

## What is “Big Data” and What Does it Mean for Healthcare?

In today’s world, business, innovation, and improvement are largely driven by data. The abstract idea of “big data” was first encountered over 70 years ago, but not until recent decades have industries begun to actively take advantage of what has been termed the “information explosion”.<sup>1</sup> In this first installment of a four part series, the history and background of big data are discussed, and the increasing attention being paid to big data in healthcare is explored within the context of the Four Pillars: the regulatory, reimbursement, competition, and technological environments of the healthcare market. Part II of the series, due next month, will delve into additional detail regarding the impact of big data on the technology sector of healthcare, within the context of the HIPAA/HITECH era.

The amount of data that is captured by our current healthcare system is classified as “big data”, which can be generally defined as “...datasets whose size is beyond the ability of typical database software tools to capture, store, manage, and analyze.”<sup>2</sup> A more technical definition of big data “...meets three criteria: volume, variety, and velocity”, requiring that the data equate to the size of terabytes or petabytes ( $10^9$  and  $10^{12}$  the size of a kilobyte, respectively); contain largely unstructured or varying types of data (i.e., not easily categorized or sorted, which makes up an estimated 85% of information in “today’s world”); and, be as close to “real-time” as possible.<sup>3</sup>

Big data has been described as having “...the potential to utterly transform the relationship that...patients [have] with the healthcare system...” and further, has been likened to historical events “...as great as the electronics revolution...perhaps even as great as the first and second Industrial Revolutions.”<sup>4</sup> One estimate predicts a reduction of \$300 to \$450 billion in healthcare spending with a system-wide adoption of big data innovation in healthcare.<sup>5</sup>

However potentially useful big data may prove to be to the healthcare industry, providers still must learn the most effective and accurate methods of collecting, managing, storing, and analyzing the data before its potential utility may become a reality. One concern is how to handle the sheer amount of data that can be collected for potential use, which ranges from clinical lab values to a range of diagnostic tests; quality and outcome indicators; billing; medication administration

orders; and, qualitative data captured in provider progress notes and consults, among others. One study estimated that in 2012, less than 3 percent of potentially useful big data underwent any type of analysis.<sup>6</sup>

Another challenge is how to interpret the wide variety of diagnostic information and medical terminology used across the industry today. In one example, the interpretation of a medical condition such as hypertension could also be interpreted as “high blood pressure” or “elevated blood pressure”.<sup>7</sup> Related to the idea of standardizing methodology and validating data accuracy is the healthcare industry’s lagging movement away from reimbursement based on fee-for-service to value-based purchasing reimbursement methodologies. This movement also depends on providers’ willingness to change practice styles to utilize big data to facilitate evidence-based care as opposed to individual clinical judgment.<sup>8</sup>

Another barrier to the utility of big data is the inherent fragmentation created by the current infrastructure of the healthcare delivery system; competing entities often work in silos of information, which impedes data sharing that would improve the coordination and integration of care across various providers. But with increased integration of care, and the influx of big data, providers and consumers alike harbor concerns about health information security and privacy in regard to compliance with the Health Insurance Portability and Accountability Act (HIPAA).<sup>9</sup> However, despite this myriad of potential barriers to the adoption of big data in healthcare, the industry is being subject to more and more regulation requiring reporting and sharing of information that draws upon big data that is already being collected, or is being requested for use.

On February 2, 2013, the Centers for Medicare and Medicaid Services requested information from medical specialty boards, societies, regional quality organizations, and other non-federal programs regarding the utility of data collected on eligible providers to a qualified clinical data registry in order to align such data with the existing Physician Quality Reporting System.<sup>10</sup> This request, among other initiatives to harness and use big data in healthcare, e.g., implementation of electronic health records; mandated reporting of healthcare quality and outcome indicators; and, increasing adoption of mobile healthcare technology to improve timeliness and

efficiency of care, will likely continue to drive the adoption of big data in the future delivery of healthcare.

Uses for big data are virtually limitless, the bounds of which various healthcare providers and enterprises have already begun to explore. However, there currently exist several barriers within the current healthcare marketplace that significantly impede the system-wide adoption of interventions that harness big data for industry improvement and cost savings initiatives. The remaining articles in this series will explore, in further detail, some of these interventions and associated barriers within the four pillars of the healthcare industry.

---

<sup>1</sup> “A Very Short History of Big Data”, by Gil Press, Forbes, May 9, 2013, [www.forbes.com/sites/gilpress/2013/05/09/a-very-short-history-of-big-data/print/](http://www.forbes.com/sites/gilpress/2013/05/09/a-very-short-history-of-big-data/print/) (Accessed 5/19/13)

<sup>2</sup> “Big Data: The Next Frontier for Innovation, Competition, and Productivity”, by James Manyika et al., McKinsey Global Institute, May 2011, p. 1

---

<sup>3</sup> “Big Data is the Future of Healthcare”, Bill Hamilton, Cognizant 20-20 Insights, September 2012, p. 1-3; “Demystifying Big Data: A Practical Guide to Transforming the Business of Government”, TechAmerica Foundation, October 3, 2012, p. 10-11

<sup>4</sup> “The Age of Big Data”, by Brad Peters, Forbes, July 12, 2012, <http://www.forbes.com/sites/bradpeters/2012/07/12/the-age-of-big-data/> (Accessed 5/16/13)

<sup>5</sup> “The Big-Data Revolution in US Health Care: Accelerating Value and Innovation”, by Basel Kayyali, David Knott, and Steve Van Kuiken, McKinsey & Company, April 2013, p. 5

<sup>6</sup> “The Digital Universe in 2020: Big Data, Bigger Digital Shadows, and Biggest Growth in the Far East”, by John Gantz and David Reinsel, IDC, December 2012, p. 11

<sup>7</sup> “6 Big Data Analytics Use Cases for Healthcare IT”, by Brian Eastwood, CIO, April 23, 2013, [www.cio.com/article/print/732160](http://www.cio.com/article/print/732160) (Accessed 5/19/13)

<sup>8</sup> *Ibid*, Basel Kayyali, David Knott, and Steve Van Kuiken, April 2013, p. 5

<sup>9</sup> *Ibid*, Bill Hamilton, September 2012, p. 5

<sup>10</sup> “Medicare Program; Request for Information on the Use of Clinical Quality Measures (CQs) Reported Under the Physician Quality Reporting System (PQRS), the Electronic Health Record (HER) Incentive Program, and Other Reporting Programs”, Centers for Medicare and Medicaid Services, Federal Register, Vol. 78, No. 26, February 7, 2013, p. 9057



(800) FYI - VALU

*Providing Solutions  
in the Era of  
Healthcare Reform*

Founded in 1993, HCC is a  
nationally recognized healthcare  
economic financial consulting firm

- **HCC Home**
- **Firm Profile**
- **HCC Services**
- **HCC Experts**
- **Clients Projects**
- **HCC News**
- **Upcoming Events**
- **Contact Us**
- **Email Us**

#### HEALTH CAPITAL

CONSULTANTS (HCC) is an established, nationally recognized healthcare financial and economic consulting firm headquartered in St. Louis, Missouri, with regional personnel nationwide. Founded in 1993, HCC has served clients in over 45 states, in providing services including: valuation in all healthcare sectors; financial analysis, including the development of forecasts, budgets and income distribution plans; healthcare provider related intermediary services, including integration, affiliation, acquisition and divestiture; Certificate of Need (CON) and regulatory consulting; litigation support and expert witness services; and, industry research services for healthcare providers and their advisors. HCC's accredited professionals are supported by an experienced research and library support staff to maintain a thorough and extensive knowledge of the healthcare reimbursement, regulatory, technological and competitive environment.



**Robert James Cimasi**, MHA, ASA, FRICS, MCBA, AVA, CM&AA, serves as Chief Executive Officer of **HEALTH CAPITAL CONSULTANTS (HCC)**, a nationally recognized healthcare financial and economic consulting firm headquartered in St. Louis, MO, serving clients in 49 states since 1993. Mr. Cimasi has over thirty years of experience in serving clients, with a professional focus on the financial and economic aspects of healthcare service sector entities including: valuation consulting and capital formation services; healthcare industry transactions including joint ventures, mergers, acquisitions, and divestitures; litigation support & expert testimony; and, certificate-of-need and other regulatory and policy planning consulting.

Mr. Cimasi holds a Masters in Health Administration from the University of Maryland, as well as several professional designations: Accredited Senior Appraiser (ASA – American Society of Appraisers); Fellow Royal Intuition of Chartered Surveyors (FRICS – Royal Institute of Chartered Surveyors); Master Certified Business Appraiser (MCBA – Institute of Business Appraisers); Accredited Valuation Analyst (AVA – National Association of Certified Valuators and Analysts); and, Certified Merger & Acquisition Advisor (CM&AA – Alliance of Merger & Acquisition Advisors). He has served as an expert witness on cases in numerous courts, and has provided testimony before federal and state legislative committees. He is a nationally known speaker on healthcare industry topics, the author of several books, the latest of which include: *“Accountable Care Organizations: Value Metrics and Capital Formation”* [2013 - Taylor & Francis, a division of CRC Press], *“The Adviser’s Guide to Healthcare”* – Vols. I, II & III [2010 – AICPA], and *“The U.S. Healthcare Certificate of Need Sourcebook”* [2005 - Beard Books]. His most recent book, entitled *“Healthcare Valuation: The Financial Appraisal of Enterprises, Assets, and Services”* will be published by John Wiley & Sons in the Fall of 2013.

Mr. Cimasi is the author of numerous additional chapters in anthologies; books, and legal treatises; published articles in peer reviewed and industry trade journals; research papers and case studies; and, is often quoted by healthcare industry press. In 2006, Mr. Cimasi was honored with the prestigious *“Shannon Pratt Award in Business Valuation”* conferred by the Institute of Business Appraisers. Mr. Cimasi serves on the Editorial Board of the Business Appraisals Practice of the Institute of Business Appraisers, of which he is a member of the College of Fellows. In 2011, he was named a Fellow of the Royal Institution of Chartered Surveyors (RICS).



**Todd A. Zigrang**, MBA, MHA, ASA, FACHE, is the President of **HEALTH CAPITAL CONSULTANTS (HCC)**, where he focuses on the areas valuation and financial analysis for hospitals and other healthcare enterprises. Mr. Zigrang has significant physician integration and financial analysis experience, and has participated in the development of a physician-owned multi-specialty MSO and networks involving a wide range of specialties; physician-owned hospitals, as well as several limited liability companies for the purpose of acquiring acute care and specialty hospitals, ASCs and other ancillary facilities; participated in the evaluation and negotiation of managed care contracts, performed and assisted in the valuation of various healthcare entities and related litigation support engagements; created pro-forma financials; written business plans; conducted a range of industry research; completed due diligence practice analysis; overseen the selection process for vendors, contractors, and architects; and, worked on the arrangement of financing.

Mr. Zigrang holds a Master of Science in Health Administration and a Masters in Business Administration from the University of Missouri at Columbia. He is a Fellow of the American College of Healthcare Executives, and serves as President of the St. Louis Chapter of the American Society of Appraisers (ASA). He has co-authored *“Research and Financial Benchmarking in the Healthcare Industry”* (STP Financial Management) and *“Healthcare Industry Research and its Application in Financial Consulting”* (Aspen Publishers). He has additionally taught before the Institute of Business Appraisers and CPA Leadership Institute, and has presented healthcare industry valuation related research papers before the Healthcare Financial Management Association; the National CPA Health Care Adviser’s Association; Association for Corporate Growth; Infocast Executive Education Series; the St. Louis Business Valuation Roundtable; and, Physician Hospitals of America.



**Anne P. Sharamitaro**, Esq., is the Executive Vice President & General Counsel of **HEALTH CAPITAL CONSULTANTS (HCC)**, where she focuses on the areas of Certificate of Need (CON); regulatory compliance, managed care, and antitrust consulting. Ms. Sharamitaro is a member of the Missouri Bar and holds a J.D. and Health Law Certificate from Saint Louis University School of Law, where she served as an editor for the Journal of Health Law, published by the American Health Lawyers Association. Ms. Sharamitaro has presented healthcare industry related research papers before Physician Hospitals of America and the National Association of Certified Valuation Analysts and co-authored chapters in *“Healthcare Organizations: Financial Management Strategies,”* published in 2008.