented for treatment and prevention in case a pandemic hit,” she says. Coronavirus swooped in before they could finish. In March, Chu’s team began surveying its study participants for the new coronavirus, too. So far, she says, most of those who have tested positive don’t have obvious COVID-19 symptoms.

Researchers found something similar in Boston, Massachusetts. In one study, in which 147 people tested positive at one shelter, just 11 reported a cough and only 1 would have met the official criterion for testing – a fever (T. P. Baggett *et al.* *J. Am. Med. Assoc.* <http://doi.org/ggtsh3>; 2020). That study is changing practices at the network of shelters affiliated with the Boston Health Care for the Homeless Program, says Travis Baggett, director of research at the programme and an author on the study. “Our data show that if we aren’t

more proactive, we’ll be too late to prevent an outbreak,” he says.

But most shelters still reserve tests for people with symptoms – or test broadly only after an outbreak has occurred. The results of this policy are troubling. For example, by the time a person from a shelter in San Francisco, California, had been diagnosed with COVID-19 in April, more than 90 other residents and 10 people who worked there were already infected. To influence policies, Baggett is running computer simulations to work out how many people will become infected, hospitalized or die from COVID-19 if the situation remains as it is – compared with the result if people are tested on a regular basis, regardless of symptoms. Costs are taken into account, too. “We’re trying to inform policymakers about different ways of doing things,” he says.

Towards a similar goal, a team of researchers from three US universities released a report in late March that lays out some minimal needs that might slow the spread of COVID-19 among homeless people, such as providing rooms for those at risk of severe disease because of underlying health conditions (see go.nature.com/3brFa5t). In projecting the “costs of inaction”, they find that, without further interventions, more than 21,300 homeless people in the United States will need to be hospitalized for COVID-19, and 3,400 will die.

Canaries in the coal mine

Health departments in the United States have started implementing interventions, such as relocating homeless people to stadiums, where beds are spaced two metres apart. And in San Francisco, Seattle and other cities, officials have reserved hotels in which to isolate people with COVID-19 who don’t have homes. Yet the vast majority of homeless individuals still remain in group facilities or in tents on the street, says Margot Kushel, a researcher-clinician who studies homelessness at the University of California, San Francisco.

She points out that many of the people sleeping in shelters have low-paid ‘essential jobs’, such as those in grocery shops and warehouses. This means they could become infected at work or in the shelters and spread the virus to others. Kushel says that, with data on how many people are infected in different settings, her team can estimate how often to screen, whether distributing face masks helps, and whether encampments are safer than indoor options. This last aspect matters in California, where about 91,000 people live outside.

But these calculations require much more data on rates of infection. The shortcoming is not necessarily because ample tests don’t exist. For example, Shana McDevitt, a researcher involved with COVID-19 testing at the University of California, Berkeley, says that her team has extra testing capability, but doctors and health officials are reluctant to recommend

News in focus

that everyone in a shelter is screened because officials lack plans for how to follow up on the results when infected people have no health insurance, money or housing. Furthermore, she says, a positive result means that the health department must work out who else the person might have had contact with – and screen them. It's a laborious task, but one McDevitt wants to see done. She says surveillance of homeless populations can also inform policymakers about whether an outbreak is waxing or waning in their communities, because people there are so vulnerable to infections. "They're kind of a canary in the coal mine," she says.

Many social workers want a stronger public-health response, too. Donald Frazier, the executive director of Building Opportunities

for Self-Sufficiency, a non-profit organization based in Berkeley, says he can't let new individuals into his network's shelters without tests of their coronavirus status. A related problem, he says, is that California is releasing thousands of inmates from prisons to decrease the risk of outbreaks there, but they aren't being tested first – and many have nowhere to go.

Researchers working to dampen the toll of COVID-19 in other crowded spaces, such as nursing homes and meat-packing plants, worry that policymakers aren't concerned enough about outbreaks in marginalized populations. Kushel says, "As scientists, it's our role to raise up these issues and help the public understand how viruses do discriminate, since we live in an inequitable world."

potentially informing policy and speeding up research that could lead to the development of vaccines and treatments. But their popularity is spotlighting the scrutiny that these studies receive. Without peer review, it's hard to check the quality of the work, and sharing poor science could be harmful, especially when research can have immediate effects on medical practice. That has led platforms including bioRxiv and medRxiv to enhance their usual screening procedures.

"We've seen some crazy claims and predictions about things that might treat COVID-19," says Richard Sever, a co-founder of both servers.

Much of that speculative work has been based on computational models, says Sever – so, after consulting with experts in outbreak science, the team decided to bar those papers from bioRxiv. "We can't check the side effects of all the drugs and we're not going to peer-review to work out whether the modelling they're using has any basis," Sever says. "There are some things that should go through peer review, rather than being immediately disseminated as preprints."

Barabási understands the need to ensure patient safety but disagrees with the decision. "It's precisely the coronavirus that creates an environment where you need to share," he says. The purpose of a preprint server "is that we decide what is interesting, not the referees". He ended up posting the study on the physical-sciences preprint server arXiv.

HOW PREPRINT SERVERS ARE BLOCKING BAD CORONAVIRUS RESEARCH

Repositories have been flooded with studies – and are screening more closely to guard against poor science.

By Diana Kwon

When Albert-László Barabási, a computational scientist at Northeastern University in Boston, Massachusetts, submitted a paper to the preprint server bioRxiv last month, he received an unexpected response. The biomedical repository would no longer accept manuscripts making predictions about treatments for COVID-19 solely on the basis of computational work. The bioRxiv team suggested that Barabási submit the study

to a journal for rapid peer review, instead of posting it as a preprint.

Publication norms are changing rapidly for science related to the coronavirus pandemic, as scientists worldwide conduct research at breakneck speed to tackle the crisis. Preprint servers – where scientists post manuscripts before peer review – have been flooded with studies. The two most popular for coronavirus research, bioRxiv and medRxiv, have posted some 3,000 studies on the topic (see 'Pandemic publishing'). The servers' merits are clear: results can be disseminated quickly,

Quality control

ArXiv, launched almost 30 years ago, was the first major preprint repository – but in recent years, discipline- and region-specific servers have mushroomed. Screening procedures vary, but an analysis of 44 servers, posted on 28 April on bioRxiv, found that most have quality-control systems (J.J. Kirkham *et al.* Preprint at bioRxiv <http://doi.org/dt3q>; 2020). Seventy-five per cent publicly provided information about their screening procedures, and 32% involved researchers in vetting articles for criteria such as relevance of content.

"There was perhaps a misconception that there are no screening checks that go on with preprint servers," says Jamie Kirkham, a biostatistician at the University of Manchester, UK, and a co-author of the study. "We have actually found that most of them do."

BioRxiv and medRxiv have a two-tiered vetting process. In the first stage, papers are examined by in-house staff who check for issues such as plagiarism and incompleteness. Then manuscripts are examined by volunteer academics or subject specialists who scan for non-scientific content and health or biosecurity risks. BioRxiv mainly uses principal investigators; medRxiv uses health professionals. Occasionally, screeners flag papers for further examination by Sever and members of the

PANDEMIC PUBLISHING

The major preprint servers have posted thousands of studies related to the coronavirus since the outbreak began.



Peer-reviewed journals have accelerated publication of studies on the coronavirus. One analysis of 14 titles, mainly in virology, found that the time to publish had dropped from 117 to 60 days.

