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President's Page for Circulation

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“One size does not fit all.”

These six, simple words represent the fundamental concept driving an unprecedented initiative of the American Heart Association, the Institute for Precision Cardiovascular Medicine.

In the field of heart disease and stroke research, we have seen enormous knowledge advances in recent decades, all of which have led to breakthroughs in our ability to treat and prevent these illnesses. We celebrate these advances, because they're allowing us to save and improve more lives than ever before. Despite these great advances there are still far too many patients suffering and dying prematurely.

Through tremendous advances in cardiovascular science and the translation of knowledge into more effective therapies, a problematic aspect of many current therapies is that their efficacy can be variable. We are still not sure why some patients respond more favorably to certain medications, or certain dosages, than others. And we still can't predict why a given surgical technique will achieve widely different results among patients. It seems clear that when it comes to providing patients with meaningful, efficacious solutions, one size does not fit all.

We created the Institute for Precision Cardiovascular Medicine because we need to learn more – much more – about the patients who depend on us to provide care that is best suited for them. Each patient has a unique genetic profile, has unique lifestyle habits, and has been impacted by unique environmental factors over the course of their lives. All of these factors play a critical role in determining which approach might be best for addressing a patient's needs and in recognizing potential red flags that can complicate the treatment process or cause unnecessary risk.

In addition to *learning about* patients, we want to find better ways to *get to know* patients. There is no shortage of discussion in the scientific literature about the need to improve doctor-patient communication and consider the quality of the overall patient experience as opposed to focusing solely on treatment outcomes. Patients should be given a platform to express their preferences and concerns, not only with respect to the clinical setting but also in the design of research studies. All of us in the medical profession want to do our best on behalf of patients, and more effective listening to patients should improve their care.

Our vision for the Institute for Precision Cardiovascular Medicine is to gather, harmonize, and analyze cardiovascular data on a scale that has never before been possible to enable new insights critical to personalizing the prevention and management of heart disease and stroke.

Here are four key areas in which cardiovascular scientists and other members of the health care community can help to fulfill this vision:

- **By identifying specific genes** that place people at higher risk for cardiovascular diseases and stroke which can revolutionize the future of cardiovascular treatment and care.
- **By uncovering important trends** by analyzing the vast amounts of available shared data from volunteers in population-wide studies, cohort studies and ongoing DNA research efforts.
- **By sharing and aggregating big data to uncover patterns**, including genetic, behavioral, and environmental influences that can save lives today and in generations to come.
- **By enhancing existing technologies** to gather and dispense real-time feedback and input from patients.

Our first foray into the precision medicine arena was built around the Cardiovascular Genome-Phenome Study (CVGPS). The American Heart Association spearheaded this collaborative effort two years ago to accelerate the future of cardiovascular medicine. The CVGPS program combines the power of long-term population studies with the precision of molecular analysis to unravel key distinctions between and within subgroups of patients. The discoveries it generates will point the way toward better-targeted, safer, and more effective treatments, based on a deeper understanding of patients' characteristics, including factors such as risk profiles and therapeutic needs.

We've also partnered with the Patient-Centered Outcomes Research Institute in an initiative that uses crowdsourcing to give patients a powerful voice in their own care. In the past year, we've conducted two crowdsourcing challenges seeking input regarding which preventive, diagnostic, and treatment approaches work best for which patients, based on their needs and circumstances. The feedback we receive will be used to design comparative clinical effectiveness research studies.

Last month, we launched One Brave Idea, a five-year, \$75 million research program focused on preventing or reversing coronary heart disease (CHD). Our prize recipient, Dr. Calum MacRae of the Brigham and Women's Hospital in Boston, will lead a team of eight experts who will conduct a multi-phased research project to uncover new genetic, molecular, and cellular markers associated with CHD which could be used to screen the population at large to identify individuals at risk of developing CHD later in life. The project will start with a study to collect genomic information, lifestyle data (sleep, activity, stress), key public health data (environmental and economic factors), and responses from people with coronary heart disease in their families. These data will be cross-referenced against data from the Framingham Heart Study and the Million Veterans Program to validate novel traits that may be associated with the onset of CHD. In the next phase of the project, Dr. MacRae and his team will develop and implement new screening approaches to identify individuals at an early age that may be at risk of developing CHD. In the final phase of the research, Dr. MacRae and his team will focus on developing novel preventive or pre-disease therapeutic

strategies with the ultimate goal of reducing the burden of CHD. Novel preventive medicine strategies, such as those to be developed within One Brave Idea, are essential for us to make the next big advances in reducing the burden of cardiovascular diseases and stroke for all Americans.

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