# Kaiser Permanente Research

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**Biostatisticians at R&E** Using numbers to create connections

between research and practice

Dr. Jiaxiao Shi and Dr. Bechien Wu discuss scientific posters at Los Angeles Medical Center's Research Days.







Dr. Heidi Fischer teaches other biostatisticians and programmers how to use a statistical methodology.

Growing up in Ventura, California, Heidi Fischer, PhD, MS, was always good at numbers. But, the self-proclaimed "math nerd" had no idea that would translate into a job she found meaningful.

It wasn't until she was out of college and working in economics that she heard about biostatisticians who used their mathematical expertise to improve people's health. She left the world of GDP trends for Kaiser Permanente Southern California's Department of Research & Evaluation.

In 2017, Dr. Fischer applied a novel statistical model to determine how bariatric surgery influences the relationship between weight and other health measures, such as kidney function, blood pressure, and diabetes.

"I'm not just looking at numbers," said Dr. Fischer. "I can actually connect these numbers to real-world clinical practice, and that is cool."

## The desire to find solutions fuels biostatics team

The challenge of turning real-world evidence into real-world health solutions fuels R&E's biostatistics team of 26 programmers, 24 biostatisticians, 9 database developers, and 3 natural language processing specialists (staff counts are as of December 2017).

Each project begins with discussion of a medical or care issue with R&E researchers or medical center clinicians. The biostatisticians then help design studies to address the pressing questions, collect the available data and clean them to remove inaccurate information, and then analyze the data. Last, they interpret that data.

"Each step is important to create accurate, interpretable, and meaningful information," said Anny Xiang, PhD, MS, director of R&E's Division of Biostatistics Research. "And through all this, of course, we collaborate with our scientific partners."

#### Overcoming the issues of real-world data

R&E biostatisticians don't have the luxury of working with the simple data of traditional academic research, where research participants are recruited or assigned to an experimental group or a control group with a strict control of treatment options and data collection.



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R&E biostatisticians need to work on data collected from populations in a real-world situation. In the clinical trial setting, patients are assigned to different treatment groups and the treatments are delivered in a tightly controlled environment. By contrast, in the real world, a patient and physician together choose the treatment they believe might have the best outcome.

Biostatisticians must find mathematical ways to reduce the chances of bias. Also, they work with data entered by hundreds of different people across the region and from multiple sources, which can result in missing data and miscoding, which can be another challenge.

"We specialize in working with large and real-world data that come from the electronic health records," Dr. Xiang said. "As a result, we create answers that address questions from a real-world perspective and are directly applicable to the general population."

Steven Jacobsen, MD, PhD, senior director of research for KPSC, noted that R&E's biostatisticians excel at continually finding new and better statistical models and algorithms to work with the real-world data.

"Whether it's taking methods used in different disciplines and applying them in our setting, or keeping tabs on the newest methodologic research, they figure out ultimately what works and what doesn't. Then, we can help clinicians make decisions about best treatments," he said.

### Physicians work directly with biostatisticians

Bechien Wu, MD, MPH, is chair of the Regional Research Committee, which provides funding to clinical investigators for their projects. He is also one of the investigators who has worked directly with biostatisticians. He and other clinicians develop research questions based on the needs they see within their own practices.

"I bring my medical background and knowledge and the biostatisticians bring their knowledge of data analysis and data structure. Together we can formulate a rigorous scientific study that benefits our patients, the organization, and the scientific community in general," Dr. Wu said.

One of Dr. Wu's studies that emerged was about the management of pancreatic cysts. The collaborators found that it doesn't make sense to aggressively monitor these cysts in patients who are dealing with multiple illnesses. The study prompted a new clinical guideline a few years ago, which was updated in 2017.

Jiaxiao Shi, PhD, who leads the 10-member team that works with medical center investigators, called the collaborations a "true partnership."

#### Biostatisticians consider complex possibilities

Dr. Fischer, the former economist, works primarily with researchers within R&E. In 2017, she was awarded funding for a new project by the Division of Biostatistics Research. She created a multivariable model to look at how bariatric surgery affected kidney function over time. The model is often used in statistics work but not often in health care, and it hadn't been previously applied to data at R&E.

The model allowed her to see new possibilities based on the real-world data collected.

"We have records for people before and after surgeries, so if we have a question, we can actually answer it here," she said. "There are so many possibilities and ways to look at things. It's incredibly exciting to me as a biostatistician to have all these options."



Dr. Lei Qian and other biostatisticians at R&E work together to turn real-world evidence into real-world health solutions.