

Timeless Approach, Latest Innovations Combine in Personalized Medicine

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One in a million describes a young woman I cared for with a rare form of kidney cancer. Unfortunately, despite all efforts, including clinical trials, she passed away from her disease. Patients like her propel me and our Mercy ministry to find solutions to enable early and accurate detection of disease, to maximize treatment response and minimize side effects.

This is the field of precision medicine, which is the latest iteration of what doctors have been trying to do since the beginning of modern medicine. It is through God's grace that the human genome was first sequenced in the early 2000s. At that time, the cost was in the billions, and it took more than a decade to do.¹ The same process now takes less than a week and costs less than \$1,000.² The ability to decode the building blocks of the human body allows for insight into the causes of disease. Artificial intelligence (AI), using multi-modal data acquired from imaging, pathology and numerous data points within the medical record, helps predict the risk of disease in patients and develops more accurate treatment plans.

At Mercy, we have invested heavily over the last two decades in preparing to use genomics and AI on every patient within our ministry.³ From rural Arkansas to city centers like St. Louis, every patient has access to this life-changing care.

It is my hope that as our precision medicine program progresses, patients like the one men-

tioned earlier will have different outcomes. My hope is for early detection of patients' diseases and treatment tailored specifically for them to lessen their suffering.

MOVING BEYOND 'ONE-SIZE-FITS-ALL' CARE

Throughout my 10 years of practicing medicine, I have had the privilege of walking alongside my patients and their families, helping them navigate the delicate balance between triumph and sorrow.

From a young age, I was fascinated by how things worked. That curiosity, paired with a deep desire to serve others, naturally led me to a career in medicine. Every day, I'm given the opportunity to not only understand the complexities of the human body but also to make a difference in the lives of those who seek care. It's this combination of curiosity, service and faith that drives me.

Medicine is an emotional roller coaster, a journey filled with breathtaking victories and heart-breaking setbacks. Yet, at its core, it is a deeply human endeavor, one that calls on us to alleviate



suffering, improve lives and nurture the hope that our patients and their families place in our hands. Whether it's extending a person's life or helping them reach a cherished milestone, we enter a profound relationship with those we serve, dedicating ourselves to making their goals possible.

For me, this deep connection is where faith and medicine intersect. Working within Catholic health care, I have found this union of faith and medicine to be especially meaningful. Mercy's mission, rooted in the Catholic tradition, reminds us that medicine is more than a profession. It is a ministry of healing that seeks to uphold the sanctity of life in all its forms, no matter where someone is on their life's journey.

And yet, as the world of medicine evolves, so too must our methods. Precision medicine leverages the latest advancements in technology — AI and genomics — to augment the practice of medicine. It enables us to move beyond the “one-size-fits-all” model of care and gives us the tools to offer more personalized and effective treatments.

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With precision medicine, we can identify the right treatment for the right patient at the right time, while minimizing harm and improving outcomes.

Already, we are seeing lives changed forever through some of our first uses of genomic technology. Take the case of an older gentleman who was diagnosed with Stage 4 incurable bladder cancer. After surgery and three failed rounds of chemotherapy, this patient's future appeared bleak. But when we ran next-generation sequencing on his tumor, we found a targeted mutation. He was then started on a newly approved targeted therapy for that specific mutation, and now, nearly one year later, he is cancer-free and still living each day with a renewed appreciation for life. His story reminds

me that medicine, at its best, extends life while enhancing its quality.

This is just one example of what is possible when we embrace innovation. Precision medicine is about more than treating disease after it occurs — it is also about preventing disease and extending one's good health. The ability to use cell-free DNA, or cfDNA, from urine, blood, saliva and other fluids to potentially diagnose disease in its earliest stages — or even before disease truly takes hold — represents a major leap forward.⁴ If these tests become part of regular screenings, cancers could be caught and treated before any symptoms are even noticed.

INNOVATION TO COMPLEMENT THE HUMAN TOUCH

AI is transforming our ability to diagnose and treat disease. AI-powered tools are helping us see patterns in radiology and pathology that would otherwise go unnoticed by the human eye. Our recent rollout of Aidoc's aiOS platform, which enables a comprehensive additional review of

most diagnostic imaging, can flag possible incidental findings outside of the scope of an ordered test.⁵ These technologies can predict disease outcomes, expedite results, suggest treatment responses and ultimately reduce the burden on our clinical colleagues. They empower us to make more informed decisions faster and with greater accuracy. In this way, AI becomes not a replacement

for the human touch, but a complement to it, augmenting our ability to care for our patients in the most effective way possible.

Mercy also is among those leading the charge in precision medicine. Through our pioneering work with an extensive longitudinal database of patient information as part of a multiyear collaboration with Mayo Clinic, we are making insights and predictions that have a direct impact on patient care. The work of our data science team is truly groundbreaking. By leveraging this vast amount of data, we can tailor treatments more precisely, reduce side effects and improve the chances of success for our patients.

The Chen Chemotherapy Model is one example of the impact data can have on patient care.⁶



Photo courtesy of Mercy

Mercy held its first precision medicine summit about the future of personalized health care in September 2024 in the St. Louis region. Pictured, left to right, are June Cha, PhD, MPH, policy director at FasterCures — Milken Institute Health; Gautum Agarwal, MD, the director of Mercy precision medicine; and Gaurav Singal, MD, physician at Brigham and Women's Hospital and Harvard Medical School faculty, who is a health care data and technology advisor.

Using a daily, smart-texting model, patients receiving chemotherapy can help care teams identify early on if they are experiencing problems that could result in hospitalization, and if so, to try and address them before that point. We've seen 26% reduced readmissions after chemotherapy and 42% fewer chemo-related emergency room visits.

Through the partnerships we've developed with industry leaders — both large and small — we are bringing solutions to the problems our patients and providers face daily. Nearly 1,000 physicians across Mercy are using ambient generative AI to clinically document summaries of patient conversations in exam rooms. Patients say they appreciate the more personalized conversation, enabling more time for patient-physician interaction by reducing physicians' time on the computer, and it enables us to see more patients

each year.

This is the work that Mercy was founded to do. Our mission is not simply to provide medical care but to bring life-changing medicine to all our patients. Faith and medicine, together, call us to lead with compassion, to innovate with purpose and to ensure that everyone — regardless of their location, background or means — has access to the best care available. As we stand at the forefront of a new era of health care, we can shape a future in which precision medicine is not a privilege but a standard of care. By leading the way, we can ensure that this revolution in medicine is equitable and just, reaching even the most underserved among us.

PROGRESS AND FAITH AS GUIDES

As we embrace these advances in medicine, we must remain grounded in the values that have



guided us for centuries. I often think of part of a quote from Thomas Jefferson, inscribed on the southeast wall of the Jefferson Memorial in Washington, D.C.:

"I am not an advocate for frequent changes in laws and constitutions, but laws and institutions must go hand in hand with the progress of the human mind. As that becomes more developed, more enlightened, as new discoveries are made, new truths discovered and manners and opinions change, with the change of circumstances, institutions must advance also to keep pace with the times."

Jefferson's words remind us that progress is necessary — not just in science and medicine but in the institutions that guide our practice. Our health care system must evolve, just as our medical knowledge evolves. But as we move forward, we must always remember why we entered this field in the first place: to heal, serve and honor the sanctity of life. Faith and medicine together give us the strength to pursue innovation while keeping compassion at the center of all we do.

I believe the key to providing the best care lies in understanding the whole person. Knowing a patient's medical history is crucial, but so is learning about their family, profession and passions. When I take the time to learn about what makes each person unique, I can treat them with greater empathy and precision. I can tailor treatments to fit their lifestyle, making care more effective and personalized.

Medicine is not just about science — it's about people. By seeing patients as individuals rather than just cases, we can use the advancements being made every day with precision medicine to provide care that addresses not only the illness but the person behind it. In my practice, this philosophy is the foundation of every interaction, and I

believe it leads to better outcomes for my patients and greater fulfillment in my role as a physician.

Together, with faith as our guide and precision medicine as our tool, we can create a future where health care is more effective, more equitable and more compassionate than ever before.

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NOTES

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