

Personalized Medicine

Tremendous potential, but challenges remain

There's no better time than now to embark on this ambitious new enterprise to revolutionize medicine.¹

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

What Is Personalized Medicine?

The use of genetic, genomic, and molecular information for accurate diagnosis, prognosis, and treatment decision-making.

Raju Kucherlapati, PhD
Departments of Genetics and Medicine,
Harvard Medical School

When Is It Coming to Mainstream Medicine?



Number of drugs to date with labels that include pharmacogenomics biomarkers²



Technical barriers, societal challenges, and costs have begun to fall, broadening patient access to advances



Personalized drugs, treatments, and diagnostic products grew from 13 in 2006³ to 113 in 2014⁴

Right Drug, Right Patient, Right Time



Personalized medicine and precision medicine are interchangeable terms that include treatments tailored to a person's molecular and/or genetic characteristics to help: avoid adverse drug reactions • increase adherence • improve quality of life • reveal alternatives

Today's tests help predict individual responses to:



Cardiovascular drugs
eg, clopidogrel P2Y12 activity testing



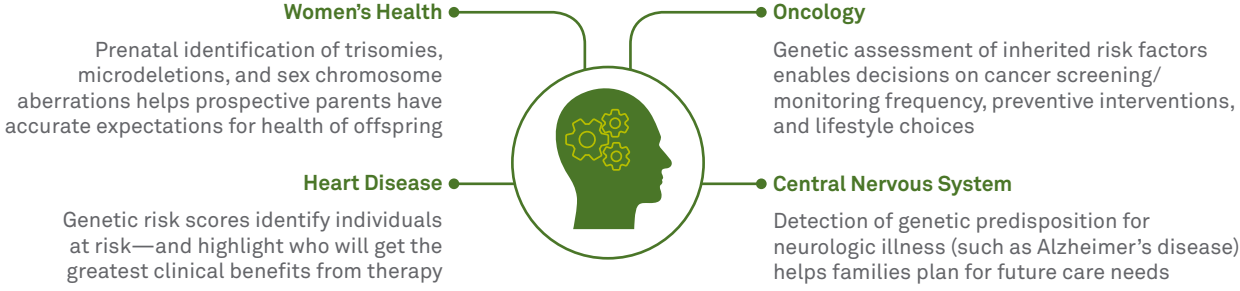
Targeted oncology therapies
in breast cancer, lung cancer, gastrointestinal stromal tumors, chronic myeloid leukemia, and late-stage melanoma



Central nervous system drugs
targeted to epilepsy, migraine, and dementia

Personalized Medicine Empowers Action From Insight

Individualized genomic testing help people work with genetic counselors to improve decision-making when facing vital choices



It can improve medicine by ultimately reducing cost, improving diagnosis, and improving care.

Douglas Rabin, MD
Medical Director, Women's Health,
Quest Diagnostics

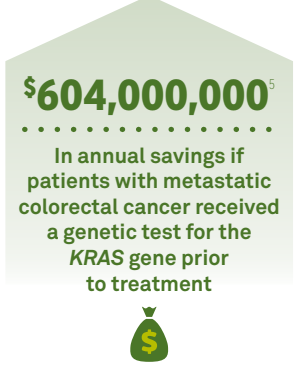
Shrinking Costs, Potential Economic Benefits

Payers increasingly recognize the value of genetic tests and targeted therapies, yet access is still inconsistent while economic evidence accumulates



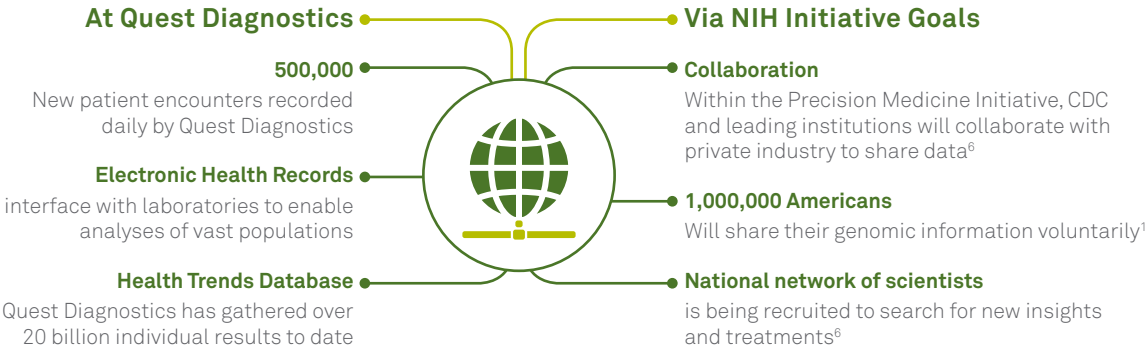
By optimizing therapies to maximize efficacy and minimize adverse outcomes, personalized medicine will lead to a reduction of health care costs and an increase in favorable outcomes.

Charles "Buck" Strom, MD, PhD
Vice President, Genetics and Genomics,
Quest Diagnostics



Big Data Power Personalized Medicine

Increasing support for large-scale data collection and sharing



Personalized medicine is changing atrial fibrillation management

DNA-based genetic risk scores improve anticoagulation therapy decisions and identify overlooked patients⁷



BRCA mutation testing improves cancer screening and treatment

A positive family history is reported by 15% to 20% of all breast cancer patients, as well as many ovarian cancers⁹

Whether from a diagnostics standpoint we can identify a disease sooner, or better identify which patient will respond best to a particular therapy, this is where patient care is going today.

Gerard Abate, MD
Medical Director, Cardiovascular Disease,
Quest Diagnostics

Among women who carry mutations in **BRCA1** or **BRCA2**, surgical intervention, in particular risk-reducing salpingo-oophorectomy, reduces risk of both ovarian and breast cancer and reduces overall mortality.⁹

Mary-Claire King, PhD
Recipient of the 2014 Lasker-Koshland Special Achievement Award in Medical Science



To fully tap the potential of personalized medicine, practitioners, scientists, and companies must collaborate in creating education for practical applications and in collecting, analyzing, and sharing data

Join our Personalized Medicine network. Receive the latest evidence-based research, education, publications, and opportunities for collaboration

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References: 1. Collins FS. *Fiscal Year 2016 Budget Request*. Department of Health and Human Services National Institutes of Health. <http://www.nih.gov/about/director/budgetrequest/fy2016testimony.htm>. Accessed May 5, 2015. 2. U.S. Food and Drug Administration. *Table of Pharmacogenomic Biomarkers in Drug Labels*. <http://www.fda.gov/drugs/scienceresearch/researchareas/pharmacogenetics/ucm083378.htm>. Accessed May 5, 2015. 3. Personalized Medicine Coalition. *The Case for Personalized Medicine*. 2011. 4. Personalized Medicine Coalition. *The Case for Personalized Medicine*. Fourth Edition. 2014. 5. Shankaran V. Presented at the Gastrointestinal Cancers Symposium. January 2009. <http://www.medscape.com/viewarticle/586946>. 6. The White House Office of the Press Secretary. *FACT SHEET: President Obama's Precision Medicine Initiative*. <https://www.whitehouse.gov/the-press-office/2015/01/30/fact-sheet-president-obama-s-precision-medicine-initiative>. Accessed May 22, 2015. 7. Tada et al. Twelve-single nucleotide polymorphism genetic risk score identifies individuals at increased risk for future atrial fibrillation and stroke. *Stroke*. 2014;45:2856-2862. 8. Pasche B. Recent advances in breast cancer genetics. *Cancer Treat Res*. 2008;141:1-10. 9. King MC, Levy-Lehah E, Lehah A. Population-based screening for BRCA1 and BRCA2. *JAMA*. 2014;312(11):1091-1092. doi:10.1001/jama.2014.12483.