

## Advancing Personalized Medicine

Two Hospitals on Leading Edge of Genomics and Integrated Healthcare.

**“For us, preventive and personalized medicine combines tools, researchers and clinicians to truly be a healthcare organization that is proactive. And Siemens has been a partner for us in accomplishing this goal.”**

**Michael Salem, MD, FACS**  
President and CEO  
National Jewish Health  
Denver

In a healthcare environment where physicians, nurses, radiologists, pathologists, behavioral and other health professionals—even patients—are looking for more efficient ways to work together as a team, where will the next generation of optimized care emerge to support this effort? And how will health systems intelligently manage the vast volume of patient information available? One answer is through integrated diagnostics—the convergence of laboratory diagnostics, advanced medical imaging and healthcare information technology (HIT) solutions—which will drive the shift from reactive healthcare to preventative and proactive healthcare and form the very foundation for personalized medicine.

Personalized medicine is about a more precise diagnosis and targeted treatment regimen for the individual patient or patient groups. It is becoming a reality through the decoding of the human genome. By studying a patient’s genetic fingerprint, essentially the separation patterns that occur in various DNA fragments, physicians can discover a disease’s genetic causes or even predict disease before it presents itself. In short, a patient’s

genotype or gene expression profile could be used to tailor medical care to an individual’s needs on a proactive basis.

“Personalized medicine will be transformational in the prediction, prevention, diagnosis and treatment of diseases,” explains Tom Miller, CEO of the Workflow and Solutions Division, Siemens Healthcare. As technology is the keystone to enabling a personalized medicine approach, Siemens Healthcare is singularly qualified to leverage its fully integrated portfolio—in vivo and in vitro diagnostics—surrounded by workflow-enabled HIT. In collaboration with its customers, Siemens Healthcare is delivering on the vision to shift the focus of medicine to a personalized and proactive model—one that allows earlier prediction and diagnosis and better understanding of disease and provides the information to tailor therapies to the unique needs of the individual.

Partners HealthCare Systems in Boston and National Jewish Health in Denver are two providers working with Siemens Healthcare to bring personalized medicine to fruition.

### **Partners HealthCare Systems**

To achieve a successful personalized medicine framework, Partners HealthCare Systems invested in an IT architecture that supports research into the genomic basis of disease.

“Physicians today say they do personalized treatment based on what they know about the patient’s history,” says John Glaser, PhD, vice president and CIO, Partners HealthCare Systems.

“What will be different tomorrow is genetics will truly be an

important class of information. Physicians and patients will be able to make better decisions about treatment plans because they may know as a result of the patient's genetic makeup, for example, that a particular cancer drug will or will not work."

Partners HealthCare's IT architecture as it relates to personalized medicine encompasses three main areas: genetic testing, bio specimen repository and linking both to the electronic medical record (EMR). This integrated approach enables researchers to link genetic test results with the EMR to allow them to do the kind of studies that help determine whether there is a genetic basis to a disease or not, according to Glaser.

By using an integrated IT architecture, the costs and time constraints of conducting genetic research can be greatly reduced. "If a researcher wants to do a genomic association study using this IT architecture, the studies can cost one-fifth of what they cost in the past and take one-tenth the time," says Glaser. "It's a huge breakthrough in efficiency and time limits. If you are an academic health system and want to work with the government or life science organizations that perform these studies, you will need this type of architecture. Otherwise, you cannot compete effectively for these research dollars."

Glaser says Partners HealthCare's work with personalized medicine in the area of genetics is in the early stages, but in the next three to five years it will be part of how the organization delivers care. "This is a big deal," he says.

### **National Jewish Health**

Two years ago, National Jewish Health made preventative and personalized medicine the foundation of its institutional strategy. "This is the way we want to practice medicine, conduct research and educate the next generation of doctors and scientists," says Michael Salem, MD, FACS, president and CEO.

The relationship between Siemens and National Jewish Health will allow for the development of novel imaging and diagnostic

technologies using genomics, proteomics, integrated research and clinical care.

The hospital plans to merge research with clinical efforts, giving physicians the ability to detect diseases earlier and offer more precise diagnoses. National Jewish Health will integrate Siemens technology throughout the facility's 19-acre Denver campus.

A major concentration at National Jewish Health is treating patients with chronic obstructive pulmonary disease, and with the help of Siemens technology the hospital can provide better coordinated care. For example, each week, a patient's care providers—his primary physician, psychologist and psychiatrist, researchers and rehabilitation specialist—meet and discuss his treatment. They ask questions such as what genetic test did the patient get? Which researchers are waiting for cells? What chemo prevention did they receive? What's the most advanced imaging we have? What are the targeted therapies and patient and family education requirements? How do we track the patient's progress over time?

An outcome of better coordinated and integrated care is the ability to make minimally invasive diagnosis. Many patients at National Jewish Health are admitted with lung nodules. The hospital is currently conducting research, gleaned from biomarkers and genetic information, to determine the possibility of making a diagnosis earlier when the nodules are smaller. Armed with information provided through research, physicians can decide sooner what treatment is best. Earlier detection and removal of cancerous nodules could significantly improve lung cancer survival.

"The idea of personalized medicine is not unique, but going after it as an entire institutional strategy is novel," says Salem. "National Jewish Health is focused on how to practically implement these ideas and solutions on behalf of patients."

*For more information, please call (888) 826-9702 or visit [usa.siemens.com/personalized-medicine](http://usa.siemens.com/personalized-medicine).*