

IBM Watson Health

The Age of Big Data and the Power of Watson

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IBM







There's a **gap** between what we know and what we do...

45.1% of medicine is not evidence based;¹ it takes **17 years** to translate science to practice²

It's **humanly impossible** to keep up with the knowledge and the data...

Doctors would have to read approximately **29 hours** each workday to keep up with new professional insights;² **80%** of data is unstructured and each of us will produce **300M books** of health-related data in our lifetime

Healthcare **Disruption** is Underway

24 months

Frequency at which **electronic healthcare data** doubles¹

\$7.2 trillion

In **global healthcare spending**; 10.6% of the global GDP⁴

150+

Exabytes of available healthcare data today²

90%

Of the world's data has been created in the past 2 years. ⁵

80%

Of data is unstructured³

75%+

Percentage of patients expected to use **digital health** services in the future⁴



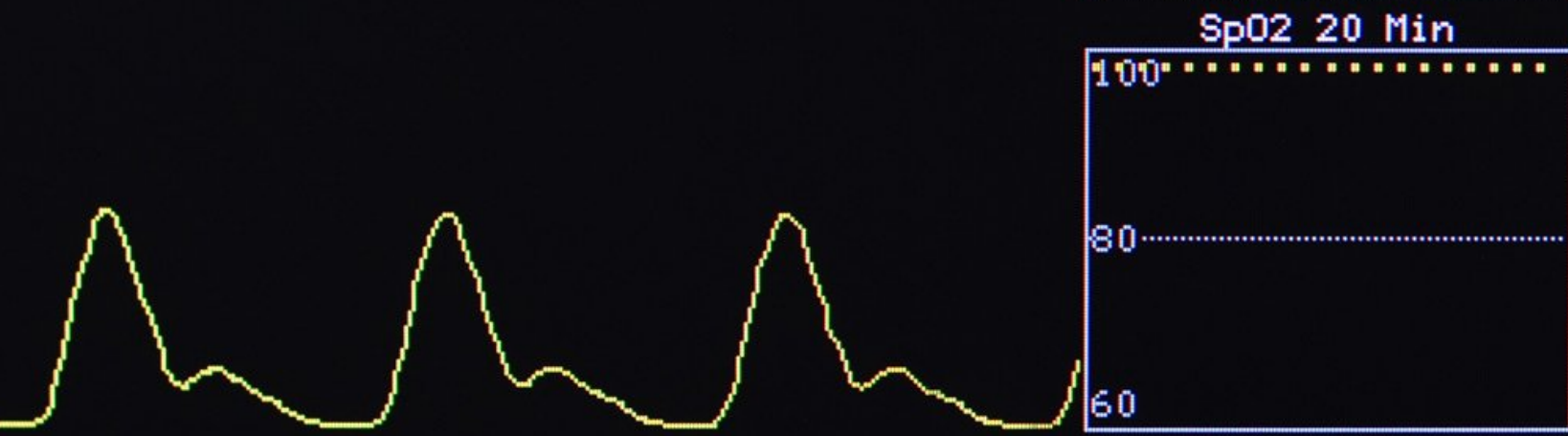
ECG bpm **80** 

PR **(55)** ST -0.03mV

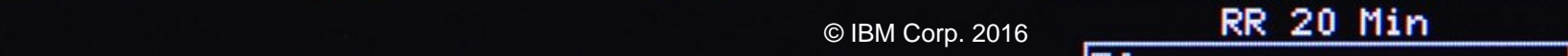


NIBP mmHg Manual
Adult Sys / Dia **100/67** PR **(80)**

Mean **(74)**



SpO2 % **98** ***

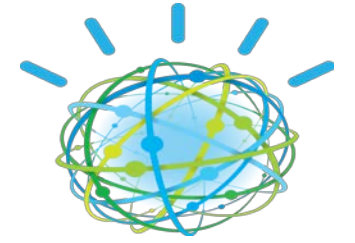


RR

Environment



Socioeconomic Standing



Data per individual

Genetics & Family History 

70%
Social and Environment
And Behavioral

1100 Terabytes
Generated
Per lifetime

Behavior & Habits



Healthcare Access & Experience 

20%
Genomics
Factors

6 Terabytes
Per lifetime

Social Influences 

10%
Clinical Factors

0.4 Terabytes
Per lifetime



The Challenges of Big Data

Keeping up¹

There are **100,000+** clinical trials running in parallel.

A patient will generate **>12 TB** of personal health data in a lifetime (300 million books).

Medline: **424 million** published articles in 5600 journals

1.8 million new articles published annually

80% Unstructured¹

A typical high-need patient has a **100+** page electronic health record.

Text where meaning is often derived from context

Images: X-rays, sonograms, electrocardiograms, magnetic resonance images, and mass spectrometry results

Noisy²

Problems of scale: **finding the signal in the noise** when its buried in millions of pages across multiple silos

Humans must collect, organize data and evaluate evidence

Introduces **cognitive bias**



Five V's of Big Data



Our mission

We, Watson Health, aspire to improve lives and give hope by delivering innovation to address the world's most pressing health challenges through data and cognitive insights.

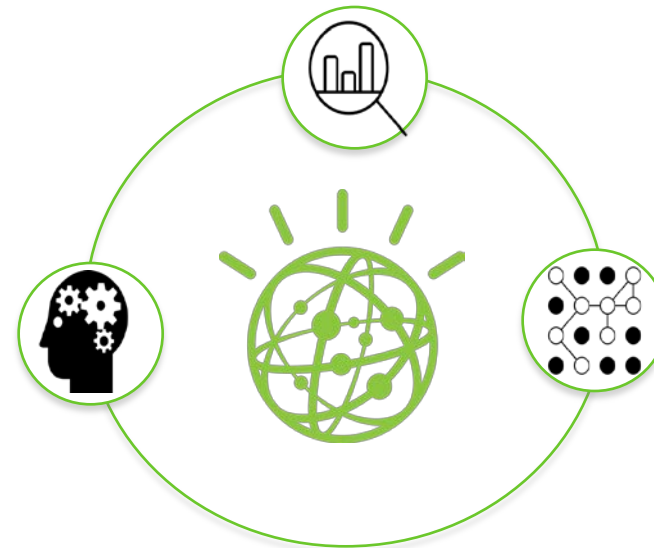
What is cognitive?

Understands

Watson can read & understand documents & data – both structured & unstructured – at a massive scale.

Reasons

Watson searches & analyzes data, returning evidence-based insights.



Learns

Decisions made by leading experts feed the engine. Watson learns & improves over time.

Humans excel at:



Common Sense



Dilemmas



Morals



Compassion



Imagination



Dreaming



Abstraction

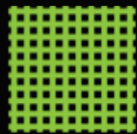


Generalization

Cognitive systems excel at:



Natural Language



Pattern Identification



Locating Knowledge



Machine Learning



Eliminate Bias



Endless Capacity

Harrow Council

Delivering the full range of business applications for health and social care



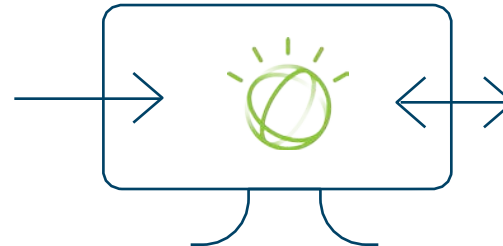
Citizen and Families

Care Management

Intake and Assessment
Case Management
Extend care team collaboration
Investigation and appeals



Case Manager



Agency Director

Benefit Management

Screening
Eligibility and Entitlement
Capturing chances of circumstances
Payment management

Cognitive Analytics



Cognitive Insights



Know Your Client



Population Health



Differential Response



Program Integrity



Cost Trends and Projections

A Comprehensive Approach to Health

Economic Health

- Retirement
- Disability
- Employment
- Migration
- Education



Employer Health

- Injury Compensation
- Workforce Development
- Sickness & Presentism
- Rehabilitation
- Back to Work



Individual Health

- Healthcare
- Social Care
- Insurers
- Researchers



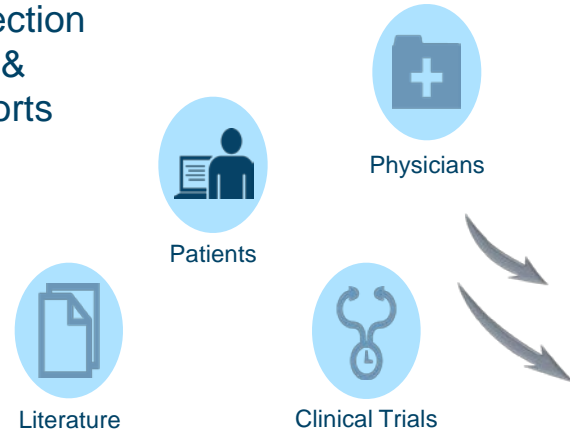
Community Health

- Social Care
- Child & Adult Protection
- Disability Supports



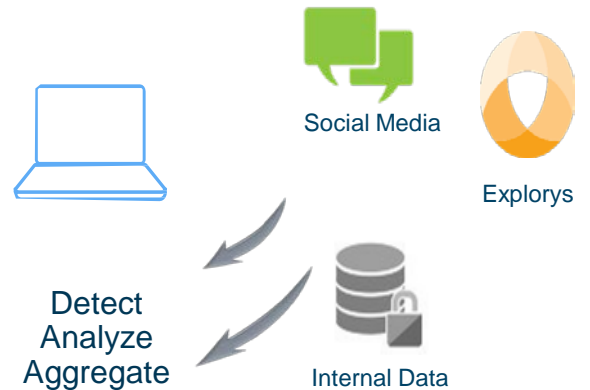
Watson for Patient Safety*

Adverse Event detection within literature & spontaneous reports



Potential Healthcare Benefits

- ✓ Identify AEs within ICSRs and literature automatically and systematically using NLP
- ✓ Scale AE detection with improved consistency, quality and accuracy



Signal detection across many data sources

Potential Healthcare Benefits

- ✓ Detect potential AEs with greater accuracy and precision through automation
- ✓ React sooner with more information through accelerated signal detection



Dashboard and Alerts for Safety Signals

*Watson for Patient Safety is currently in development

Imagine a World Where...

Researchers can:

access structured and unstructured data from disparate sources in seconds

quickly uncover novel patterns and connections across domains and therapeutic areas

focus their time and resources investigating selected targets supported by evidence

Which may lead to...

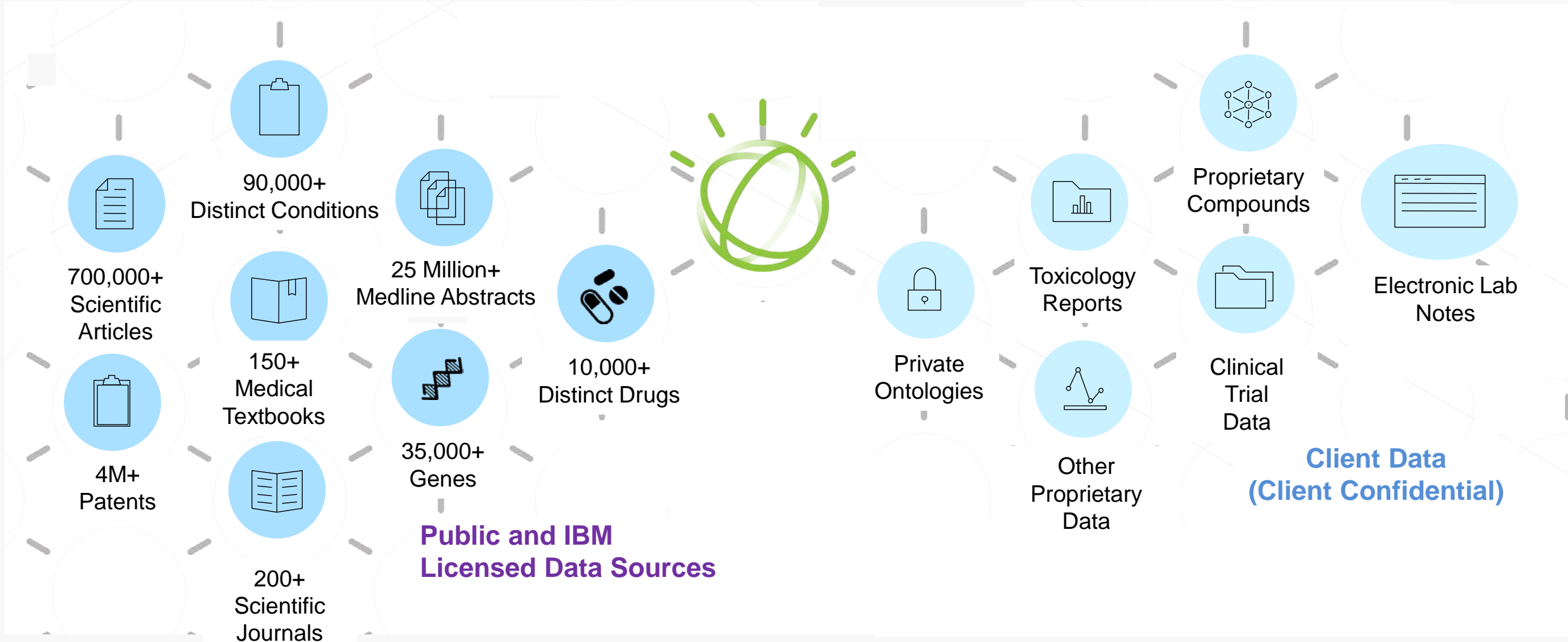
more efficient and informed decision-making

effective drugs reaching patients sooner

The Goal of Watson for Drug Discovery is to Make This a Reality



Watson for Drug Discovery looks broadly across public, licensed and client data to unlock hidden information and deliver insights



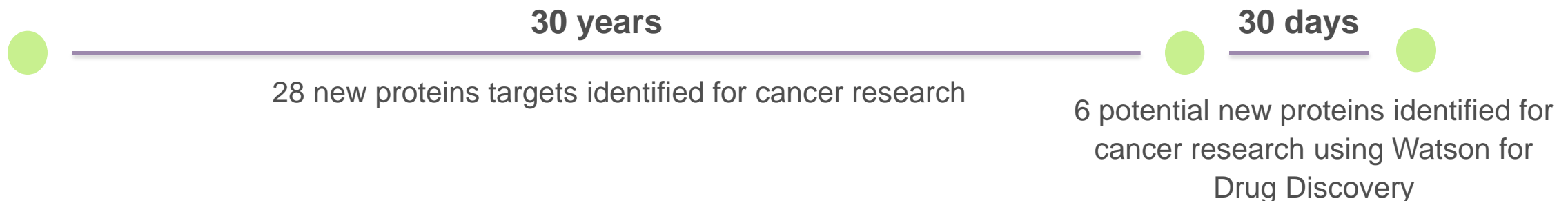
Case study: accelerating discovery in oncology


Baylor
College of
Medicine

- There is data overload of 100,000 new cancer articles published per year. On average, one p53 kinase was discovered per year over the past 35 years
- Using **IBM Watson for Drug Discovery**, Baylor College of Medicine researchers were quickly alerted to targets for research based on data and evidence from thousands of scientific articles

Watson Value:

- In the last 30 years, scientists have uncovered 28 p53 kinases; the Baylor team found 6 potential new kinases that target p53 in around 30 days.



A group of diverse people holding hands in a circle on a grassy field under a blue sky. The image is taken from a low angle, looking up at the hands and faces. The people are smiling and looking towards each other. The background shows a clear blue sky and some greenery.

Watson is creating a new partnership between
humans and technology to
help improve **relationships** by
enhancing, scaling, and accelerating
knowledge.

Thank you!

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