system doesn’t recognize the new strain.”

The change is known as “antigenic drift.” Immunity a person might have built up to one variation of the virus is powerless against the next strain. But Baric hopes that by finding common elements of the viruses’ genetic structure—and then causing the body to build immunity to those elements—he can create a vaccine effective against about 95 percent of the norovirus strains that infect humans.

“His work, although still with mice, has shown there is a way to develop effective vaccines against these viruses, even though you have to cover quite a few genetic types,” said Jan Vinjé, PhD, norovirus team leader in the Gastroenteritis and Respiratory Viruses Laboratory Branch of the U.S. Centers for Disease Control and Prevention.

“[Baric] brings a fresh, new perspective to the field,” Vinjé said.

Lisa Lindesmith, an epidemiology research specialist who’s been working with Baric for 10 years, agrees.

“We are moving the field from the idea of short-term immunity. This is groundbreaking work, and so is the coronavirus work. It’s very rare for a lab to be so good at two different things.” — Ramona DuBose

Ten clinics in six study centers. Thousands of patients who suffer from a disease that has multiple variations. Three years’ worth of clinical and molecular data for each patient.

How do you capture and organize the information a study like that generates? How do you analyze all that complex data to make it useful to those searching for treatments?

Through the groundbreaking methods of UNC’s Collaborative Studies Coordinating Center—that’s how.

Lisa LaVange, PhD, director of the CSCC and professor of biostatistics at the UNC Gillings School of Global Public Health, leads data collection and analysis effort for a project called SPIROMICS, a nationwide study that aims to help the more than 12 million people with chronic obstructive pulmonary disease (COPD), a progressive condition that makes breathing difficult.

SPIROMICS is short for SubPopulations and InteRmediate Outcome Measures in COPD Study. That mouthful of a moniker indicates the project’s two goals: to identify and better understand the various kinds of COPD—known types include chronic bronchitis and emphysema—and to discover quicker ways to measure whether new treatments will work. LaVange and her team won a seven-year, $8 million contract from the National Institutes of Health’s National Heart, Lung and Blood Institute to serve as SPIROMICS’ Genomics and Informatics Center.

“It’s a real pan-campus research project,” says LaVange. She believes the award came to UNC because of its reputation for state-of-the-art approaches to biostatistics, data management and pulmonary research.

The Genomics and Informatics

Harnessing vast data to understand COPD and speed up new treatments
Center draws together the expertise of Richard Boucher, MD, Claire Doerschuk, MD, and Wanda O’Neal, PhD, at the UNC School of Medicine; Jane Greenberg, PhD, and Javed Mostafa, PhD, at the School of Information and Library Science; and Fred Wright, PhD, and Wei Sun, PhD, at the UNC Gillings School of Global Public Health’s Department of Biostatistics, where CSCC is based. The CSCC team includes programmers, statisticians, clinical monitors and project assistants and is led by CSCC faculty member David Couper, PhD, and project manager Betsy Carretta. A fifth-generation, state-of-the-art data management system, recently upgraded to enhance data security and implement industry-wide data standards, will be used for the massive amounts of data to be collected as part of the project.

Chronic obstructive pulmonary disease is the fourth leading cause of death in the United States, and currently no drugs bring about long-term improvement. Study centers in Winston-Salem, N.C., Ann Arbor, Mich., San Francisco, Los Angeles, New York City and Salt Lake City will conduct a wide range of clinical testing, collect biological specimens, and take both baseline and follow-up radiological scans of more than 3,200 patients.

“The fun comes when we start putting clinical, radiological, molecular and biological variables together,” says LaVange.

LaVange’s team will test specific hypotheses about new subgroups of COPD patients. “Not all people are affected by all forms of COPD in the same way,” she explains. “If we better understand the subtypes of the disease, we can better target patients for enrollment in clinical trials designed to investigate a particular therapeutic agent.”

The team also will identify biological, clinical and radiological markers that indicate how severe a patient’s disease is and potentially can provide a sense of whether a therapeutic agent is working or not. Clinical trials to test new pharmaceuticals can take years to complete, LaVange points out. Finding markers that predict long-term outcomes in a shorter period of time can accelerate the development process and, combined with more targeted patient enrollment, has the potential to improve the chance of success in future COPD clinical trials.

—Kathleen Kearns

The fun comes when we start putting clinical, radiological, molecular and biological variables together.