



**Hackensack**  
University Health Network

# Why Making Connections

The Internet Of Things In Healthcare  
January 14, 2016

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Hackensack University Medical Center



# About Hackensack University Health Network

- ❖ New Jersey-based parent company of HackensackUMC, HackensackUMC Palisades, the HackensackUMC Foundation, Hackensack University Medical Groups, HackensackUMC at Pascack Valley and HackensackUMC Mountainside.
- ❖ Part of the nation's largest healthcare consortium, AllSpire Health Partners; with a total of 28 hospitals and service area of more than six million people.
- ❖ More than 11,300 employees, 3,100 credentialed medical staff members and 1,697 hospital and nursing home beds at hospitals within the Network#1 hospital in New Jersey and one of the top four New York metro area by the *U.S. News & World*
- ❖ Healthgrades® America's Best 100 Hospitals in 10 different areas – more than any other hospital in the nation
- ❖ Healthgrades America's 50 Best Hospitals™ for nine years in a row
- ❖ Healthgrades Distinguished Hospital Award for Clinical Excellence™ 13 years in a row
- ❖ 23 Gold Seals of Approval™ by the Joint Commission – more than any other hospital in the country
- ❖ HackensackUMC is the Hometown Hospital of the New York Giants and the New York Red Bulls

[www.HackensackUMC.org](http://www.HackensackUMC.org)





Google

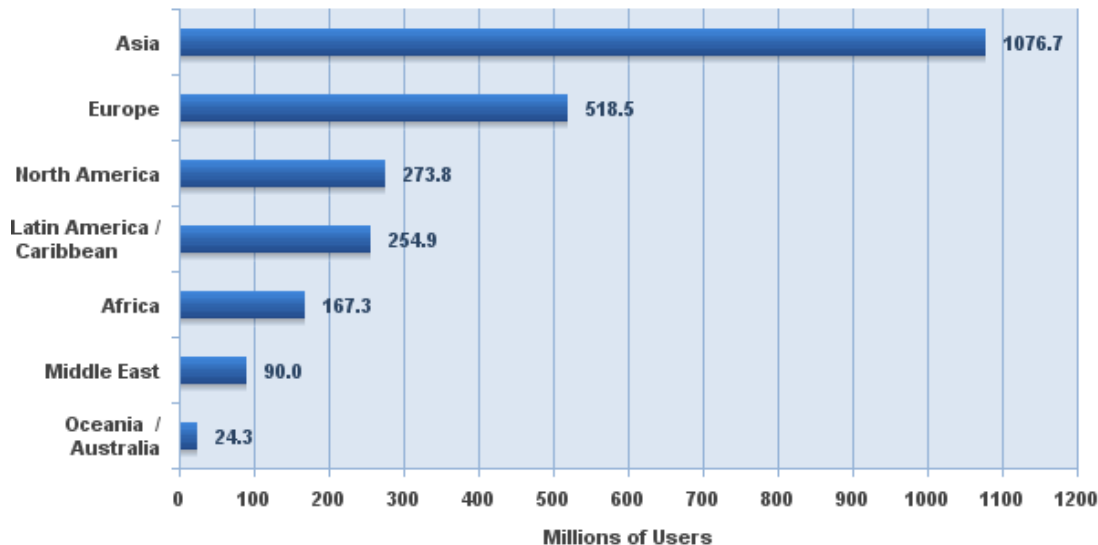
The image features the Google logo in its signature multi-colored font (blue 'G', red 'o', yellow 'o', blue 'g', green 'l', red 'e'). The logo is centered on a light blue background. Behind the text is a large, faint, semi-transparent watermark of the letter 'G', which is composed of four colored segments: light red at the top, light yellow on the left, light blue on the right, and light green at the bottom. At the very bottom of the image, there is a horizontal strip of green grass.



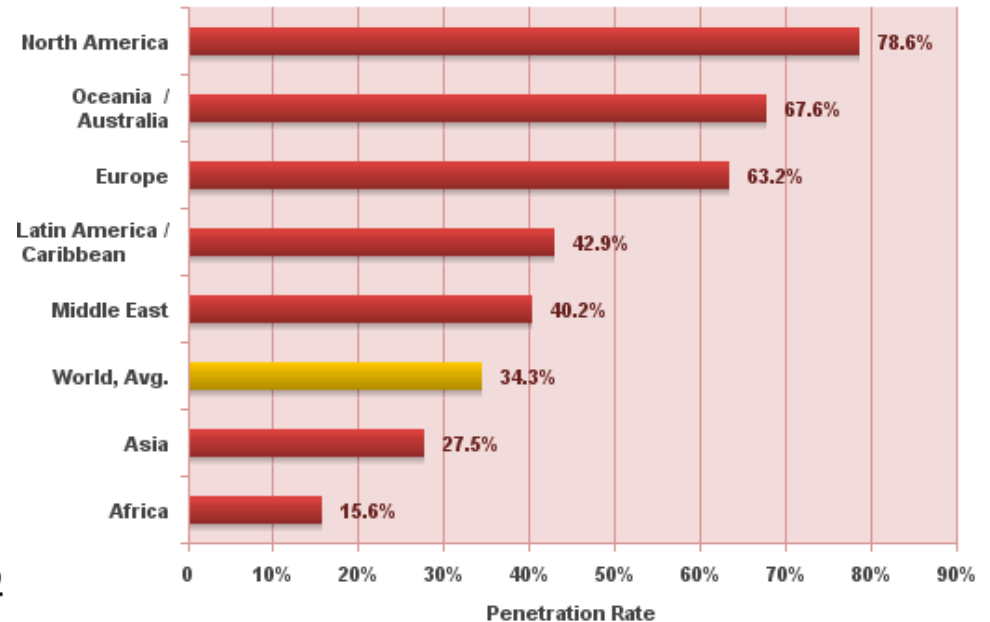
# The Internet

## Fuel for the fire

**Internet Users in the World  
by Geographic Regions - 2012 Q2**



**World Internet Penetration Rates  
by Geographic Regions - 2012 Q2**



Source: Internet World Stats –  
[www.internetworldstats.com/stats.htm](http://www.internetworldstats.com/stats.htm)  
2,405,518,376 Internet users estimated for June 30, 2012  
Copyright © 2012, Miniwatts Marketing Group

# 6 Billion New Minds

Greatest period of innovation ever

- Create
- Discover
- Desire
- Consume
- Invent



# From desktop to pocket

**PRESIDENTS' BIRTHDAY SALE!**

**DON'T DELAY!**

# Radio Shack

## AMERICA'S TECHNOLOGY STORE

**All-Weather Stereo**  
**Cut 24% \$1188**  
Realistic STEREO-MATE AM/FM personal receiver shrugs off rain, water, ice, wind, moisture.

**AM/FM Clock Radio**  
**30% off \$1389**  
Chromatone™ 241 clock radio's compact size cuts nighttime clutter on your desk.

**In-Ear Stereo Phones**  
**HALF PRICE! \$788**  
Realistic™ in-ear phones weigh just 0.8 ounces! With carry pouch, you're set.

**Micro-Thin™ Calculator**  
**39% off \$48**  
Radio Shack DC-413 is only 1/8" thick. Size of a 10¢ coin. One button, 100% accurate.

# 0% INTEREST!

## NO PAYMENTS UNTIL MAY!

## NO DOWN PAYMENT!

**HURRY! OFFER ENDS TUESDAY FEBRUARY 19**

**3-DAY SPECIALS ABOVE GOOD SATURDAY THRU MONDAY ONLY!**

\* See Special Radio Shack Store Hours for details. Offer good on purchases of \$100 or more. Payment is due by the 15th day following the purchase. No cash advance. Offer good on purchases of \$100 or more. Payment is due by the 15th day following the purchase. No cash advance. Offer good on purchases of \$100 or more. Payment is due by the 15th day following the purchase. No cash advance.

**COME IN AND TAKE ADVANTAGE OF THESE OTHER FANTASTIC VALUES!**

**INTRODUCTORY SPECIAL!**

**Save \$670**  
**\$1599**

Low to \$449 Reg. Separate offers \$1599

- 286-Based PC Compatible
- Color Monitor
- 20MB SmartDrive™ Hard Drive
- Easy-to-Use 10-in-1 DeskMate® Software
- 40-Megabyte diskette

**BONUS PACKAGE**

- Lotus Spreadsheet For DeskMate
- DeskMate O&A Write
- Quick
- 2-Button Mouse

**VHS Camcorder**

**Save \$799**  
**\$100**

Low to \$100 Reg. \$899.50

Realistic Model 92 includes color light for night shooting, 2-lens battery, VHS camcorder, no ads.

**3-Way Speaker With Massive 15" Woofer**

**Save \$110**  
**\$14995**

Low to \$110 Reg. \$1609

Optimum Match™ system combines two 15" speakers with 4" horn tweeter. 8" subwoofer.

**Mobile Cellular Telephone**

**Save \$100**  
**\$199**

Low to \$100 Reg. \$299.50

**Tiny Dual-Superhet Radar Detector**

**Save \$60**  
**7995**

Low to \$139.50 Reg. \$199.50

Road Patrol XK™ detector lets you drive with confidence. Searches X, W & S band tones. 400 mhz.

**Mobile CB With Channel Controls on Mike**

**HALF PRICE! \$4995**

Low to \$249.50 Reg. \$499.50

Realistic TRC-430 lets you get highway info as Radio-pac's fastest hand to drive, alarm, repeat service.

**20-Memory Speed-Dial Phone**

**Cut 33%**  
**2995**

Low to \$199.50 Reg. \$449.50

Radio Shack ET-292: Real-time 20-number speed-dial, 100% call, 100% call, 100% call.

**Deluxe Portable CD Player**

**Save \$40**  
**\$15995**

Low to \$119.50 Reg. \$159.50

Realistic CD-250 has 10-play, 100% accurate, 100% accurate, 100% accurate.

**Compact 10-Channel Desktop Scanner**

**Save \$30**  
**9995**

Low to \$69.50 Reg. \$99.50

Realistic PRO-37 lets you catch the news as it happens! Hear police, fire, taxi, military, with more, 400 mhz.

**Our Easiest-to-Use Phone Answerer**

**Cut 17%**  
**4995**

Low to \$42.50 Reg. \$59.50

DUPHON® TAD-240 answerer is ready to use—just plug it in. Has built-in microphone, no ads.

**Handheld Voice-Activated Cassette Tape Recorder**

**49% OFF**  
**2995**

Low to \$154.50 Reg. \$309.50

Realistic CR-88 includes 10-play, 100% accurate, 100% accurate, 100% accurate.

Check Your Phone Book for the Radio Shack Store or Dealer Nearest You. See Special Radio Shack Store Hours for details. Offer good on purchases of \$100 or more. Payment is due by the 15th day following the purchase. No cash advance. Offer good on purchases of \$100 or more. Payment is due by the 15th day following the purchase. No cash advance.

Everything  
from this 1991  
ad now fits in  
your pocket



# Unexpected Convergent Consequences

Of faster & cheaper computing power

Networks

Sensors

Artificial Intelligence

Robotics

3D Printing

Synthetic Biology

Materials Sciences



# Exponential Advances

From idea to billion dollar company

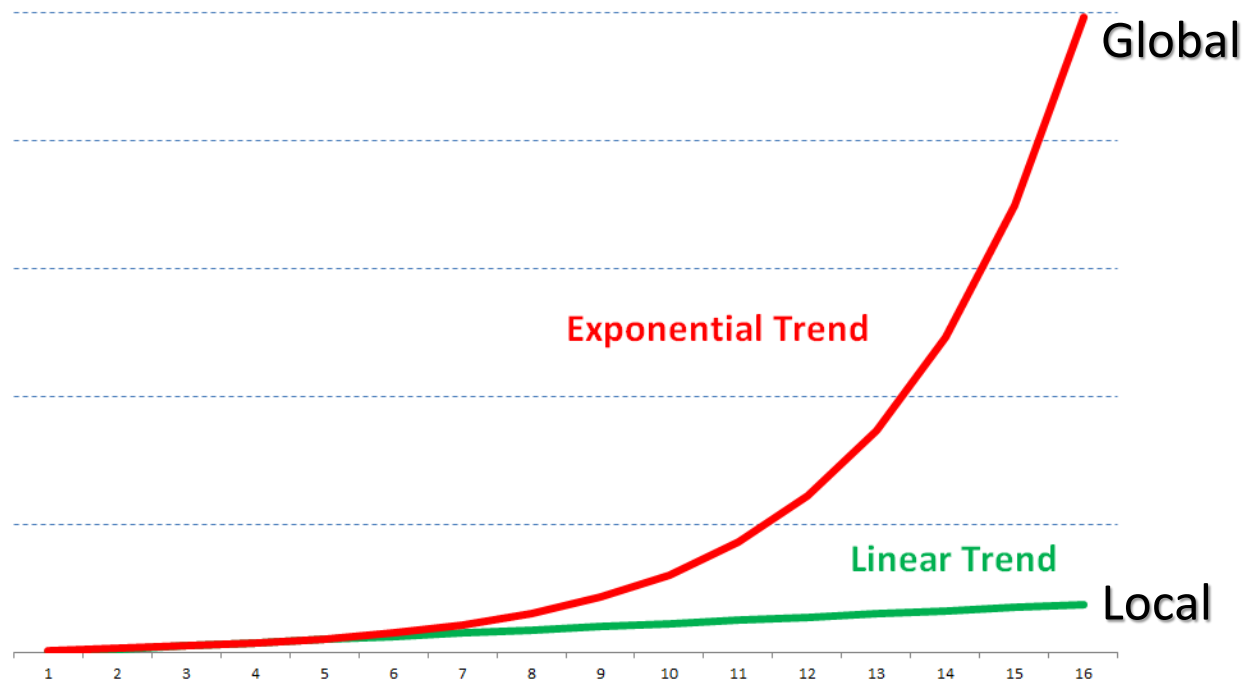
- Youtube
- Instagram
- Dropbox
- Uber
- Oculus VR
- Whatsapp
- Snapchat
- AirBnb





# Growth

From linear & local to exponential & global



# Download Your Brain

Live forever



# Healthcare will be free

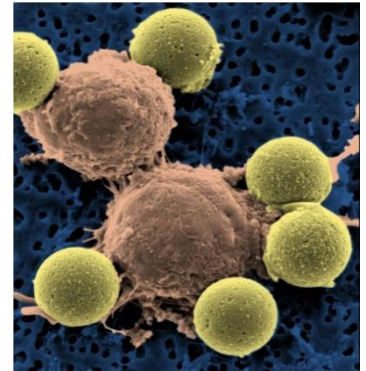
Self Service & Funded





# Doctor G's Story

## New Therapy Delivery Mechanisms



- Dr. Carl June at the University of Pennsylvania
- Extract T-Cells
- Genetically engineer them with HIV virus
- Programmed to catch proteins in cancer cells & regenerate
- Transfused back into the patient



# The Pressures

## A Quest for Customer Loyalty

Convenience is Required

Whenever Access is Guaranteed

High Quality is a Given

Patient Reported Outcome Reimbursement



# Components of the Shift

Prevention

Primary Care

Ambulatory Setting

Home



# Pharmaceutical Delivery

## The Changing Mechanism

From  
Oral, IV & Dermal



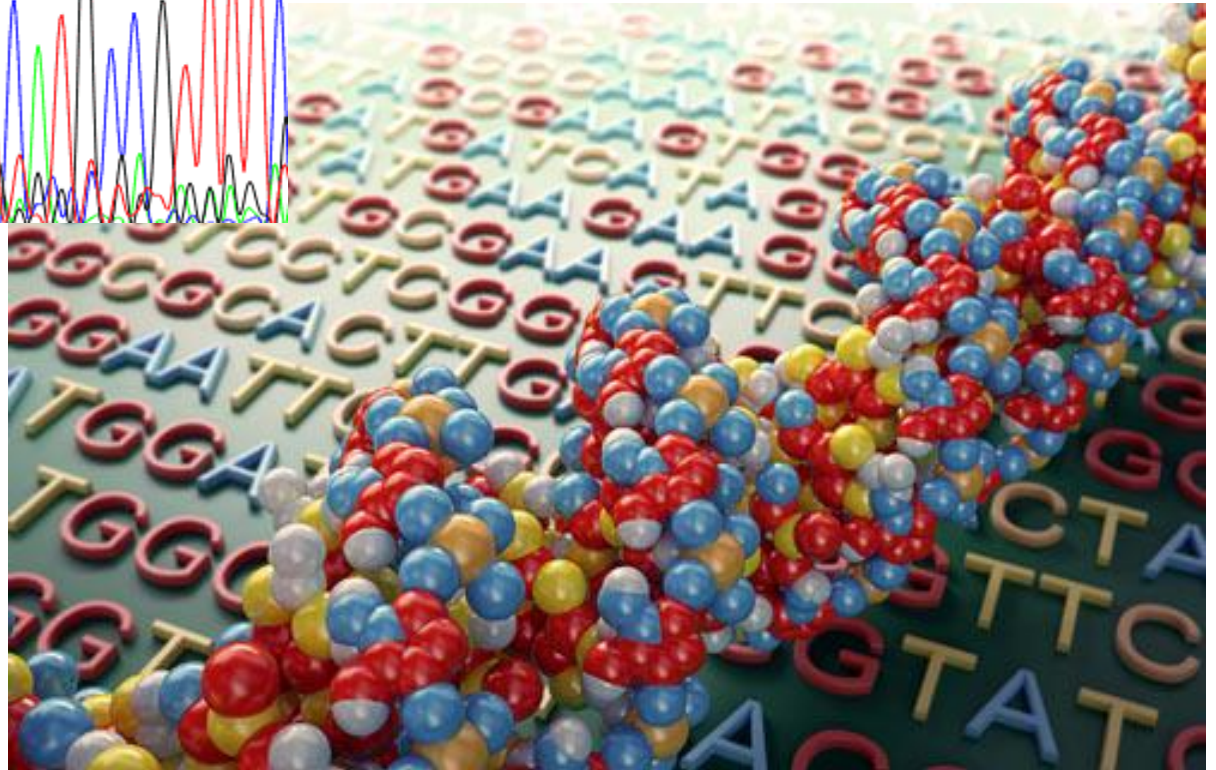
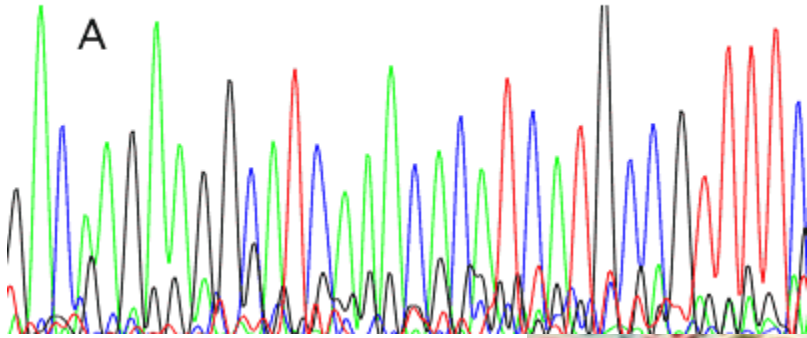
To  
Nano Therapy &  
Genetic Engineering



# Genomics

## DNA Sequencing

G A C A A G A A G G C A T C A A A C A C A T C A T G C C G T T T T C  
i Thr Arg Arg His Gln Thr His His Ala Val Phe  
230 240 250





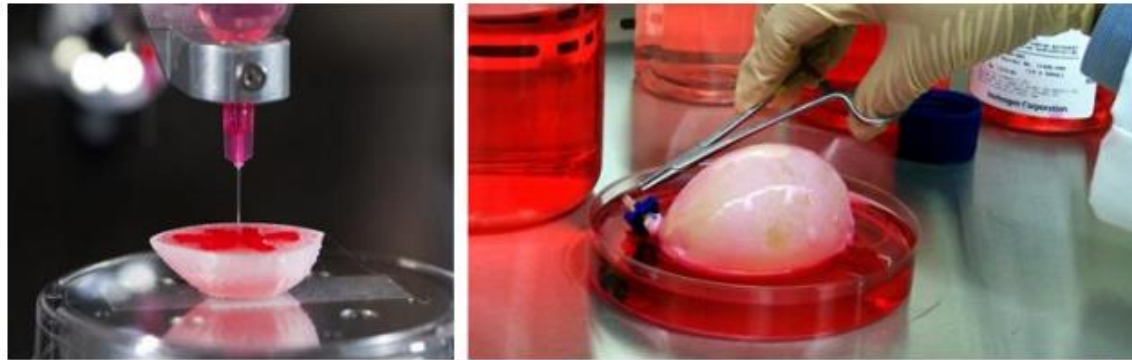
# Printable Organs

Closer than ever



**Photo: Wake Forest University Baptist Medical Center**

Scientists at the Wake Forest Institute for Regenerative Medicine have developed tissue aimed at replicating the outer ear using bioprinting.

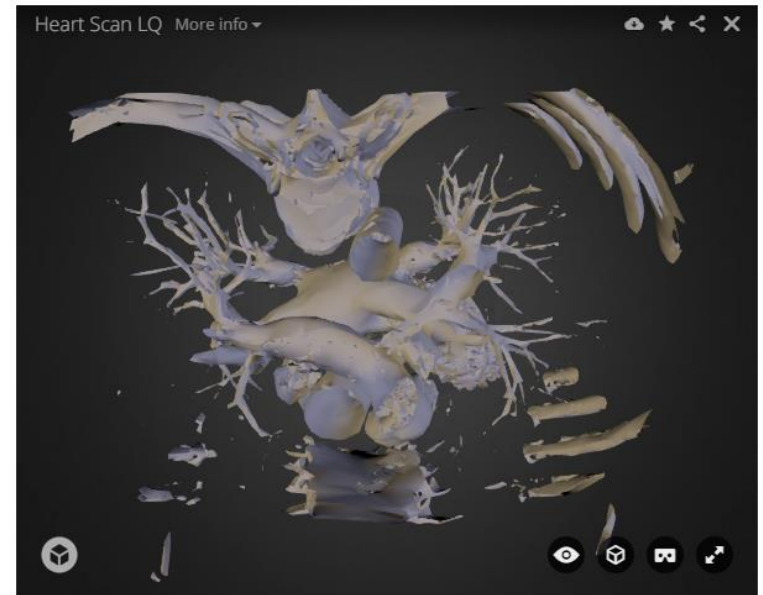


**Photo: Wake Forest University Baptist Medical Center**

The scientists at Wake Forest IRM are also using bioprinting to develop a replacement bladder.

# Google Cardboard

## Virtual Enhanced Surgery



# Healthcare's Future

The Future is Now

<b>Gamifying Health</b>	Games on Lumosity.com
<b>Augmented and Virtual Reality</b>	Google Glass
<b>Telemedicine</b>	Stanford Video Consultation
<b>Surgical and Humanoid Robots</b>	World Class Surgery in Remote Locations
<b>Portable Sensors &amp; Diagnostics</b>	Qualcomm Tricorder X Prize
<b>Lab Grown Organs</b>	Liver Tissues & Skin
<b>3D Printing Revolution</b>	Devices, Tissues, Cells, Drugs
<b>Artificial Intelligence</b>	IBM Watson
<b>Virtual-Digital Brains</b>	Dr. Kevin Warwick Neural Implant

# The Consumer Will See You Now...

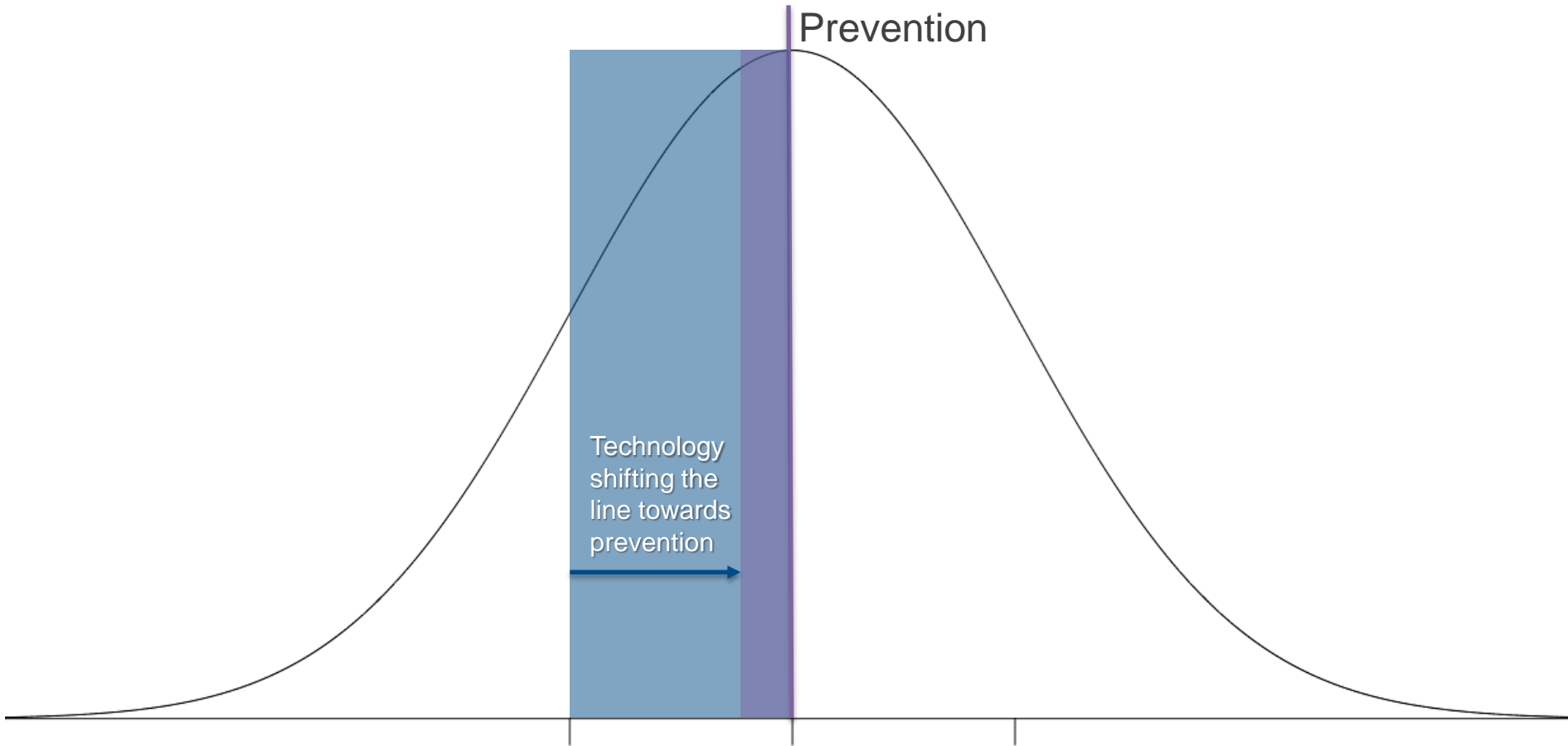
Devices, Wearables, Implantables





# The Technology Shift

Toward total prevention



# What Are We Doing Now

## The Basics

We digitalized the records



Now we want to get the data out as meaningful information via analytics to create value

Analytics

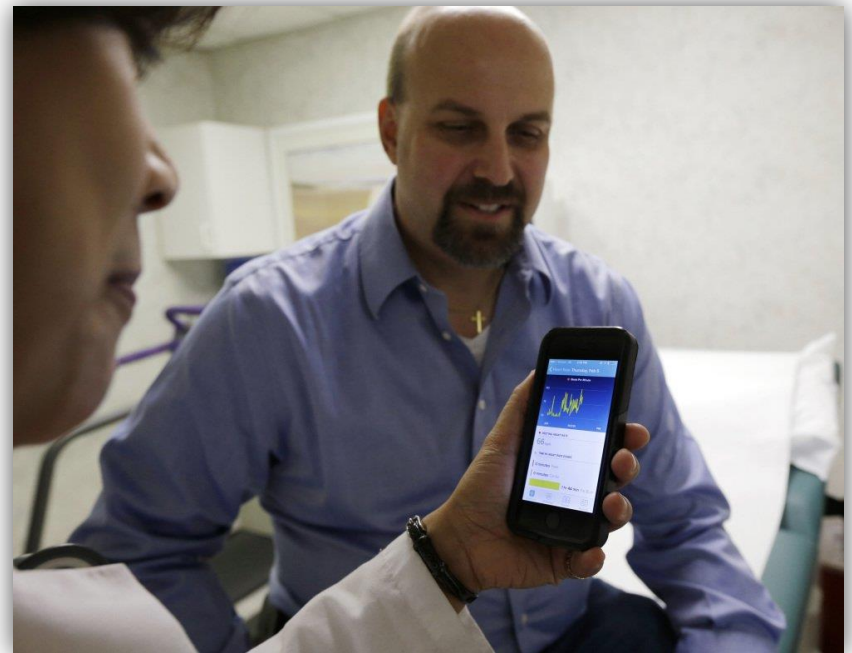
Value Creation

Predictive Analytics

Decision Making  
(Strategic & Tactical)

# Apple Healthkit

Keeping connected to patients



# ADOPT MEOWS

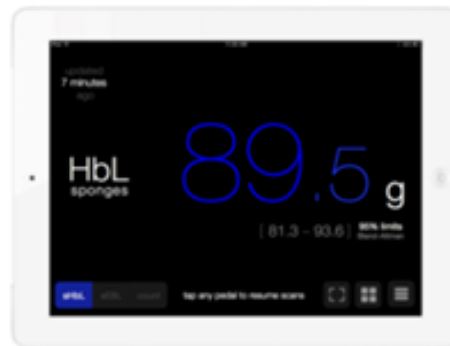
## Redefining Quantified Blood Loss as a Vital Sign



Check in Sponge



Capture Image



View Results

0	1	2	3
≥ 95			
9-14	15-20	21-29	≥ 30
51-100	101-110	110-129	≥ 130
101-180	181-200	201-219	≥ 220
	> 200ml/hr		
A	V	P	U
36,1-37,3	37,4-38,4	≥ 38,5	

Feed as Vital  
Sign to EHR

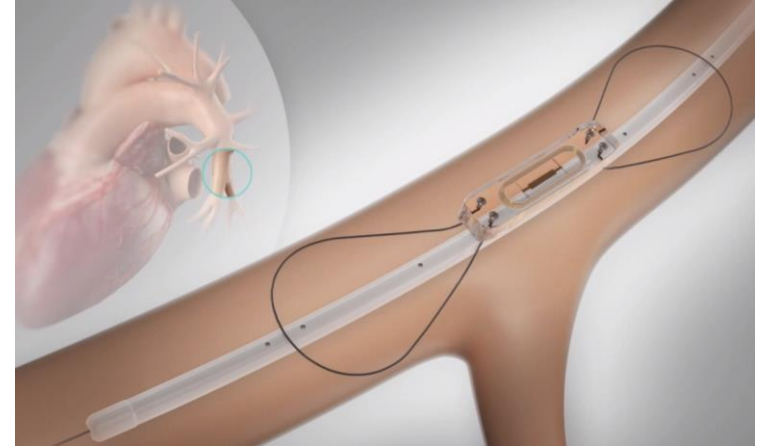


# St. Jude's Medical CardioMEMS

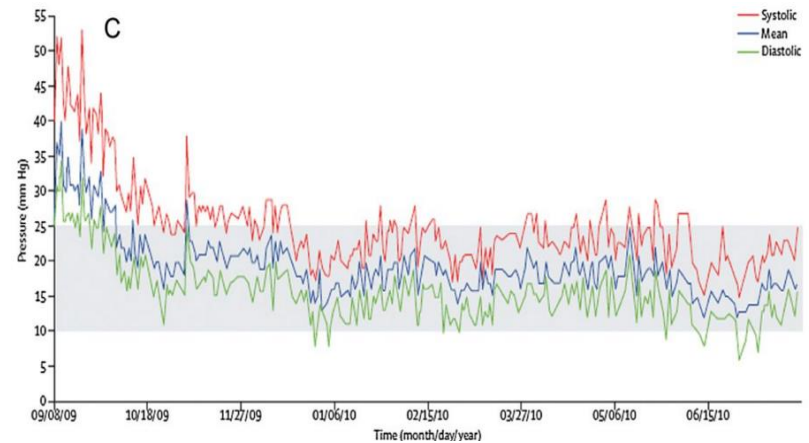
## Implanted Pulmonary Artery Sensor



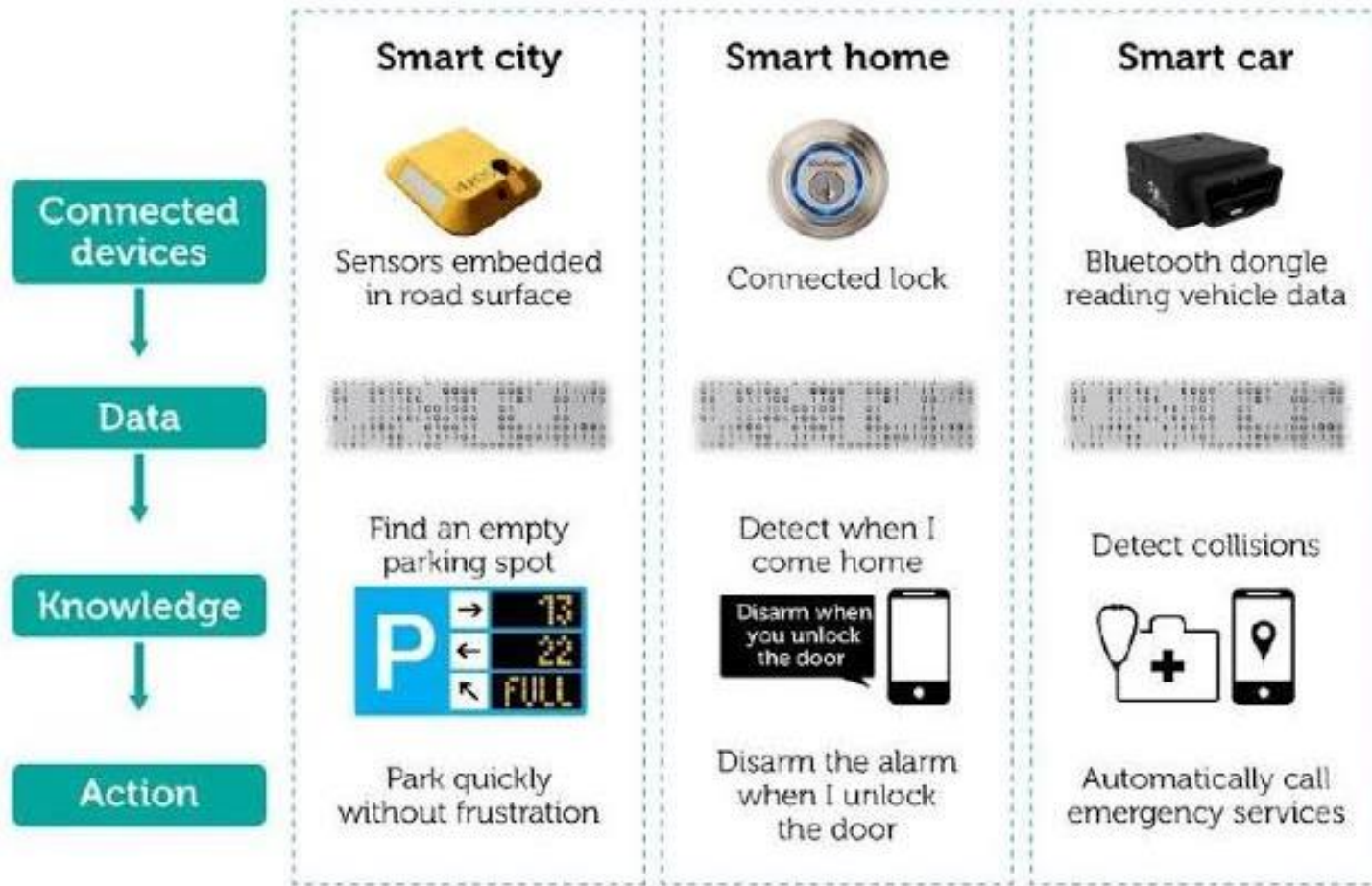
Implanted  
in Artery



Transmit  
from  
Home to  
EHR



# Creating Value from Data



Smart Patient



Wearables



Detect Future Heart Attack



Schedule Doctor Visit and forward EKG

# Personal Profile

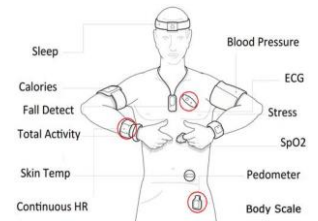
What makes us - us



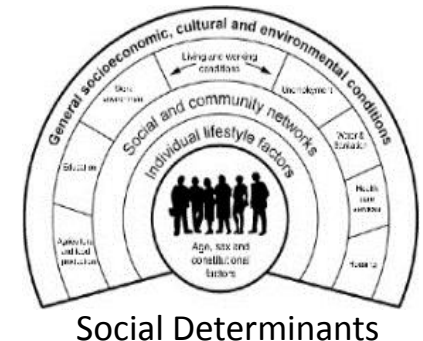
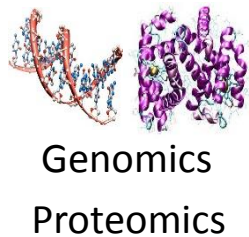
Spending  
Habits



IoT &  
Wearables



Location





# Thank You



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University Health Network

Contact or Follow Dr. Shafiq Rab



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@CIOSHAFIQ



[www.HackensackUMC.org](http://www.HackensackUMC.org)