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Is AI the Cure for Cancer?

Research has expanded the use of *Artificial Intelligence* (AI) to further revolutionize healthcare, specifically in personalized cancer diagnosis and treatment.[1] In April 2015, the *International Business Machine Corporation* (IBM) announced the development of a cognitive computing software called "*Watson Healthcare Cloud*," a cloud database where "*providers and researchers can share and analyze health data for greater insights into trends to improve individual and overall patient outcomes*."[2] With its ability to process data, the Watson Healthcare Cloud has the potential to revolutionize cancer treatment in the near and distant future. Nevertheless, skeptics are concerned that the use of this newest AI technology may lead to negative consequences, including security breaches resulting in *Health Insurance Portability and Accountability Act* (HIPAA) violations as well as potential white-collar job losses.[3] This Health Capital Topics Article will describe the Watson Healthcare Cloud, its current utilization, and the potential benefits and barriers to its development for the future.

Watson's essential feature is its ability to process and compare patient data to large data sets on an unprecedented scale. After inserting diagnostic information provided by clinicians – including genetic sequence, patient symptoms, and laboratory results – Watson utilizes the latest computer processing capabilities to match a patient's data with relevant medical literature and clinical trials to determine the proper treatment pathway.[4] This data processing tool has already had clinical impacts. First, doctors in certain health systems have begun to use Watson in the creation of personalized cancer treatments based on personally identifiable markers in a patient with cancer, commonly known as "*genetic fingerprints*." IBM has partnered with Mayo Clinic to integrate Watson's cognitive computing mechanisms to match a cancer patient to the appropriate clinical trial.[5] Second, care teams are inputting information from a patient's *electronic health record* (EHR) to improve and personalize oncology care by "*connecting traditional sources of patient information with the growing pools of dynamic and constantly growing healthcare information*."[6] The end goal is for Watson to completely replace the way decisions are made by a committee of doctors and increase the focus on personalized treatments for each individual patient.[7]

From the clinician's perspective, managing the challenges relating to the provision of quality oncology care is essential yet often difficult. These challenges include:

> "*(1) managing the sheer quantity and heterogeneity of the data and knowledge involved – encompassing millions of medical records, genomewide datasets, and documents; (2) planning thousands of complex, multistep treatment strategies that ethically balance the needs of the individual with those of science; (3) capturing and analyzing the results of these treatment experiments in diverse causal and empirical models of cancer biology and drug response; (4) continuously testing and refining these models to account for new clinical and laboratory findings; (5) generalizing the models across patients and cancers and integrating them to improve decision making; and (6) integrating human and machine planning, learning, and decision making to exploit their respective strengths*."[8]

While these challenges are unavoidable and often insurmountable, many see that the utilization of "*super-intelligence*" such as Watson could overcome these challenges and support the ultimate goal of curing cancer.[9] For example, IBM has announced its collaboration with 14 cancer centers using Watson's Genomic Analytics.[10] The goal of this collaboration is to give clinicians the capability to identify more personalized and precision-based cancer treatments for a broader patient population.[11] For example, the Genome Institute at Washington University in St. Louis has partnered with IBM's Watson to compare the genetic data of individual cancer patients with various cancer gene databases and every published scientific paper regarding cancer genetics.[12] What typically takes experts hours or days to analyze has now been accomplished in a matter of minutes.[13] Consequently, Watson may replace current decision-making protocols regarding which drugs to give a patient based on his or her genetic information, as well as information from scholarly articles/research already available.[14]

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Even with the potential benefits of utilizing AI in the diagnosis and treatment of cancer, there is still heated debate regarding whether the various disadvantages and risks could overshadow its potential clinical and research benefits. One major factor has been the potential loss of white-collar jobs. In many instances in history, as technology progressed, certain occupations became obsolete. "*The original 'computers' were drudges, often women, who performed endless calculations for their higher-ups. Just as transistors took their place, so AI will probably turf out whole regiments of white-collar workers.*"[15] However, researchers at the *Massachusetts Institute of Technology* (MIT) have emphasized that Watson will only be used to "*mak[e] doctors' jobs easier*," not to replace them.[16] Another major risk of AI in cancer research is security in the Watson Health Cloud's features. In the healthcare context, improperly secured patient information may subject both a covered entity (i.e., the healthcare provider) and their business associates (i.e., the operator of Watson) to potential liability under HIPAA.[17] In response to this concern, IBM is continuously working to modify the cloud's platform to allow massive amounts of confidential personal health information to be anonymized and shared in a secure setting.[18] Additionally, IBM has begun implementing the "*IBM QRadar*," which is a security intelligence software used by the Watson Health Cloud to help organizations quickly target, identify, and prioritize security threats.[19] The application of AI has significantly expanded over the past few years and, considering the above developments, will likely progress further in years to come. AI's extensive capabilities can ultimately transform the healthcare industry and significantly impact cancer research.[20] The U.S. spends billions of dollars each year on gene sequencing and targeting genetic mutations.[21] However, cancer may involve thousands of mutations, and Americans spend an average of $2.6 billion to identify the proper drug treatment for a patient.[22] Additionally, the *U.S. Food and Drug Administration* (FDA) preclinical and clinical testing phases can take an additional 12 to 15 years after the initial identification of the treatment.[23] The use of AI, specifically Watson, can substantially decrease the drug discovery time and cost through its ability to synthesize trillions of data points in a matter of days, in contrast to years.[24]

Moreover, there have been announcements of other partnerships to aid in the "*Watson-in-medicine business pursuit.*"[25] For example, IBM is utilizing Watson in its collaborations with: (1) Apple to develop apps and tools systems for data collection in clinical trials; (2) Johnson & Johnson to create a personal concierge service to prepare patients for knee surgery and recovery; and, (3) Medtronic to collect data regarding patients' personal use of implantable heart devices and diabetes products and understand how well the implants are working.[26] With today's technological advancements in healthcare, the likelihood of discovering a cure for cancer, or any other chronic disease, has increased exponentially. Despite the potential risks, the emerging utilization of AI, specifically Watson, can be a means to an end for cancer, and other chronic diseases, and have a positive life-altering effect on patients, as well as their providers.

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1 "Is AI the Killer App for Cancer?" By Caleb Garling, Wired, 2015, http://www.wired.com/2015/04/ai-killer-app-cancer/ (Accessed 4/30/15).
2 "IBM launches Watson Health global analytics cloud" By Lucas Mearian, ComputerWorld, April 14, 2015, http://www.computerworld.com/article/2909534/ibm-launches-watson-health-global-analytics-cloud.html (Accessed 5/12/15).
3 "IBM Watson Dives Further Into Cloud, Healthcare Analytics" By William Terdoslavich, Information Week, May 5, 2015, http://www.informationweek.com/big-data/big-data-analytics/ibm-watson-dives-further-into-cloud-healthcare-analytics/d/d-id/1320291 (Accessed 5/7/15); "The Dawn of Artificial Intelligence" The Economist, May 9, 2015, http://www.economist.com/news/leaders/21650543-powerful-computers-will-reshape-humanitys-future-how-ensure-promise-outweighs (Accessed 5/11/15).
4 "Transforming Cancer Patient Care with IBM Watson for Oncology" IBM, 2015, http://www.ibm.com/smarterplanet/us/en/ibmwatson/watson-oncology.html (Accessed 5/13/15).
5 "IBM's Watson Takes on Cancer Screening Challenge" By Michael Moore, Tech Week Europe, May 6, 2015, http://www.techweekeurope.co.uk/data-storage/ibm-watson-cancer-screening-167680 (Accessed 5/7/15).
6 *Ibid.*
7 "AI Being Used to Help Cancer Patients" By Sead Fadilpasic, IT Pro Portal, May 6, 2015, http://www.itproportal.com/2015/05/06/ibm-ai-watson-help-cancer-patients/ (Accessed 5/7/15).
8 "Cancer: A Computational Disease that AI Can Cure", By Jay Tenenbaum and Jeff Shrager, AI Magazine, Vol. 32, No. 2, Summer 2011, p.14-26, http://www.aaai.org/ojs/index.php/aimagazine/article/view/2345/2213 (Accessed 4/30/15).
9 "Artificial Intelligence Raises New Hope for Cancer Patients", By James Temple, Re/Code, June 7, 2014, http://recode.net/2014/06/07/artificial-intelligence-raises-new-hope-for-cancer-patients/ (Accessed 4/30/15).
10 "IBM Announces Watson Genomic Analytics; Collaboration with 14 Cancer Centers" Bio-IT World, May 5, 2015, http://www.bio-itworld.com/2015/5/5/ibm-announces-watson-genomic-analytics.html (Accessed 5/11/15).
11 *Ibid.*
12 "IBM's Watson Enters Market for Analyzing Cancer Genetics" By Matthew Herper, Forbes, May 5, 2015, http://www.forbes.com/sites/matthewherper/2015/05/05/ibms-watson-enters-market-for-analyzing-cancer-genetics/ (Accessed 5/11/15).
13 *Ibid.*
14 *Ibid.*
15 The Economist, May 9, 2015.
16 "MIT developing cancer-diagnosis AI software" By Chuck Bednar, RedOrbit, April 25, 2015, http://www.redorbit.com/news/health/1113378507/mit-developing-cancer-diagnosis-ai-software-042515/ (Accessed 5/11/15).
17 "HIPAA Privacy and Security Basics for Providers" Centers for Medicare & Medicaid Services, July 2014, http://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/Downloads/HIPAAPrivacyandSecurity.pdf (Accessed 9/23/14) p. 2.
18 "IBM Expands Watson Ecosystem with New Partnerships, Cognitive Computing Apps and Services" IT News Online, May 5, 2015, http://www.itnewsonline.com/prnewswire/IBM-Expands-Watson-Ecosystem-with-New-Partnerships-Cognitive-Computing-Apps-and-Services/376942 (Accessed 5/11/15).

(Continued on next page)

19 "IBM Brings Security Intelligence to the Cloud" By Darryl Taft, E-Week, April 23, 2015, http://www.eweek.com/security/ibm-brings-security-intelligence-to-the-cloud.html (Accessed 5/11/15).
20 "Identifying Cancer Research Studies" Artificial Intelligence in Medicine, Inc., 2015, http://www.aim.ca/cancer-research/ (Accessed 5/6/15).
21 "Artificial Intelligence and the Transformation of Healthcare" By Niven Narain, Wired Innovation Insights, January 22, 2015, http://insights.wired.com/profiles/blogs/artificial-intelligence-and-the-transformation-of-healthcare#axzz3ZNuUytHN (Accessed 5/6/15).
22 *Ibid.*
23 *Ibid.*
24 *Ibid.*
25 "IBM Is Collaborating With Apple On Artificial Intelligence Health Program" WT Vox, April 14, 2015, https://wtvox.com/2015/04/ibm-is-collaborating-with-apple-on-artificial-intelligence-health-program/ (Accessed 5/11/15).
26 *Ibid.*

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