By Barry P. Chaiken, MD, FHIMSS

Watson, come here. I need you!

Although a call for Watson brings to mind Alexander Graham Bell's first words on the telephone or Sherlock Holmes's greeting to his physician companion, *The New York Times* heralded another Watson on its February 17, 2011, front page. The artificial intelligence computer system won on the game show *Jeopardy!* In the television program's only computer versus machine match-up, Watson defeated Brad Rutter, the biggest all-time money winner, and Ken Jennings, the record holder for the longest championship streak. Watson had access to 200 million pages of structured and unstructured content, which consumed more than four terabytes of disk space. Fortunately for Mr. Rutter and Mr. Jennings, Watson did not have access to the Internet.

While Watson surely bested its human competitors in its ability to "push the buzzer"—the computer was directly connected to the signaling device—it struggled with categories rich in nuance, particularly those containing only a few words. While most humans can discern meaning from short expressions by combining personal experience with generalization of word meanings, Watson processed data much too literally.

This experience with Watson illuminates how artificial intelligence computer systems offer healthcare providers robust, evidence-based clinical decision support. In addition, it identifies the special role humans play in diagnosing and treating patients. If combined together, these capabilities can synergistically offer higher levels of valuable and effective care.

Need for More Clinicians

With passage of the Affordable Care Act of 2010, as many as 32 million additional individuals will be added to the insurance rolls as the provisions of the Act take effect over the next four years. The baby-boom generation is just reaching retirement age and the point in their lives when their demand for healthcare services increases significantly. Massachusetts, the leader in healthcare reform and universal coverage, is experiencing a severe shortage of primary care physicians, leading to long waits for appointments despite the fact that it has one of the country's highest physician-to-patient ratios. The American Association of Medical Colleges projects a shortage of 45,400 and 65,800 primary care physicians in the United States in 2020 and 2025 respectively.

Although expansion of education and training provides a means to address these shortages in the future, clinical decision support, properly deployed among a variety of different types of clinicians, offers a significant tool to leverage existing clinical resources now. Intelligently designed clinical decision support, properly implemented among trained staff, expands the capabilities of clinicians at all levels, allowing them to expand the number and types of patients they treat.

Innovative Use of HIT Needed

To meet the healthcare needs of our fellow citizens, our healthcare system requires a health information technology revolution, a drastic change in the way we deliver care by utilizing information technology (IT) in new and innovative ways. Deploying healthcare IT to replicate the processes and workflows that currently deliver our poor results on so many measures only guarantees continued suboptimal and unacceptable clinical and financial outcomes.

We must focus on three key areas: 1) information technology tools, 2) processes and workflows, and 3) healthcare provider tasks, duties, and responsibilities.

Solutions come from an in-depth understanding of tools and creative thinking around what each healthcare professional can do and how best to deploy an individual's skill. Valued healthcare IT solutions offer these professionals healthcare IT tools that leverage their unique skill, while organizing the processes and workflows to deliver a consistently high quality, safe, and efficient healthcare outcome.

Clinical Decision Support Expands Access

Clinical decision support at the point of care plays a significant role in expanding the number of clinicians available to provide primary care. Through such healthcare IT tools, best practices—those that we know from scientific evidence offer the highest probability to produce the

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best healthcare outcome—can be delivered to each patient by healthcare professionals educated, guided, and "double-checked" by the healthcare IT tool.

Currently, patient care delivery relies upon an unreliable system formed from poorly integrated and highly variable human parts. Solutions integrating clinical decision support provide needed support tools that increase the reliability of the human components, while integrating these components through effective processes and efficient workflows. In addition, as best practices change, they can be delivered efficiently through the existing workflow by simply changing the knowledge contained in the clinical decision support tool. Currently, changing practice patterns requires the inefficient, and mostly ineffective, method of targeted medical education.

Changing What Clinicians Do

Deployment of clinical decision support within healthcare IT systems fundamentally changes what physicians, nurses, and other healthcare professionals do. Physician activities become more challenging on a cognitive level as other routine tasks such as drug dose recall, use of best practice order sets, and drug-allergy checking become automated. Physician expertise is assigned to more important tasks including solving difficult diagnostic problems, devising customized patient treatment plans, and influencing patient adherence to chronic disease care regimens.

Work for nurses and other healthcare professionals changes dramatically too. More tasks, formerly done by physicians or healthcare specialists, are completed by these professionals guided by intelligent processes and workflows that include meaningful healthcare IT. Therefore, the number of qualified clinicians available to deliver quality care increases to meet the demands of the increasing insured population.

Clinical knowledge and experience, normally obtained only through years of study and work, can now be codified in clinical decision support tools that less trained clinicians can apply to their patients. The delivery of care is now standardized around a high level of quality, with outlier patients—those identified as having unusual medical problems and in need of more complex care plans—referred to primary care physicians or physician specialists.

As chronic care patients make up the majority of an ambulatory adult medicine practice, many visits engender monitoring of a patient's medical condition rather than diagnostic activities or significant changes made to therapeutic plans. Reducing the number of these types of patients seen by physicians frees them up to care for patients requiring higher levels of service.

Expanding the capabilities of all clinicians through the deployment of clinical decision support increases the availability of primary care providers while ensuring high levels of quality care.

The revolution for healthcare providers is inherent in the dramatic change needed in what professionals do and how they do it. Therefore, effective change management techniques must be utilized to facilitate the acceptance of new responsibilities and duties in addition to the new processes and workflows required of these new roles.

For information technology to play a valuable role in reducing healthcare costs while enhancing quality of care, it must be deployed in a way that completely reinvents how care is delivered, professionals provide the care, and technology is leveraged. Watson's success on *Jeopardy!* demonstrates the capabilities of computers to store and retrieve medical knowledge at the point of care, thereby freeing clinician minds from the unnecessary

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burden of recalling facts. Clinicians are freed to focus on their patients while more effectively utilizing their ability to identify unusual patterns previously obscured by the "noise" inherent in a busy practice.

In 2011, progressive organizations will further the deployment of computer-based clinical decision support, rework the roles of all caregivers, and transform their processes to achieve ever-increasing levels of quality, safety, and efficiency of care delivery. ▮PSQH

Barry Chaiken *is the chief medical officer of DocsNetwork, Ltd. and a member of the Editorial Advisory Board for* Patient Safety & Quality Healthcare. *With more than 20 years of experience in medical research, epidemiology, clinical information technology, and patient safety, Chaiken is board certified in general preventive medicine and public health and is a Fellow, and former Board member and Chair of HIMSS. As founder of DocsNetwork, Ltd., he has worked on quality improvement studies, health IT clinical transformation projects, and clinical investigations for the National Institutes of Health, U.K. National Health Service, and Boston University Medical School. He may be contacted at bchaiken@docsnetwork.com.*

REFERENCES

Markoff, J. (2011, February 16). Computer wins on 'Jeopardy!': Trivial, it's not. *The New York Times*. Available at http://www.nytimes.com/2011/02/17/science/17jeopardy-watson.html
Watson (computer). (2011, April 26). In Wikipedia, *The Free Encyclopedia*. Available at http://en.wikipedia.org/w/index.php?title=Watson_(computer)&oldid=425982822