LEADING THE BIOMEDICAL REVOLUTION IN PRECISION HEALTH

Wednesday, April 8, 2015

At a dinner reception at the Sharon Heights Golf & Country Club on April 8, an engaged audience of donors learned about Stanford Medicine's bold next steps in leading the biomedical revolution, with a focus on precision health.

"If the 19th century was the century of chemistry, and the 20th century was the century of physics, the 21st century is the century of biology and medicine," said Lloyd B. Minor, MD, Carl and Elizabeth Naumann Dean of the School of Medicine.

Partners in Medicine is an annual event to update supporters of Stanford Medicine and the three annual funds—Cancer Discovery Fund, Hospital Partners, and Med Fund—about how they are helping to advance medical education, scientific discovery, and patient care in local and global communities.

"In so many ways today, people from many, many different fields are focusing on biomedical problems. And we are uniquely poised to lead in that revolution here at Stanford, for many reasons," said Minor. "One of the foremost reasons is that our academic medical center—two hospitals and our school of medicine—are so well integrated with the rest of Stanford University. We're on the campus of this great university. We interact with faculty and the schools all around the university."

Minor described the Stanford Medicine of today: with 1,950 faculty members; a staff of almost 16,000; 3,400 medical trainees; and 340 physicians practicing in networks of care throughout local communities. Stanford Medicine provides care for 42,000 inpatient hospitalizations and 771,000 outpatient visits per year, and delivers about $320 million in direct benefit to local communities each year—that is, care and services provided without charge.

"Through our precision health initiative, we are developing a new way of looking at health care. In the areas where we are pre-eminent, we will maintain, sustain, and advance that pre-eminence. In the areas where we aren't, we have a plan that will get us to pre-eminence in a defined period of time," he said.

"What do I mean by precision health?" asked Minor. "What we hope to do in precision health is leverage the power of genomics to diagnose and treat disease, but also to focus on prediction and prevention. We want to predict and prevent diseases before they occur, and when we can't, to discover and diagnose diseases so early that they can be treated much more effectively.

Several recent examples where advances in basic science at Stanford have had an impact on clinical care include:

- Maternal-Fetal Medicine: screening of embryos during first five days of gestation now helps predict viability, considerably increasing success rate of in vitro fertilization
- Genome Sequencing and Gene Therapy: using gene therapy as a cure for certain genetic mutations that result in severe immunodeficiency syndrome

- Cancer Biomarkers for Early Detection: a new method of tagging antibodies so that cancer cells can be detected in the bloodstream by ultrasound or laser, as a way of diagnosing cancer much, much earlier.

Many elements come into play in precision health to make us healthier, keep us healthy, or restore us to health. Minor described the relationships among those elements using the visual of a tree: fundamental research and biomedical data sciences form the trunk, transformative biomedical platforms form the limbs, and pre-eminent clinical care reaches out through the leaves.

Fundamental research and biomedical data sciences: Understanding the mechanisms of living organisms at a basic molecular and cellular level underlies the advances that will be made in developing better prediction and treatments. And increasingly, new knowledge is coming from analysis of large data sets. Both of these are areas of strength at Stanford Medicine.

"We have the opportunity to look at huge amounts of data and look for relationships between elements of the data without preconceived notions of what relationships might exist," said Minor. "Whether it's understanding the genome at a very basic level, or understanding the best treatments by looking at outcomes across thousands of patients to develop the best care delivery platforms, biomedical data science underlies all of those," he said.

Transformative biomedical platforms: Nine transformative biomedical platforms exist at Stanford today with substantial strengths to approach precision health in new and innovative ways. The core strengths that Stanford Medicine is developing and leveraging include population health sciences, health-care value science, human immunology, diagnostics and imaging, neurosciences, cancer biology, genomics, chemistry and human biology, and stem cell and regenerative medicine.

"What you won't find at other academic medical centers are these core nine areas together. They are already exceptionally strong, and poised to be even stronger moving forward during the next 5 to 10 years," said Minor.

"We have an amazing cancer immunology program, advances in diagnostics and imaging, and the number one ranked genomics and genetics program in the country. We have the first, the largest, and most impactful stem cell institute with a lot of emphasis on cancer stem cell. This core is coming together to impact the care of patients. And that's what makes us distinctive. That's what gives us the leading advantage moving forward."

Stanford's Institute for Immunity, Transplantation, and Infection is developing better ways of testing and measuring the immune system, to discover responses to vaccines, allergic reactions, and underlying causes of cancer. Their work impacts precision health, for example, in studying why the effectiveness of the flu vaccine in older people is less than in younger people.

Pre-eminent clinical care: Precision health at Stanford Medicine comes together in providing pre-eminent clinical care at the two hospitals and through the networks of clinical care being built in communities where people live and work. "Everything we do is for the benefit of patients in delivering the kind of personalized, patient-centered care that we want to provide to everyone," said Minor.

Shared areas of excellence associated with the two hospitals include transplantation, cardiac care, and cancer care. Orthopaedics is distinctive at the adult hospital, as is maternal, fetal, and newborn health at the children's hospital, with pediatric cardiac surgery recognized as a premier clinical program.

Minor thanked supporters for their display of support and their generosity.

“Philanthropy plays such an important role in everything we do. With the absolute spending power of the NIH at its lowest in about 15 years, philanthropy truly is the reason that Stanford Medicine has been able to progress so rapidly.

“With your help, our impact is going to continue to increase. Our engagement with our communities and our engagement with knowledge is going to continue to grow and move forward. We very much embrace the notion that our best days are ahead of us.”

About Stanford Medicine’s Annual Funds
*The **Cancer Discovery Fund** supports Stanford’s physician-scientists and their groundbreaking research by providing vital resources at the initial stages of their projects. The importance of gifts to **Hospital Partners** is part of our ability to advance our mission of providing leading edge, coordinated care, delivered with compassion, one patient at a time. Gifts to the **Med Fund** make a difference to our students, residents and fellows, and postdocs by supporting vital aspects of the School of Medicine program, including financial aid, an innovative academic experience, and a supportive environment for student life and career growth.*

For more details about this evening, please contact Leadership Giving at stanfordmedicine@stanford.edu.