



## The ambitious plan behind Obama's \$215 million program to transform medicine

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The Precision Medicine Initiative, announced by President Obama in his 2015 State of the Union address, is an incredibly ambitious project. Obama [has called for](#) \$215 million from the 2016 budget to fund it, and the research involved will take years to complete.

It's supposed to transform medicine as we know it, removing much of the guesswork that comes from using medicines that are designed to treat the "average patient," and replacing that with treatments that — based on genetic information — are designed to work specifically for each individual.

Once we start to see the effects of this initiative, a patient will look at what we think of as modern medicine now "and say, 'Oh that was so crude and rough,' compared to what we'll be doing 10 or 20 years from now," said Dr. Eric Green, the director of the [National Human Genome Research Institute](#) at the National Institutes of Health, in an interview at Smithsonian magazine's "[The Future is Here](#)" festival.

But we've thought that new discoveries and scientific achievements would transform medicine in the past too, and they haven't always lived up to the hype — so how do we get from where we are now to this future of medicine?

**You start with a really, really big study**, says Green. We're already making a lot of progress by focusing a great deal of research on cancer treatments that are designed using genomic information.

Yet the upcoming study will be the key to moving medicine forward for all of us.

### **'The tip of the iceberg'**

We first mapped the human genome 12 years ago, something that had been described as a project that would totally revolutionize medicine. While genome-based testing is [already making a difference](#) for some patients, results that trickle down to clinical care have been somewhat limited. That's because, according to Green, what we've seen so far is only "the tip of the iceberg."

The technology has moved faster than the science, and now we need to figure out what to do with that technological capability. We can map a genome cheaply and quickly — but what can we do with all that information? That's where the Precision Medicine Initiative comes into play. To start, that really big study Green mentioned will genetically test and follow at least one million volunteers for years, allowing researchers to see their genomic data and also other health information that will help shed light on how genes interact with diet, exercise, and environmental factors.

A study that follows more than a million people is massive, "**one of the largest research populations ever assembled**," according to President Obama's 2015 State of the Union speech. Now, for the first time in history, [we have an unprecedented ability](#) to recruit volunteers and track data, and that many people (and perhaps more) will be necessary to get a grasp on how the genetic differences between people have an effect.

We each have about 3 billion letters in our genetic code, and [on average, we differ from another person](#) by one out of every 1,000 letters. On the one hand, that makes us incredibly similar — about 99.9% the same — and yet it also means there may be up to 6 million differences between you and the person next to you. The question is how understanding those differences will affect our health.

Green knows that even after we figure this out, it won't cure everything or end disease. But "it'll make us so much more sophisticated," he said. "We're just so much operating in the dark right now."

It's a daunting task and Green readily admits that we don't exactly know what's going to happen as we proceed. Scientists will almost certainly have to change gears and refocus their priorities as they learn more.

But launching a new initiative like this reminds him of a place we've been before.

As he said in his talk:

It was the spring of 1990 that we were just months away from launching the Human Genome Project. The scale of the project was almost overwhelming and the details about how we were going to actually sequence the human genome were far from known. But the mission was compelling, and the project just struck like it was the right thing to do at that moment in time. Well, fast forward 25 years to today, and the Precision Medicine Initiative has the identical feel. The task in front of seems almost daunting yet it absolutely makes sense to get going and to capitalize on these exciting opportunities in front of us.