

Scripps Research gets \$120 million to change medicine

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Dr. Eric Topol will co-lead the effort to enroll and engage 1 million Americans in a study that will deeply explore people's health and regularly provide them with information that they can share with their doctors.

The \$120 million grant from the National Institutes of Health is part of the Obama administration's Precision Medicine Initiative, which will customize patient care through big advances in digital technology.

Topol is one of the nation's best known digital medicine advocates. The Scripps Research Institute professor has been pushing medicine to use mobile sensors and smartphone apps to monitor and treat patients. He's also pushed doctors to tie treatment to a broader range of data, ranging from a person's genome to their diet to the air quality in their neighborhood and the microbes in their gut.

Topol's interests are reflected in the NIH's new all-volunteer study, which will last at least five years. People will use mobile and web apps to register and participate. The "citizen scientists" will be able to upload a wide variety of data, including blood pressure, heart rhythm, glucose levels and sleep and exercise patterns. The app also can upload recordings of the tremors that are experienced by patients with Parkinson's disease.

Many people will be asked to give blood and urine samples so scientists can study their biological makeup, especially their genes, proteins and

microbes.

People who are served by certain health care providers also can have the companies upload their electronic medical records. Blue Cross Blue Shield and Walgreens clinics are among the companies that have agreed to help with the study. The San Diego Blood Bank will help collect blood samples. Apple and Verizon will spread awareness about the campaign. And San Diego's Qualcomm will help with the app's data security.

The NIH will crunch this large volume of data to better understand the nature of illness and disease.

"We'll be capturing granular biomedical data from 1 million volunteers who represent the entire gamut of medical conditions," said Topol, director of the Scripps Translational Science Institute, or STSI.

"Using new tools such as mobile sensors, smartphone apps and genomics means that we'll be getting data that previously wasn't obtainable at this scale.

"Unlike previous medical research, much of the data obtained from the participant will be returned to that individual on a continuous basis - and that data can be shared with the participant's doctor."

Topol's STSI is expected to enroll 350,000 of the 1 million people in the study. The rest will be recruited from other institutions across the country.

STSI will seek volunteers from "infancy to advanced age, across all ancestries and demographics," Topol said. "Today, data are only collected via clinic visits in the contrived, one-off setting. The (new study) data will be collected via [smartphone apps](#) and sensors in the real world, real-time, with feedback."

NIH Director Francis Collins told The San Diego Union-Tribune, "This bold initiative, empowered by participation of a million or more fully engaged U.S. participants, will (teach) all of us about how to keep people healthy, and how to manage chronic disease when it strikes - not in a 'one-size-fits-all' fashion, but based on individual differences in environmental exposure, lifestyle and genetic factors.

"It will ultimately revolutionize the practice of medicine."

Recruiting 1 million volunteers may not be easy.

Many people are wary of sharing health information online. And others simply don't want to participate long term.

Topol's collaborators are aware of the challenge.

"We're going to make this as easy as possible for people," said Praduman Jain, chief executive officer of Vibrent Health of Fairfax, Va. "There's only going to be one app. People won't have to jump around to participate."

Dr. David Wellis, [chief executive officer](#) of the San Diego Blood Bank, is expecting strong interest from the public.

"Blood donors are ideal for this study," Wellis said. "They represent an ethnically diverse population. They're used to giving samples. And blood banks are trusted. People can help by giving a little extra blood. That will have a real impact."

University of California, San Diego computer scientist Larry Smarr - a major proponent of digital medicine - saw opportunity and obstacles ahead.

"Given the natural variation among [people](#), it is necessary to get personalized data on large numbers of participants to move the [precision medicine](#) program forward," said Smarr, who founded Calit2, a UC San Diego tech incubator.

"Of course, no one person can possibly read through the millions of data sets that will be generated by this program, so there will need to be a parallel effort in [data](#) analytics and machine learning to bring the patterns out of the sea of numbers.

"Furthermore, since one of the goals of precision medicine is to catch evolving disease threats very early - way before there are symptoms - longitudinal time series of biomarkers on each individual will be needed, thus multiplying the Big Data challenge."

Topol is happy to be moving in the right direction, saying, "We can't keep using a one-size-fits-all approach to medicine. We need to customize treatment to the individual."

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