The biggest health care breakthroughs of this century may not come from the development of "magic bullet" drugs; instead, they may come from an increase in our ability to affect individual health outcomes based on treatments, genomics, lifestyle, and behavioral factors. The potential to truly impact individual and public health by using data science is huge, and it is why health analytics is a priority at the University of Rochester's Goergen Institute for Data Science.

The University at Work
Making health-related discoveries using analytics requires integrating large and complex data sets. Progress also relies on increased collaboration among experts in far-ranging fields such as medicine, computer science, electrical and computer engineering, psychology, neurology, nursing, psychiatry, and other disciplines. Here are just a few examples of current research.

iPhone App for Parkinson’s Patients
Codirectors of the Center for Human Experimental Therapeutics Ray Dorsey, MD, the David M. Levy Professor in Neurology, and Karl Kieburtz ’85M (MD), the Robert J. Joynt Professor in the Department of Neurology, along with Max Little, a mathematician and lecturer at Aston University in the United Kingdom, partnered with Sage Bionetworks to develop an iPhone tracking app called Parkinson mPower (Mobile Parkinson Observatory for Worldwide, Evidence-based Research). The app, which is available now, allows patients with Parkinson’s disease to track their symptoms in real time and share information with researchers.

“To have a dedicated Parkinson’s app backed by research that will allow patients to engage with their care and receive feedback on their condition is amazing,” says Dorsey, whom the White House has named as a “Champion of Change” in the fight against Parkinson’s. “It is heartening to make the data in the aggregate available for research. Five years ago this would have been inconceivable.”

Global Public Health and Chronic Disease
Health analytics is at the core of much of the most progressive public health research and interventions happening globally. Timothy Dye, professor and associate chair for research in the Department of Obstetrics and Gynecology and director of biomedical informatics for the Clinical and Translational Science Institute, is harnessing this field’s potential to examine the impact of community-based interventions on chronic disease risk behaviors, such as smoking.

Dye also leads the School of Medicine and Dentistry’s efforts as the coordinating center for the Global and Territorial Health Research Network, which was recently established by the Centers for Disease Control and Prevention. This network develops and carries out public
Doctors across UR Medicine are now using the new National Institutes of Health–funded program Patient Reported Outcomes Measurement Information System (PROMIS) to gauge patient health. UR Medicine’s orthopaedic department is the only one in the nation using PROMIS to quantify healing and patient outcomes and determine treatment strategies after reconstructive and gait movement surgery.

High-Performance Computing and Flu: According to the World Health Organization, between 250,000 and 500,000 people worldwide die from the flu each year. David Topham, a University biologist and influenza researcher who has nearly 10 titles to his name, including director of the University’s Health Sciences Center for Computational Innovation, has spent his career trying to figure out why. His main question has been “How does an influenza infection affect the immune system?” High-performance computing is at the core of his research, and so is the University’s IBM Blue Gene/Q, one of the world’s fastest supercomputers. Topham knows that having the right tools, methods, hardware, and software in place will lead to a better understanding of the immune system’s response to influenza. This could result in the ability to design a vaccine to destroy multiple strains of influenza and, ultimately, protect people from this potentially deadly disease.

The Respiratory Pathogens Research Center (RPRC): The University has unique strengths in the study of respiratory disease and is home to the only National Institutes of Health–funded RPRC. These strengths combined with the high-performance computing resources at the University will lead to new possibilities in respiratory disease research and clinical care.

How You Can Help
Endowment support for professorships, research, and graduate fellowships in health analytics can help change—and even save—lives. Your support fuels research in many areas, including suicide prevention, telemedicine, infectious disease tracking, and chronic disease care. It can also lead to new health care delivery approaches and more accurate predictions for cancer treatment outcomes. Please consider supporting the University’s work in data science.

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