

# Intelligent Health Informatics: The Promise

*by John S. Eberhardt III; Alexander Stojadinovic, MD; Todd A. Radano; and John Epple*

The authors are part of a broad, multidisciplinary team focused on the development of novel intelligence systems for decision support in healthcare. These systems have the potential to fundamentally and definitively alter the continuum of healthcare by prospectively directing appropriate personalized care where it is needed most. The substance abuse screening algorithms, for example, can detect 30 percent of addicts with a 70 percent positive predictive value and can accurately classify future utilization 81 percent of the time.<sup>1</sup> If implemented to target disease management services, this paradigm could yield savings of up to \$50 million per million enrolled lives. As a collective, we have developed breast cancer risk identification algorithms that determine interval risk of breast cancer using readily available clinical data, without the need for resource-intensive testing. The risk models have a 42 percent positive predictive value for cancer risk in a 12-month interval as determined by cross-validation.<sup>2</sup> The ability to detect breast cancer early and without high-priced testing has the potential to radically improve patient outcomes, particularly in underserved populations where improvement in early detection has been lackluster.

What do these innovations mean for policy? They provide clear examples of how we can and should drive substantial improvements in healthcare outcomes and costs by simply directing and applying existing technology and infrastructure more effectively. For example, the substance abuse screening models have promoted dialogue with payers about how they deliver disease management services so as to maximize enrollee-specific benefits in a cost-effective way—thereby ending the inefficient “one size fits all” model. The breast cancer risk identification algorithm, like our substance abuse screening models, has been developed within the current workflow, using readily available data without expensive and potentially risky diagnostic testing.

These decision support tools have tremendous potential to improve outcomes, but the barriers to implementation and widespread adoption are primarily cultural and financial rather than technological. To realize the full benefits of electronic health records, with improved healthcare quality and outcomes with lower attendant costs, it is imperative to adopt and promulgate policies, regulations, and reimbursement strategies that encourage widespread acceptance of this type of intelligence and that focus on the process of healthcare rather than the products and procedures of medicine. However, we have begun to discover that intelligent systems can in fact drive reform in their own right. We can deliver substantial improvements in care purely through more effective utilization of the data we have and how we process the data. As we progress toward integrated, intelligent informatics, patients and payers can begin to reorient the industry toward a more outcomes-focused model of care and reimbursement.

John S. Eberhardt III, is an executive vice president for healthcare at DecisionQ Corporation in Washington, DC.

Col. Alexander Stojadinovic, MD, FACS, U.S. Army, is the director of the Combat Wound Initiative and vice chairman of surgery at Walter Reed Army Medical Center and an associate professor of surgery at Uniformed Services University of the Health Sciences.

Todd A. Radano is an executive vice president at DecisionQ Corporation in Washington, DC.

John Epple is the director of business development at DecisionQ Corporation in Washington, DC.

## Notes

1. Weinstein, L., T. Radano, T. Jack, P. Kalina, and J. Eberhardt III. "Application of Multivariate Probabilistic (Bayesian) Networks to Substance Use Disorder Risk Stratification and Cost Estimation." *Perspectives in Health Information Management* 6 (Fall 2009).
2. Stojadinovic, A., C. Eberhardt, L. Henry, J. S. Eberhardt, E. A. Elster, G. E. People, A. Nissan, and C. D. Shriver. "Development of a Bayesian Classifier for Breast Cancer Risk Stratification: A Feasibility Study." *ePlasty Open Access Journal of Plastic Surgery* 10 (March 29, 2010).