IBM Watson

Watson in Healthcare

EHiN 2015

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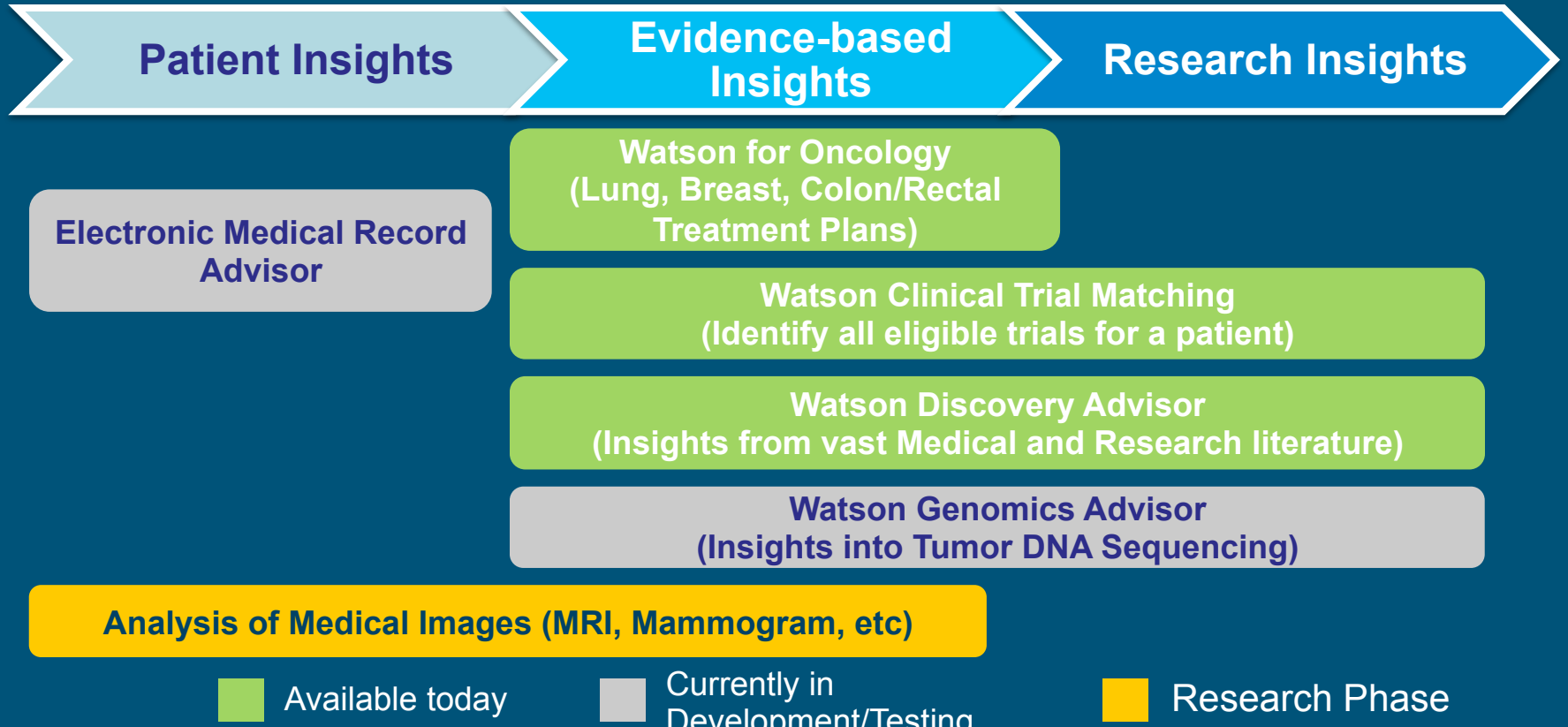
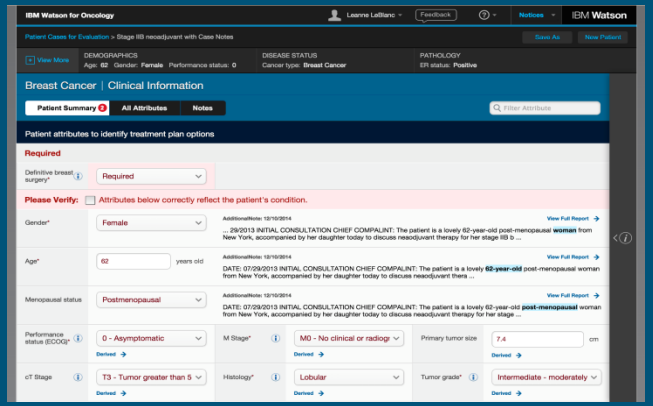
 - *Nephrology Advisor*

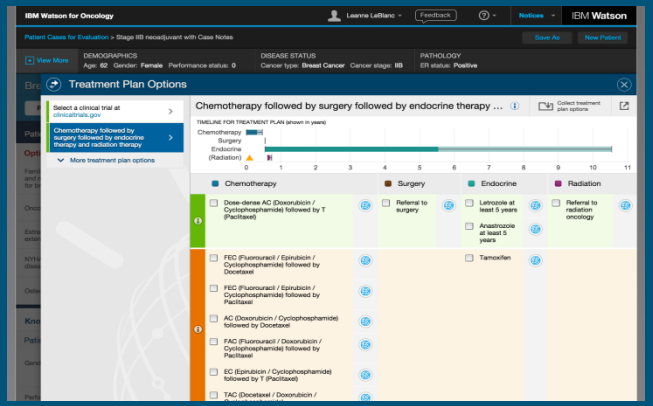
Select Watson solutions address a wide range of clinical and research needs in oncology



IBM Watson for Oncology
Trained by Memorial Sloan Kettering

Memorial Sloan Kettering Cancer Center





Business challenge:

- Ability to assess quickly the best treatments for an individual patient based on latest evidence and clinical guidelines

Watson solution:

- A tool to assist physicians make personalized treatment decisions
  - Analyzes patient data against thousands of historical cases and trained through thousands of Memorial Sloan Kettering MD and analyst hours
  - Suggestions to help inform oncologists' decisions based on over 290 medical journals, over 200 textbooks, and 12M pages of text
  - Evolves with the fast-changing field
  - Currently supports first line treatment (Breast, Lung, Colorectal cancers)

Watson Discovery Advisor

Business challenge:

- Researchers can't innovate fast enough to create truly breakthrough therapies
- They struggle to anticipate the safety profile of new treatments and design trials that demonstrate efficacy and safety

Watson solution:

Making linkages that unlock insights

Which **accelerate breakthroughs in**

- Disease understanding
- Drug discovery
- Toxicity assessment (early safety)
- Trial design
- Comparative effectiveness
- Pharmacovigilance (drug safety)

Watson Corpus

Over 1TB of data

Over 40m documents

Over 100m entities and relationships

Available External Data

Chemical database	12M+ chemical structures
Public genomics	20,000+ genes
Medical textbooks	50+ books
Medline	23M+ abstracts
Other journals	100+ journals
FDA drugs/labels	11,000+ drugs
Patents	16M+ patents

Clinical Trial Matching

Business challenge:

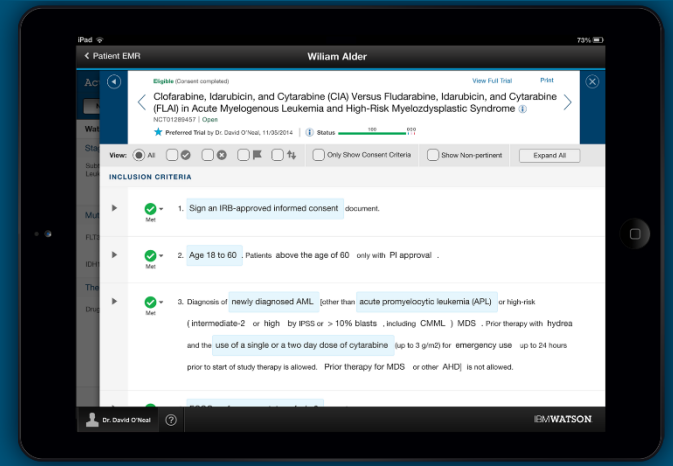
- Clinicians have **no easy way to search across eligibility criteria** of relevant clinical trials for their patient; affecting research advancement and patient care
- Less than 10% of clinical studies are completed on time
- 30% of sites for clinical trials fail in enrolling even a single patient

Watson solution:

- Use patient data to **instantly check eligibility** across all relevant clinical trials, which can improve research and treatment outcomes

Two use cases:

- **Point of care**: Cognitive Physician assistant to assess patient eligibility against all available trials
- **For Pharma:** Identify potentially productive sites (potentially eligible patients) help recruit patients for a specific trial



Initial focus is oncology, Watson is trained in breast, lung and colorectal cancer, with other tumor types to follow

Leading institutions recognize the promise of Watson…..

Ongoing Training Partner

Memorial Sloan Kettering Cancer Center

Watson for Oncology, trained by Memorial Sloan Kettering

available in clinical use in lung, breast, colon and rectal cancer

Bumrungrad International HOSPITAL

Bumrungrad International Hospital

5 year agreement for Watson for Oncology

THE UNIVERSITY OF TEXAS MD Anderson Cancer Center

Making Cancer History®

MD Anderson

Introduced proprietary solution with Watson for clinical use for Leukemia and Molecular Targeted Therapies

MAYO CLINIC

Mayo Clinic

Completed testing with Clinical Trial Matching for lung, breast, colon and rectal cancer

BCM Baylor College of Medicine

Baylor College of Medicine

Published results of use with Watson Discovery Advisor – identified 7 targets for P53 activation within weeks

NEW YORK GENOME CENTER

Watson Genomics Advisor

Secured 13 Cancer and Academic medical centers for beta testing

Department of Veterans Affairs

Selected Watson to analyze EMRs in a demo project

MAYO CLINIC

Mayo Clinic

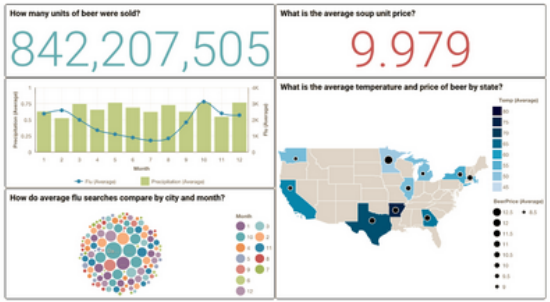
Selected Watson to analyze EMRs for Clinical Efficiency and Effectiveness Program

IBM **Watson**

Watson and your silos of information

It's All About the Beer

RELEVANCE 81 %

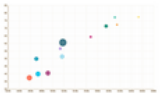


A look at what affect the weather has on beer sales.

Last updated September 24, 2015

Beer Sales by Temperature

RELEVANCE 84 %



What affect does temperature and time of year have on beer sales?

Last updated September 21, 2015

Beer Sales by Month and City

RELEVANCE 70 %

What affect does month and city have on beer sales?

Last updated August 12, 2015

Let's talk about Flu

RELEVANCE 53 %

How does Flu affect beer sales?

Last updated August 12, 2015

Case Studies

Memorial Sloan Kettering is a training partner for Watson for Oncology, which helps fight cancer with evidence-based treatment recommendations

Challenges

- It can take up to 15 years for the latest evidence to be put into practice
- 160 hours/week for a clinician to stay up-to-date on the latest medical literature
- How can we scale the expertise of the best oncologists?

Success Value

"Watson's ability to analyze huge volumes of data and reduce it to critical decision points is essential to improve our ability to deliver effective therapies"
– Dr. Craig Thompson, CEO, MSK

Watson for Oncology is now available with early customers

"The partnership between Memorial Sloan Kettering, and IBM Watson, is really at the forefront of our ability to deliver evidence-based medicine, through analytic approaches, to understanding cancer as a disease"
– Dr. Craig Thompson, CEO MSK

Source: http://www-935.ibm.com/services/multimedia/MSK_Case_Study_IMC14794.pdf

Bumrungrad International Hospital Selects IBM Watson to Improve Medical Care for Cancer Patients

Challenges

Goal of 10% revenue increase in 2015	**Est. 3 million medical tourists in Thailand in 2015**	**How do we improve the quality of cancer care in Bangkok and case evaluations at referral offices in 16 countries on four continents?**

Success Value

"It is fast, thorough, and has the uncanny ability to understand how the available evidence applies to the unique individual I am treating."
– Dr. James Miser, Chief Medical Information Officer

Engagement to kick-off in early 2015

"Medical knowledge is increasing very fast and cancer care is particularly complex. Oncologists race against time to find the best treatment for their patients. How does one take into account all the latest clinical research? How do you find what doctors elsewhere have learned from treating a patient like yours? Watson makes it possible" – Dr. Num Tanthuwanit, CEO

Mayo leverages Watson technology to speed up Clinical Trial Research

Challenges

- MC conducts 8,000 human studies in addition to 170,000 ongoing worldwide
- 5% of MC patients take part in trials. How can we get to 10%?
- 95 Billion spent on trials, only 6% complete

Value

"With shorter times from initiation to completion of trials, our research teams will have the capacity for deeper, more complete investigations,"
– Nicholas Russo, M.D. Mayo Project Lead

Success

A proof-of-concept phase is currently underway, with the intent to introduce it into clinical use in early 2015

"In an area like cancer —where time is of the essence — the speed and accuracy that Watson offers will allow us to develop an individualized treatment plan more efficiently so we can deliver exactly the care that the patient needs," –Steven Alberts, M.D., Chair of Medical Oncology at Mayo Clinic

Source: http://newsnetwork.mayoclinic.org/discussion/mayo-clinic-and-ibm-task-watson-to-improve-clinical-trial-research/

MD Anderson partners with Watson to create an Oncology Expert Advisor to assist clinicians

Challenges

Data overload from 100,000+ patients/ year, thousands of clinical trials, and an ongoing flood of publications	**80% of medical information is unstructured**	**How do we democratize cancer care, so that community cancer centers deliver care at the level of MD Anderson?**

Success Value

"It is unrealistic to expect any human mind to read, understand and retain the overwhelming amount of medical literature, much less to assimilate such in real-time to make evidence-based care decisions consistently for each patient. That is where technology comes in,"
– Dr. Lynda Chin. Chair of Genomic Medicine

Overall accuracy of standard of care recommendations in 200 test leukemia cases was over 80%

"OEA is the tip of the spear for transforming our cancer care delivery. It will allow us to break free the constraints of our current delivery model and begin to build a true patient-centered healthcare system,"
– Dr. Lynda Chin, Chair of Genomic Medicine and leader of the project.

Source: http://www.tmcnews.org/2014/08/ibm-watson-joins-md-anderson-in-cancer-fight/

Department of Veterans Affairs will assess Watson technology in pilot study that could benefit 8.3 million veterans requiring care each year

Challenges

The amount of medical data doubles every three years	**Size and complexity associated with patient data in EMRs is overwhelming**	**The potential of EMRs has not been realized given the discrepancies of how the data is recorded, collected and organized across healthcare systems**

Success Value

Watson will make it possible for VHA physicians to interact with medical data in natural language, process millions of pages of patient information and medical literature to uncover patterns and insights, and learn from each interaction. By sifting through reams of clinical data, Watson is able to distill evidence and knowledge within seconds.

During the pilot, Watson will base clinical decisions on realistic simulations of patient encounters – pre-visit, visit and post-visit situations.

"Physicians can save valuable time finding the right information needed to care for their patients with Watson technology…A tool that can help a clinician quickly collect, combine and present information will allow them to spend more time listening and interacting with the Veteran." –Carolyn Clancy - Interim Undersecretary for Health - VA

Watson assists Baylor College of Medicine researchers in generating better tumor suppression hypotheses

Challenges

5000 new articles/ year on P53 kinases	**500 known human kinases and 10s of thousands of possible proteins they can target**	**Time intensive process to identify new relationships**

Success Value

According to Dr. Olivier Lichtarge, professor at Baylor College of Medicine.,"…with p53, there are over 70,000 papers published on this protein. Even if I'm reading five papers a day, it could take me nearly 38 years to completely understand all of the research already available today on this protein. "

Watson was used to mine the medical literature up to 2003 when only half of the 33 phosphorylating protein kinases had been discovered. Of the nine found nearly a decade later, Watson accurately predicted seven.

"Our…hope is to systematically extract knowledge directly from the totality of the public medical literature. For this we need technological advances to read text, extract facts from every sentence and to integrate this information into a network that describes the relationship between all of the objects and entities discussed in the literature," –Dr. Lichtarge, Cullen Foundation Endowed Chair at Baylor.

New York Genome Center and IBM Watson launched an initiative to accelerate a new era of genomic medicine

Challenges

As the cost of Next Generation Sequencing decreases, there will be an increase in tumor genome sequencing resulting in massive quantities of genetic data to analyze	**It can take on an average from 4-6 weeks to analyze and interpret genetic data manually**	**Complexity of matching genetic mutations of individual's tumor with molecular targeted therapies using multiple data sources**

Value

"With this [genomics] knowledge, doctors will be able to attack cancer and other devastating diseases with treatments that are tailored to the patient's and disease's own DNA profiles. This is a major transformation that can help improve the lives of millions of patients around the world."

– Dr. John E. Kelly, Senior Vice President, Solutions Portfolio & Research

Success

Secured Beta testing relationships with 13 Cancer and Academic medical centers

"Applying the cognitive computing power of Watson is going to revolutionize genomics and accelerate the opportunity to improve outcomes for patients with deadly diseases by providing personalized treatment."

– Robert Darnell, M.D., Ph.D., CEO, President and Scientific Director of the New York Genome Center

Source: http://www-03.ibm.com/press/us/en/pressrelease/43444.wss

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Thank you!

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