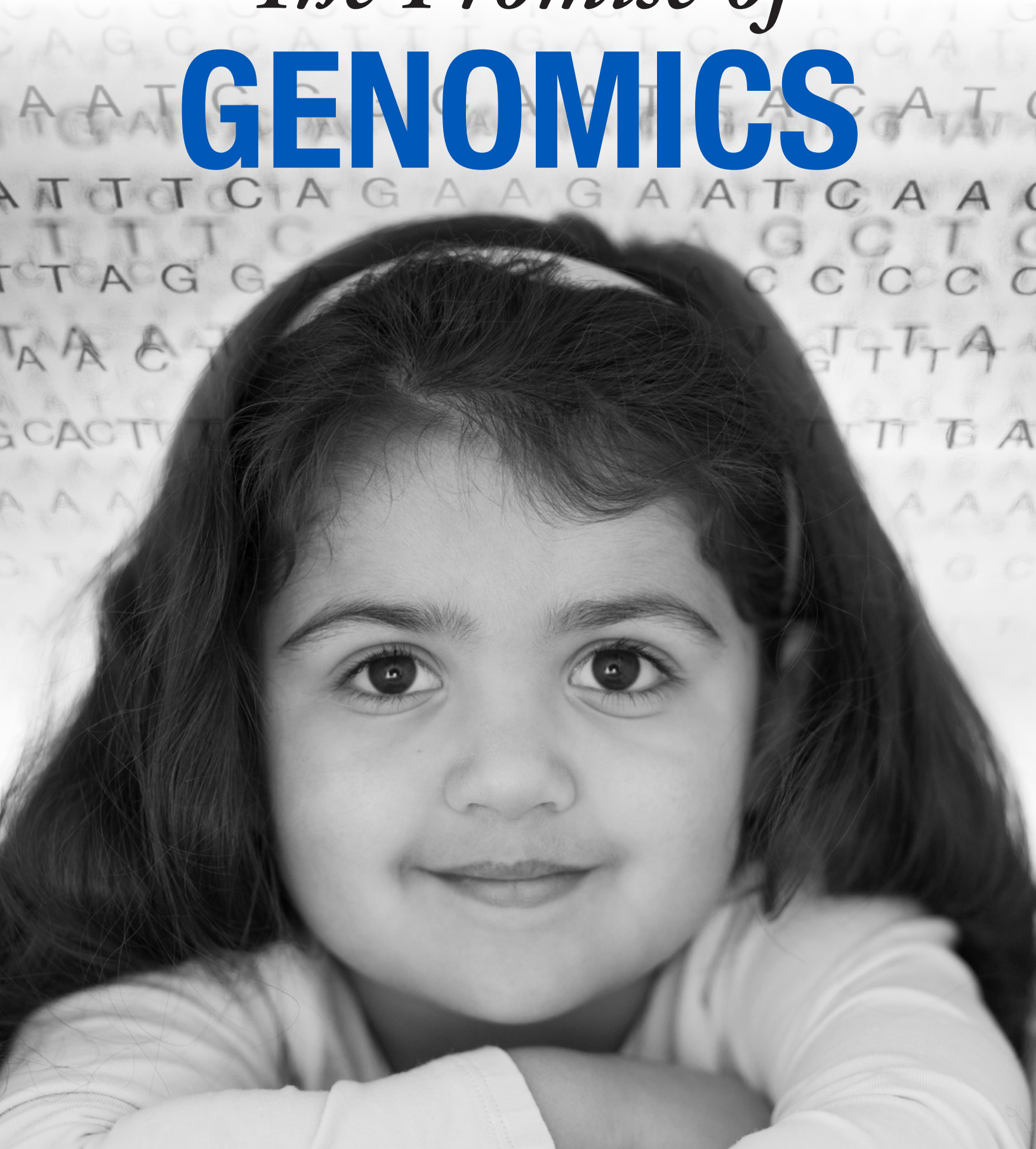
THE NATIONWIDE PEDIATRIC INNOVATION FUND
AT NATIONWIDE CHILDREN'S HOSPITAL

The Promise of GENOMICS



In 2014, Nationwide announced the formation of the Nationwide Pediatric Innovation Fund at Nationwide Children's Hospital to accelerate the most promising clinical and research programs. A significant portion of that funding was directed to the genomics program at Nationwide Children's. Through this report, we introduce you to the promise of genomics for transforming the lives of children everywhere.

"WHAT MORE POWERFUL FORM OF STUDY OF MANKIND COULD THERE BE THAN TO READ OUR OWN INSTRUCTION BOOK?"

– Francis S. Collins, MD, PhD, Director, National Institutes of Health

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The human genome is the blueprint for what makes up a human being. The Human Genome Project — which mapped a human genome for the first time in 2003 — is one of the great feats of scientific achievement in our history. It is the man-on-the-moon moment for the current generation of medical professionals. For the diagnosis, care and, ultimately, prevention of most diseases, genomics provides a new frontier.

Imagine being able to provide a complete, specific "instruction manual" about your child to his pediatrician. That's the future using genomic medicine. Every patient gets the right diagnosis and the right treatment at the right time.

To most people, this is the work of science fiction. But at Nationwide Children's Hospital, propelled by the generous Nationwide Pediatric Innovation Fund, together we are at the forefront of making that amazing future a reality today. Our shared vision is to make genomic sequencing and analysis as fast, efficient and economical as possible, so that it becomes the normal standard of care, to provide the best outcomes possible for all children.

In our genomes is the answer to virtually every single medical condition. Thanks to the vision and support of the Nationwide Foundation, technologies developed at Nationwide Children's Hospital will make it possible for every doctor to easily read each patient's instruction manual.

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NATIONWIDE CHILDREN'S
When your child needs a hospital, everything matters.℠

GENOMICS: FROM POTENTIAL TO REALITY

WHAT IS DNA?

DNA is the blueprint for life. It is made up of units called genes.

Genes are made up of pairs of nucleotides that code for all the proteins and cells that make up the human body.

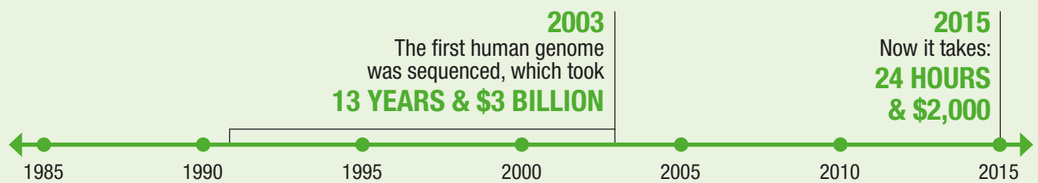
THE NEED FOR GENE SEQUENCING AND ANALYSIS

Sometimes genes can be mutated, which can cause abnormalities or disease.

These mutations can be found using gene sequencing and analysis.

GENE SEQUENCING TIMELINE

The Human Genome Project was one of the great feats of scientific achievement in human history. Completed in April 2003, it gave science the ability, for the first time, to read the genetic blueprint of a human being. But now, analyzing that genomic data is the main obstacle to its use.



OVERCOMING OBSTACLES TO PRECISION MEDICINE

PRECISION MEDICINE:

An innovative approach to disease prevention and treatment that takes into account differences in people's genes, environment and lifestyles.

Today even the smallest research groups can complete genomic sequencing in a few days. But after a genome is sequenced, scientists are left with billions of data points to analyze before any useful information can be gathered to use in research and clinical settings.

One human genome has enough data points to fit in **12 BLU-RAY DISCS OR 40,000 KING JAMES BIBLES**

THE OBSTACLES:

For years, time and cost were challenges to making the use of genomics in medicine a reality.

TIME

COST

"NATIONWIDE CHILDREN'S COMMITMENT TO REALIZING THE PROMISE OF PRECISION MEDICINE TO SHAPE THE FUTURE HEALTH OF CHILDREN IS EXTRAORDINARY AND WE ARE PLEASED WE CAN PLAY AN INTEGRAL ROLE."

– James Hirmas, CEO, GenomeNext

Now, the key to making precision medicine a routine part of pediatric and adult health care is coming from Nationwide Children's Hospital. Dr. Peter White and his team at Nationwide Children's have developed a unique computational technology called "Churchill" that allows highly accurate, efficient analysis of a whole genome sample in as little as 90 minutes for a cost of about $800.

NATIONWIDE CHILDREN'S CAPABILITIES:

Time to Analyze a Genome
90 MINUTES

Cost to Analyze a Genome
$800

Our computational technology could also be the key to solving some of our greatest population health puzzles. Here's why: The Nationwide Children's algorithm, which was recently licensed to GenomeNext, LLC, can outperform all other current technologies to analyze thousands of human genomes and find the genetic mutations that could be the underlying cause of disease.

COMPARISON TO BEST OF CLASS

Time to Analyze a Genome

Average of the best of class technologies from the Broad Institute and Stanford University
72 HOURS

Nationwide Children's Churchill
90 MINUTES

NATIONWIDE CHILDREN'S HOSPITAL: UNIQUELY POSITIONED TO CHANGE THE WORLD OF MEDICINE

THE 1000 GENOMES CHALLENGE

The "Intel Head in the Clouds Challenge on Amazon Web Services (AWS)" showed further proof of Churchill's exceptional capabilities. Our technology was chosen by Intel from among proposals around the world to re-analyze 2,504 human genomes from 26 population groups, originally analyzed and completed in September 2014 by the 1000 Genomes International Consortium. The results were astounding.

"IT'S GREAT TO SEE THAT IMPORTANT PROJECTS SUCH AS THIS ARE ABLE TO TAKE ADVANTAGE OF THE SCALE AND FLEXIBILITY OF THE CLOUD, ADVANCING AND IMPROVING THE DELIVERY OF CARE FOR PATIENTS WORLDWIDE."

– Matt Wood, General Manager, Data Science at Amazon Web Services, Inc.

	NATIONWIDE CHILDREN'S/ GENOMENEXT		1000 GENOMES INTERNATIONAL CONSORTIUM
	The 1,000 Genomes Project is an international collaborative mapping the full diversity of human DNA		
70 TIMES FASTER	**7 DAYS** from raw data to results	Compared to	**18 MONTHS** from raw data to results
WITH 1% OF THE PERSONNEL	**5 SCIENTISTS** *= 10 scientists*	Compared to	**418 SCIENTISTS** *= 10 scientists*
AT 0.7% OF THE COST	**$70,000 TOTAL** *$ = $100,000*	Compared to	**$10 MILLION TOTAL** *$ = $100,000*

HELPING ONE, HELPING MANY

Churchill has been licensed to GenomeNext for broader clinical use, but it is available for universities and non-profit research organizations to use free of charge. To date, nearly 400 academic centers have downloaded the technology to share research knowledge.

400 ACADEMIC CENTERS
have downloaded the free-of-charge Churchill software for their own research use.

Aside from the amazing speed and low cost, the accuracy of this technology is 99.999 percent.

This information is invaluable to the genomic medicine program at Nationwide Children's to help identify disease-causing gene mutations in pediatric patients. More broadly, this technology facilitates population scale genomic analysis in just days, which will have a dramatic impact on genomic research and medicine globally.

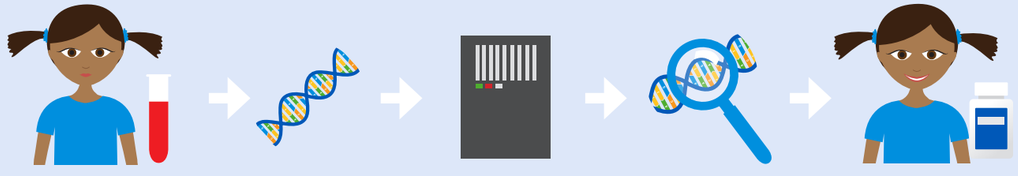
IMPACT OF GENOMIC RESEARCH AT NATIONWIDE CHILDREN'S

INDIVIDUAL PATIENTS

POPULATION HEALTH

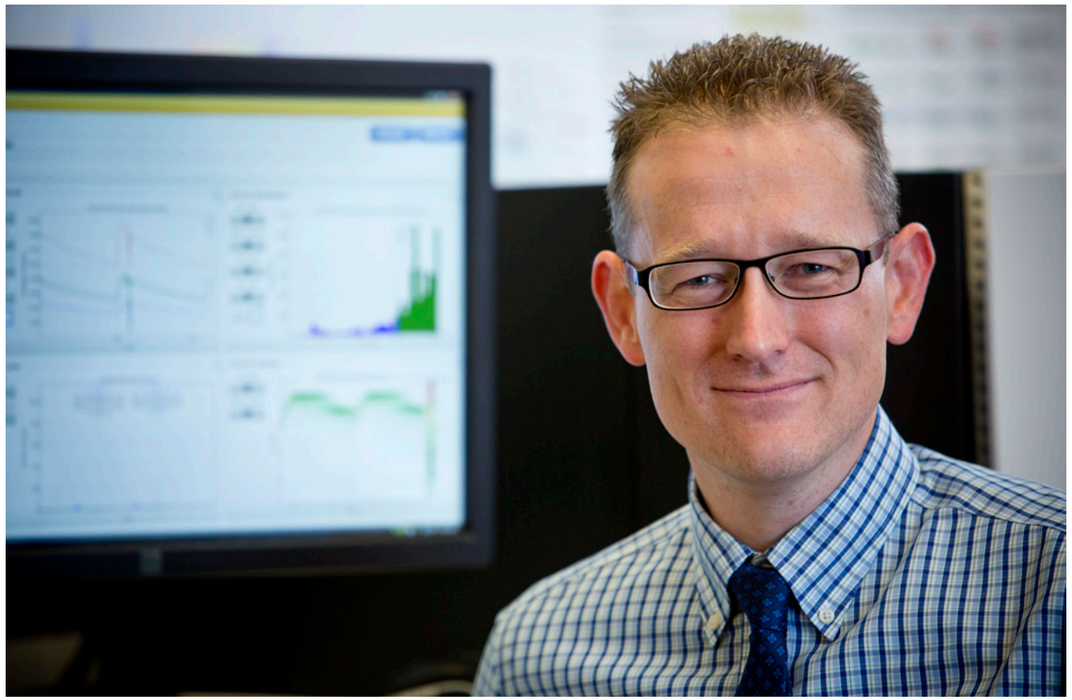
CHURCHILL'S SPEED AND ACCURACY MAKE IT A TRANSFORMATIVE TOOL TO HELP DIAGNOSE PATIENTS WITH COMPLEX DISEASES AND DISCOVER THE BEST WAYS TO TREAT THEM.

GENOMICS AND TAILORED CARE AT NATIONWIDE CHILDREN'S: THE PROMISE TODAY



DATA USED IN ALL CLINICS INCLUDING

GI | Neonatology | Heart | Cancer | Neuroscience | Infectious Disease



Dr. Peter White and his team developed genomic analysis technology at Nationwide Children's Hospital.

THE NATIONWIDE PEDIATRIC INNOVATION FUND: BRINGING THE FUTURE OF CARE TO PATIENTS NOW

Nationwide Children's Hospital and Nationwide are uniquely positioned to usher in this new era of genomic-based medicine because of the generous support from the Nationwide Pediatric Innovation Fund.

With support from the creation of the fund in 2014, together we laid the groundwork for establishing a national center of excellence, recruiting for renowned scientists in the field and constructing world class facilities. Support from the fund in 2015 has allowed us to continue building this base from which the future of health care will be developed.

As we work to make genomic analysis faster and less expensive, the field of genomics currently is not an inexpensive endeavor. A single sequencing machine — which helps find the needed genomic information to be analyzed — can cost $10 million. The plans for our center of excellence include recruiting additional scientists and bioinformatics specialists. Over time, total investments in this area will easily approach $100 million.

However, the return on this investment will change the global approach to medicine and research. Through the innovative collaboration between Nationwide and Nationwide Children's we can boldly proclaim that the future of health care for children and adults alike is now.

NOT ALL PATIENT STORIES HAVE THE HAPPIEST OF ENDINGS. YET, IN SPITE OF CHALLENGING OUTCOMES, WE DISCOVER HOPE AND PROMISE FOR THE FUTURE.

Imagine your child falls into a coma. Doctors suspect that a metabolic disorder is to blame but cannot concretely define the problem. Current standards of diagnosis and care yield no answers. You and your family embark upon what health professionals label a "diagnostic odyssey" costing tens of thousands of dollars with no results. Meanwhile, your child is out of the coma but cannot function normally, cannot even walk or talk because of this unidentified condition.

A similar situation troubled a family that ultimately ended up at Nationwide Children's Hospital. Dr. Peter White was driven to find an answer. Using genome analysis techniques pioneered at Nationwide Children's, Dr. White discovered the child suffered from an extraordinarily rare condition, a damaging disorder that the National Institutes of Health states that many infants do not survive.

While Dr. White's determined inquiry finally gave the family the relief of an answer, the knowledge was too late to reverse the damage. The child continues to face serious medical challenges.

However, if Dr. White's advanced genome analysis strategies were a routine part of patient care, the problem could have been quickly diagnosed and easily treated. With a simple and inexpensive medication delivered orally, this child could have a normal life.

Through this missed opportunity, we can see the promise of genomics, along with the responsibility and urgency to make these techniques part of the everyday standard of care for patients everywhere.

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