

Artificial Intelligence in Healthcare - Reimbursement (Part One of a Four-Part Series)

The prevalence and utilization of *artificial intelligence* (AI) is expanding in modern life, such as through the quotidian use of *intelligent assistants* such as *Siri*, *Alexa*, and Google. Similarly, the healthcare industry is experiencing a paradigm shift as a result of the growth of AI.¹ The ever-expanding scope and increasing speed at which data is bombarding users of technology demands new tools to properly store, to allow for timely retrieval, and to effectively analyze that data. These changes will significantly impact the daily function of healthcare providers. This Health Capital Topics article is the first installment of a four-part series, that will examine AI through the conceptual framework of the Four Pillars of Healthcare, i.e., Reimbursement, Regulation, Technology, and Competition. This first article will focus on how AI is affecting the current healthcare reimbursement environment.

AI is an overarching term that denotes when a computer program uses data and algorithms to continuously "*learn*" in order to complete a task.² Current cutting-edge AI systems use *deep learning*, a process that strengthens internal problem solving networks in order to quickly classify inputs based on multiple qualifiers, such as an AI system identifying the model of a car by looking at its size, manufacturer emblem, shape, and even engine sound.³ Older AI systems utilize *machine learning*, which is similar to *deep learning* but is more limited in the size and complexity of the tasks it can complete.⁴ Both methods, i.e., *deep learning* and *machine learning*, are currently in use in the healthcare industry.⁵

The *Centers for Medicare and Medicaid Services* (CMS) is the largest payor of medical costs, mainly through the Medicare and Medicaid programs.⁶ The federal government, which functions as a *de facto* rate setter for commercial insurance due to its leverage in the marketplace,⁷ has historically developed reimbursement models reactively, and has not been swift to develop new, innovative payment models or to reimburse emerging technologies. For example, telemedicine has been in use for nearly three decades, but Medicare did not begin reimbursing for telemedicine services until 2011.⁸ Despite this lack of direct reimbursement to providers for AI-related services, health organizations have been incentivized to use AI to generate revenues indirectly,

e.g., through savings arising from more efficient data entry and coding processes.

AI currently assists healthcare organizations in providing more efficient and accurate care, allowing for the completion of a greater number of reimbursable services. For example, SpeechPro partnered with PenRad to outfit hospital rooms with AI-installed biometric devices that allow providers to leverage voice recognition technologies to enter data verbally (rather than by hand), eliminating the need for staff to type in information, allowing for quick and secure care, as well as decreasing the risk of hospital-acquired infections, because providers are no longer touching as many objects in the patient room and potentially spreading bacteria or viruses.⁹ Other healthcare providers are partnering with technology companies to develop AI-powered "chatbots," also called "intelligent assistants," which work to analyze patient questions over an Internet connection, and then, based on the *chatbot*'s triage of the patient-communicated ailment, forwards the patient to the appropriate live support personnel; the chatbot can also suggest physicians and answer insurance questions for the patient.¹⁰ Similarly, Amazon has partnered with companies to develop skills for Alexa, its AI-powered intelligent assistant, to provide voice-activated services that, based upon the patient's question or aliment, can suggest reading materials, immediately connect the patient to a physician for a telemedicine consultation, schedule the patient for an in-person appointment with a specialist, or direct the patient to "more urgent care."11 These chatbots are streamlining evaluation and management services in healthcare by completing a portion of the patient evaluation before the patient ever interacts with a human provider. In addition to the support provided by these *chatbots* to patients, the speech recognition software included in chatbots can support providers in the input of medical, coding, and billing data, allowing physicians to see more patients and more effectively bill insurers by verbally inputting data (at a quicker speed that what they could type) concurrently with their patient evaluation.¹²

AI is also enhancing the process of medical coding and billing, allowing providers to capture previously unbilled services. Many providers, due to a lack of education, fear of federal legal action, or other reasons, "undercode" services, i.e., submit a code that reports "a lower-level service than is supported by documentation," causing them to forfeit reimbursable services.¹³ For example, a physician may submit a claim for an average office visit, which includes only one chronic illness or injury, when the provider could easily bill for a code for more intense treatment because the patient, in fact, had two or more chronic illnesses or injuries.¹⁴ AI tools designed to review human coding decisions for accuracy could be trained to maximize reimbursable services that were not originally coded for billing, potentially leading to increases in the amount that a provider is reimbursed.¹⁵ In addition to reviewing coding decisions, AI can also analyze the inputted codes and ensure federal programs are being properly billed. For example, the federal government uses AI extensively to detect and enforce miscoded services, mainly through Recovery Audit Contractors (RACs) whose AI-powered algorithms search for trends in billing to identify potentially erroneous and/or fraudulent submissions.¹⁶ The implementation of AI solutions by healthcare organizations may identify and remedy these billing errors before RACs detect them, potentially avoiding the notoriously burdensome audit process of RACs and potential penalties.17

In addition to utilizing AI within the clinical and billing arenas, both healthcare enterprises and insurers are utilizing AI in the analysis of big data collected from electronic health records and other data inputs to track patient care. Healthcare enterprises are seeking to reduce costs, or to enhance incentive-based payments, by utilizing big data to track physicians and "monitor...their progress toward [quality] goals, such as giving recommended mammograms."¹⁸ Private insurers are similarly using AI to track physicians, and have stated their plans to set rates for overall episodes of care, which will financially punish those physicians who provide the costliest care.¹⁹ A 2013 McKinsey & Co. report noted that "[w]ith these emerging shifts in the reimbursement landscape [from volume-based to value-based], healthcare stakeholders have an incentive to compile and exchange big data more readily."20 The report estimated that long-term healthcare industry savings from reduced spending as a result of an increased use of technology related to big data could be as high as \$450 billion.²¹ The Workgroup for Electronic Data Interchange (WEDI), a healthcare information technology nonprofit that advises the U.S. Department of Health and Human Services (HHS), released a report in March 2016 finding that as healthcare financing shifts to value-based reimbursement, the use of AI can quickly identify and close gaps in care.²² The report conducted a case study on a Delaware healthcare organization, Christiana Care Health System, that utilized AI to analyze historical and real-time health data from multiple sources in order to "identify at-risk populations and gaps in care," and allowed medical staff to more effectively treat patients.²³

As revenue streams tighten due to the paradigm shift from *volume-based* to *value-based reimbursement*, AI will likely become an even more important resource for healthcare organizations. Although AI's current use falls outside of the healthcare services for which insurers are currently reimbursing, the greatest effect of AI on the U.S. healthcare industry in an era of reform may be the efficiency with which providers are able to bill for services in an evolving reimbursement environment and the opportunity to reduce operating expenses by replacing tasks performed by humans with AI solutions.

The next article will discuss AI in the current regulatory environment of the U.S. healthcare industry.

Reports/NationalHealthExpendData/NationalHealthAccountsPro jected.html (Accessed 4/25/2017), Table 3.

- 7 "Medicare's Role in Determining Prices throughout the Health Care System: Mercatus Working Paper" By Roger Feldman et al., Mercatus Center, George Mason University, October 2015, http://mercatus.org/sites/default/files/Feldman-Medicare-Role-Prices-oct.pdf (Accessed 12/11/2015), p. 3-5.
- 8 "Telehealth Services" 42 C.F.R. Ch. IV § 410.78 (October 1, 2011), p. 404.
- 9 "SpeechPro Partners with PenRad to Offer Touchless Data Entry and Security for Hospitals" Press Release, PR Web, July 22, 2015,

- 10 "Microsoft Takes Another Crack at Health Care, This Time With Cloud, AI and Chatbots" By Dina Bass, Bloomberg (February 16, 2017), https://www.bloomberg.com/news/articles/2017-02-16/microsoft-takes-another-crack-at-health-care-this-time-withcloud-ai-and-chatbots (Accessed 4/18/2017).
- 11 "HealthTap Launches Voice-Activated Doctor A.I. Through Amazon's Alexa" HIT Consultant (February 20, 2017), http://hitconsultant.net/2017/02/20/healthtap-launches-voiceactivated-doctor-amazons-alexa/ (Accessed 4/24/2017).
- 12 Dina Bass, Bloomberg, February 16, 2017
- 13 "Coding: The Under-coding Epidemic" By Bill Dacey, Physicians Practice, April, 1, 2006, http://www.physicianspractice.com/articles/coding-undercoding-epidemic (Accessed 4/18/2017); "Medicare Contractor

 [&]quot;From Virtual Nurses To Drug Discovery: 106 Artificial Intelligence Startups In Healthcare" CB Insights, February 3, 2017, https://www.cbinsights.com/blog/artificial-intelligencestartups-healthcare/ (Accessed 4/25/2017).

^{2 &}quot;What's the Difference Between Artificial Intelligence, Machine Learning, and Deep Learning?" By Michael Copeland, Nvidia, July 29, 2016, https://blogs.nvidia.com/blog/2016/07/29/whatsdifference-artificial-intelligence-machine-learning-deeplearning-ai/ (Accessed 4/4/2017).

^{3 &}quot;What Is The Difference Between Deep Learning, Machine Learning and AI?" By Bernard Marr, Forbes (Dec. 8, 2016), https://www.forbes.com/sites/bernardmarr/2016/12/08/what-isthe-difference-between-deep-learning-machine-learning-andai/2/#224cdc79154f (Accessed 4/6/2017).

⁴ *Ibid.;* Michael Copeland, July 29, 2016

⁵ See, e.g., "First FDA Approval For Clinical Cloud-Based Deep Learning In Healthcare" By Bernard Marr, Forbes, January 20, 2017, https://www.forbes.com/sites/bernardmarr/2017/01/20/first-fda-

approval-for-clinical-cloud-based-deep-learning-inhealthcare/#21cbd469161c (Accessed 4/25/2017).

⁶ Projections for 2017 estimate that health insurance funds an estimated 74.9 percent of National Health Expenditures (NHE), with private insurance payments projected to account for 34.2 percent of these expenditures, and Medicare and Medicaid expecting to account for 36.9 percent of NHE in 2017, at 20.3 percent and 16.6 percent, respectively "National Health Expenditure Projections 2016-2025" Centers for Medicare and Medicaid Services, March 21, 2017, https://www.cms.gov/Research-Statistics-Data-and-

Systems/Statistics-Trends-and-

http://www.prweb.com/releases/2015/07/prweb12856076.htm (Accessed 4/24/2017).

Calls Out the Perils of Undercoding" By John Verhovshek, American Academy of Professional Coders, October 3, 2016, https://www.aapc.com/blog/36417-medicare-contractor-callsout-the-perils-of-undercoding/ (Accessed 4/25/2017).

- 14 Bill Dacey, Physicians Practice, April, 1, 2006
- 15 "Unravelling The Mysteries Of Medical Billing With Artificial Intelligence" By David Bayer, Health IT Outcomes, October 12, 2016, https://www.healthitoutcomes.com/doc/unravelling-themysteries-of-medical-billing-with-artificial-intelligence-0001 (Accessed 4/25/2017); See, e.g., "Computer Assisted Coding Emscribe®" Artificial Medical Intelligence, http://www.artificialmed.com/computer-assisted-codingemscribe/ (Accessed 4/25/2017).
- 16 "Pervasive Medicare Fraud Proves Hard to Stop" By Reed Abelson and Eric Lichtblau, The New York Times, (August 15, 2014), (2014), (2014), (2014)

https://www.nytimes.com/2014/08/16/business/uncoveringhealth-care-fraud-proves-elusive.html (Accessed 4/20/2017).

17 "GAO finds Medicare's audit contractors may duplicate efforts" By Bob Herman, Modern Healthcare, (August 14, 2014), http://www.modernhealthcare.com/article/20140814/NEWS/308 149964/gao-finds-medicares-audit-contractors-may-duplicateefforts (Accessed 4/20/2017); "Hospitals sue HHS over sluggish RAC appeals" By Joe Carlson, Modern Healthcare, (May 23, 2014),

http://www.modernhealthcare.com/article/20140523/NEWS/305 239965/hospitals-sue-hhs-over-sluggish-rac-appeals (Accessed 4/20/2017).

18 "Hospitals Prescribe Big Data to Track Doctors at Work" By Anna Wilde Mathews, The Wall Street Journal, (July 11, 2013), online.wsj.com/article/SB1000142412788732355100457844115 4292068308.html#printMode (Accessed 4/14/2017).

20 "The 'big data' revolution in healthcare: Accelerating value and innovation" By Peter Groves, Basel Kayyali, David Knott, Steve Van Kuiken, McKinsey & Company, January 2013, p. 3.

22 "Report: Closing Gaps in Care through Health Data Exchange" Louis W. Sullivan Institute for Healthcare Innovation and the Workgroup for Electronic Data Interchange, March 31, 2016, http://www.wedi.org/docs/publications/full-report.pdf?sfvrsn=4 (Accessed 4/20/2017), p. 26.

23 Ibid.



¹⁹ Ibid.

²¹ Ibid. p. 1, 8.



(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

HCC Services

- Valuation Consulting
- <u>Commercial</u> <u>Reasonableness</u> <u>Opinions</u>
- <u>Commercial Payor</u> <u>Reimbursement</u> <u>Benchmarking</u>
- <u>Litigation Support &</u> <u>Expert Witness</u>
- <u>Financial Feasibility</u> Analysis & Modeling
- Intermediary <u>Services</u>
- <u>Certificate of Need</u>
- <u>ACO Value Metrics</u>
 <u>& Capital Formation</u>
- Strategic Consulting
- <u>Industry Research</u> Services



Robert James Cimasi, MHA, ASA, FRICS, MCBA, CVA, 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 Master in Health Administration from the University of Maryland, as well as several professional designations: Accredited Senior Appraiser (ASA – American Society of Appraisers); Fellow Royal Institution of Chartered Surveyors (FRICS – Royal Institution of Chartered Surveyors); Master Certified Business Appraiser (MCBA – Institute of Business Appraisers); Certified Valuation Analyst (CVA – 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 – 2nd Edition" [2015 – AICPA]; "Healthcare Valuation: The Financial Appraisal of Enterprises, Assets, and Services" [2014 – John Wiley & Sons]; "Accountable Care Organizations: Value Metrics and Capital Formation" [2013 - Taylor & Francis, a division of CRC Press]; and, "The U.S. Healthcare Certificate of Need Sourcebook" [2005 - Beard Books].

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). In 2016, Mr. Cimasi was named a "Pioneer of the Profession" as part of the recognition of the National Association of Certified Valuators and Analysts (NACVA) "Industry Titans" awards, which distinguishes those whom have had the greatest impact on the valuation profession.



Todd A. Zigrang, MBA, MHA, ASA, FACHE, is the President of HEALTH CAPITAL CONSULTANTS (HCC), where he focuses on the areas of valuation and financial analysis for hospitals, physician practices, and other healthcare enterprises. Mr. Zigrang has over 20 years of experience providing valuation, financial, transaction and strategic advisory services nationwide in over 1,000 transactions and joint ventures. Mr. Zigrang is also considered an expert in the field of healthcare compensation for physicians, executives and other professionals.

Mr. Zigrang is the co-author of "*The Adviser's Guide to Healthcare – 2nd Edition*" [2015 – AICPA], numerous chapters in legal treatises and anthologies, and peer-reviewed and industry articles such as: *The Accountant's Business Manual* (AICPA); *Valuing Professional Practices and Licenses* (Aspen Publishers); *Valuation Strategies*; *Business Appraisal Practice*; and, *NACVA QuickRead*. In addition to his contributions as an author, Mr. Zigrang has served as faculty before professional and trade associations such as the American Society of Appraisers (ASA); the National Association of Certified Valuators and Analysts (NACVA); Physician Hospitals of America (PHA); the Institute of Business Appraisers (IBA); the Healthcare Financial Management Association (HFMA); and, the CPA Leadership Institute.

Mr. Zigrang holds a Master of Science in Health Administration (MHA) and a Master of Business Administration (MBA) from the University of Missouri at Columbia. He is a Fellow of the American College of Healthcare Executives (FACHE) and holds the Accredited Senior Appraiser (ASA) designation from the American Society of Appraisers, where he has served as President of the St. Louis Chapter, and is current Chair of the ASA Healthcare Special Interest Group (HSIG).



John R. Chwarzinski, MSF, MAE, is Senior Vice President of HEALTH CAPITAL CONSULTANTS (HCC). Mr. Chwarzinski's areas of expertise include advanced statistical analysis, econometric modeling, as well as, economic and financial analysis. Mr. Chwarzinski is the co-author of peerreviewed and industry articles published in *Business Valuation Review* and *NACVA QuickRead*, and he has spoken before the Virginia Medical Group Management Association (VMGMA) and the Midwest Accountable Care Organization Expo.

Mr. Chwarzinski holds a Master's Degree in Economics from the University of Missouri – St. Louis, as well as, a Master's Degree in Finance from the John M. Olin School of Business at Washington University in St. Louis. He is a member of the St. Louis Chapter of the American Society of Appraisers, as well as a candidate for the Accredited Senior Appraiser designation from the American Society of Appraisers.



Jessica L. Bailey-Wheaton, Esq., is Vice President and General Counsel of HEALTH CAPITAL CONSULTANTS (HCC), where she conducts project management and consulting services related to the impact of both federal and state regulations on healthcare exempt organization transactions and provides research services necessary to support certified opinions of value related to the Fair Market Value and Commercial Reasonableness of transactions related to healthcare enterprises, assets, and services. Ms. Bailey-Wheaton is a member of the Missouri and Illinois Bars and holds a J.D., with a concentration in Health Law, from Saint Louis University School of Law, where she served as Fall Managing Editor for the *Journal of Health Law & Policy*.



Daniel J. Chen, MSF, is a Senior Financial Analyst at **HEALTH CAPITAL CONSULTANTS** (HCC), where he develops fair market value and commercial reasonableness opinions related to healthcare enterprises, assets, and services. In addition he prepares, reviews and analyzes forecasted and pro forma financial statements to determine the most probable future net economic benefit related to healthcare enterprises, assets, and services and applies utilization demand and reimbursement trends to project professional medical revenue streams and ancillary services and technical component (ASTC) revenue streams. Mr. Chen has a M.S. in Finance from Washington University St. Louis.