The future of medicine means redefining patient care, treatment, and testing

From gene sequencing to sensors, scientific discoveries will mean better prevention and treatment.

BY JACQUELINE LISK | July 3, 2020

In the meantime, a common war-time strategy was to catapult flaming darts over an enemy’s castle walls. In anticipation, kingdoms would assemble bucket brigades to prevent the fire from spreading. Dr. Roy Smythe, CEO of SomaLogic, says health-care delivery is a bit like medieval warfare — focused on treating acute diseases, rather than preventing by better managing chronic conditions, which almost always lead to an acute disease event.

“The problem with this medieval warfare model? The burning objects just keep coming over the wall,” says Smythe.

So how do you prevent the flaming objects from infiltrating your castle? Smythe believes you empower people to play a bigger role in taking care of their health by democratizing technology and data. Patients and medical professionals should work together to use personal data — including genomic and proteomic information — to assess and diagnose health problems, and monitor and improve people’s conditions.

Let’s consider the factors that are making prevention and treatment easier, and the role you could play in managing your own health in the future.

Making health an equal partnership

Equitable health care means health-care delivery to anyone at any time by relying on data and emerging technology to remove constraints like location and time. There is nothing magic about finding out you have a urinary tract infection using a home diagnostic, being given an AI-supplemented recommendation for the appropriate antibiotic (based on your genomic and proteomic information, as well as the characteristics of the organism), and ordering the drug that is delivered drive an hour later to your doorstep,” Smythe explains.

He believes much of the technology and science needed to make ubiquitous health care already exists. SomaLogic, for example, is a protein biomarker discovery and clinical diagnostics company based in Boulder, Colorado. That scores the living data stream of human proteins — such as genomic, proteomic, physiologic, and other real-time monitoring — and translates that insight, its mission is to deliver individualized health-management information people can use to optimize their personal health.

“Empowering individuals with technology and information to self-manage will free up the time and incredible resources to take care of those who do need to be treated by an expert,” he notes.

Like Smythe, Dr. Bertalan Meskó, PhD, who is known as “The Medical Futurist” for his role as director of The Medical Futurist Institute, believes health-care technologies will allow patients to have more of an equal partnership with medical professionals. Meskó has decades of experience analyzing how science fiction technologies can become a reality in medicine and health care.

“Digital health is a cultural transformation that, on the short term, creates an equivalence doctor patient partnership which is unprecedented in the history of medicine, and on the long term, leads to the democratization of care,” he notes.

The short-term change is already happening, he says, noting countries such as Denmark and New Zealand have already “established policies that aim to make patients empowered with technologies and connected solutions.” COVID-19 could spur that transformation, as more people embrace telemedicine to reduce risk of infection.

As the pandemic has shown, checks and appointments can often be done via telephone and the internet. People no longer need to take off work or travel for an appointment. These virtual appointments often cost less than in-person care, explains Jeremy Scherer, DSP, and director of the access experience team at PRECISIONHealth, a company that evaluates health-care innovations to understand their economic and ergonomic value.

“The type of care we can deliver remotely is becoming increasingly sophisticated. The emergence of online therapy and improved drug delivery technology means that more patients on chronic, reduced therapy can be treated in the comfort of their home versus going to costly sites of care like the hospital,” Scherer says.

For example, the University of Pennsylvania’s Cancer Care at Home program uses careful patient selection criteria and highly trained oncology nurses to administer certain cancer drugs at patients’ homes. Scherer says the program has grown markedly since COVID-19 began.

He refers especially to chemotherapy that uses video conferencing to inspect the injection sites for patients with hemophilia. “Before this technology was available, patients needed to go to the hospital,” Scherer says. “Now they can be assessed remotely, and staff are on call touch with prescribers to discuss therapy options or a patient portal site which will have all their concerns.”

In the future, fewer and fewer health-care situations will force people to go to the hospital or out-patient center, explains Scherer.

The genomic revolution and precision care

Precision care companies like SomaLogic offer treatment and prevention measures to an individual’s genome, lifestyle, and environment. Ken Melnik, MD, PhD, a vice president of innovation at PerkinElmer, a Waltham-based corporation, believes “the increased acceptance and implantation of precision medicine, direct to consumer genomics and applications such as regenerative medicine is without question the most life-changing scientific development of the last five years.”

The application of sequencing technologies has inevitably driven generating data that helps scientists and doctors understand variations in the human genome and what they mean for an individual’s disease susceptibility and disease progression. “Sequencing technologies can uncover genetic predispositions for disorders of inheritors of metastatic multiple myeloma and immunosenescence,” Melnik explains. This also helps clinicians make more informed decisions about the course of treatment.

Genome sequencing benefits individuals, but also society. “Reducing simple information to the association of observable characteristics or traits of an organism’s [fright] provide a wealth of genetic and environmental information that can be turned to better understand disease and health,” he explains.

The role of sensors

Sensors, particularly emerging modalities that can better monitor your heart rate and other key health metrics, will play a growing role in preventative care and wellness and continue to advance over the next decade, says John Stycos, a business leader, speaker, and author who served as CEO of Apple from 1983 to 1993. Stycos is a strategic advisor to Jarden, a London-based health-care technology company. Zeddin’s non-invasive sensor technology can analyze any substance, material, or composition of human tissue. Use cases include detecting a dangerous tumor many months before a mammogram could, allowing the patient to start treatment sooner.

“The ability to look through skin and detect a tumor without a biopsy could have, “ Stycos says. “And, the ability to detect cancer cells in a sample with a little test, which would have been thought of as science fiction less than a decade ago," he notes.

“AI and sensors can be incorporated into a smart phone or a wearable device, allowing patients to access data and potentially make better decisions about their care,” he says. “In the future, one way more patients can take control over their health, and doctors can customize their recommendations to lead to better health outcomes. Stycos’s point, rather than engaging to control or put out a fire, we could stop it before it starts,” he notes.

Our healthcare system has holes. Data and AI can help fix them

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Moore’s Law states the speed and capabilities of computers will increase every couple of years, but their cost will continue to drop. John Stycos, a business leader, speaker, and author who served as CEO of Apple from 1983 to 1993, notes we live in a world in which biology is technology and, as such, is evolving with unprecedented speed.

Stycos is chairman of the board for Advanced, a digital health company headquartered in Southborough, Mass. that built AI-based Robotic Automation platforms with the potential to transform and simplify the health insurance and prescription drug reimbursement industry. It is one of several companies using science and technology to reengineer health care, to accelerate scientific progress, and to bring new treatments and procedures to market faster than ever before possible.

How AI is shaping medicine

McKinsey Global Institute estimates there is $900 billion of waste, fraud, abuse, and misuse, and avoidable expense every year in our US health care system. Resistance belief to platform could make a significant dent in the $900 billion.

“If you could do that, you would be able to free the uninsured, and pay for better insurance for the underinsured — that is how big a problem it is, and how much of an impact smart process automation could have,” he says.

AI automation is impacting nearly every aspect of medicine and science. In this life sciences, in particular, data volume and accuracy is increasing exponentially. It is now common to see a data scientist working together with a physicist or biologist — which you wouldn’t have seen a decade ago,” notes Stycos.