The Communications/Data Transformation that will Change ALL of our Ideas about HealthCare

Speaker: David Smith SocialCare™

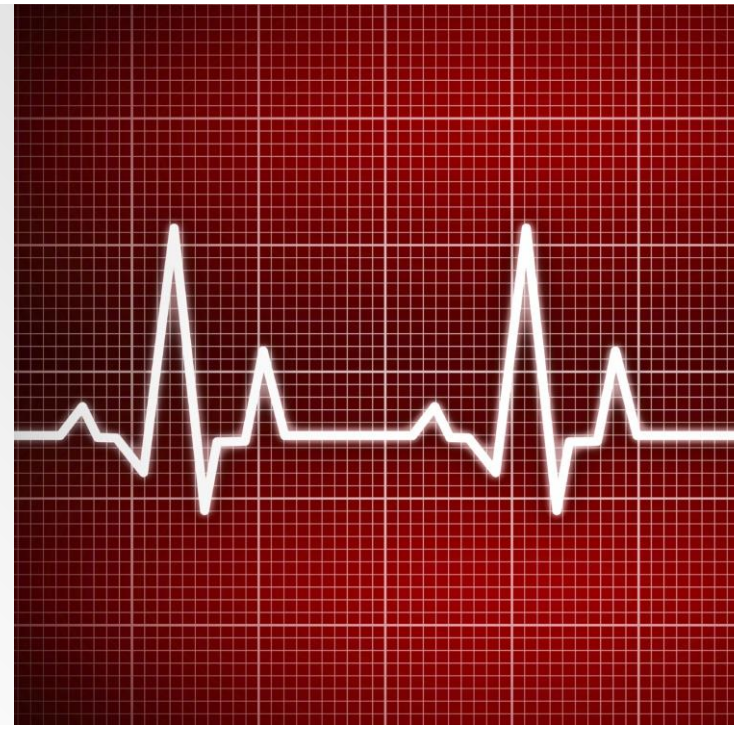
The pace of change has never been greater and no industry is as ripe as Healthcare to take advantage of it. Many of the major systems in use today in healthcare can trace their roots back to the mainframe and client server technologies. In addition, most of the systems are closed systems and will not work with others. Technology, Regulatory, Demographics, Social Media, and Industry change are creating a perfect storm where change and transformation will create a new future and will transform the HealthCare Industry.

The Perfect Storm of events has happened to cause the healthcare industry to be ripe for innovation and disruption. This Perfect Storm is a combination of Government legislation mandating that all healthcare providers "digitize" and convert all paper health records to Electronic Health Records (EHR), forcing them to use a product from the current Health IT marketplace which is extremely outdated, cumbersome, and expensive. Also, with the passage of the Affordable Care Act (Obamacare), over 30 million uninsured Americans will qualify for health insurance coverage. That's an influx of over 30 million new patients entering an already broken healthcare system that we have in this country.

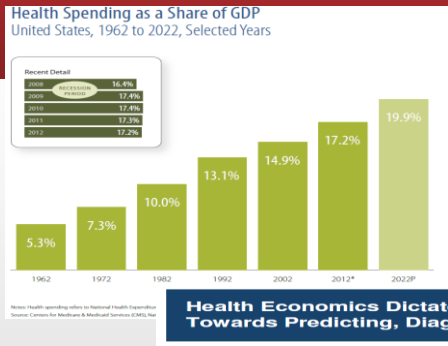
The Communications/Data Transformation that will Change ALL of our Ideas about HealthCare

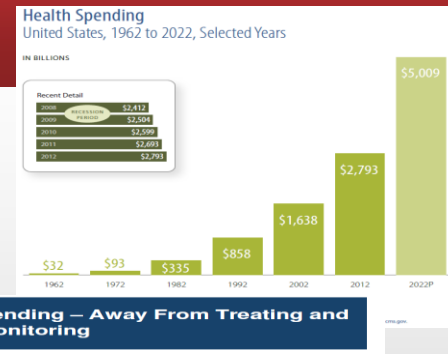
David Smith

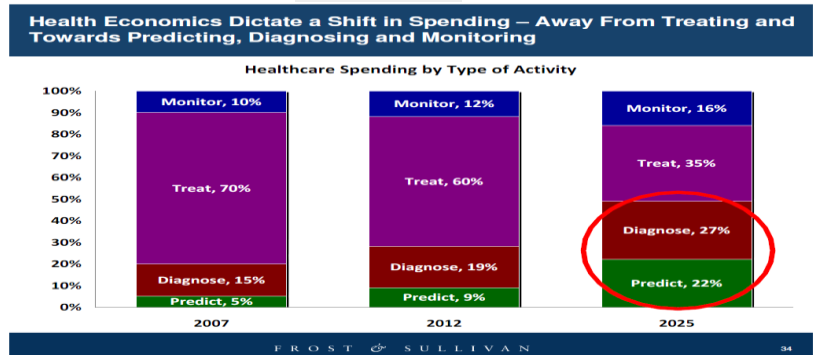
SocialCare™



Market Size







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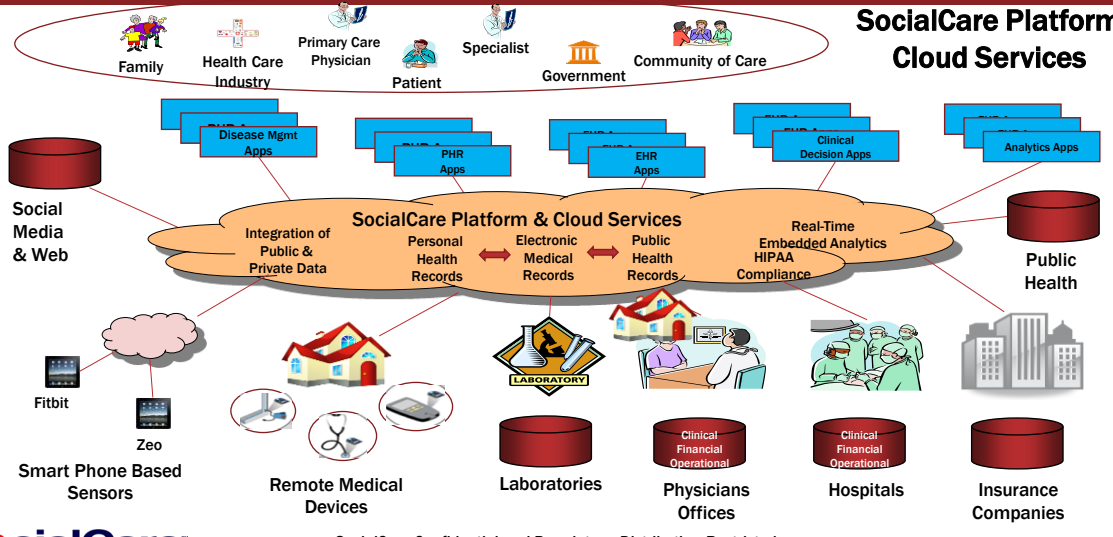
SocialCare Platform and Services

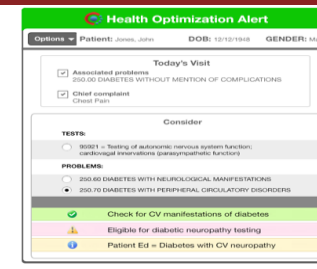


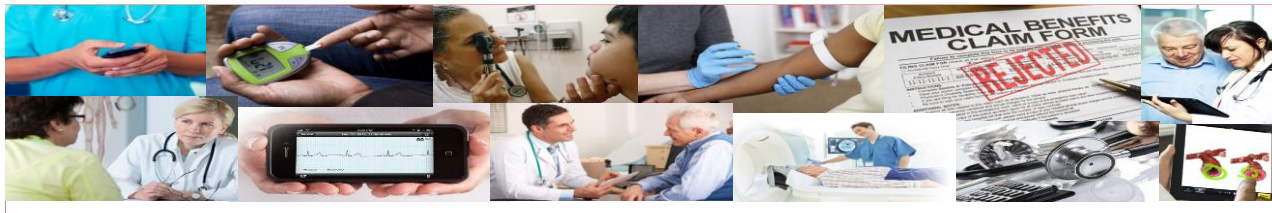
SocialCare™

Health Optimization Alerts™

Right information to the
Right people at the
Right time to enable the
Right action

Through autonomous actions based on business rules





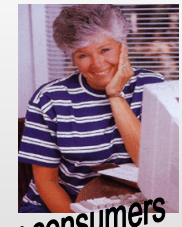
The Perfect Storm

Internet

Disgruntled physicians

New HCFA quality standards
New purchaser demands

Regulatory

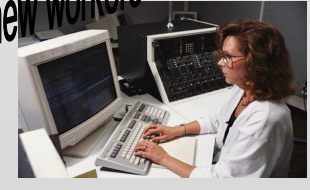


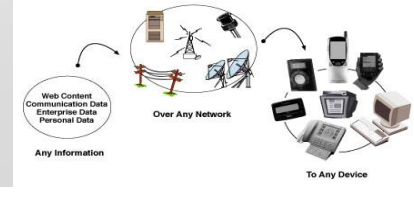
New technologies

IOT

New consumers

New tasks, new workers





"Healthcare is up next for transformation. Healthcare is the largest segment of our economy. Few people are satisfied with the current American healthcare system. It gets more expensive while innovations that actually improve the patient experience are rare. While there may be innovative new treatments and surgeries, basic functions for healthcare practices like storing and sharing electronic health records between physicians are still a pain." – TechCrunch

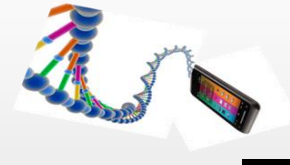
"The past decade belonged to the rise of social networking. Now, with the passage of the Affordable Care Act, this is the decade for healthcare entrepreneurs." – VentureBeat

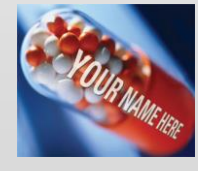
Current State of Healthcare System

- Healthcare "System" is antiquated and not equipped to transform
- Government isn't coming up with solutions
- Universities are focused on intellectual property vs collaboration
- Bringing solutions to market requires large players
- BUT Innovative solutions require nimble organizations
- AND Large players are not nimble
- GROWING Need for Rapid Innovation and Time to Market
- DISRUPTIVE Information Age an Opportunity to Reinvent the system

Drivers of Change in Health Care

- Increasing public accountability
- Privacy and Security
- Rise of sophisticated consumers
- 24/7 society
- Science and technology –particularly molecular biology, IOT, and IT
- Ethical issues to the fore



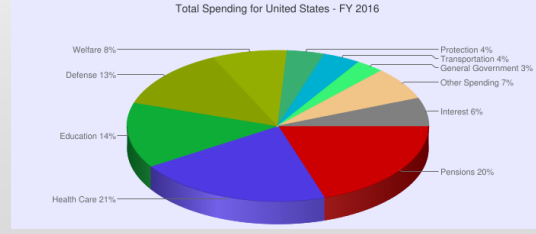


The Problem

- Between the health care we have today and the care we could have in the future lies not just a gap, but a large chasm
- A system full of underuse, inappropriate use, and overuse of care services and systems
- Unable to deliver today's science and technology; will be even worse with innovations in the pipeline
- But even today's innovations will not work in a broken system

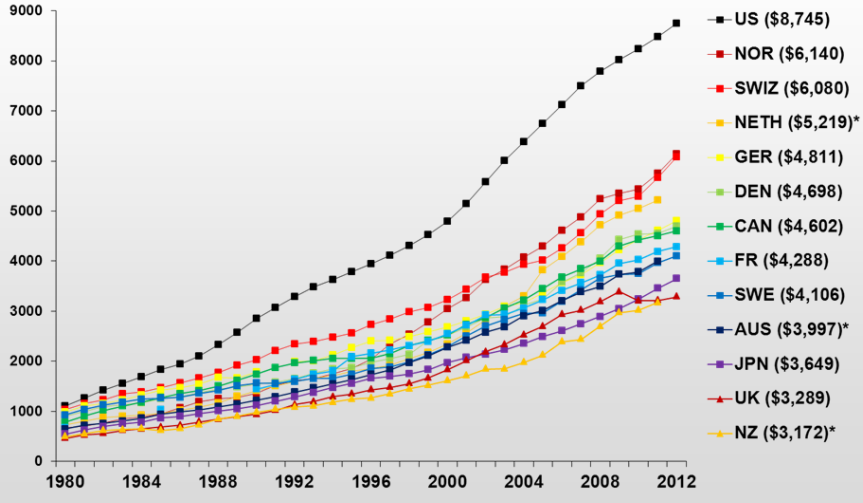
A snapshot of some of the problems…

- Quality of care
  - U.S. residents receive about 50% of care that is recommended[1]. Is this good? Acceptable?
- Individual expenditures
  - By 2025, average family premium will EQUAL median income
  - This means 50% of Americans will spend EVERY dollar they make on a health insurance policy.
- National expenditures
  - 21% of GNP is health care
  - 25% of economic growth between 2000-2005[2]



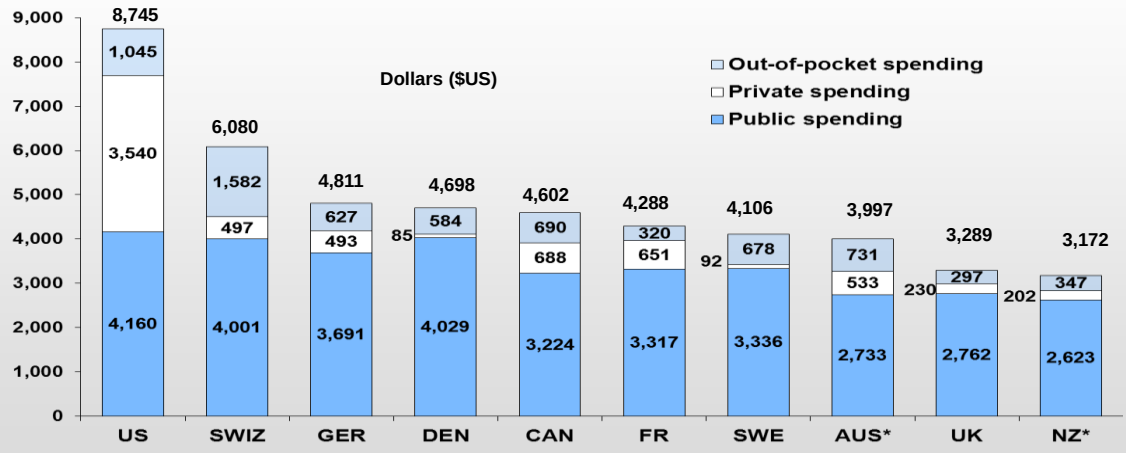
[1]McGlynn EA, Asch SM, Adams J et al. The Quality of Health Care Delivered to Adults in the United States. NEngl J Med. 2003;348:2635-2645.

Average Health Care Spending



Health Care Spending per Capita by Source of Funding, 2012

Adjusted for Differences in Cost of Living



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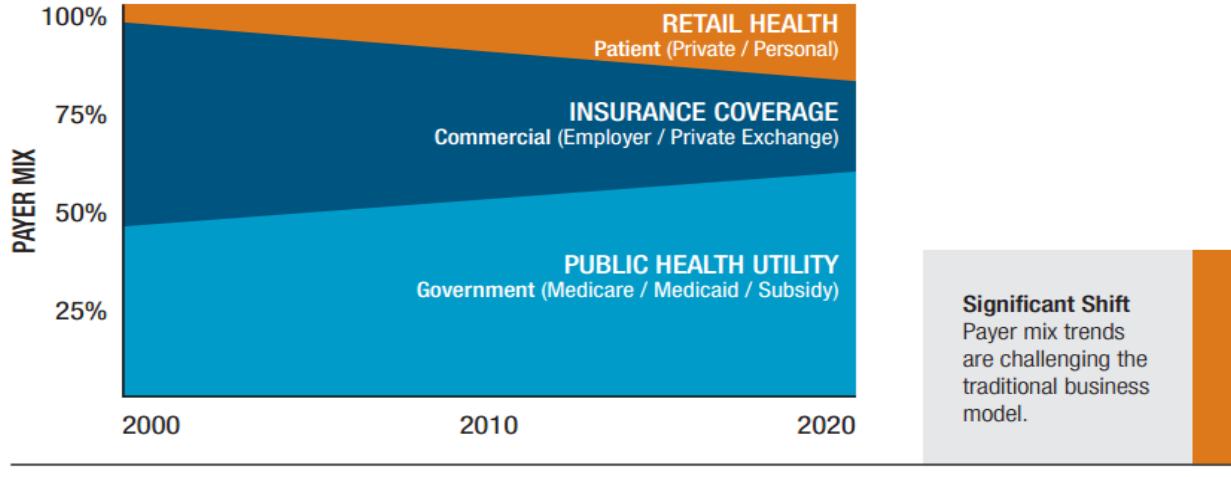
Source: OECD Health Data 2014.



Source: Huron Healthcare

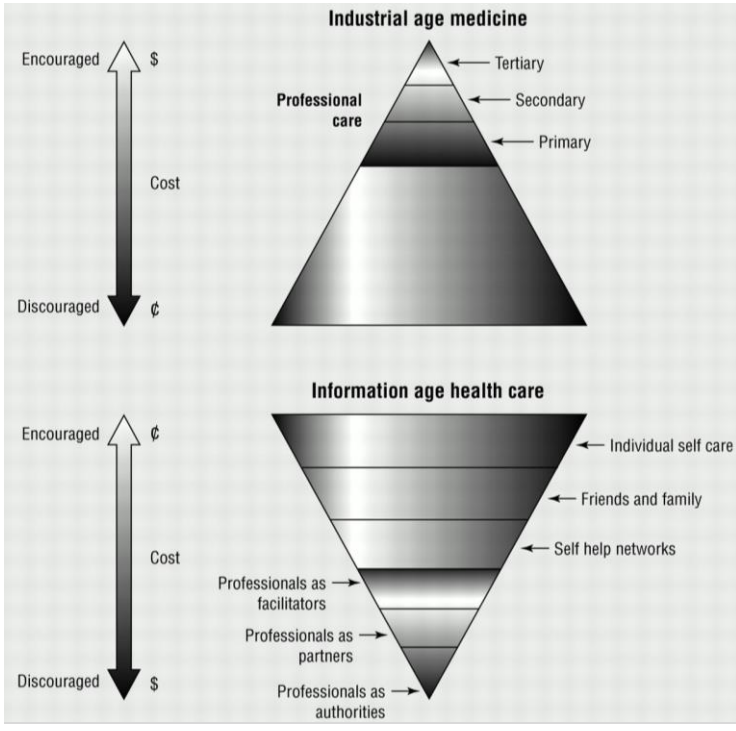
UNITED STATES HEALTH SYSTEM COVERAGE

- Richest country in the world
- Many Americans do not get the care they need
  - Ranked last of 23 developed nations in providing universal care (Commonwealth Fund)
  - 45 million (15% of population) have no health insurance
  - Millions are "underinsured"
- Not curing people with curable diseases?
- Risk of financial ruin due to medical bills
  - Medical bankruptcy is a unique American problem
  - 60% of bankruptcies are a result of medical bills
  - Approximately 700,000 Americans/year

SAVING OUR FUTURE REQUIRES TOUGH CHOICES TODAY…

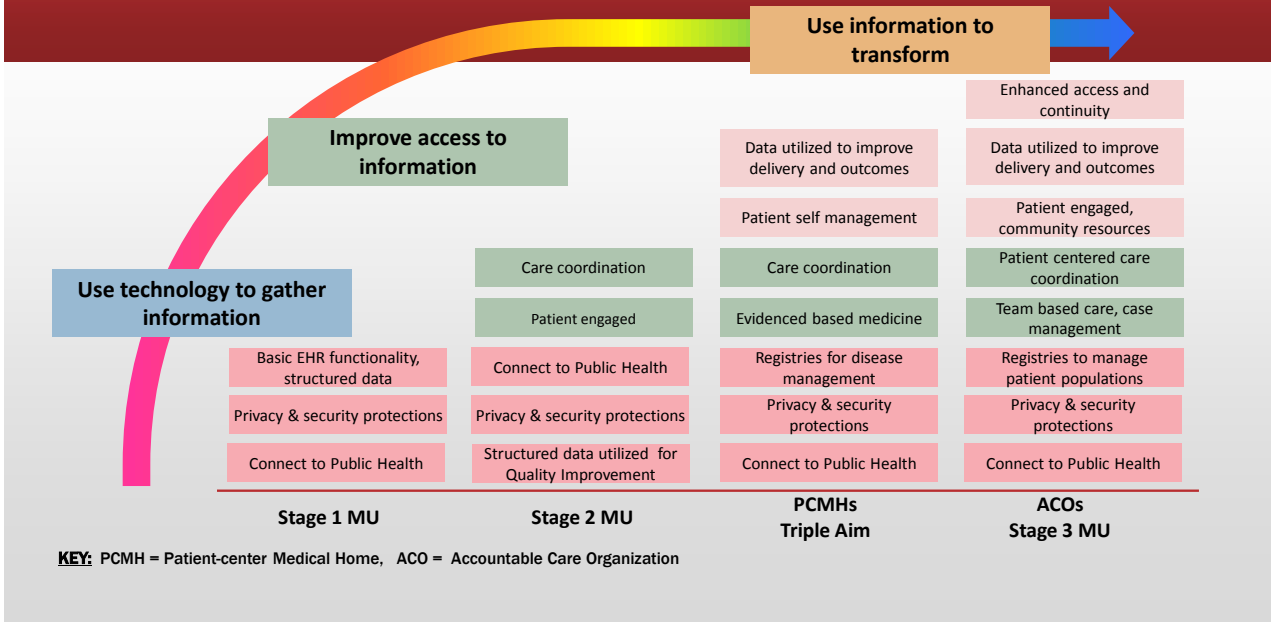
The Honorable David M. Walker, Comptroller General of the USA

- "Our single largest domestic policy challenge is healthcare"
- The truth is, our nation's healthcare system is in critical condition. It's plagued by growing gaps in coverage, soaring costs, and below average outcomes for an industrialized nation on basic measures like error rates, infant mortality and life expectancy.



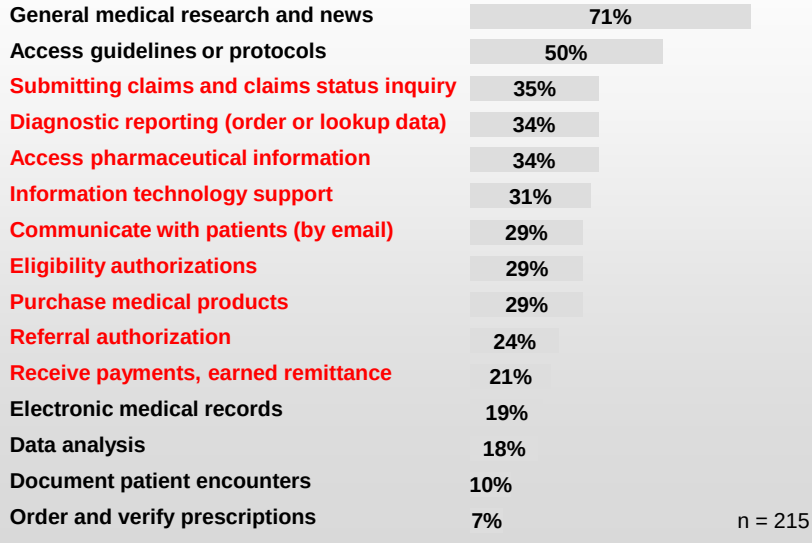
A Transformation is Occurring in Healthcare

Federal Roadmap Since 2010 to 2025

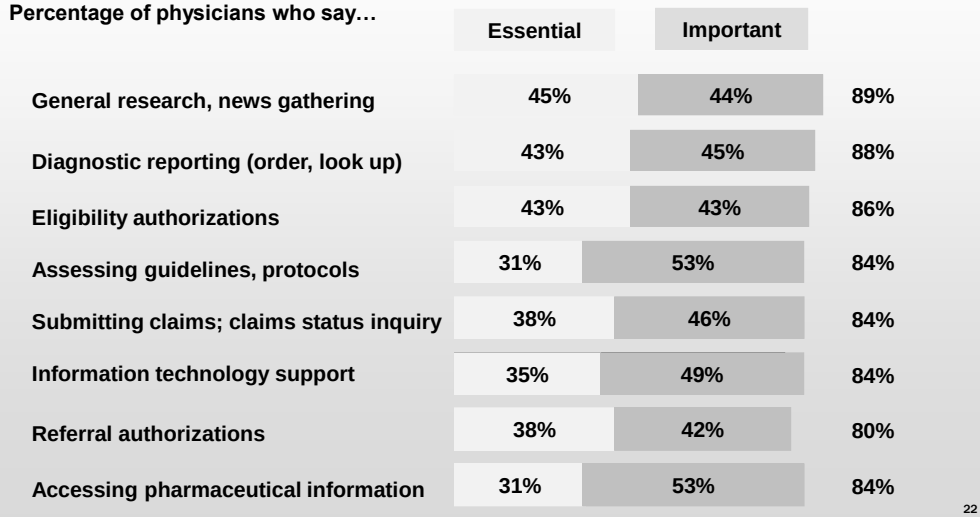


KEY: PCMH = Patient-center Medical Home, ACO = Accountable Care Organization

30% use at least one Internet-enabled application for core business and clinical functions



Over 80% agreed Internet applications were essential or important



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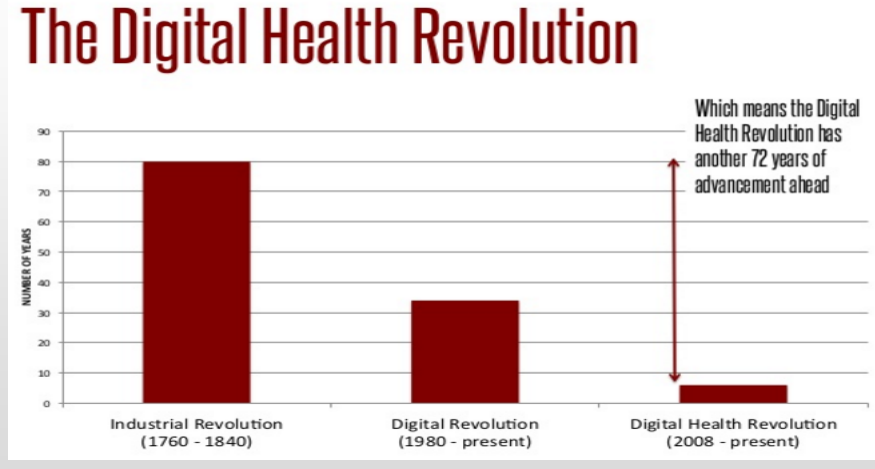
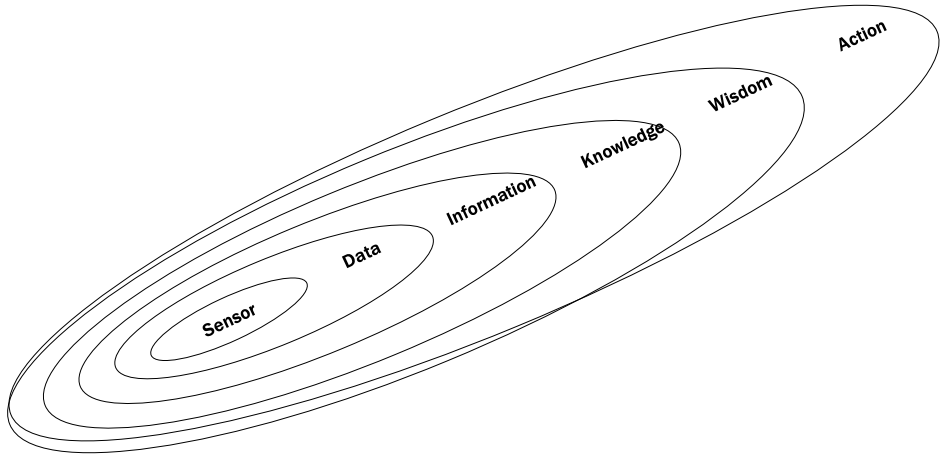
Entering the Age of Data

- **Data is THE central business asset:**
  - "Data are an organization's sole, non-depletable, non- degrading, durable asset. Engineered right, data's value increases over time because the added dimensions of time, geography, and precision." (Peter Aitken)
- **Data generation has changed forever**
  - Instrumentation of All businesses, people, machines
- **Data is born digitally and flows constantly**
  - "All things are flowing.." (Heraclitus, 500 BC)



http://www.slideshare.net/3wpr/10-digital-health-trends-for-the-next-20-years/6-0102030405060708090IndustrialRevoluMon176001840DigitalRevoluMon19800presentDigitalHealthRevoluMon20080presentNUMBEROFYEARSTheDigitalHealthRevolution



Challenges ahead:
Clinical devices, biotechnology and pharmaceuticals *converge with IT*

Organ Assistance and Substitution

- In the next two to five years, the novel organ assistance and substitution devices most likely to be developed and reach the market include
  - bioartificial liver assist devices that utilize live hepatocytes
  - an artificial lung known as an intravenous membrane oxygenator (IMO) that will perform short-term rescue in patients with acute respiratory distress (Hattler Respiratory Catheter)
  - an artificial retina that will restore limited sight in blind patients with retinal diseases
  - implantable, closed-loop artificial pancreas systems

Targeted Clinical Conditions: OAS Technologies

Category	Diseases/Conditions
Artificial Retina	Retinitis Pigmentosa (RP) Age-related Macular Degeneration (AMR)
Bioartificial Liver	Acute and Chronic Liver Failure - Hepatitis - Alcoholic Liver Disease - Toxins
Bioartificial Kidney	Acute and Chronic Renal Failure - Diabetes - High Blood Pressure - Glomerulonephritis
Total Artificial Heart/ Ventricular Assist Device	Acute and Chronic Heart Failure - Congestive Heart Failure (CHF) - Coronary Heart Disease (CHD)
Artificial Lung	Acute and Chronic Pulmonary Failure - Chronic Obstructive Pulmonary Disease (COPD); primary causes are chronic bronchitis and emphysema - Cystic Fibrosis - Primary Pulmonary Hypertension
Artificial Pancreas	Diabetes Mellitus - Type I - Type II - Gestational Diabetes
Artificial Bowel Sphincter	Severe Fecal Incontinence

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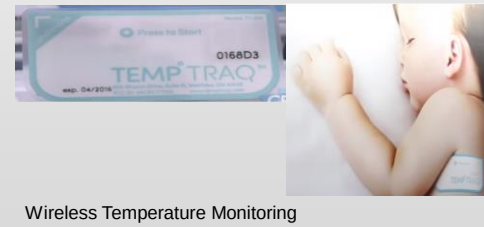
Sensors and Wearables at CES 2016

First Market: Diabetics, Cardiovascular Disease

Smart headband Manages and Mitigates Tension

Making it fashionable to wear sensors



Wireless Temperature Monitoring

Sensors and Wearables at CES 2016

HealthBox from HTC and Under Armour

Package of wristband, chest strap, and scale

Fitbit Blaze

On-screen workouts
Tracks runs, monitors heart & sleep

Force Impact Technologies' FITGuard

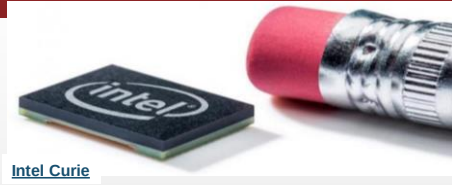
Intends to detect and prevent concussions by lighting up LEDs to indicate danger

Oakley Radar Pace

"Siri for cycling"

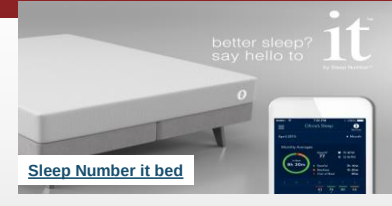
Pairs with power meters, speed/cadence sensors, etc.
.....with voice control/feedback

Sensors and Wearables at CES 2016



Intel Curie

$10 computer from Intel (used in Radar Pace)
Being incorporated into a bike and snowboard



Sleep Number it bed

Sleep IQ algorithm and predictive modeling
API for other devices

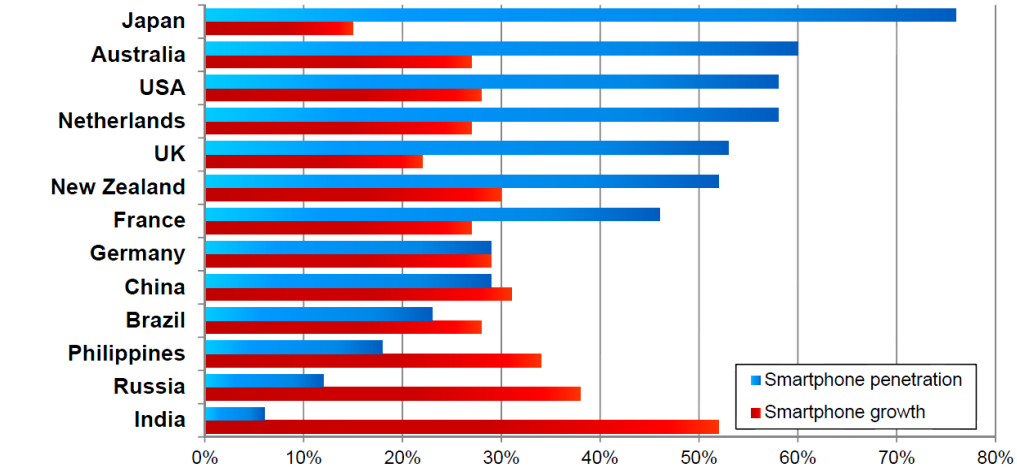
Withings Thermo and Go

Non-invasive temperature taking with connected app

MedWand

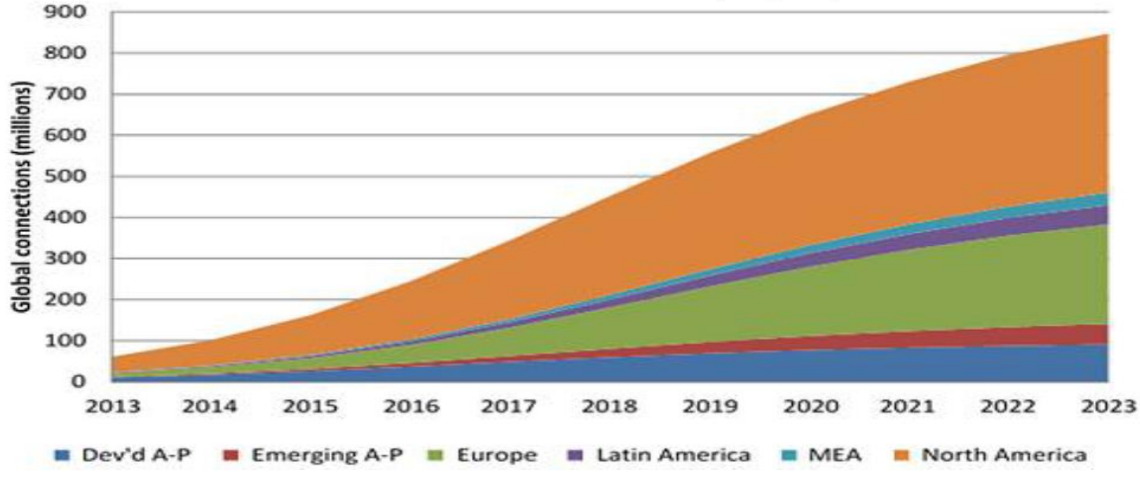
Handheld scanner combining temperature, heart rate, blood oxygen, otoscope, and stethoscope sensing

Global smartphone penetration



Source: Kleiner Perkins Caulfield Byers, as of Q2 2013

Global healthcare M2M connections by region, 2013-2023



[Source: Machina Research, 2014]

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Productivity and the e-Physician

	Old Doctor	New Doctor
Visits	27	6
Time	10”	30”
E-mail Time	0	4 hours
E-mail Contacts	0	40
Pts/Day	27	46
Contacts/1000	2.25	3.83

You can lead a horse to water ..
but how do we get physicians to drink?

Don Moran, AEI

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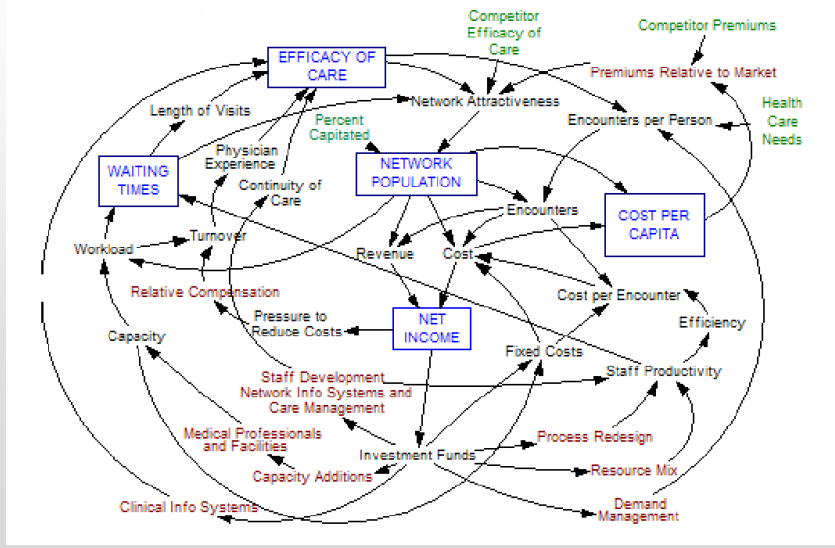
Cyber Physicians

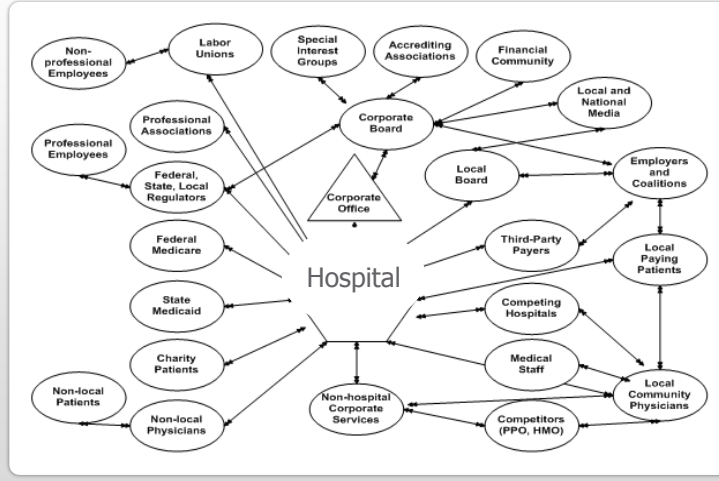
- The number and form of “infomediaries”–knowledge brokers will proliferate
- All the information available to professional will be available to patients
- Cyber Physicians will look after people’s health, detecting changes through sensors, prompting preventive activities and treatments

Understanding the system and the levers



Healthcare Stakeholder Map

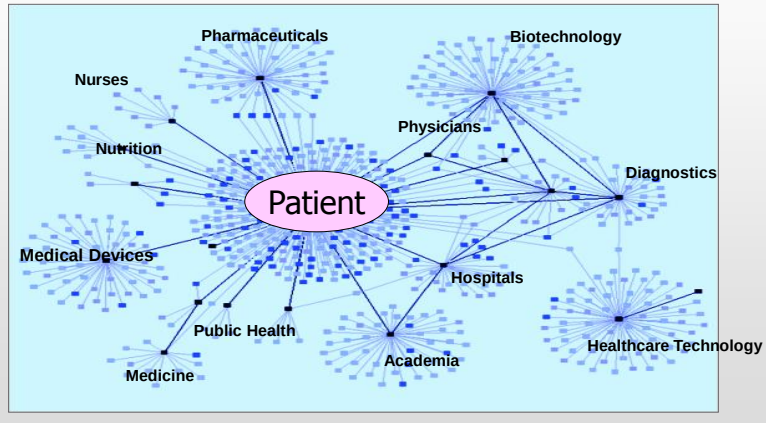
Current



Source: Shortell, S., and Kaluzny, A. (2000). *Health Care Management: Organizational Design and Behavior* (4th ed.).

Future Healthcare Network

The Patient Will Become the Nucleus of Healthcare



Healthcare Horizons

Horizon	2010	2025
Centers of Care	**Institutions** Clinics, surgery centers & hospitals	**Home** Avatar, online, "smart" technology
Gatekeeper	**Primary care physicians**	**AI** via portable electronic diagnostics and automated "care"
Genetics	**Simple -** Testing for simple disorders reaches affordability critical mass ($350/profile)	**Universal -** Testing, treatment and prevention is mainstream including reproductive health
Implants & Prostheses	**Manmade materials** surgical repair materials, drug delivery, and synthetic biochemical materials	**Regenerative biochemical** process and technological advances (regenerative organs, artificial haemoglobin, etc.)
Longevity	**Degenerative** 80 to 90 years, aging and metabolic breakdown	**Nearly non-degenerative** 125+ years, increased quality of life
Hospitals	**Treatment center for disease** - LOS in days	**Teaching center for patients**,– LOS in hours

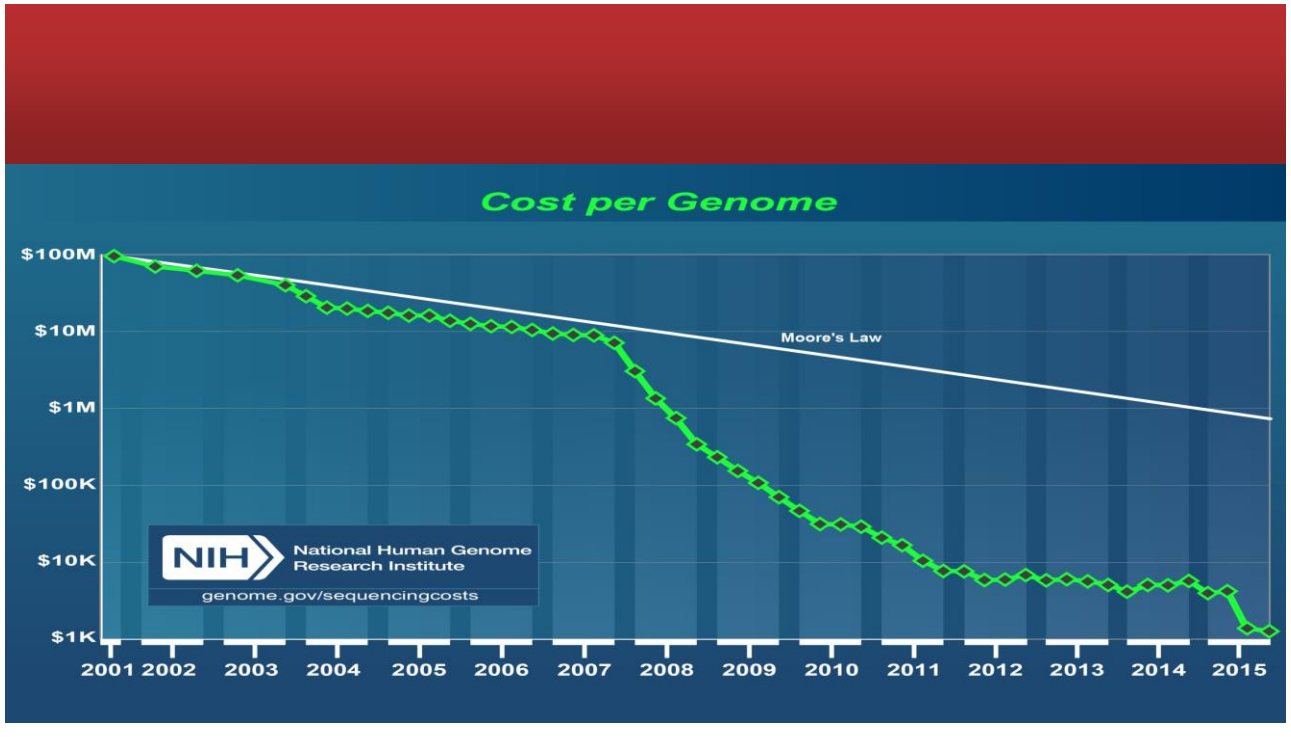
Source: Updated from Coates, J., Mahaffie, J., and Hines, A. (1997). *2025: Scenarios of US and global society reshaped by science and technology.*

Blood Protein Diagnostics

- ***In vitro*** blood protein diagnostics
- Major organs or cells secrete protein blood **molecular fingerprint**
- **Single** cell analysis
- Blood fingerprint will report **organ status**, distinguish **health from disease**, and **which disease**

Genetics

- HapMap ↓ £/€/$ of human genetic variation (disease diagnosis)
- "Gene Chip"– **multiple** gene examination
- Personal **genome sequencing** direct-to-consumer (DTC)
- Identified **origins** and **causal relationships** of complex diseases
- **"Epigenetic"** factors linked to diseases, heritability across generations
- **Stem cell** transplants
- Human reproductive **cloning**



The Nanomedical Universe

- Nanomedicine
- Nanobots
- Nanorobotic therapy
- Nubots
- Nanosensors
- Bionanobots
- Nanotechnology

Smart Living

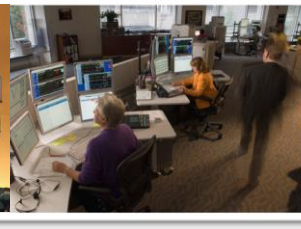
- Smart clothes
  - Sense body functions
- Smart bathroom
  - Evaluate body fluids
- Smart kitchen
  - Prepare body nutrients
- Smart house
  - Elderly can live at home

Virtual Reality Surgery

- **Remote** 3D diagnostics
- **Robotic-assisted** procedures
- **Minimally invasive** surgeries
- **Global access** to experts

Remote Tele-Treatment

Electronic ICU (**eICU**):

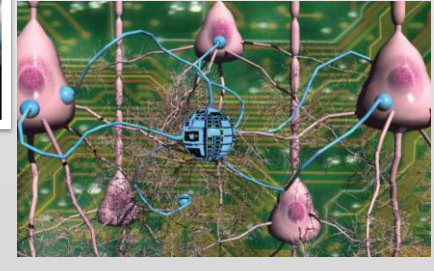


Sentara Hospitals **achievements**:

- Multi-site access to **Intensivists**
- **25% reduction** in ICU hospital **mortality rate**
- **17% decrease** in ICU **LOS**
- **20% increase** in **ICU capacity** created by shorter ICU LOS
- **26% reduction** in hospital **costs** for ICU patients

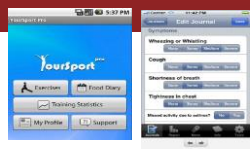
Bionics

- **"Neuroprosthetics"** - brain implants to prevent disease
- Health avatars capable of **artificial thought**
- Bionic eyes/ears/limbs/organs
- Bionic everything!!!
- **Where does this leave pharmaceuticals?**



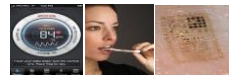
"I Am My Own Medical Home"

Advanced knowledge technologies allow self-care



Wellness & disease mgmt. apps

Personal health record



Noninvasive biomonitoring

Digital coach ("avatar")

Facilitated Disease Network

Big name vendors offer free avatar-based health coaching if other integrated health products and services are purchased

Where Americans receive primary care:

- 40% Consumer Directed Health Plans – self-managed care
- 40% Health Systems and Groups – primary care relationship in integrated systems
- 10% Concierge Practices – sophisticated personalized care
- 10% Uninsured – use ER and CHC when they have to

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No frills airlines to no frills care?

You get what you pay for

The journey of creating the future

"The healthcare system as it is now looks nothing like a capitalist market in which competition pushes prices down and consumers make informed tradeoffs between price and quality. "

"The difficulty bringing free-market forces to the healthcare industry helps explain why Americans spend the most on healthcare, with only mediocre results. If we're lucky, market forces are beginning to have a tangible, if subdued, impact. We need a lot more."

Thank You!

David Smith

President

SocialCare™

dsmith@socialcare.com