

# Computação Cognitiva e os desafios na Saúde

---

***Mariana Perroni, MD***  
*Coordenadora Médica*  
*Healthcare Transformation*

*maperroni@br.ibm.com*









## EXPECTATIVA DE VIDA



69,8  
anos

2000

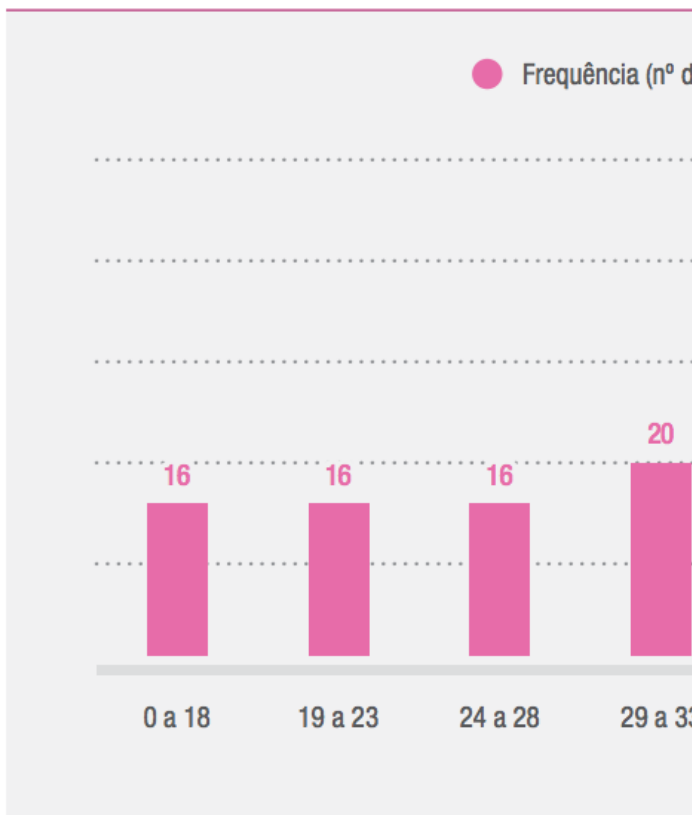
75,5  
anos

2015

*Em 2015, o número de idosos equivalia a 11,7% da população total. Em 2030, a projeção populacional do IBGE indica que a quantidade de pessoas com 60 anos ou mais deve corresponder a 18,6% da população.*

GRÁFICO 11

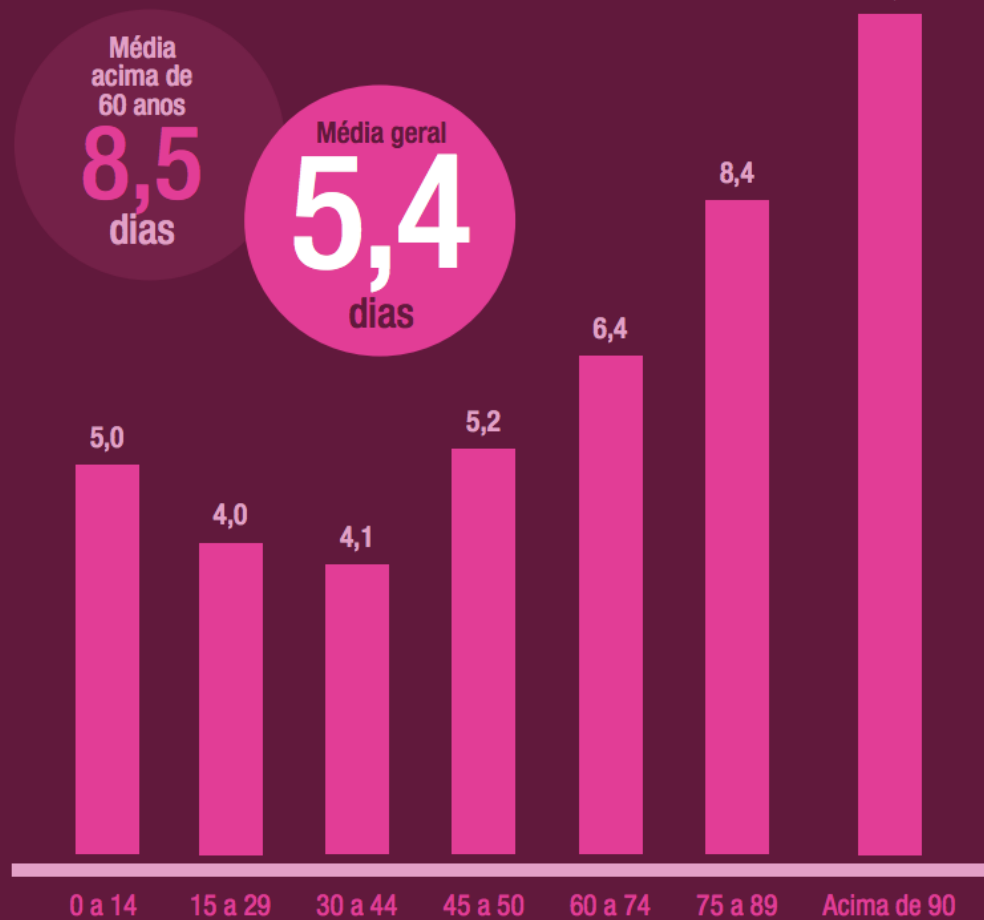
Frequência



Fonte: ANS. Elaboração: Anahp.

### TEMPO MÉDIO DE PERMANÊNCIA POR FAIXA ETÁRIA (dias)

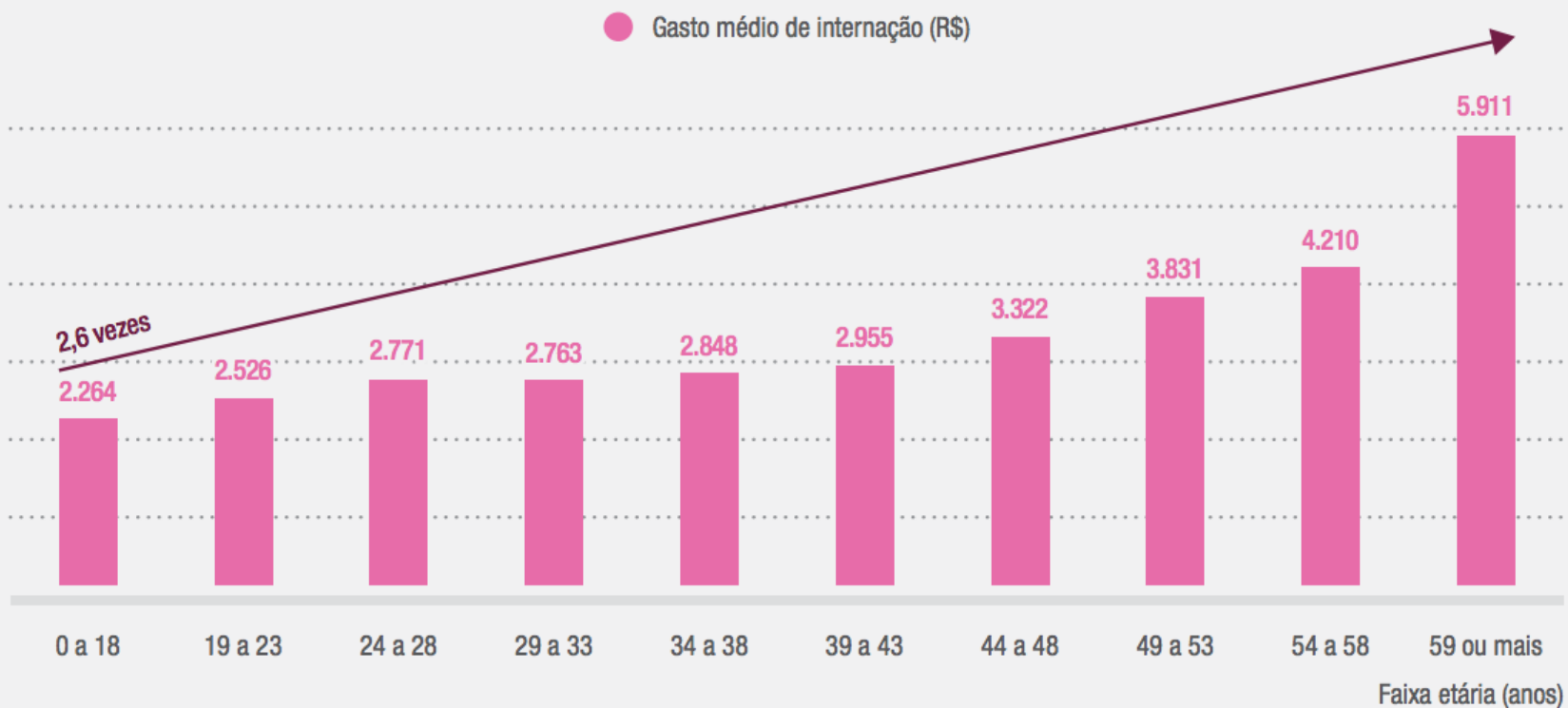
TODOS OS HOSPITAIS ANAHP



Fonte: Elaborado pela Anahp a partir de informações do SINHA/Anahp.

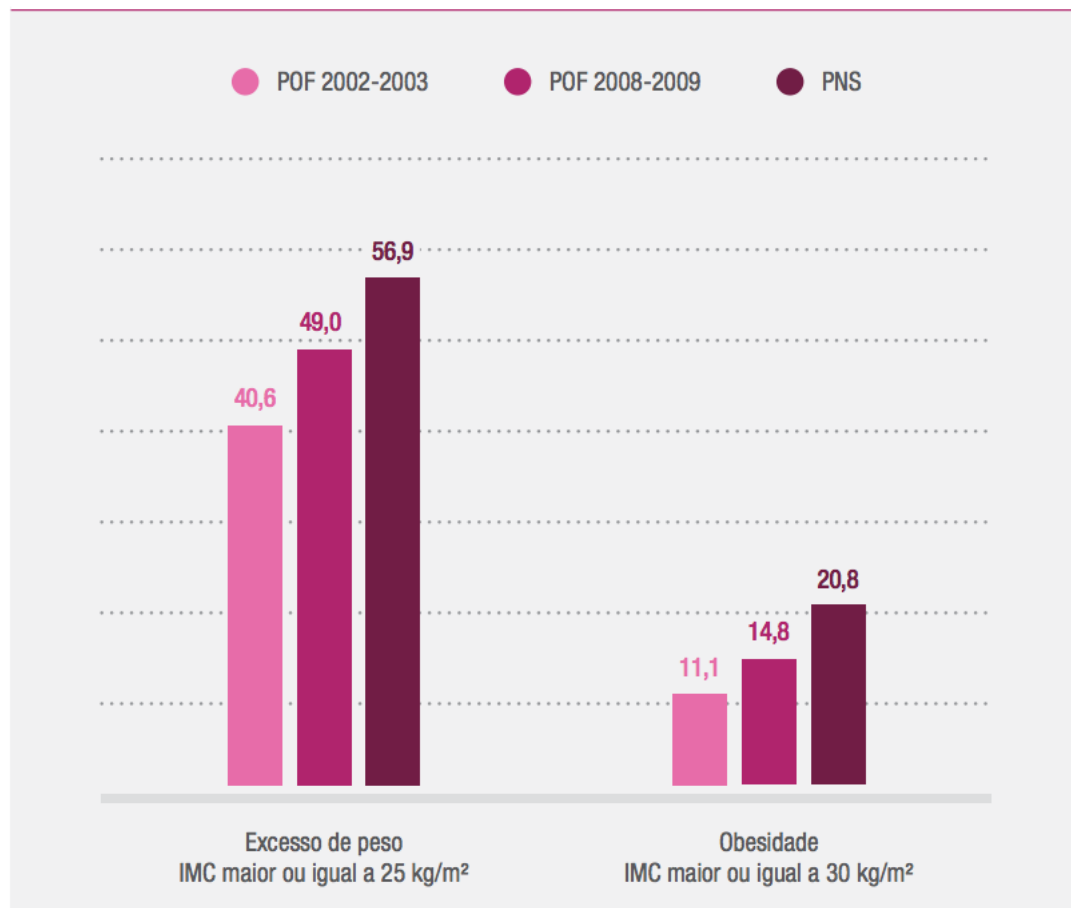
## GRÁFICO 12

### Gasto médio por internação por faixa etária – 2014



## GRÁFICO 13

### Prevalência de excesso de peso e obesidade na população de 20 anos ou mais de idade (%) – Brasil, 2002-2003, 2008-2009 e 2013



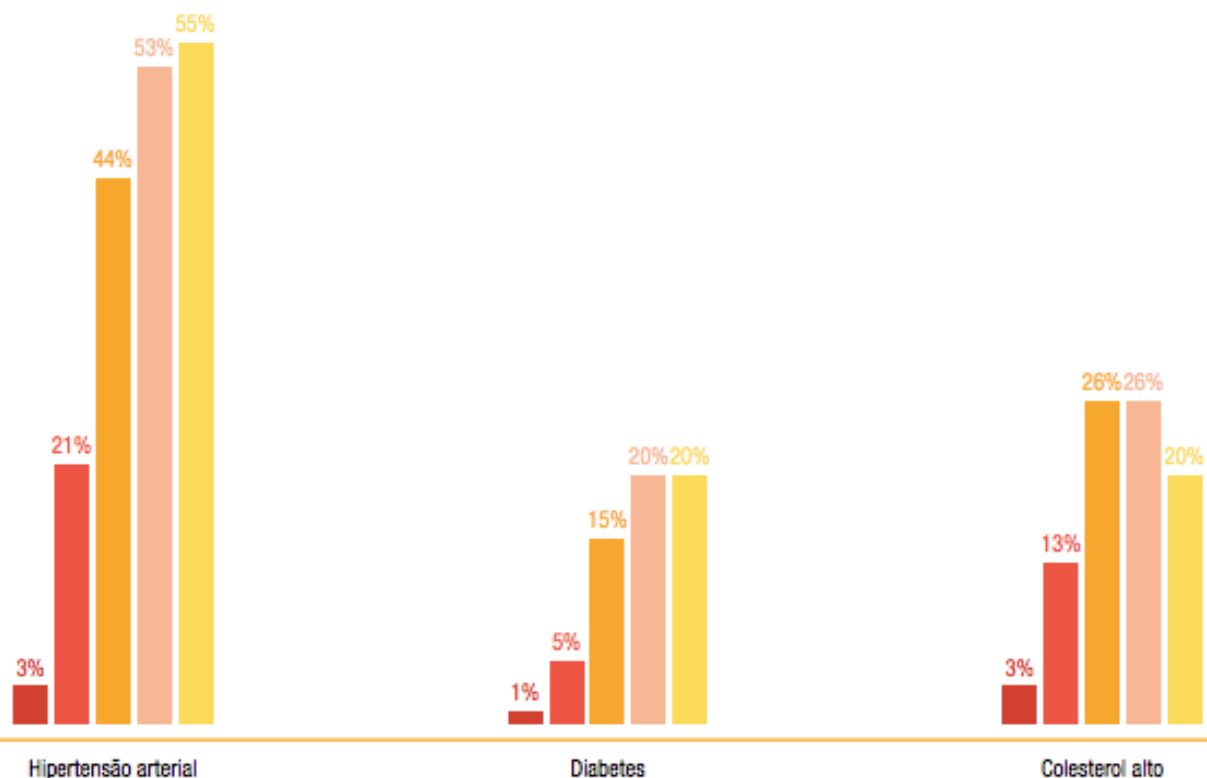
Fonte: Elaborado pela Anahp a partir de informações da POF (Pesquisa de Orçamentos Familiares) 2002-2003/2008-2009 e PNS (Pesquisa Nacional de Saúde) 2013 (IBGE).



## GRÁFICO 9

### PERCENTUAL DE PESSOAS COM UMA DAS DOENÇAS CRÔNICAS SELECIONADAS POR FAIXA ETÁRIA – BRASIL, 2013

■ 18 a 29 ■ 30 a 59 ■ 60 a 64 ■ 65 a 75 ■ 75 ou mais



Fonte: Elaborado pela Anahp a partir de informações da PNS 2013 (IBGE).

Cancer  
research

Half of  
will ge

1960

Cancer Rese  
growing old

ore of us



The Washington Post

👍 CURTIR

To Your Health

## Colorectal cancer rates rising sharply among Gen X and millennials

BY LAURIE MCGINLEY  
28 DE FEVEREIRO DE 2017 12:00

**i** Cancer is pri  
Cancer Research

Rates of colon and rectal cancer, which overall have been declining for decades in the United States, are instead rising sharply

ly to get it, says

86% dos gastos em Saúde são atribuídos a pacientes com doenças crônicas.

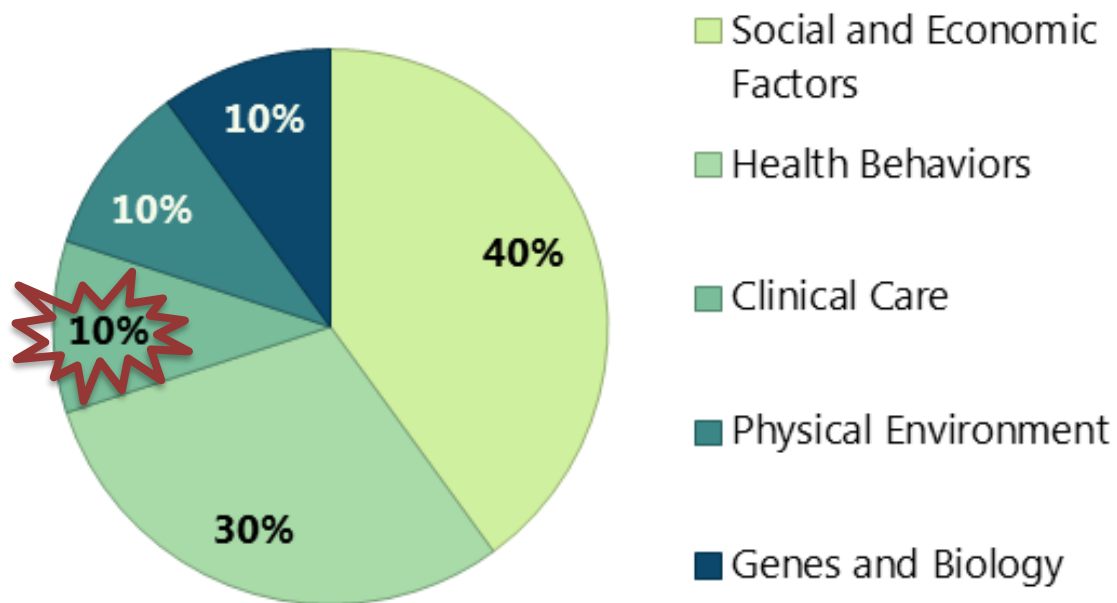
The Centers for Disease Control and Prevention - Health Expenditures:  
<http://bit.ly/2aYPkLY>

Atenção à Saúde?

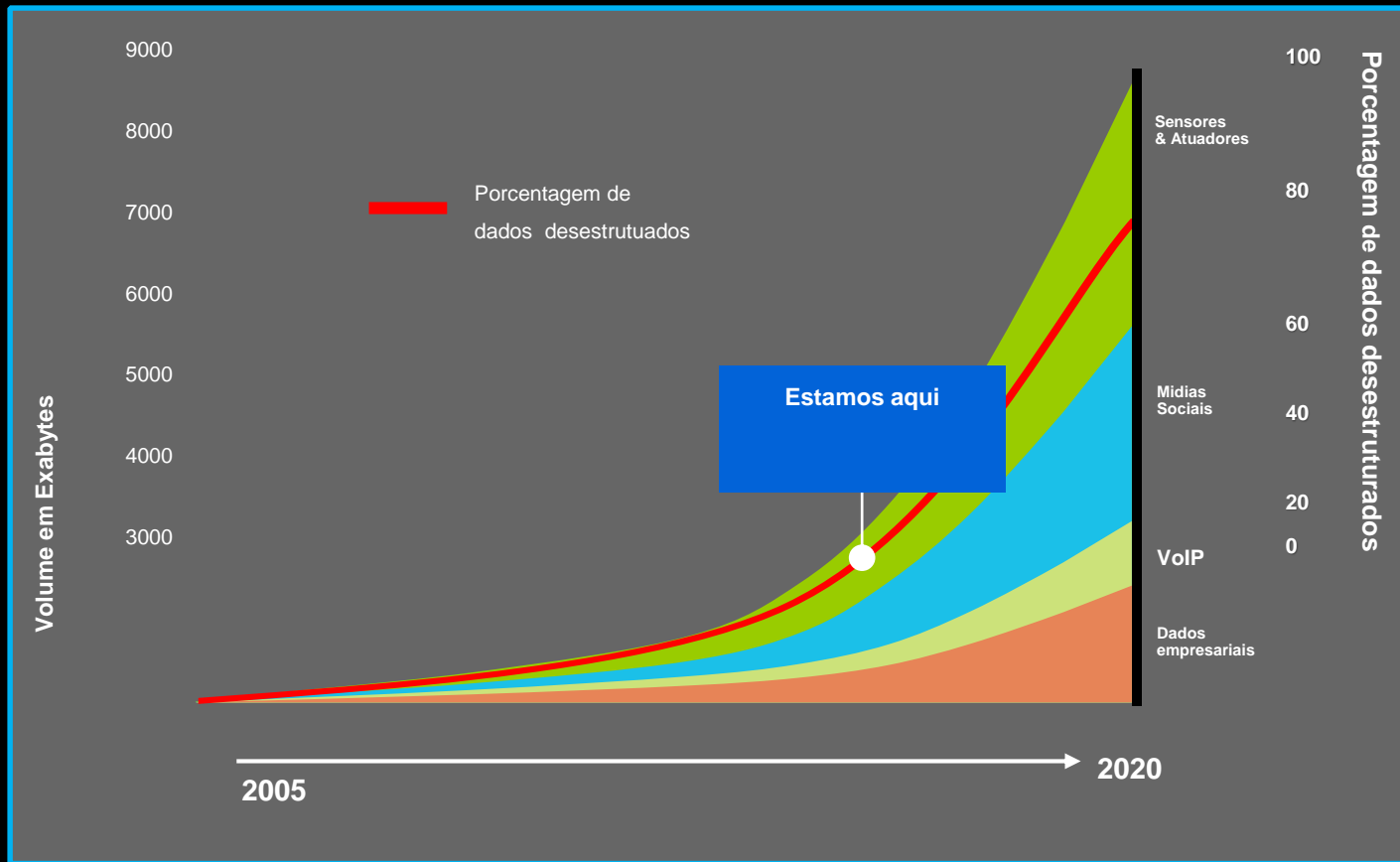
Doença



## Factors Influencing Health and Well-Being



90% dos dados de hoje – criados nos 2 últimos anos



80% - não estruturado

# TIME

## Never Offline.

The Apple Watch is just the start. How wearable tech will change your life—like it or not

BY LEV GROSSMAN  
AND MATT VELLA

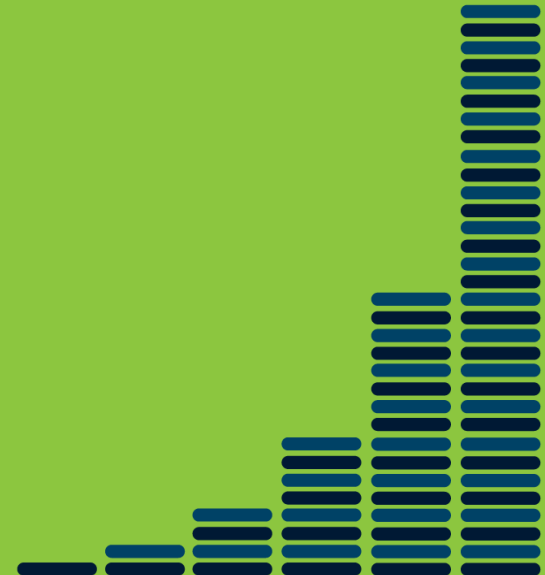




The average person is likely to generate more than one million gigabytes of health-related data in their lifetime. Equivalent to 300 million books.

## IBM Watson Health

Medical data is expected to double every 73 days by 2020.



## IBM Watson Health



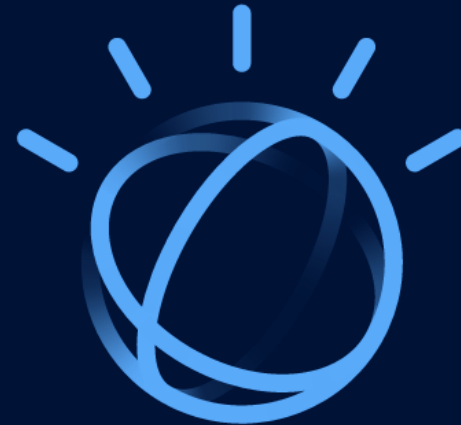
# Os dados aumentam de forma cada vez mais rápida

**1TB**

Dia/ paciente com câncer <sup>1</sup>

**0.5%**

Quanto se analisa <sup>2</sup>

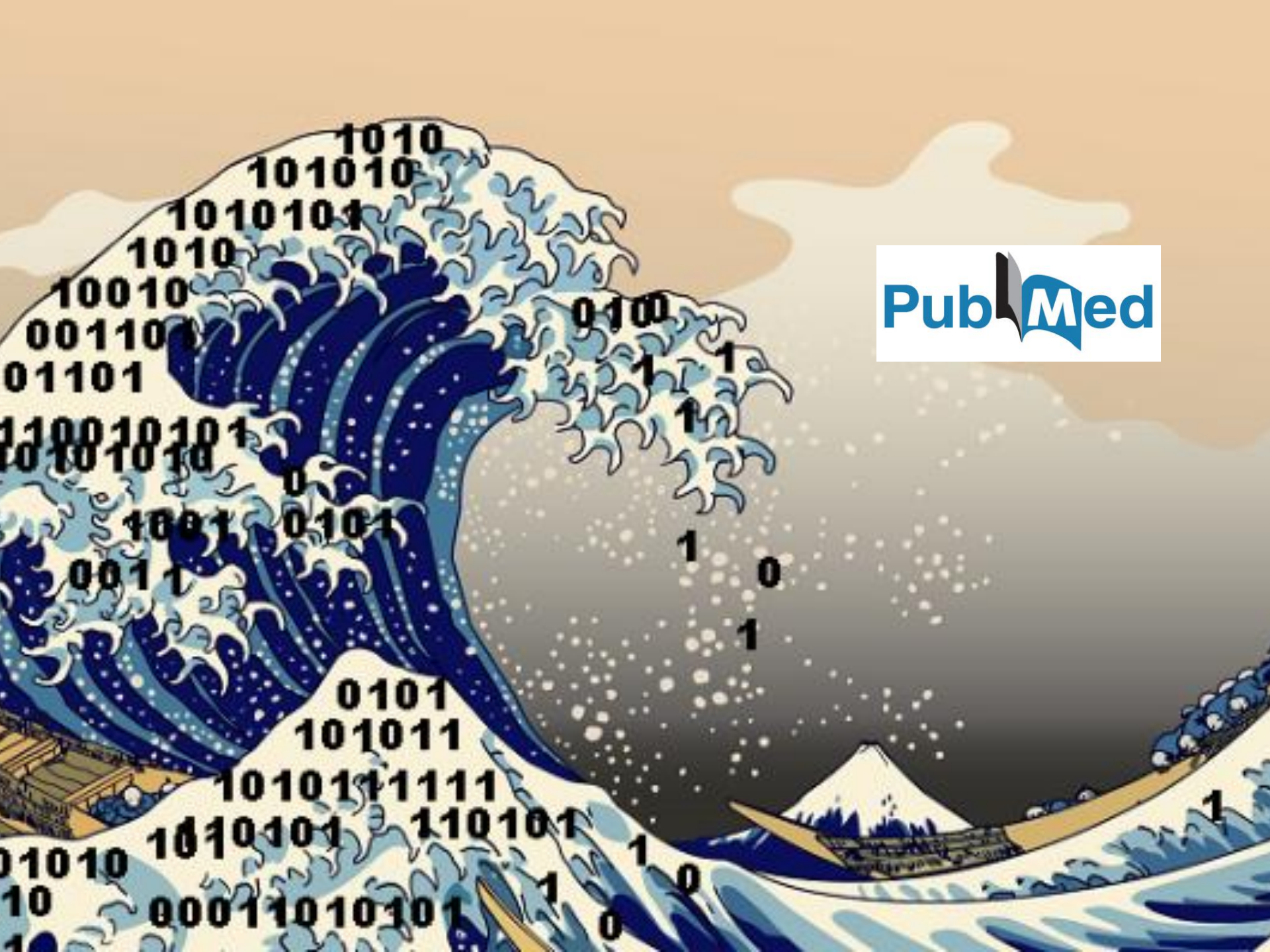


1: Dr Patrick Soon Shiong , NantHealth @ NHS Confederation Conference June 4, 2015

2: Digital Universe Study, IDC, sponsored by EMC, 2012

3. <http://www.economist.com/blogs/babbage/2013/02/computer-aided-medicine>

4. Journal of Clinical Oncology, Talk about Health Blog, Sept 2011



PubMed

# A BIG DATA CURE?

US Healthcare Costs = \$2.9 Trillion

**17.4% of GDP**

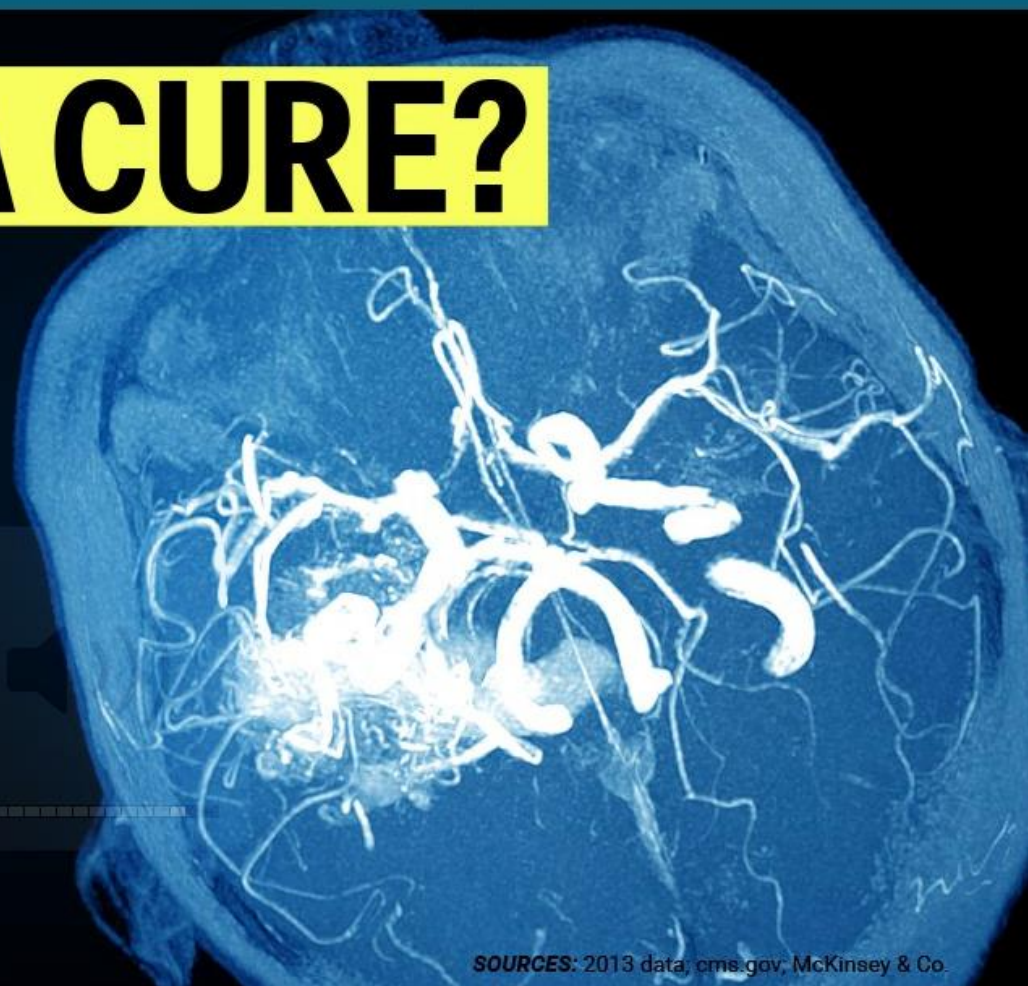
**\$9,255 per person**

## PROMISES

Savings of up to \$1B a year.  
Shift toward "evidence-based" treatment.

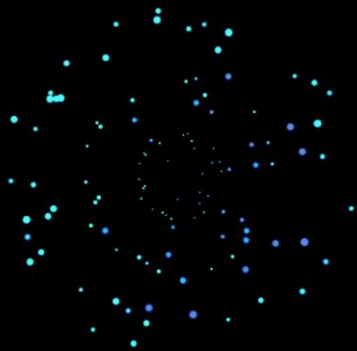
## OBSTACLES

Privacy concerns.  
Resistance from patients and doctors.



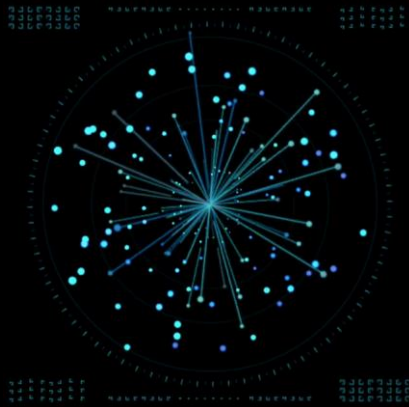
SOURCES: 2013 data; cms.gov; McKinsey & Co.

Data



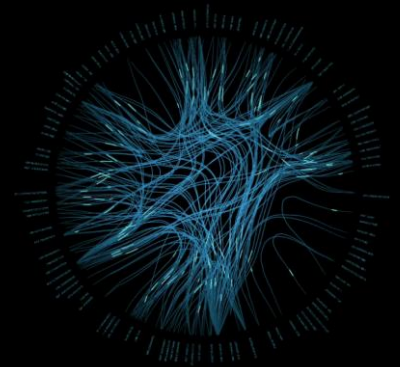
Analytics

Information



Cognitive

Knowledge



# São necessárias novas ferramentas



## Humano

- Cérebro – consumo e processo de quantidade limitada de informação
- Fadiga física e mental. Produtividade limitada
- “Errar é humano.”

## Sistemas atuais



- Não avalia ambiguidade
- Pré-programado e rígido. Não aprende ou raciocina
- Não interage de forma natural



Organizações necessitam: máquina incansável que seja capaz de aprender o novo, enumerar hipóteses, resolver ambiguidades, com precisão de respostas e simples interface



## Watson: A Cognitive System

### Understands Natural Language

Watson can read and understand millions and millions of documents.

- Medical Texts
- Evidence-Based Guidelines
- Peer-reviewed Articles
- Clinical records

### Generates and Evaluates

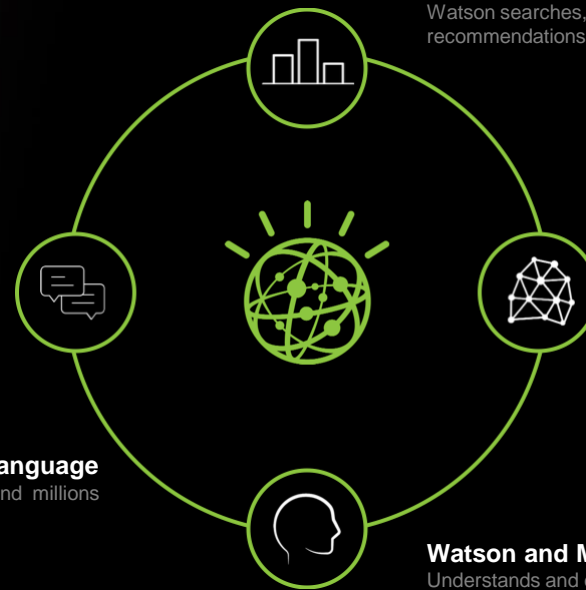
Watson searches, extracts candidate recommendations scores and ranks decisions

### Learns and Adapts

Decisions being made by leading Physicians feed the engine

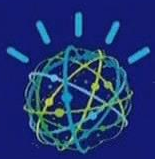
### Watson and Me

Understands and engages me  
Learns and improves over time  
Helps me discover  
Establishes trust  
Has endless capacity for insight  
Operates in a timely fashion



**Congenital disorder characterized by the absence of pigment in the skin.**

Jeopardy! game board showing three contestants: Ken (\$2,000), Watson (\$13,400), and Brad (\$5,000). A central screen displays a glowing green hand icon.



# Solutions

Population Health Management

Condition Specific Care

Health and Wellness

Social Programs

Discovery Solutions

Real World

Evidence

**MERGE**  
An IBM Company

**CURAM**  
SOFTWARE

**explorys**  
An IBM Company

**PHYTEL**

**IBM Watson**

Watson Analytics

**Epic**

**Johnson & Johnson**



**Medtronic**



**North Shore LIJ**

**NYC**  
gov  
always open



MEMORIAL SLOAN-KETTERING CANCER CENTER  
ESTABLISHED 1884

**Cleveland Clinic**

**MAYO CLINIC**

**NORTH SHORE MEDICAL CENTER**

**Hamburg**

**Adventist**  
HEALTH SYSTEM

**AULTMAN**

**St. Joseph Health**

**SUMMA**  
Health System

**Baylor Scott & White**  
HEALTH

**MedStar Health**

**UnityPoint Health**

**University Hospitals**

**LEGACY**  
HEALTH

**Trinity Health**

THE UNIVERSITY OF TEXAS  
**MD Anderson**  
Cancer Center

**Saskatchewan**  
Real Growth. Real Opportunity.

**Meritus**  
Health

**Colorado Health Neighborhoods**  
Centura Health.

**BAPTIST**  
HEALTH  
Depend On Us For Life.

**NATIONAL ORTHOPAEDIC & SPINE ALLIANCE**

**HEALTH**

**Froedtert**  
HEALTH

**OhioHealth**  
BELIEVE IN WE

**MetroHealth**

**Bumrungrad**  
International

**MERCY HEALTH**

**compensar**



**BON SECOURS RICHMOND HEALTH SYSTEM**  
Bon Secours Health System

**Froedtert & MEDICAL COLLEGE OF WISCONSIN**

**AARON GENERAL HEALTH SYSTEM**



# A Clearly Differentiated Health Technology Company



Cloud



Content

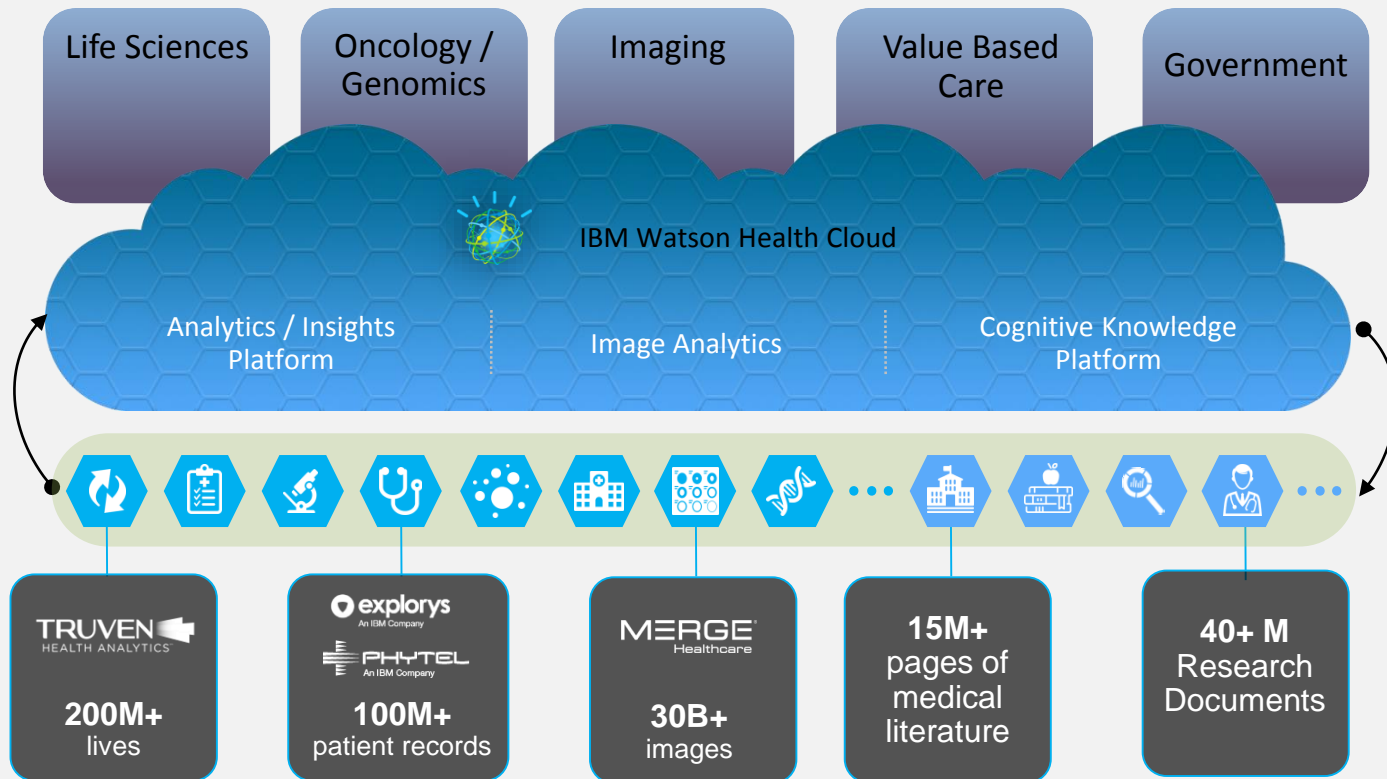


Cognitive  
Computing



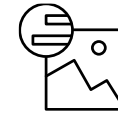
Collaboration

# Watson Health provides a platform for innovation



# Innovative Cognitive Solutions with Watson APIs

Currently available  
 Available, additional cognitive integration in process  
 In development / \*\*IBM Research



## Oncology & Genomics

## Government

## Life sciences

## Value-Based Care

## Imaging

Watson for Genomics

Social Program Management

Clinical trials

Next Generation Population Health Suite

“Cardiac Advisor”\*\*

Watson for Oncology

Health & Human Services

Watson for Drug Discovery

Next Generation Payer Analytics

“Voice to Report or Cardiologists and Radiologists”\*\*

Clinical Trial Matching for Oncology

Next Generation Program Integrity

Watson for Patient Safety

Next Generation Provider Portable Analytics

“Breast Advisor”\*\*

Adaptable Cognitive API Services

Deep Learning

Sequence Learning

Natural Language Processing

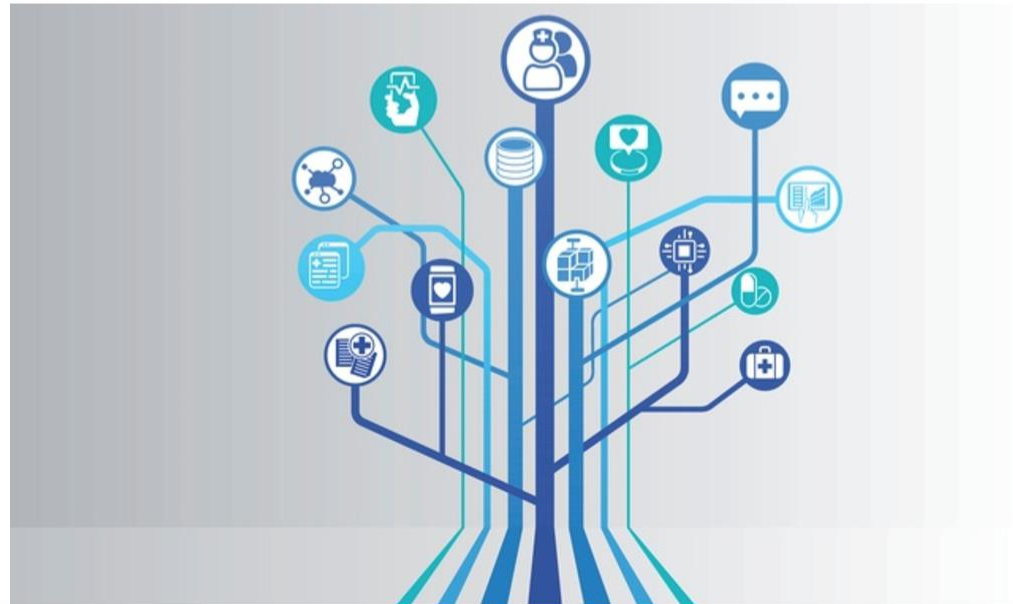
Domain-specific Annotation, Curation



## TOOLS & STRATEGIES NEWS

# Cleveland Clinic, IBM Watson Partner for Population Health

Cleveland Clinic and IBM Watson are expanding their health IT partnership to include new population health management capabilities driven by cognitive computing.





News room > News releases >

## **Memorial Sloan-Kettering Cancer Center, IBM to Collaborate in Applying Watson Technology to Help Oncologists**

IBM Watson combined with MSKCC's clinical knowledge will help physicians access and integrate latest science and knowledge

care  
made with  
IBM Watson

AACR

ABOUT US

Home > News

News Release

Media Advisory

Media Contact

Press Policy

AACR Annual Meeting

National Cancer

Join | Donate



NEWSROOM

Já pensou reunir  
todo o conhecimento  
do mundo para  
vencer o câncer?  
A gente pensou:  
**IBM Watson  
for Oncology**



HOSPITAL DO CÂNCER  
MÃE DE DEUS  
SISTEMA DE SAÚDE MÃE DE DEUS

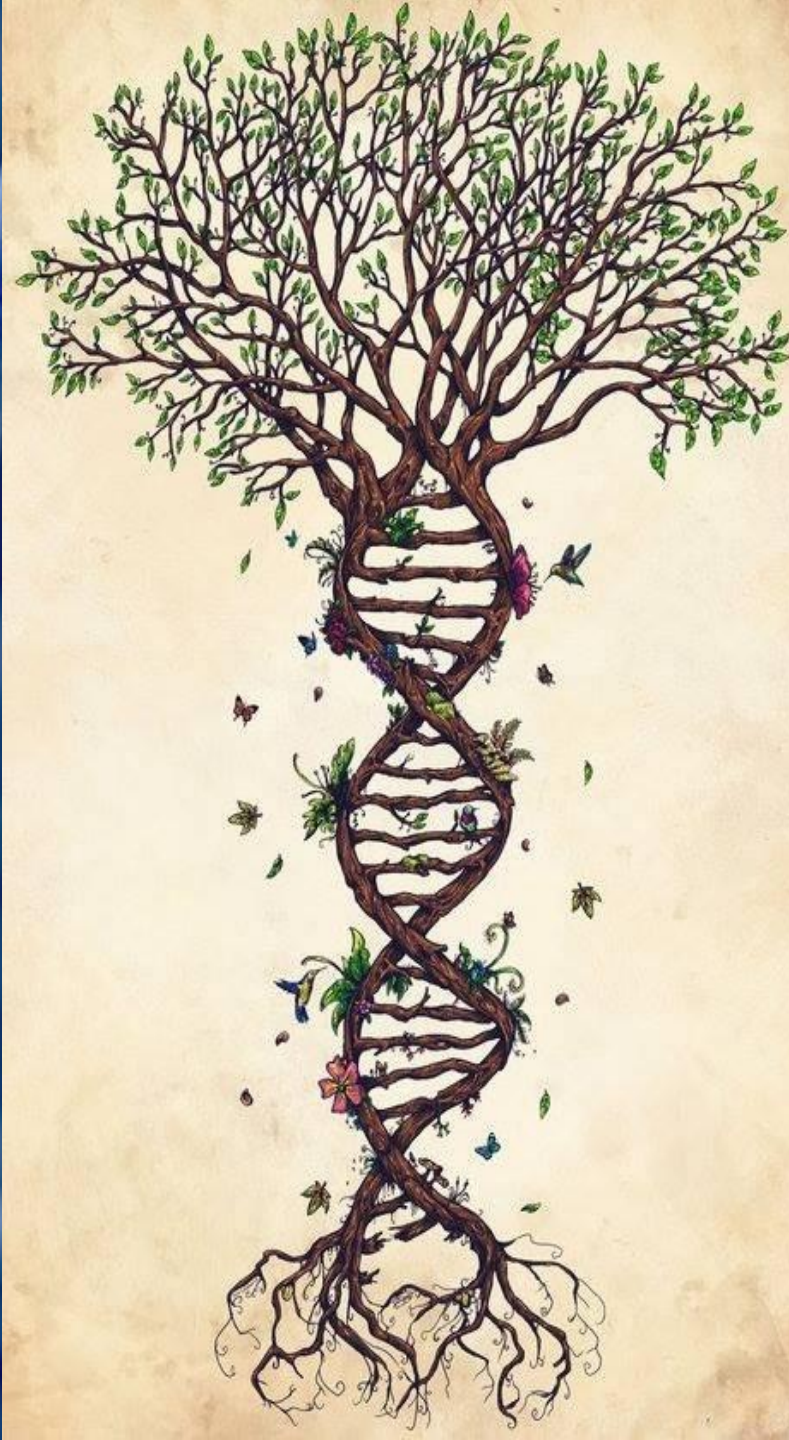
a high

ast

data  
cancer



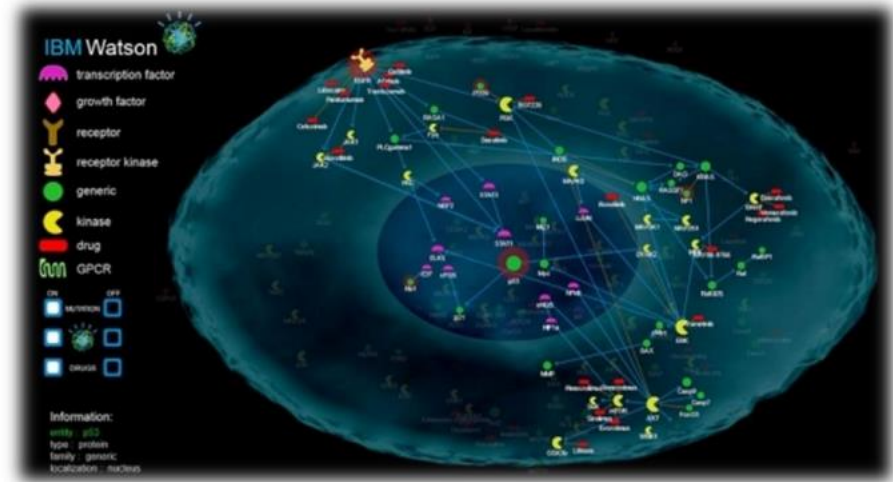




Identifying patterns in genome sequencing and medical data to unlock new insights.

Bridging the gap between sequencing and personalized medicine.

## IBM Watson Genomic Analytics



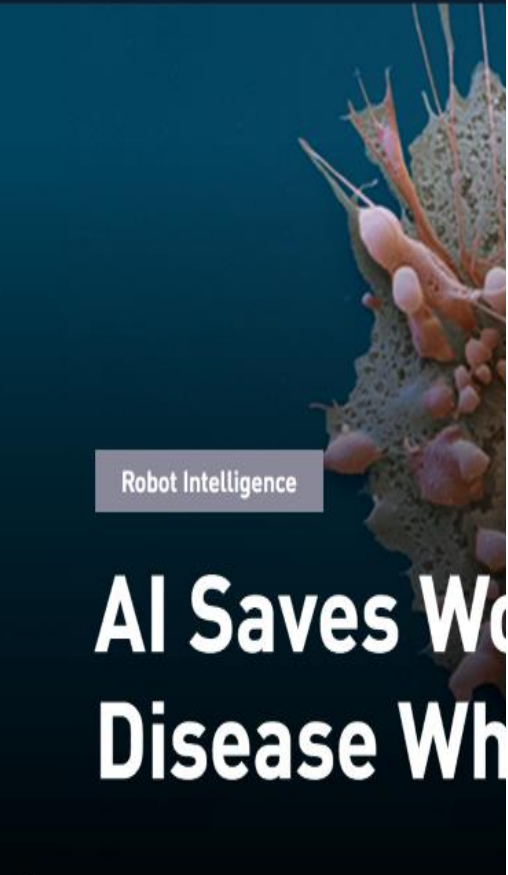
### Business problem:

Cannot accurately and comprehensively understand and take action on the Genomic Sequencing results.

### Solution:

- Case specific analysis to identify mutations, gene expression, tumor heterogeneity, etc.
- Identify drug options, provide rapid evidence retrieval and patient molecular profile analysis.





Robot Intelligence

# AI Saves World From Disease When

## IN BRIEF

Reports assert that Japanese intelligence to detect a type c

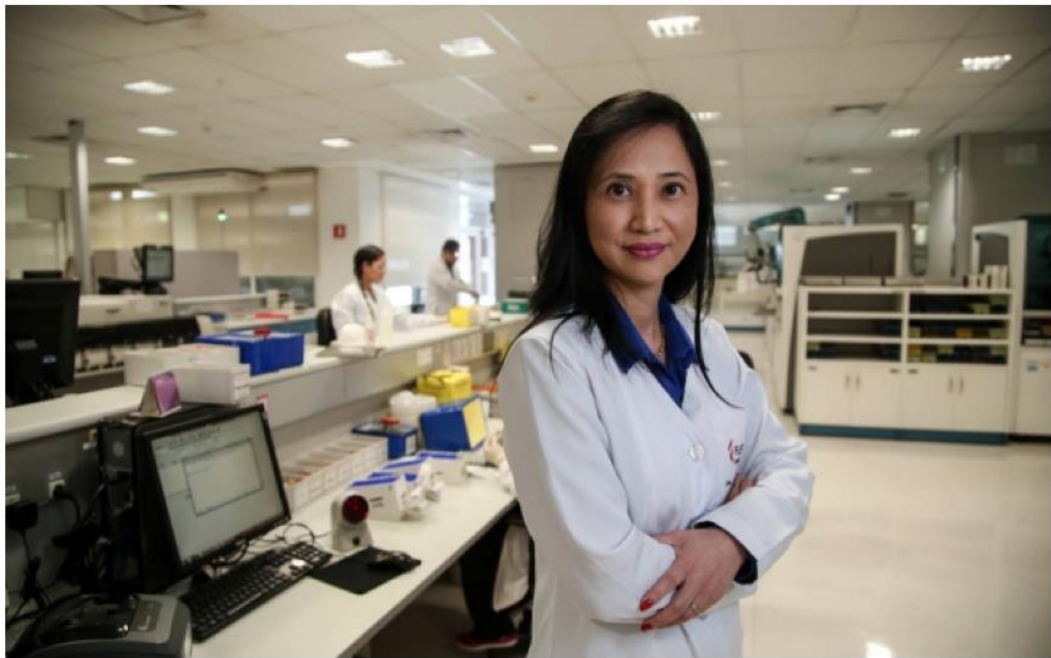
# Fleury e IBM se unem para analisar DNA

Sistema da IBM vai ajudar a diagnosticar mutações genéticas; laboratório é a primeira instituição médica a testar o Watson na América Latina

04/10/2016 | 05h00



Por Claudia Tozetto - O Estado de S.Paulo



Velocidade. Para Jeane, Watson vai ajudar Fleury a entregar sequenciamento genético com informações mais detalhadas

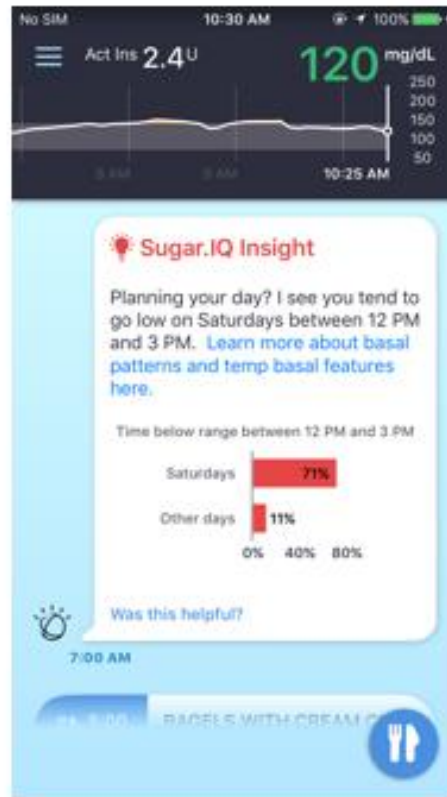
led  
Science Photo Library

# IBM



# Medtronic

Medtronic



YOUR READING LIST



IBM Watson Imaging Collaborative Adds 16 Health Systems, Tech Firms



Grads of Life *Voice*: How A Year-long Program Prepared Me For Success At A Social Venture Startup



Jim Gilliam: Survivor. Founder. Connector.



This App Is Conquering Insomnia And Depression At The Same Time



Wearable Fitness Devices Attract More Than The Young And Fit

# IBM Watson Imaging Collaborative Adds 16 Health Systems, Tech Firms



**Bruce Japsen**, CONTRIBUTOR

*I write about healthcare business and policy* [FULL BIO](#) 

Opinions expressed by Forbes Contributors are their own.

## TWEET THIS



The collaborative is designed to provide IBM Watson a “real-world experience and share real-world findings”

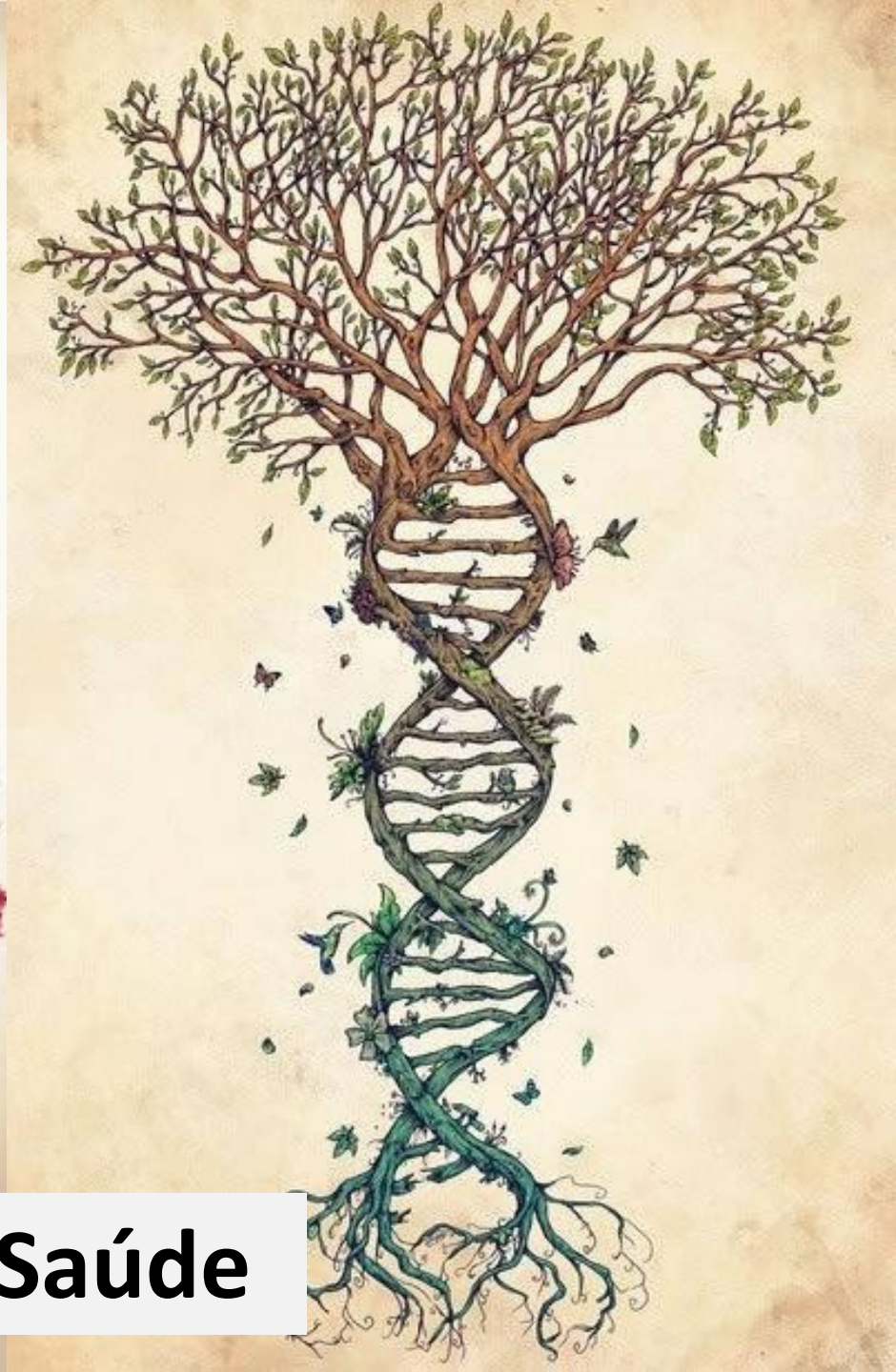
IBM Watson Health is casting a wider net to feed its artificial intelligence system, [forming a 16-member international collaborative](#) of health systems, academic medical centers and imaging technology companies to speed development of products that diagnose patients correctly the first time.

From hospitals in rural America and academic medical centers in the inner city to imaging companies in Europe and Japan, [IBM](#) IBM -0.23% [said the collaborative](#) broadens its effort to identify healthcare’s big problems in “real-life” settings in daily practice. The Watson Health business already has data on an estimated 300 million patients and the collaborative will help capture the experience of doctors and imaging centers working with different



# Atenção à Doença





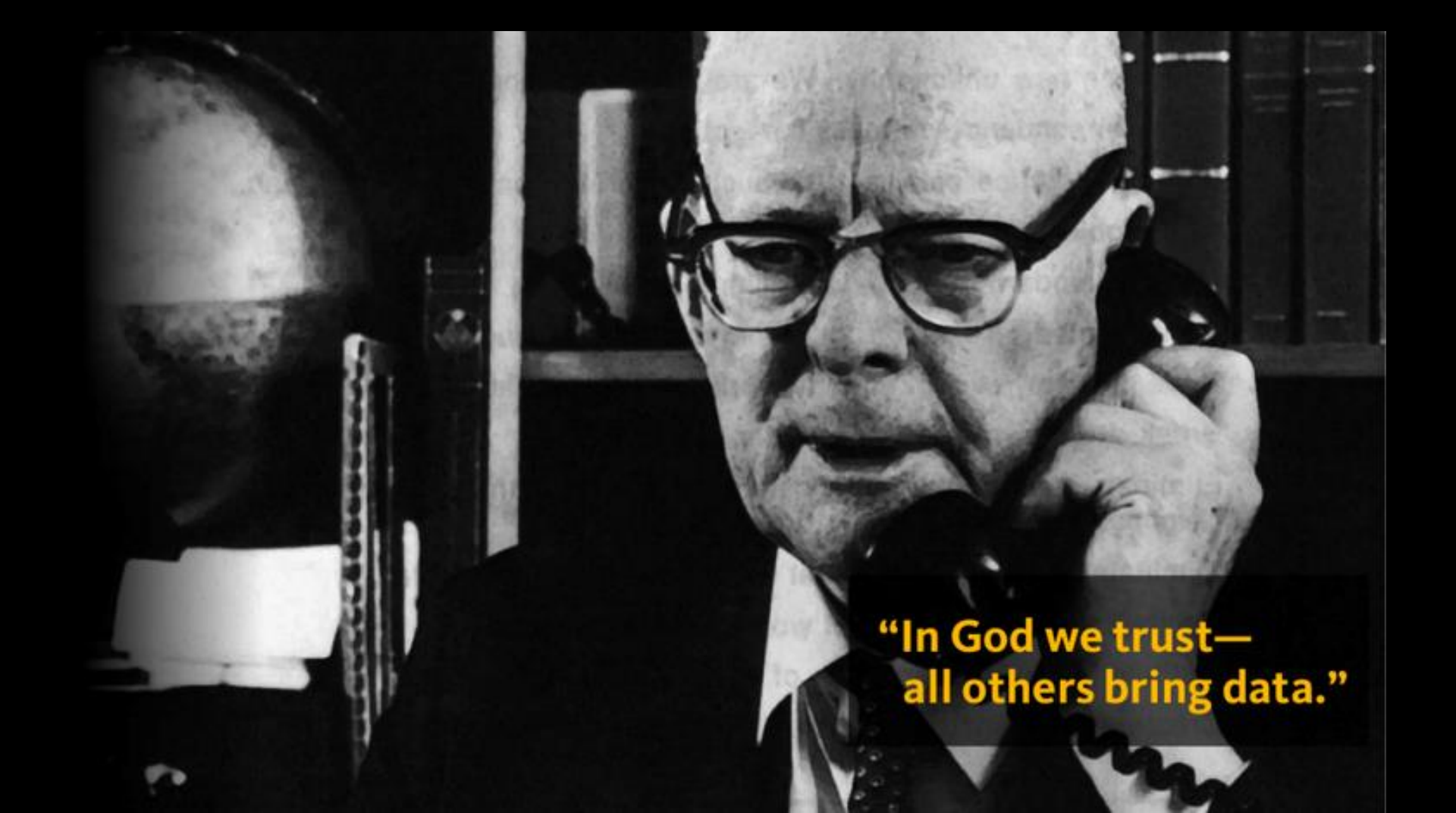
**Atenção à Saúde**



*“ That it will ever come into general use, notwithstanding its value, is extremely doubtful; because its beneficial application requires much time and gives a good bit of trouble both to the patient and the practitioner; because its hue and character are foreign and opposed to all our habits and associations.”*

John Forbes, MD - A Treatise on the Diseases of the Chest  
London, **1821**



A black and white photograph of an elderly man with glasses, wearing a suit and tie, talking on a rotary phone. He is in an office setting with bookshelves in the background. The lighting is dramatic, with strong highlights and deep shadows.

**“In God we trust—  
all others bring data.”**

**Dra Mariana Perroni**  
*Coordenadora Médica*  
*IBM Healthcare Transformation*

[maperroni@br.ibm.com](mailto:maperroni@br.ibm.com)