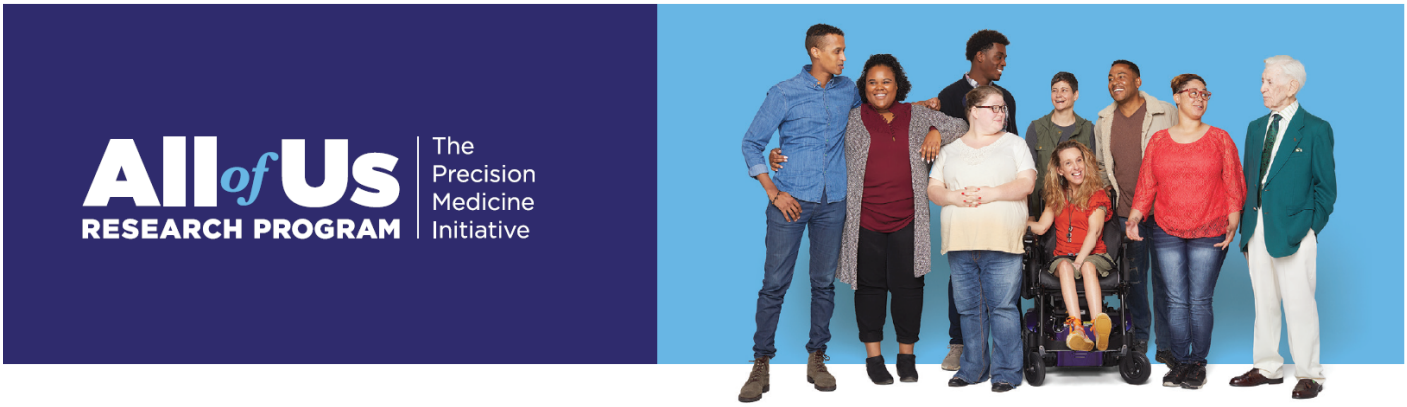
Breakthroughs

Feinberg School of Medicine Research Office

June 2017



Precision Medicine for "All of Us"

During the 2015 State of the Union Address, then-President Barack Obama announced the launch of a bold new plan.

"I want the country that eliminated polio and mapped the human genome to lead a new era of medicine — one that delivers the right treatment at the right time," Obama said. "Tonight, I'm launching a new Precision Medicine Initiative to bring us closer to curing diseases like cancer and diabetes, and to give all of us access to the personalized information we need to keep ourselves and our families healthier."

Northwestern is now embarking on a groundbreaking research effort to help make that goal a reality.

Last year, the National Institutes of Health awarded the university — along with four other regional institutions that make up the Illinois Precision Medicine Consortium — a five-year, $51 million grant to help launch a landmark longitudinal research effort central to Obama's Precision Medicine Initiative.

Philip Greenland, MD, the Harry W. Dingman Professor of Cardiology and director of the Center for Population Health Sciences, is the principal investigator of the Illinois Precision Medicine Consortium, one of a number of consortiums across the country.

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"The scale of this is really new," said Greenland, also a professor of Epidemiology in the Department of Preventive Medicine. "This model of data collection — at a scale bigger than anything we've done before — seems as though it could actually improve the way that we go about diagnosing, treating and predicting the onset and outcome of disease."

The Illinois consortium, which aims to enroll around 125,000 participants in the cohort, plans to begin recruitment at a pilot level in mid-August 2017.

The field of precision medicine — an emerging approach to disease prevention and treatment that takes into account a person's individual genes, lifestyle and environment — has already seen a number of promising advances. For example, some novel cancer therapies now target specific gene mutations. But it's recognized that significant progress must still be made before medicine can truly be tailored to every individual patient.

The national program, dubbed the *All of Us* Research Program, aims to recruit one million or more people living in the United States of all ages, ethnicities and backgrounds to share their genetic information, electronic health data and biological samples over a long period of time. Participants in the study will also be invited to fill out questionnaires and contribute data via smartphones, sensors or mobile health apps that will offer insights into environmental factors and lifestyle exposures.

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Precision Medicine

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"The ultimate goal is to speed up medical breakthroughs, so healthcare in the future can become more tailored to individual differences in lifestyle, environment and biological makeup," said Maria Lopez-Class, PhD, MPH, MS, a project officer for the *All of Us* Research Program at the NIH.

"We're looking to the Illinois Precision Medicine Consortium and our other partners to help design the program and spread the word to potential participants, including people who may never have taken part in research before," Lopez-Class said. "We want the *All of Us* community to reflect the tremendous diversity of our country, so that the knowledge we gain from this resource benefits everyone."

HEALTH DATA FOR ALL

Beyond helping to design the study and recruiting a significant number of participants, Northwestern is also a sub-awardee of the program's Data and Research Center, which will support the secure storage and organization of the datasets across the country. Abel Kho, MD, director of the Center for Health Information Partnerships, is leading those efforts at Northwestern.

"We've been working very diligently on the infrastructure, including a major focus on building a bulletproof secure environment so that people have 100 percent confidence that their data is being managed securely," explained Kho, also an associate professor of Medicine in the Division of General Internal Medicine and Geriatrics and of Preventive Medicine in the Division of Health and Biomedical Informatics. "We're running right up against some of the pressing challenges of informatics, and finding that we have to build new things. It's exciting. This has never really been done on a scale like this across such a broad population."

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The *All of Us* Research Program is distinctive in its strong focus on building a diverse database. "People are being recruited from all walks of life — there are people who will be in the study who have never been seen at an academic medical center. From a research standpoint, that's really exciting," Kho said. "Because of the large number of people, and because it's looking at a population that's somewhat representative of the country, we have the opportunity to answer more complex questions than we have in the past. There's the potential to look at the interaction between genes and people's environments, and answer questions like, 'What's more important: nature or nurture?'"

In the long term, one of the key research objectives of the *All of Us* program is that the resulting database of anonymized data will be open-access, serving as a rich resource not only for investigators and scientists across the country, but for anyone looking to gain insights into a particular disease or health question.

The hope is that together, these unique factors that characterize *All of Us* — its size, open-access format and broad scope — will eventually lead to important advances in the ability to practice precision medicine.

"Right now, we can give people general advice, like avoid smoking, eat this diet and exercise more, which is all good. But we want to be able to give more specific advice — and that's what this study is really getting at. If I'm going to tell a patient to take a drug, or have major preventive surgery, we really want to know what their specific risks and benefits are," Greenland said. "Hopefully, given the size of the study — combined with improvements in the analysis of large data and our ability to collect health information — we'll now be able to understand that data in ways we never could before. We might find something that could really make a difference in improving human health."

Feinberg will begin enrolling participants for the *All of Us* Research Program in August 2017. All faculty, staff, students and their friends and family have the opportunity to become a part of this historic effort. For more information visit allofus.nih.gov. If interested in joining the *All of Us* Research Program, please e-mail joinallofus@northwestern.edu.

All of Us RESEARCH PROGRAM | The Precision Medicine Initiative