ORIGINAL ARTICLE

2017 Annual Meeting of the American College of Radiology—Moreton Lecture: Forecasting the Futures of Radiology

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Abstract

Purpose: The traditional forces of change in health care are no longer working as they did in the past. Political gridlock has destroyed Washington's ability to create sensible policy for reforming the medical marketplace, creating chaos for providers. Fortunately, chaos creates opportunity. The idea of creating one's future has never been more relevant and necessary.

Materials and Methods: Predicting—the science of extrapolating future values from historical data—is not a valid method for looking ahead when causal relationships that explained change in the past are themselves being redefined (the current situation). Forecasting—the art of estimating probabilities of possibilities—is the appropriate method for anticipating futures when causality is being redefined. With its focus on identifying a range of possibilities, forecasting identifies many different outcomes that are simultaneously possible for radiology.

Results: Health care's new climate is being shaped by four defining trends: 1) revolution in biological science that is shifting caregivers' mission from acute care to disease management; 2) proliferation of information and communications technologies that are transforming the way care is delivered; 3) end of economic growth in the medical marketplace that is reshaping demand for care; and 4) political dysfunction that forces caregivers and their business partners to develop successful futures on their own.

Conclusions: Radiology 3.0 is nicely aligned with the transformational trends. Staying focused on implementing Radiology 3.0 is supported as the optimal strategy for creating the profession's futures. Diagnostic convergence, establishing a unified diagnostic science with laboratory medicine, is proposed as a complementary initiative.

Key Words: Policy, futurism, patient perspective, clinical practice, information systems, quality assurance/improvement

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SEEKING ORDER OUT OF CHAOS

The 2017 Moreton Lecture presents a rare opportunity to look into the crystal ball from a perspective that radiology's future must be shaped by innovation—purposefully moving the science and its practitioners in unprecedented directions. Washington, DC, site of the ACR's 2017 annual meeting, provides an appropriate setting for proactive futurism because reform is traditionally driven by politics. Maneuvering between Capitol Hill and the White House historically played a fundamental role in shaping the evolution of health care, and the ACR has been a generally successful participant in the process. However, politics in Washington has become completely dysfunctional over the past few years, to the point of being unpredictable now. Any profession that waits for today's politicians to tell it what to do is almost certainly bound to descend into chaos because federal officials are incapable of developing a shared vision of where health care ought to go and what role government should play along the way.

Fortunately, impending chaos creates opportunity. History includes example after example of good things that arose from disorder. I see today's chaotic state of health care as a golden opportunity for radiology to imagine a good future for health care and the profession's role in creating it. The worst thing we can do is play

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Chicken Little, expecting the sky to fall because there's nothing we can do to reverse current trends. Given today's counterproductive divisions between and within the political parties, health care organizations and their partners need to rise above politics, creating positive solutions that can be implemented without—even despite—policy directives from Washington.

CREATING THE FUTURE

Creating one's own future has been a major premise of books on management and strategy for several decades now, often accompanied by a quotation attributed to Abraham Lincoln: "The best way to predict your future is to create it." I like to complement it with Confucius' observation: "Surely, we will end up where we are headed if we do not change direction." Looking at futures of radiology with both these perspectives in mind is a lot more energizing than letting entropy run its course. Creating futures is particularly relevant today because, for reasons elaborated throughout this presentation, health care is almost certain to change more in the next 5 years than it has in the past 50. (For what it's worth, I've been working full-time in health care for 48 years, experience that hopefully gives me some authority to make such a long-term statement.) Turbulent times invite us to take charge.

PREDICTING VERSUS FORECASTING

To begin, I make a strong distinction between predicting and forecasting. They are not synonyms. Understanding the difference between predicting and forecasting is important for radiologists who want to establish diagnostic imaging as a force for creating better futures for American health care. As the physicist Max Planck observed, "When you change the way you look at things, the things you look at change." Predictions and forecasts provide different pictures of the future, so selecting the right approach is a critical first step in the process of looking ahead and making plans.[1]

A prediction is a specific estimate of the expected value of a key variable at a future point in time. Making predictions is a science with formal mathematical models and computational methods, based on the critical assumption that how things worked in the past is how they will continue to work in the future. The process begins with specification of an equation that defines the

relationship between a dependent variable (the parameter to be predicted) and independent variables that have explained changes in it in the past. The mathematical function (eg, linear, exponential, wave) that "best fits" the historical relationship is then used to compute a future value of the dependent variable—the prediction—by extrapolation from historical data.

For example, when Barack Obama was inaugurated in 2009, the Congressional Budget Office published a prediction that health care spending in the United States would consume 20% of the gross domestic product (GDP) in 2015, a substantial increase from approximately 15% at the time the prediction was made (see Fig. 1). President Obama unexpectedly decided to focus on reforming health care—a goal he opposed as a candidate—because he believed that the predicted increase in medical spending would prevent him from pursuing other goals he favored.

Actual health care spending in 2015 was approximately 17% of GDP, with growth 60% lower than predicted (ie, an increase of only 2% in GDP share rather than 5%). How could the prediction be so wrong? The Patient Protection and Affordable Care Act's (ACA) main provisions did not begin until 2014, so Obamacare cannot claim credit for lower than predicted spending. Rather, the prediction was wrong because of unprecedented changes in relationships among the variables that explained health spending through 2004 (the last year of real data used to compute the prediction) and those that explained it over the following decade. These changes, precursors of new forces and relationships that are radically transforming health care, are elaborated later in this lecture.

THE SUPERIORITY OF FORECASTING

The key conclusion at this point in my analysis is that predicting the future of health care is inappropriate because the realities of health care's evolution today violate the assumptions of predictive science. Extrapolating from historical trends will not give an accurate picture of where health care is likely to go; new trends prevail. Prognosticators need another way to look at the future when the future is not an extension of the past. As luck would have it, I was formally trained in the other established quantitative approach—forecasting—before I got my graduate degrees in a predictive science (economics). I learned how to forecast as a weatherman before becoming a medical economist.

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[1] For a detailed analysis of the differences and how to operationalize them, see Bauer [1].