The Future of Health Is Cognitive

Global Site Solutions Summit
Kyu Rhee, MD, MPP
Chief Health Officer, IBM Corporation
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This is one of Lister's original stethoscopes, and it was presented by him to Dr. Bégin, a French army surgeon, in 1863. The widow gave it to me.
Health centers offer safety net, but rising demand a strain

By Larry Wheeler, Gannett News Service

Americans are used to hearing bad news about their healthcare system — that millions of people lack health insurance and medical costs are spilling out of control.

But amid those trends is evidence that a vital and often overlooked health care safety net is performing effectively and efficiently.

That national network of 952 federally approved community health centers serves more than 14 million poor and uninsured patients who otherwise might go without prenatal care, cancer screenings, diabetes treatment and a long list of other services.

CROWDS: Hispanics, uninsured drive growth at health centers

UNIQUE SERVICE: Baltimore centers help most vulnerable patients

DATABASE: Find the center nearest you

"I have no idea where else I would go for health care," said Shirley Dorsey, 51, a patient at Baltimore Medical System's health center. "It's important to have some place where poor people who don't have insurance can come and not be afraid of being turned away."
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 practice.²

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;³ **8K+** published research articles per day; **80%** of data is unstructured and each of us will produce **300M books** of health-related data in our lifetime.
The 5 Vs of Big Data

Volume  Variety  Veracity  Velocity  Value
Healthcare disruption is underway

24 months
Frequency at which electronic healthcare data doubles\(^1\)

150+
Exabytes of available healthcare data today\(^2\)

80%
of data is unstructured\(^3\)

$7.2 \text{ trillion}$
In global healthcare spending; 10.6% of the global GDP\(^4\)
- Healthcare is too expensive
- Focus on healthcare
- Patients are not empowered
- Big data without insights
- Inadequate collaboration among stakeholders
We have an opportunity to address these challenges
The Cost of Health Care
How does it compare?

If other prices had grown as quickly as healthcare costs since 1945...

- a dozen eggs would cost $55
- a gallon of milk would cost $48
- a dozen oranges would cost $134

Source: Institute of Medicine
Rising healthcare costs is a jobs issue


<table>
<thead>
<tr>
<th>Region</th>
<th>2014 %</th>
<th>2015 %</th>
<th>2016* %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global</td>
<td>7.5</td>
<td>8.0</td>
<td>9.1</td>
</tr>
<tr>
<td>Americas (ex-U.S.)</td>
<td>10.6</td>
<td>13.3</td>
<td>15.3</td>
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<tr>
<td>Asia Pacific</td>
<td>7.3</td>
<td>6.4</td>
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<tr>
<td>Europe</td>
<td>5.3</td>
<td>5.2</td>
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<tr>
<td>Middle East/Africa</td>
<td>10.3</td>
<td>12.6</td>
<td>12.2</td>
</tr>
</tbody>
</table>

*Projected

A Decade Of Health Care Cost Growth Has Wiped Out Real Income Gains For An Average US Family

Even accounting for price increases in other goods and services, the family had $95 more in monthly income to devote to nonhealth spending in 2009 than in 1999. By contrast, had the rate of health care cost growth not exceeded general inflation, the family would have had $45 more per month instead of $95—a difference of nearly $5,400 per year. Even the $95 gain was artificial, because tax collections in 2009 were insufficient to cover actual increases in federal health spending. As a result, we argue, the burdens imposed on all payers by steadily rising health care spending can no longer be ignored.

Sources: Towers Watson, Health Affairs
**We need to go upstream and deliver value**

<table>
<thead>
<tr>
<th>Primary (3-5%)</th>
<th>Secondary (5-10%)</th>
<th>Tertiary (85-92%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevention of disease, illness, and injury</td>
<td>Early detection of disease, illness, and injury</td>
<td>Treatment of disease, illness, and injury</td>
</tr>
</tbody>
</table>

**Vitality and Wellness**
Well-being, energy, capacity, resilience
We must go to where healthcare begins

1,000 individuals

800 report symptoms

327 consider seeking care

217 visit a physician

65 visit a complementary or alternative medical provider

21 visit a hospital outpatient clinic

14 receive home health care

13 visit the ER

8 are hospitalized

<1 hospitalized in an academic medical center

Source: The Ecology of Medical Care, New England Journal of Medicine, 2001
HEALTH > Healthcare

Life Expectancy
- 80+
- 77.5-80
- 75-77.5
- 72.5-75
- 70-72.5
- 67.5-70
- 65-67.5
- 60-65
- 55-60
- 50-55
- 45-50
- 40-45
- 0-40

Source: CIA Factbook, 2015
We are at a historic shift in technology

1900 Tabulating
1950 Programmable
2011 Cognitive
What is a cognitive system?

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

Reasons
Watson searches & analyzes data, returning evidence-based recommendations.

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
Learn How to Use IBM Watson for Clinical Trial Matching

Redisplay the tutorial at anytime by selecting 'Help' under the information menu.

View Help Tour

Dive Right In
Ask Watson and review clinical trials

For a given patient, either evaluate the clinical trials or review the trials that are preferred by you and other practitioners.

Start Now
7 Ps of Health/Healthcare

- Payors
- Policymakers
- Purchasers
- Product Manufacturers
- Providers
- Pioneers
- Patients
IBM Offering U.S. Employees Watson Technology to Identify Cancer Treatments

IBM uses software in several oncology treatment centers globally but says it's the first time it will be available to U.S. employees.

By RACHEL EMMA SILVERMAN
Oct. 11, 2016 8:00 a.m. ET

Navigating the labyrinth of cancer treatments can be so disorienting for patients that International Business Machines Corp. is enlisting its powerful supercomputer Watson to help.

The computing giant today says it will offer its Watson artificial intelligence software to its U.S. employees to help them identify appropriate treatments and options for clinical trials. The benefit will be available beginning early next year to employees and their families who are covered under several of the company’s insurance plans.
John Kelly: It had no idea what questions it was going to get. It was totally self-contained. I couldn't touch it any longer. And it's learned ever since. So fast-forward from that game show, five years later, we're in cancer now.

Charlie Rose: You're in cancer? You've gone—

John Kelly: We're-- yeah. To cancer—

Charlie Rose: --from game show to cancer in five years?

John Kelly: --in five years. In five years.

Five years ago, Watson had just learned how to read and answer questions.

Now, it's gone through medical school. IBM has enlisted 20 top-cancer institutes to tutor Watson in genomics and oncology. One of the places Watson is currently doing its residency is at the university of North Carolina at Chapel Hill. Dr. Ned Sharpless runs the cancer center here.

Our Dream Team to transform health/healthcare globally
An Open Platform for Entrepreneurs to Drive Innovation

350+
Watson ecosystem collaborators

8,000
new IBM Bluemix platform users per week

77,000+
Developers globally using IBM Watson Developer Cloud Services
Go Upstream and Deliver Value

HEALTH > Healthcare

Empowered Consumers

Cognitive Insights

Trust and collaboration among stakeholders
Watson is creating a new partnership between **humans and technology** to help improve **relationships** by enhancing, scaling, and accelerating **knowledge**.
Let’s Work Together

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