



*Will precision  
medicine cure  
physician burnout?*

# Third Wave

■ **By Grace E. Terrell, M.D., M.M.M., FACP, FACPE**

“**T**he trouble with change is that it usually arrives before we are ready for it,” said Arnold Glasow.<sup>1</sup> He should know. He lived from 1905 until 1998, publishing his first book at the age of 92. Living from the dawn of the 20th century until the dawn of the Internet, he published a humor magazine for 60 years from his home in Freeport, Illinois. This self-effacing American thinker was perpetually quoted in *Forbes*, *The Wall Street Journal*, *Chicago Tribune*, and other standards of the pre-web media and used his generous spirit to bring humorous insight to life’s perpetual problems.

In our more frenzied time of perpetual electronic media, information overload, and 24/7 access to work, perhaps his gentle humor could provide some respite, if not wisdom.

In our contemporary healthcare delivery system environment, the pace of change we are experiencing appears to be driving an unprecedented and accelerating level of physician burnout. It is a global problem involving every medical and surgical specialty and has increased from one in three physicians in 2009 to 39.8% in 2013, to 46% of physicians in 2015, to a staggering 51% in 2017.<sup>2,3</sup>

Physician burnout has been linked to low patient satisfaction and care quality, high medical error rates and malpractice risk, high physician and staff turnover, high

physician alcohol and drug abuse and addiction, and physician suicide.<sup>4</sup> The causes of clinical burnout have been intensely studied, with low control over the pace of work, time pressure, family responsibilities, electronic health records, and chaotic environments identified as leading causes.<sup>5</sup>

These are all manifestations of the intense pace of change the healthcare industry is experiencing due to advances in the biosciences and information technology and massive cultural and sociodemographic frameshifts. It is highly unlikely that the pace of change will slow any time soon.

## **Taking Control**

So, does that mean the epidemic of physician burnout is unsolvable? My belief is that burnout can be prevented, managed, and reversed. Much of that depends on managing change to reestablish a sense of control in one’s professional and personal life. Although much of the literature about burnout focuses on stress management techniques, such as exercise, mindfulness, and time management, less is devoted to taking control in a broad context—that is, understanding the nature of the changes in the environment and redesigning one’s professional role to adapt to changes. For clinicians, a deep understanding of the ways in which the healthcare delivery system is undergoing change is crucial to taking



while insights from genetic research of the microbiome is completely rewriting medical therapeutic approaches for some conditions, from broad pharmaceutical approaches to therapies focused entirely at the individual level.

## A Changing Ideal

The terms we have used over the past 15 years to describe ideal medical practice have evolved. The traditional image of the physician at the bedside of the individual patient remains an important motif, and it is enhanced by concepts embedded in the Institute for Healthcare Improvement's Triple Aim:

- ▶ Improving the patient experience of care (including quality and satisfaction)
- ▶ Improving the health of populations
- ▶ Reducing the per capita cost of health care

The focus of the past few years on population health has been about risk-stratifying patients and developing models of care integrated with value-based payment models. Within this framework, specialized care models are supported by population-specific ecosystems based on the unique needs of specific population segments.

For example, patients with severe behavioral disorders may need dedicated psychiatric clinicians, pharmacogenetic testing to guide medication management, dedicated social workers, and embedded primary care, whereas those with chronic conditions and social needs may need case workers embedded in the care team. Those at the end of life may need palliative care experts, support for caregivers, and legal/financial advisers for families more than they need specialist care. Those with poly-chronic and complex conditions may require remote monitoring, dedicated extensivist physician care, and self-management smartphone applications that limit the need for face-to-face clinic transactions.

These care models are all designed to improve the Triple Aim by taking highly tailored approaches to specific population segments. These interventions have all been shown to work but take time. Case management for high-risk patients with targeted conditions is shown to reduce primary admissions and emergency department visits within three to six months, whereas interventions for low-risk chronic disease patients, such as disease registries, chronic disease care optimization, preventative care, screening, lifestyle changes, and wellness, may take from two to five years to impact at the population level.

None of these interventions are focused on breakthroughs in scientific knowledge such as new pharmaceutical agents or therapeutic procedures. Rather, they are redesigned delivery system interventions aimed at maximizing impact on populations by segmenting them by medical and social needs. In

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contrast, the Institute of Medicine's (IOM's) recent focus on improving diagnosis in health care is designed to address the failings of traditional medical diagnostic processes currently embedded in the healthcare delivery system. IOM's 2014 report on improving diagnosis emphasized the need for establishing a work system and culture that supports the diagnostic process and improvements in diagnostic performance, ensuring that health information technologies support the diagnostic process, and designing payment and care delivery environments that support the diagnostic process.<sup>6</sup>

## Patients, Not Bell Curves

For practicing physicians, embracing redesigned population health management strategies and diagnostic improvement techniques should not be threatening as they are consistent with our inherent professional ethic to improve patient care.

Yet, the increasing physician burnout rate suggests the changes required for these newly designed processes are taking an enormous toll on physicians. I believe one of the reasons for this disconnect is inherent in the phenomenology of the physician-patient contract.

Every practicing physician knows that every single day we see patients who just don't fit into neatly stratified categories. This is the quintessential component of real medical practice. The uniqueness of each patient reconnects us to our roots of making sure the patient in front of us is getting the best care possible. A lot of the frustration physicians have experienced over the past 20 years is based on our instinctual understanding that much of contemporary medical practice disrupts our ability to ensure this. Patients are not bell curves. They do not have average needs. Their individual reactions to a particular pharmaceutical intervention may or may not be within the norms of premarket clinical trials.

Population health management, evidence-based medicine, and the quality improvement efforts over the past 30 years are built on 20th century scientific qualitative methods. Quality assurance programs tend to be based on measures identifying averages and variances, with poor quality determined by a particular cutoff threshold and action taken for measures below this set threshold.

Embedded within the Six Sigma/Lean/Continuous Quality Improvement (CQI) and other quantitative methods are strategies to reduce variation and narrow the bell curve. Quality improvement programs redesign overall processes not so much to reduce variation but to improve overall outcome by acting on all occurrences.

Table 1

## Volume-, Value-, Precision-Based Delivery Model Comparison

	Volume-Based	Value-Based	Precision-Based
Reimbursement	<ul style="list-style-type: none"> <li>▶ FFS/DRGs</li> <li>▶ Penalties for readmits, never events</li> </ul>	<ul style="list-style-type: none"> <li>▶ P4P measures</li> <li>▶ Shared savings/risk payments</li> </ul>	<ul style="list-style-type: none"> <li>▶ APMs based on outcomes</li> </ul>
Organizational Model	<ul style="list-style-type: none"> <li>▶ Departments</li> </ul>	<ul style="list-style-type: none"> <li>▶ Populations</li> <li>▶ Conditions</li> <li>▶ Focused factories</li> </ul>	<ul style="list-style-type: none"> <li>▶ Care models</li> <li>▶ Consumer/patient engagement</li> </ul>
Value Drivers	<ul style="list-style-type: none"> <li>▶ Volume</li> <li>▶ Efficiency at the procedure level</li> </ul>	<ul style="list-style-type: none"> <li>▶ Efficiency at the population level</li> <li>▶ Low variability</li> <li>▶ Quality process measures</li> </ul>	<ul style="list-style-type: none"> <li>▶ Efficiency at the individual patient level</li> <li>▶ “n” of one analytic modeling</li> <li>▶ Quality outcomes measures</li> </ul>
Profit Pools	<ul style="list-style-type: none"> <li>▶ Admissions/discharges</li> <li>▶ Ancillary services</li> <li>▶ Surgeries/procedures</li> <li>▶ Visits</li> </ul>	<ul style="list-style-type: none"> <li>▶ Chronic condition management</li> <li>▶ Population management</li> <li>▶ Wellness and prevention</li> </ul>	<ul style="list-style-type: none"> <li>▶ Information management</li> <li>▶ Patient differentiation capabilities</li> </ul>
Investments	<ul style="list-style-type: none"> <li>▶ Capacity</li> <li>▶ Patient referrals</li> <li>▶ Revenue-producing assets</li> </ul>	<ul style="list-style-type: none"> <li>▶ Clinical integration</li> <li>▶ Commercialization</li> <li>▶ Health IT</li> </ul>	<ul style="list-style-type: none"> <li>▶ Information integration</li> <li>▶ Predictive analytics</li> <li>▶ Whole-person focused design</li> </ul>

Likewise, the assumptions underlying healthcare payment systems are modeled on 20th century quantitative methodology. Actuarial risk projections are based on population averages, with spending trends setting insurance prices and managed care techniques focused on decision-making at the actuarial averaging level rather than individual patient needs assessment.

### 21st Century Capabilities

The capabilities inherent in 21st century technology will substantially disrupt healthcare ecosystems and business models built on these old analytic methods. The 19th century Gaussian curves upon which 20th century science and technology were quantified are giving way to new quantitative methodologies made possible by rapid computing power, artificial intelligence, and machine learning. Massive amounts of data from disparate sources can be analyzed and integrated in ways heretofore impossible. Healthcare data from electronic health records, functional imaging, and health concept representation can integrate with information from systems biology, the “omics” and molecular biology, synthetic biology, and brain mapping.

These data can be integrated with sensors, transducers, and personal health devices, mobile computing data, communication platforms, gaming strategies, three-dimensional printing, biocomputing, and dynamic modeling, rather than traditional statistical thinking methodologies. Man/machine interfaces are on the near horizon, and clustered regularly interspaced short palindromic repeats/associated protein 9 (CRISPR/Cas 9) technology will permit genomic design at the personalized level.

From these predictive tools, we will have capabilities to impact health care through prevention strategies previously impossible. Early personalized intervention, population surveillance, in-utero screening and treatments, and bio-indicators will hasten the transition of medicine away from late-in-the-game reactive therapies. Moreover, these same technological information capabilities will permit new standards of performance with respect to online care provisions, quality systems, peer feedback, workflow-embedded guidelines and care plans, pay-for-success contracting, and integrated performance measures.

Essentially, precision medicine is the convergence of biology and information in a proactive healthcare system. Precision medicine provides better diagnostic, therapeutic, and preventative health care. Diagnostic odysseys will diminish as idiopathic conditions are mapped to specific genetic variances and genome-wide association studies unlock the mysteries of complex disease risk factors.

Precision diagnostics will eliminate unnecessary testing and enhance patient safety. We are already seeing greatly improved adherence to therapy for patients with schizophrenia due to companion diagnostic testing screening for risk of side effects. Pharmacogenomic tests accurately predict therapeutic response in patients with major depression and bipolar disease, and targeted cancer drugs are improving long-term survival in metastatic disease. Early personalized interventions can integrate with population surveillance to enable robust complex clinical decision support. Predictive modeling with open, dynamic knowledge banks can create a democratized health information community.



**With proper design, precision-medicine technologies can return medicine to our core mission of focusing on the patient at the individual level.**

## Restoring Focus

Predictably, the healthcare industry has been slow to understand the implications of these impending changes. Traditional diagnostic and treatment processes are based on observation, incremental testing, and trial-and-error therapy strategies. But the ability to have whole-genome sequencing information for about the price of an MRI will upend these traditional approaches.

With proper design, precision-medicine technologies can return medicine to our core mission of focusing on the patient at the individual level, with accelerated diagnosis and heretofore unheard of individualized therapies.

Our first step in designing the new precision medicine ecosystem is to understand the critical differences in the business models underlying healthcare delivery models (see Table 1).

In the fee-for-service model, reimbursement is at the per unit service base. Therefore, adequate volume is necessary for financial sustainability. The organizational model is at the department level, and volume and efficiency are value drivers at the per service/procedure level. Profit pools are defined by the number of admissions/discharges, ancillary services, surgeries/procedures, and visits. In this volume-based business model, investments are in capacity to increase service volume. Patient referrals are invested in by purchasing or aligning with physician practices. Revenue producing assets are the paramount capital investments: cath labs, imaging equipment, OR space, and hospital beds.

In contrast, value-based models tie performance to reimbursement. Although most contemporary value-based payment

models are still built on the traditional fee-for-service chassis, pay-for-performance measures, shared savings, and/or risk payments are made retrospectively, and care coordination fees are often added on a per-member-per-month basis. The organizational model is built around patient populations that are risk-stratified based on conditions and focused factories, where high-volume, high-efficiency facilities develop for certain conditions and treatments with differentiated payments based on high performance standards (“centers of excellence”). Value drivers are efficiency at the population-level, low-variability, and quality-process measures. Profit pools in value-based models are in chronic condition management, population management, and, in the long term, wellness and prevention. Necessary investments in this business model are in clinical integration, commercialization, and health information technology capable of measuring performance.

Finally, the precision-based business model is coming into focus with some interesting distinctions. Reimbursement can be in alternative payment models or in fee-for-service, but is highly tied to outcomes rather than performance measures. The organizational model is at the care model level and necessitates consumer/patient engagement. The value drivers are efficiency at the individual patient level, with an “n” of one analytic measurement structure and quality outcomes rather than quality process measures. Profit pools are based on information management and patient differentiation capabilities. Investments are in information integration, predictive analytics, and whole-person focused design.

## Looking Forward

These critical business design factors are essential in understanding how to go about competing in the healthcare ecosystem rapidly transforming based upon 21st century technologies. We should be looking forward to this transformation. We can refocus our industry on patient-centered solutions. We will reduce professional burnout. We will improve patient care. Bring it on! [GRJ](#)

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**Grace E. Terrell, M.D., M.M.M., FACP, FACPE**, is president and chief executive officer at *Envision Genomics, Inc.*, a comprehensive clinical genomics services provider, and a general internist at *Wake Forest Baptist Healthcare Cornerstone Internal Medicine*. Dr. Terrell serves as treasurer on the *AMGA Board of Directors*.

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