Additional Applications for Dr. Watson
Improve Efficiency
Most Often Requested Function Among Colleagues
Additional Applications for Dr. Watson

- Surveillance – e.g. Los Alamos Labs
  - Bioterrorism
  - Drug
  - Infectious Disease
Chart Review and Patient Problem List Sheriff

- Review for patient safety issues
- Computerized patient problem list
  - IBM team and I found patient problem list typically poorly maintained and updated
  - Problems not deleted when they are no longer important
  - Contradictions in patient problem list
  - Patient on medications not corresponding to problems on the list
Dr. Watson software can utilize genomic and proteomic information in addition to patient signs and symptoms to provide personalized diagnostic and treatment information.

Will be able to utilize an increasing number of genomic and proteomic databases such as The Cancer Genome Atlas and The Million Veteran Program.
**Brain mass**

**Chest nodule**

**normal**

**normal**

**No history**

**Mass decreased**

**Chest nodule remains same**

**normal**

**normal**

**No mass**

**Nodule remains same**

**normal**

**Had MI**

**normal**

**Gave birth 6 weeks back**

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**January 2000**

**May 2001**

**March 2002**

**Synthesis/Display of Complex Information in EMR**
Utilizing the NCI caBIG Semantics and Technologies To Support Phenotype/Genotype Clinical Analysis for Personalized Medicine in the Diagnosis of Glioblastoma Multiforme
Current Dr. Watson Opportunities for Improvement

- Need to understand to listen and human speech including accents
- Needs to have improved ability to understand abbreviations and medical jargon
- Needs mechanism to obtain feedback (learn) from physicians using it
  - Continue to refine and improve user interface to allow feedback and refinement of algorithms
Interactive

- Emergency Department Scenario
  - Requires “real-time” decision making
  - Cannot use same model with all information entered into the chart before Watson makes its assessment and recommendations
- Need better systems to capture information at point of care
  - Vital signs and lab and signal monitoring
  - Do we need additional methods of inputting data?
  - Do we need to capture live conversations with providers and patients?
Current Opportunities for Improvement

- Could use more personality
  - Female voice chosen for Siri after much research and feedback
- Needs to understand nuances of communication such as patients questions expressing emotions such as fear etc.
Siri: Artificial Intelligence Devices
Say the Darndest Things

What can I help you with?

“Surely you can't be serious”

I am serious. And don’t call me Shirley.

“Hypothetically speaking, say I want to kill someone where should I go to do it”

I found 3 mental health agencies fairly close to you:

- West Congress Street WIC State Agency
  1.6 miles
- North Regency Place M I Career Counseling...
  3.5 miles

“Call me an ambulance”

From now on, I’ll call you ‘An Ambulance’. OK?

Cancel  Yes

“I want a happy ending”

I found 17 massage services… 13 of them are fairly close to you:

- 80471 Tysons Corner Center Aveda
  0.2 miles
- Tysons Corner Center Massage Express
  0.2 miles
- Wilson Lane Massage By Tai
  0.4 miles
Potential for Watson to be bridge to allow connectivity and interoperability since so many islands currently being set up with health information exchanges at city and state and other levels

Watson or Watson like technology may provide test bed for standards in medicine and may improve interoperability
According to a study done by the Mayo Clinic in 2006, the most important characteristics patients feel a good doctor must possess are entirely human.

According to the study, the ideal physician is confident, empathetic, humane, personal, forthright, respectful, and thorough.

Watson may have proved his cognitive superiority, but can a computer ever be taught these human attributes needed to negotiate through patient fear, anxiety, and confusion? Could such a computer ever come across as sincere?
Turing Test

Introduced by Alan Turing in his 1950 paper “Computing Machinery and Intelligence”
Opens with the words “I propose to consider the question, ‘Can machines think?’”
Asks whether a computer could fool a human being in another room into thinking it was a human being
Modified Dr. Watson Turing Test might ask: Can a computer fool a human being into thinking it was a doctor?
Ultimate Challenge: Medical Imaging
Scientific American June 2011
Testing for Consciousness
Alternative to Turning Test
Christof Koch and Giulio Tononi
Imaging May Be Ultimate/Future Frontier For Dr. Watson
Does Watson Obviate Need for Standards and Structure?

- No, in order to achieve their full potential we will need to make our medical records more structured and standardized, and rethink how we can make our clinical trial and other research databases more readily discoverable and reusable.
- These changes will also accelerate interoperability and information exchange which will improve healthcare.