tracts and patents, as well as discussions about founding a biotechnology company.

The Emory case has further stoked fears among U.S.-based researchers of Chinese ethnicity that they are being unfairly scrutinized. “It’s a little disturbing, I must say,” says retired physicist Da Hsuan Feng, who previously worked as vice president of research at the University of Texas in Dallas. “I’ve been here since 1964, and so I wasn’t here during the [former Senator Joseph] McCarthy age, but this is uncomfortable.”

A harsher verdict comes from Shin-Shem Steven Pei, an electrical engineer at the University of Houston who in September 2018 helped organize a meeting between researchers, lawyers, and FBI to discuss espionage investigations of Asian Americans. Universities and federal agencies are “using Chinese American researchers as scapegoats,” he says, asserting that institutions have done a poor job of helping researchers comply with rules that once received little attention. “If you did not really enforce those rules, then you cannot slam the book on them at this time,” he says.

He and others also wonder whether Emory provided the Lis with due process. As a private university, it has broad leeway to fire employees, lawyers say. But Feng believes Emory would be well served to publicly provide more detail about the case. “There’s a necessity for a certain level of transparency,” Feng says. (Emory told *Science* it will not comment beyond its statement.)

In contrast to the Lis, Lookman is charged with a federal crime and was taken into custody before being released to home detention this week. Lookman, who has a doctorate in theoretical physics and was awarded one of LANL’s highest honors in 2017, faces three charges of making false statements. He allegedly lied about his involvement with the Thousand Talents Program on an employment form in 2017 as well as during 2018 conversations with a counterintelligence officer and an investigator conducting a background check. The charges carry a maximum penalty of 5 years in prison.

The recent cases are unlikely to be the last involving research affiliations with China. Federal officials have said they are scrutinizing a wide range of related activities, and President Donald Trump’s administration appears eager to penalize what it sees as unfair practices by the Chinese government. For its part, NIH said in its statement to *Science* that it is continuing “to remind universities to look closely at their organizations to mitigate unscrupulous practices by individuals that aim to capitalize on the collaborative nature of the U.S. biomedical enterprise.” ■

PHOTO: AMANDA VOISARD/MESA7 MEDIA

BIOMEDICINE

Native American groups wary of big U.S. biobank

Tribes say health officials were slow to consult them

By **Jocelyn Kaiser**

Joseph Yracheta knows the value of genomics-based medicine. As a master’s student, Yracheta, who is of Mexican Indigenous ancestry, studied genetic variants that influence how Native Americans respond to medications. But when it comes to a massive U.S. effort to identify correlations between DNA and health, called All of Us, Yracheta is a skeptic.

“I just don’t think tribes should participate in All of Us” because of the lack of clear benefit and a history of mistreatment by researchers and the U.S. government, says Yracheta, who is now studying health disparities among Native Americans as a doctoral student at Johns Hopkins University in Baltimore, Maryland. “I don’t think there’s a correct way to do this.” Many tribal leaders and researchers are also hesitant, creating an unexpected obstacle for the ambitious study.

Earlier this month, leaders of the National Institutes of Health (NIH) in Bethesda, Maryland, celebrated the 1-year anniversary of the effort, which aims to gather DNA and health records for 1 million volunteers by the end of 2024. They pointed with pride to the study’s diversity: More than 50% of the 143,000 volunteers fully enrolled so far belong to minority groups. They did not mention that Native Americans, who make up 1.7% of the U.S. population, are not formally on board.

“I’m very excited and supportive of the research,” says Aaron Payment, tribal chairman for the Sault Ste. Marie Tribe of Chippewa Indians in Michigan and chair of NIH’s Tribal Advisory Committee. But, he adds, “There is a level of frustration and anger and skepticism.” Formal meetings with tribal nations began this month, and NIH staff members say the discussions will lead to an action plan before the project’s data are released to researchers next winter. But tribal leaders are unhappy that these discussions did not begin sooner, and that Native Americans are informally enrolling in the study in the meantime.

Announced by then-President Barack Obama 4 years ago, the All of Us study will make anonymized data widely available so the scientific community can use them again and again in open-ended studies. A similar project in the United Kingdom has had remarkable success (*Science*, 4 January, p. 18).

All of Us has partnered with Latino and African American organizations, but efforts to engage the Native American community have faltered. With some 600 tribes to consult and a limited budget, “obviously, this is very complicated,” says Gwynne Jenkins, chief of staff for the All of Us Research Program. But Payment says NIH officials, including NIH Director Francis Collins, seemed “naïve” about past problems that make tribes cautious about participating in research studies.

One prominent case involved the Havasupai tribe in Arizona, which sued researchers in 2004 after their DNA samples, gathered for diabetes research, were allegedly used to study schizophrenia and inbreeding without permission from the tribe (*Science*, 30 April 2010, p. 558). “Indian communities were treated as specimens in the past. The research was not done in a culturally appro-

The All of Us project hasn't been able to recruit at events like the Northern Navajo Nation Fair in Shiprock, New Mexico.

priate way," Payment says. The Navajo Nation banned all genetic studies in 2002.

Meanwhile, All of Us launched nationwide in May 2018, including in cities such as Phoenix that have large populations of Native Americans. As of mid-February, the study already had DNA samples and health records for more than 1600 volunteers who self-identified as American Indian or Alaska Native and were able to indicate their tribe. That's 1.5% of participants, close to proportional representation of Native Americans.

That worries tribal leaders. In August 2018, a report from an All of Us working group of tribal leaders, health experts, and NIH officials said that data from individual volunteers could lead to findings with implications for an entire tribe. The report also suggested an individual participant from a small tribe might be identifiable in spite of data safeguards. Yracheta and some other indigenous scientists add that participation should enable tribes, not just companies, to benefit if data from Native Americans lead to a promising test or treatment.

Some tribes believe they should be able to decide whether their members take part in research. "Not all tribes agree. But it raises questions about whether or not it is appropriate to recruit tribal members off reservation when the tribe is not aware that type of recruitment is going on," says Nanibaa' Garrison, a Navajo and a geneticist and bioethicist at the University of Washington in Seattle.

The working group noted that tribes should have the power to approve publications on their group, a clear explanation of the role of companies in the study, and an opportunity to bless biological samples before disposal. Native Americans should also be part of a special committee that approves research projects focused on this group, the report concluded.

Acting on recommendations from the working group, All of Us plans to add a Native American to its research advisory panel. After gathering more input, NIH will decide later this year whether to include already-gathered Native American data in the database.

Formal consultations with tribes will ramp up in June in Reno, Nevada, at the midyear meeting of the National Congress of American Indians, which represents many tribes. By September, NIH expects to release a report that describes "things we can do and things that we can't do," Jenkins says. She hopes some tribes will eventually invite All of Us to recruit on their reservations. "My aspiration would be that we're able to develop those kinds of rich, trusting partnerships." ■

REPRODUCIBILITY

Psychology's reproducibility solution fails first test

Published research often strays from preregistered plans

By **David Adam**

Behavior change is difficult—just ask any psychologist. A new study shows behavior change among psychologists is no different. Efforts to improve the robustness of research by asking psychologists to state their methods and goals ahead of time, a process called preregistration, have stumbled at the first hurdle.

"Preregistration is not as easy as it may seem," says Aline Claesen, a psychologist at the Catholic University of Leuven (KU Leuven) in Belgium. She and her colleagues examined 27 preregistration plans filed from February 2015, when the journal *Psychological Science* started to offer badges for pre-registered studies, to November 2017. In every case, her team reports this month in a preprint on the PsyArXiv server, the researchers deviated from their plan—and in every paper but one, they did not fully disclose these deviations.

"I was totally surprised by how many of these [changes] were undisclosed," says Wolf Vanpaemel, a psychologist on the KU Leuven team. "There's no good excuse for not transparently indicating all changes you made."

> ***"Preregistration is not as easy as it may seem."***
>
> **Aline Claesen**, Catholic University of Leuven

As part of an effort to lessen the field's reproducibility problems, psychology picked up the idea of preregistration from clinical research, where it has been the norm for more than a decade. By setting out, for example, the number of volunteers that will be recruited and the criteria that will be used to analyze the data, preregistration is intended to make research more transparent and reduce both the temptation to fish for significant results and the opportunity for bias (*Science*, 21 September 2018, p. 1192). More than 27,000 such plans from various fields are lodged with the Open Science Framework, up from 12,000 in 2017. And ClinicalTrials.gov holds more than 250,000.

The KU Leuven researchers say plan changes can make sense when unforeseen problems with the method become clear during a study. The team members say, however, that not disclosing deviations can raise suspicions, although they do not suggest the papers they examined are unreliable.

For example, one of the most common deviations the KU Leuven team noted was in sample size. Preregistration is supposed to crack down on "optional stopping," in which researchers recruit subjects until they have data that support their hypothesis. The authors of one *Psychological Science* study wrote in their preregistration that they "expect to sample 600 participants" but then reported 616 participants in the published paper. This small increase "leaves open the possibility that the authors stopped data collection at 600 participants and used optional stopping to arrive at a favorable outcome with 616 participants," the preprint warns.

The lack of transparency is troubling, but understandable, Vanpaemel says: Some researchers might fear their paper won't be published if they admit to not having entirely followed their preregistration. "As soon as we see more papers being published [with] transparent changes, these concerns will be hopefully lessened."

Steve Lindsay of the University of Victoria in Canada who is also editor-in-chief of *Psychological Science* admits that he has given authors leeway to write vague preregistrations and not account for all deviations. He says policing the system would take effort the journal hasn't budgeted for. But, he adds, there has been "modest improvement" in the preregistration process at the journal since the study was conducted.

And Dan Simons, a psychologist at the University of Illinois in Champaign, describes the identified shortcomings as growing pains. "My guess is that most [authors] were well-intentioned and just didn't know how to do it very well."

Brian Nosek, a psychologist at the University of Virginia in Charlottesville who directs the Center for Open Science, which runs the Open Science Framework, says the KU Leuven team's findings should help. "The key message here," he says, "is that preregistration is a skill and not a bureaucratic process." ■

David Adam is a journalist based near London.

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