Alumni Exchange

THE UNIVERSITY OF ILLINOIS
COLLEGE OF MEDICINE
CHICAGO PEORIA ROCKFORD URBANA

Alumni Exchange

The Future of Healthcare…
Cool stuff coming!

THE UNIVERSITY OF ILLINOIS COLLEGE OF MEDICINE
CHICAGO PEORIA ROCKFORD URBANA

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UIC Alumni Exchange

AGENDA

- Introduction
- Telehealth
- Precision Medicine
- Internet of Things (IoT)
- Drones
- 3D Printing
- Nanobots
- Artificial/Augmented Intelligence (AI)

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My Journey

Clinical, IT, Business

Penn Engineering

Northwestern Medicine

Advanced Health Technologies

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SZOLLOSI HEALTHCARE INNOVATION PROGRAM

PROXICOM

healthfinch

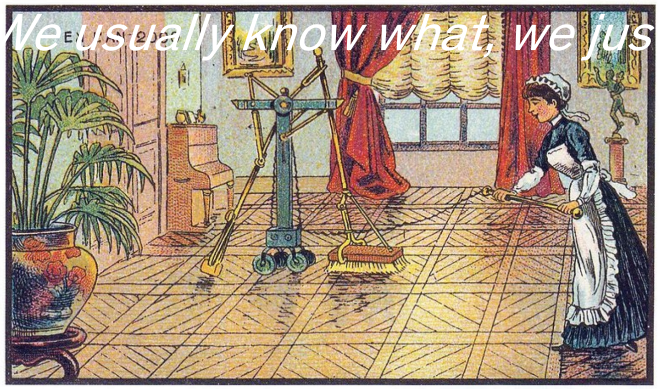
OneView
Revolutionizing Patient Experience

MDLIVE
Always there.

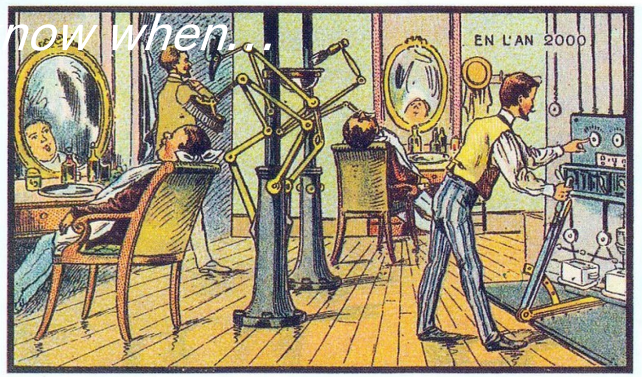
FutureHealth

What Might The Future Look Like?

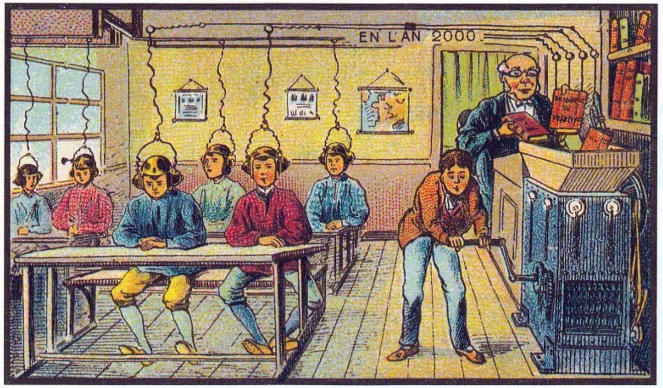
We usually know what, we just don't know when…



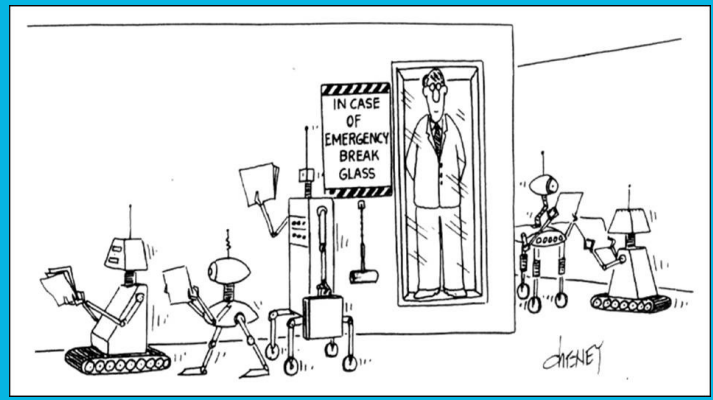
Electric Scrubbing



The New-Fangled Barber



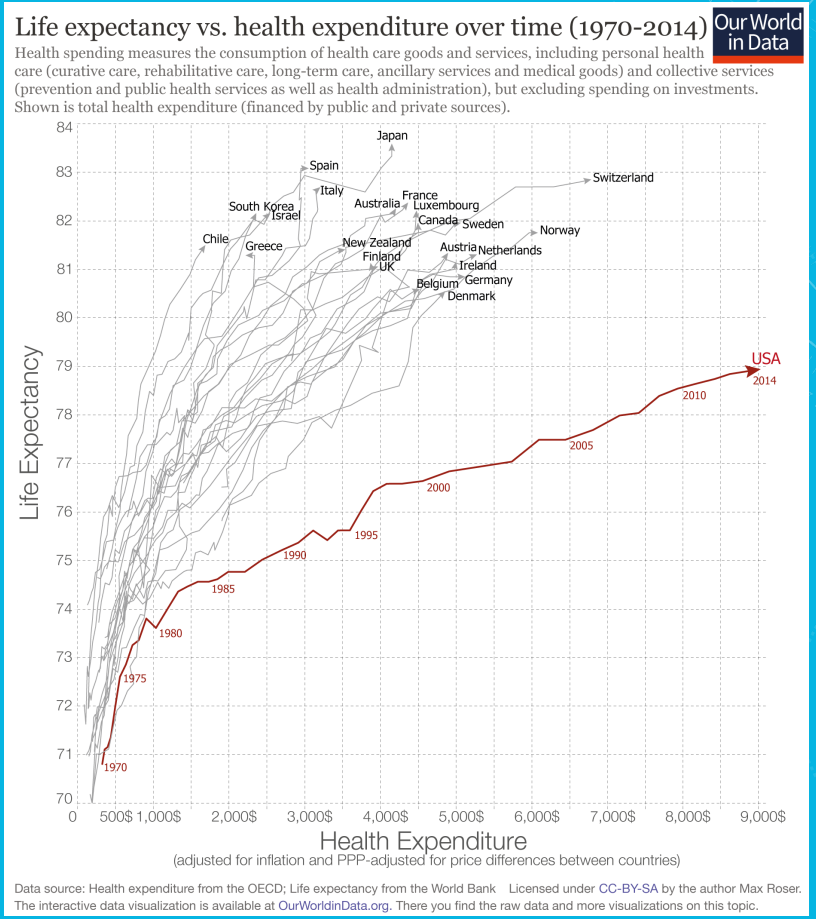
At School



Source: http://www.washingtonpost.com/news/wonkblog/wp/2015/10/04/what-people-in-1900-thought-the-year-2000-would-look-like/

Introduction

Why we need Innovation
In Healthcare



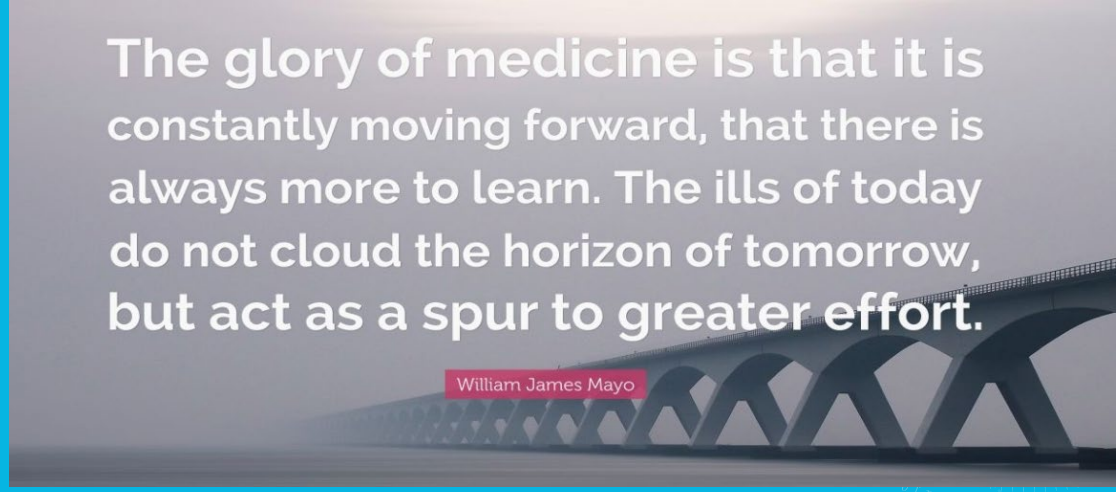
Ref: https://ourworldindata.org/wp-content/uploads/2016/04/ftotHealthExp_pC_USD_long-1.png

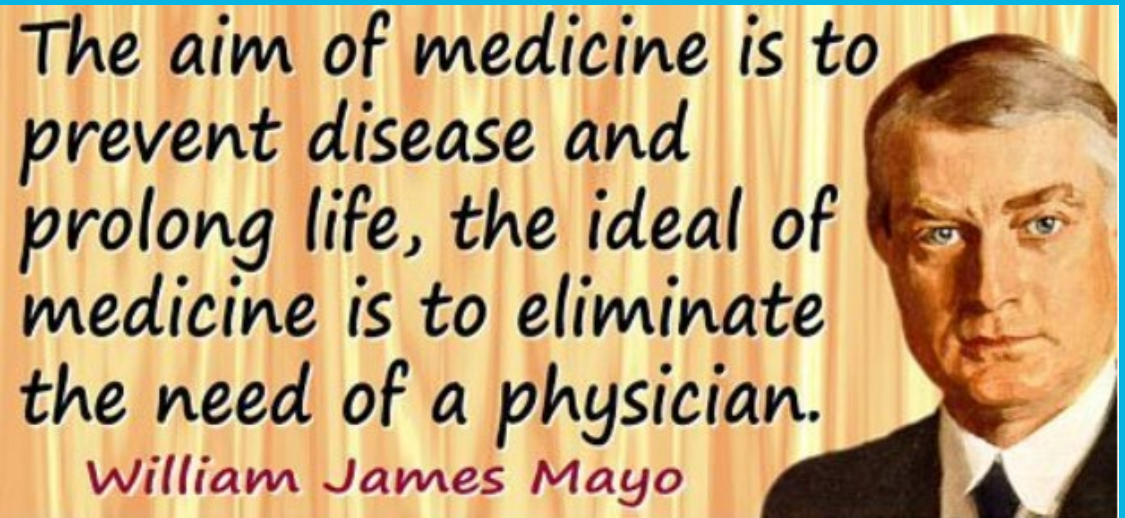
Introduction

How to think about Innovation

Introduction

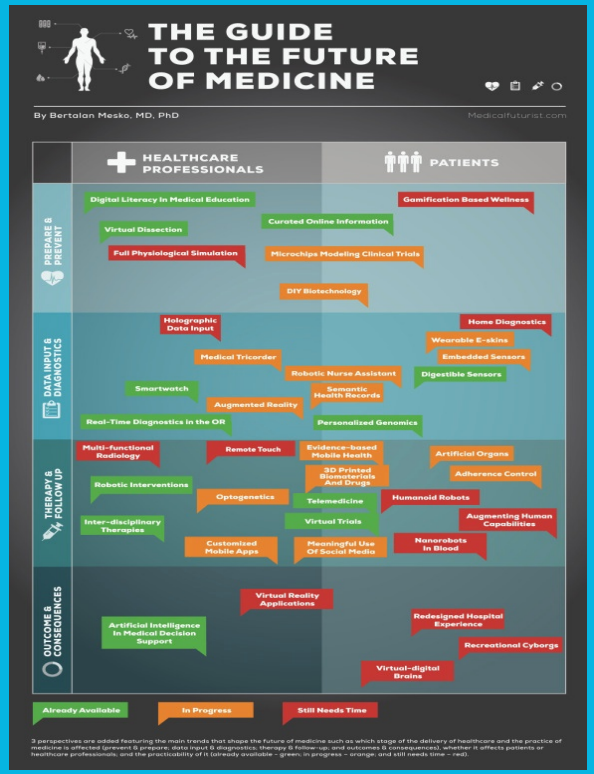
Doing new things
in Healthcare

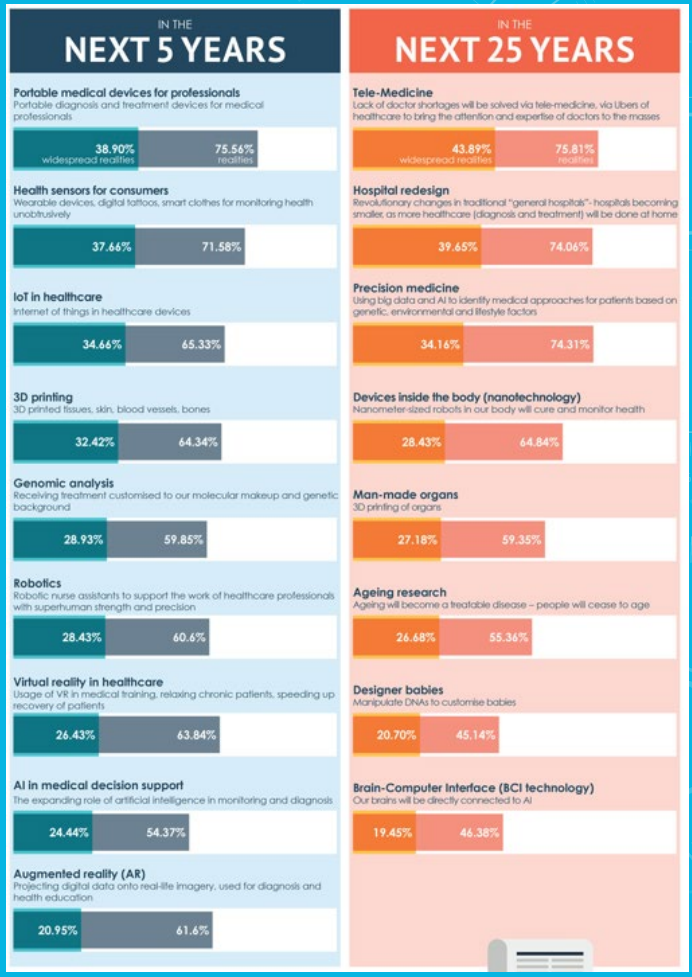




Introduction

What the Future of Healthcare might look like…





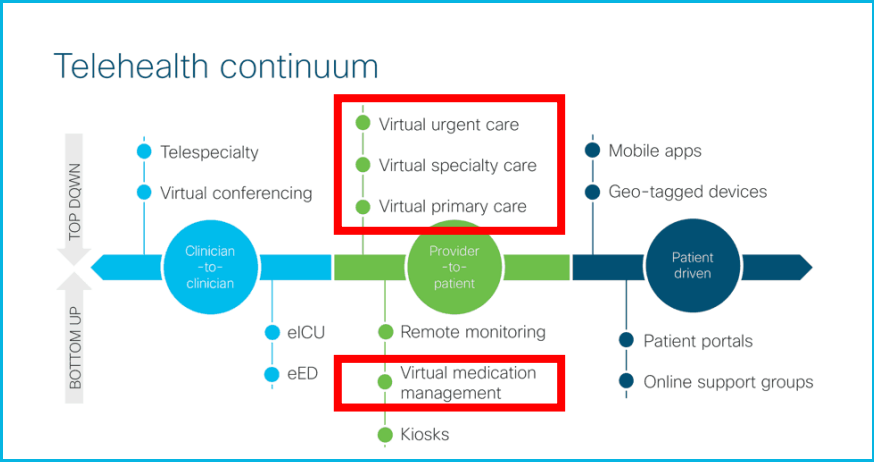
http://scienceroll.files.wordpress.com/2013/10/medical_infographic_final.jpg?w=581&h=1024

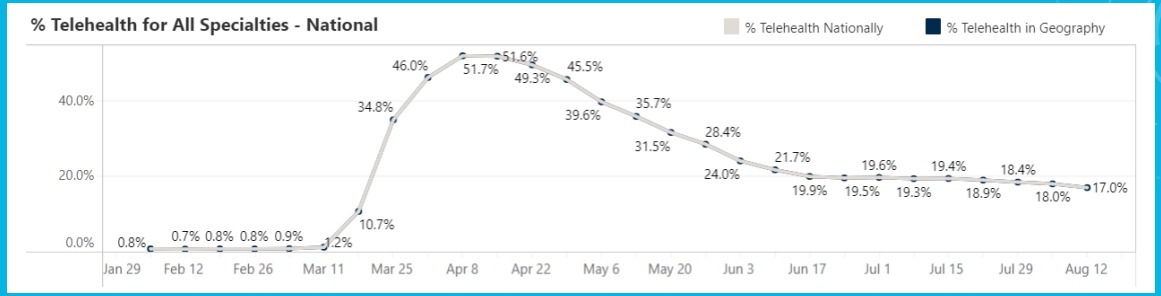
https://thefutureishere.economist.com/healthcare/thefutureofheathcare-infographic.html

Telehealth

Telehealth

Tech + Services across multiple use cases

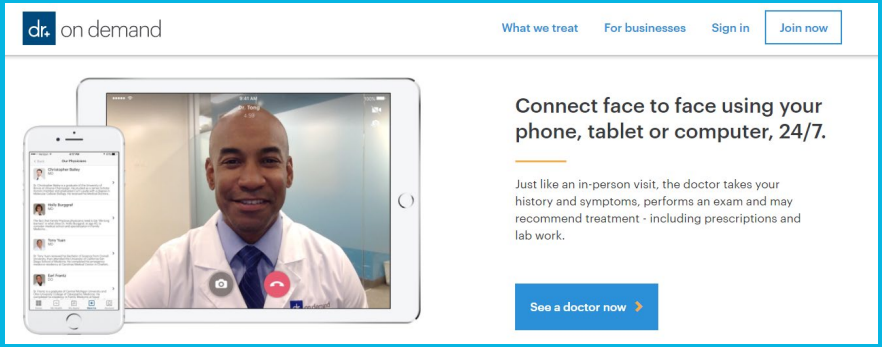


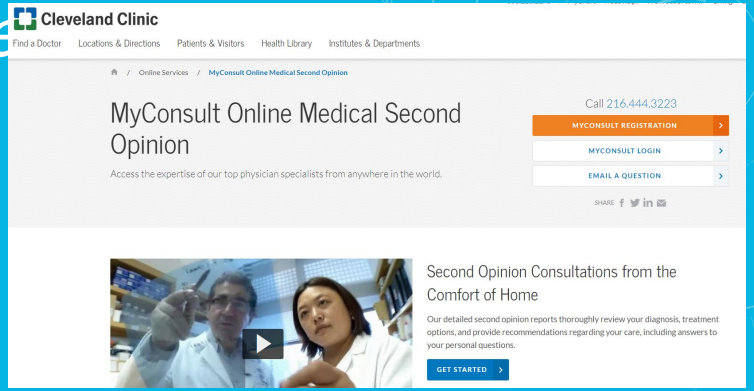


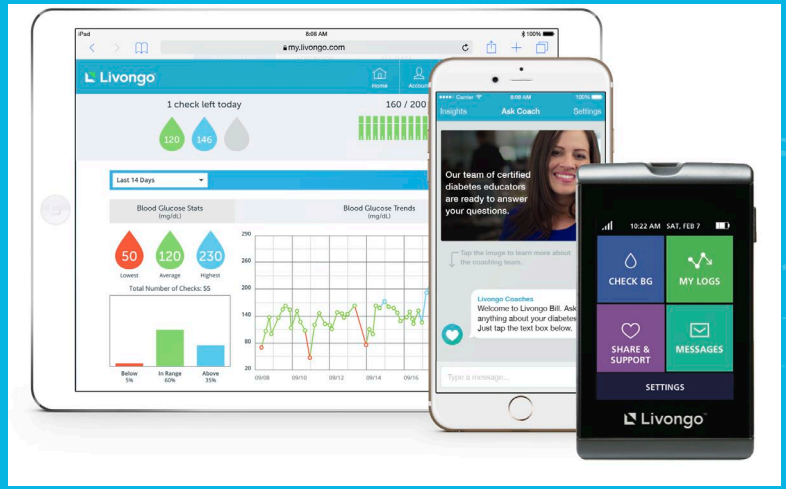
https://reports.chartis.com/telehealth_trends_and_implications-aug2020/

Telehealth Examples

Urgent, Chronic, Preventive Care

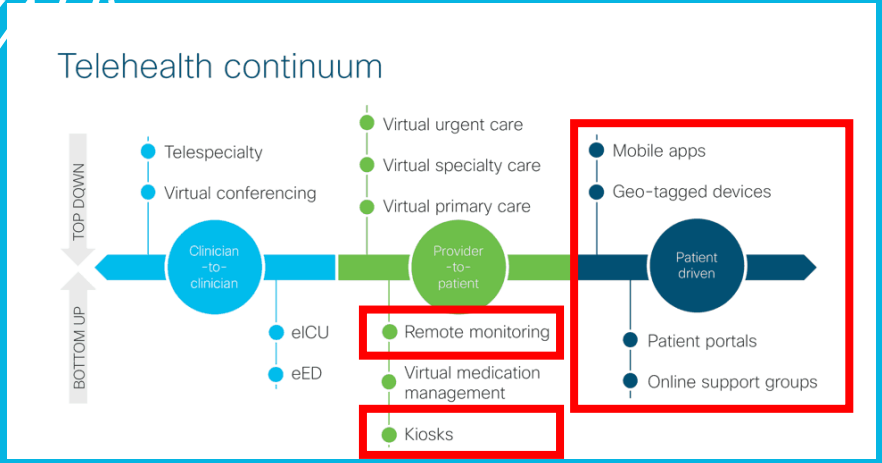


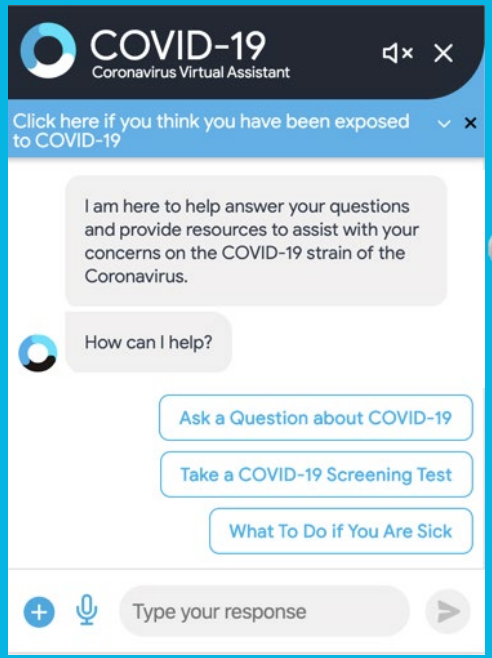


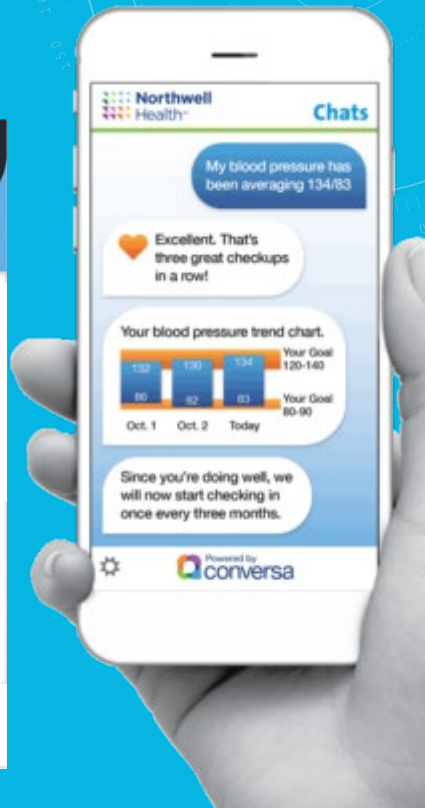


Telehealth

Virtual Care = TeleHealth (TH) + Autonomous Health (AH)



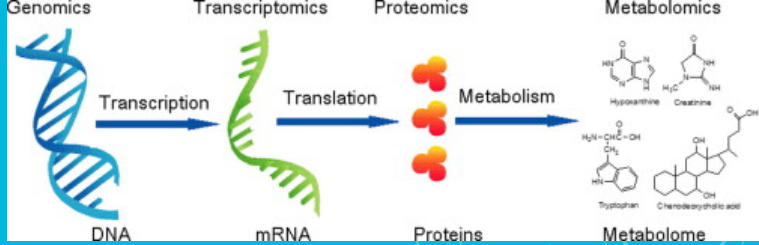


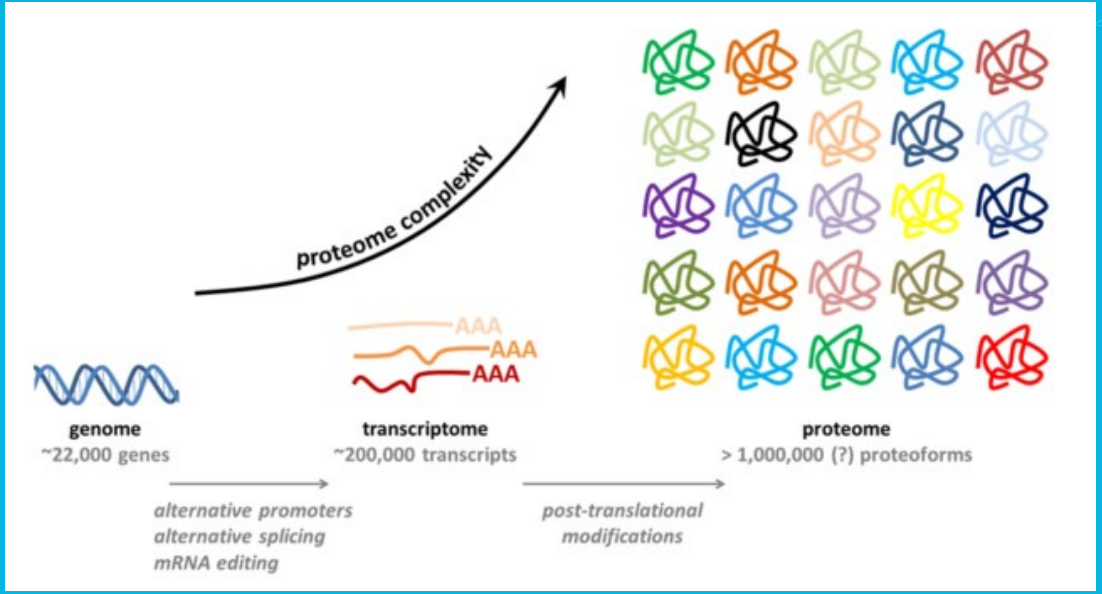


Precision Medicine

Precision Medicine

Diagnosis and Treatment across a Spectrum





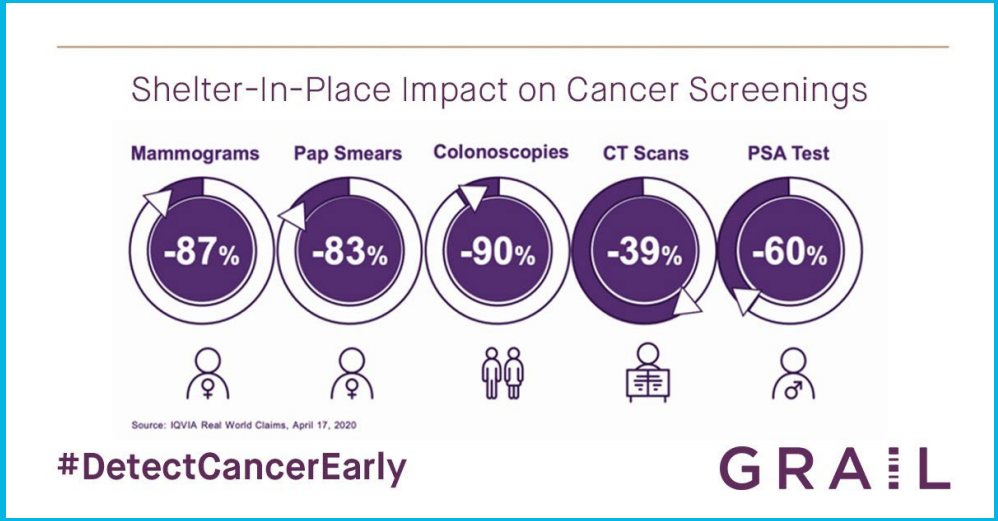
Precision Medicine

Genomics for Risk Evaluation and Treatment Choices

Provider	Entertainment Genetics		Medical Genetics			Cancer Genetics
	Ancestry	Traits	Pharmacogenomics	Risk Factors	Carrier Status	Tumor
ActX		✓ Limited	✓ Reviewed comprehensive screening	✓ Reviewed comprehensive screening	✓ Reviewed comprehensive screening	
ActX 23andMe Service			✓ Reviewed screening	✓ Reviewed screening	✓ Reviewed screening	
ancestry	✓	✓				
23andMe	✓	✓		✓ Limited non-professional without review	✓ Limited non-professional without review	

Precision Medicine

Genomics for Cancer Detection



Precision Medicine

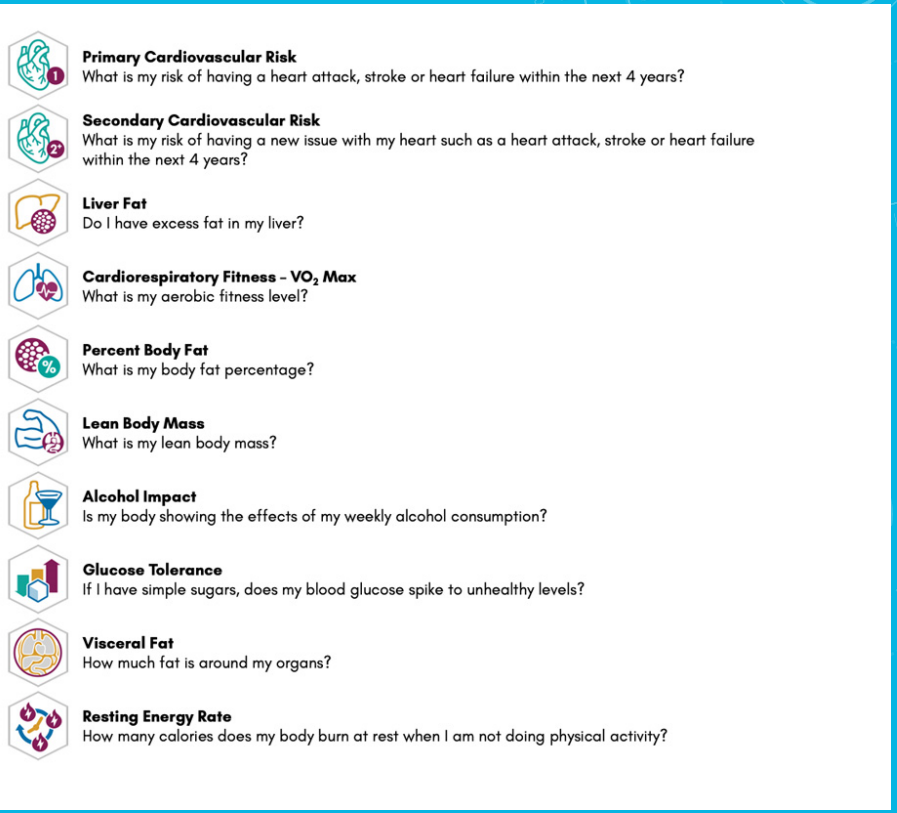
Proteomics for Biometrics and Risk Detection

SomaLogic®

SAME GENOTYPE. DIFFERENT PHENOTYPE.

PROTEIN ASSAYS COMPLEMENT GENOMICS TO IDENTIFY:

- Patient subpopulations
- Novel therapeutic targets
- New disease applications for approved drugs
- Possible safety concerns
- Mechanisms of action

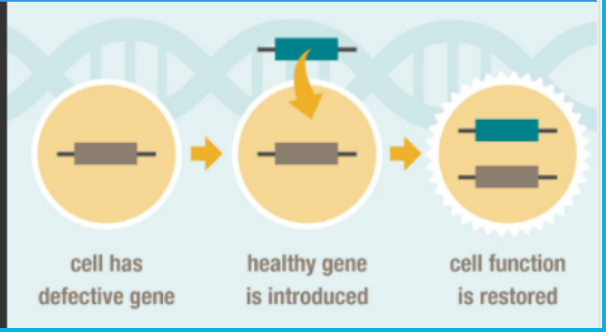


Precision Medicine

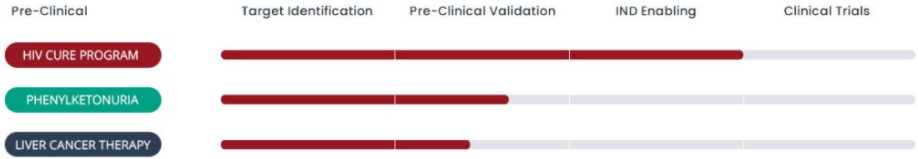
Gene Therapy

What is Gene Therapy?

Gene Therapy is when a "normal" healthy gene substitutes in for a harmful gene in cell by using a vector.



Pipeline



The New York Times

A 'Cure for Heart Disease'? A Single Shot Succeeds in Monkeys

A novel gene-editing experiment seems to have permanently reduced LDL and triglyceride levels in monkeys.

Alzheimer's

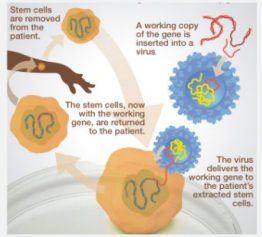
In a trial done on mice, less plaque developed in the brain of the mouse that received gene therapy, resulting in less damage to the part of the brain containing memory.

A gene therapy trial to treat leukemia (a cancer affecting the blood)

26 out of 59 patients "experienced complete remission"

Cancer

Immune deficiencies

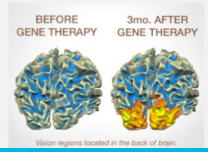


Heredity Blindeness

Patients with LCA after trials with gene therapy,

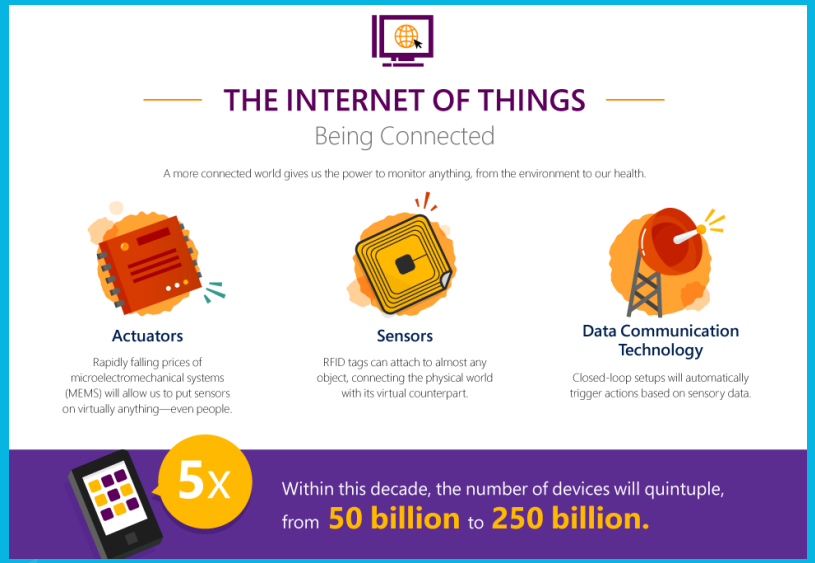
6 out of 9

experenced better vision



Internet of Things (IoT)

IoT
Sensors in Healthcare



Content: "Disruptive Technologies: Advances that will transform life, business and the global economy". McKinsey Global Institute, May 2013.
Infographics: http://enterprise.microsoft.com/en-us/roles/it-leader/infographic-5-technologies-disrupting-your-business/

IoT

Wearables

Wearable Electronic Sweat Sensor Detects Health Biomarkers

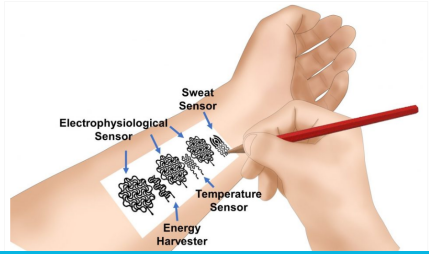
NEWS Jul 28, 2020

The new tattoo: Drawing electronics on skin

One day, people could monitor their own health conditions by simply picking up a pencil and drawing a bioelectronic device on their skin. In a new study, University of Missouri engineers demonstrated that the simple combination of pencils and paper could be used to create devices that might be used to monitor personal health.

July 13, 2020

Contact: Eric Stann, 573-882-3346, StannE@missouri.edu



Reference: https://www.pnas.org/content/early/2020/07/09/2008422117

IoT

Ingestibles for biometrics and imaging

Traditional

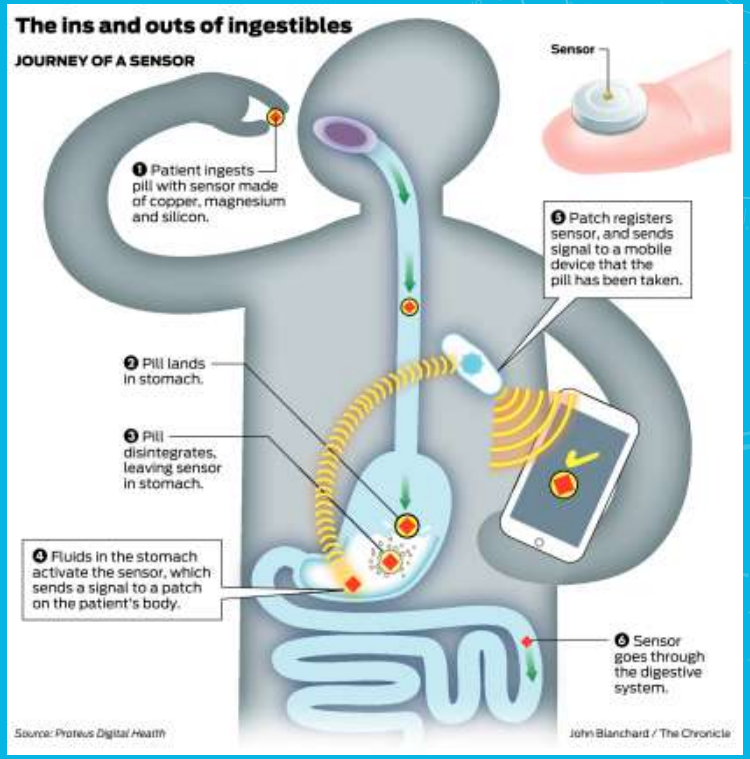
Apogee system

Portable

Philips Lumify

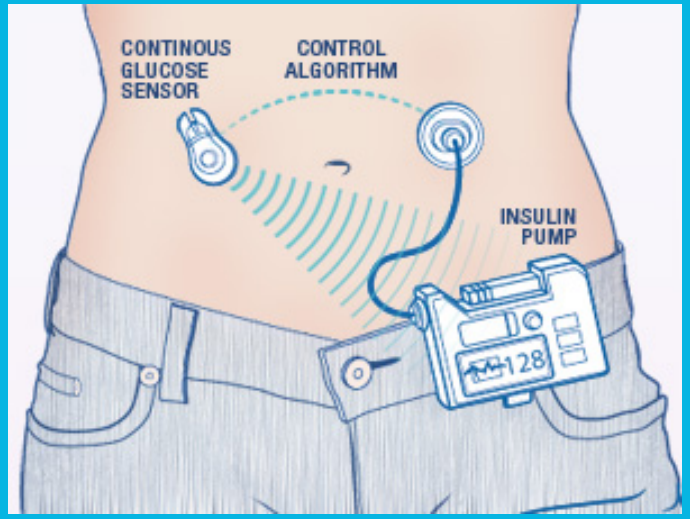
Ingestible

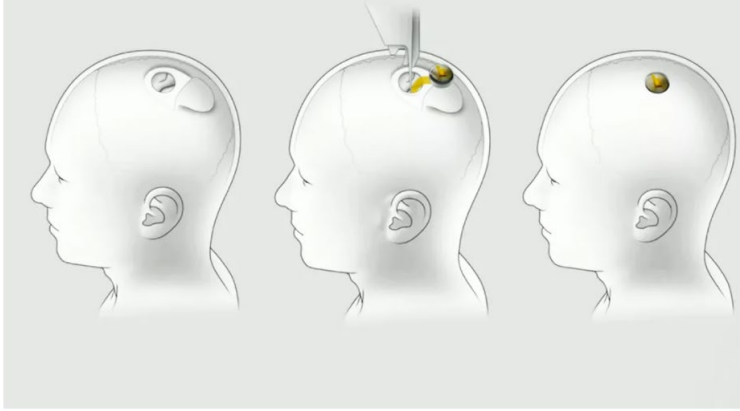
Capsule Ultrasound Device (CUS)



IoT

Implantables





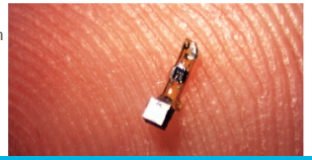
Neuralink's brain-machine interface technology sinks electrodes into the brain then uses a chip to communicate with computers outside your skull.

Dust-sized implantable sensor could enable brain-controlled prosthetics, continuous organ monitoring

By **Jonah Comstock** | August 08, 2016

SHARE Share 26

Researchers at the University of California Berkeley **have created a tiny sensor**, the size of a grain of sand, that can sit on a nerve, muscle, or organ and monitor the electrical signals passing through it. The sensor, dubbed "neuro dust", was designed as a next-generation control interface for prostheses but could eventually turn out to have a wide range of healthcare applications.



Drones

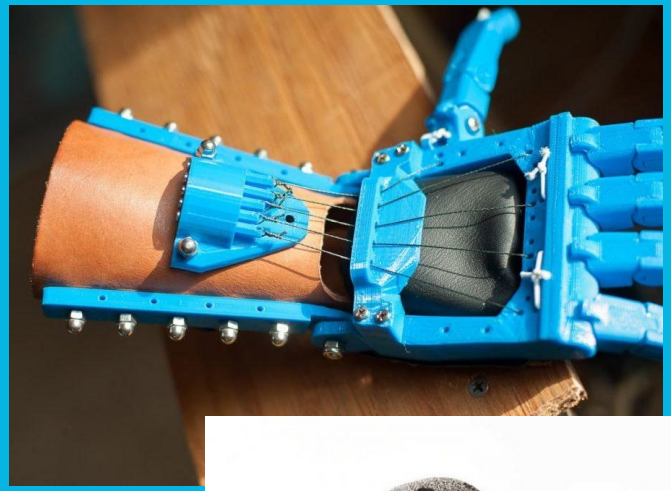
Drones

Search, Delivery, Care

3D Printing

3D Printing

Prosthetics, Devices, Personalized Surgery, Tissue/Organs

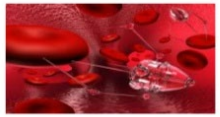


Nanobots

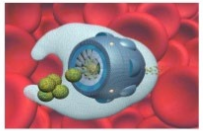
Nanobots

Diagnosis, Surgery, Treatments

Nanobot in action



A nanorobot machine roaming through the bloodstream, injecting or taking samples for identification and determining the concentrations of different compounds.



NANO BOTS

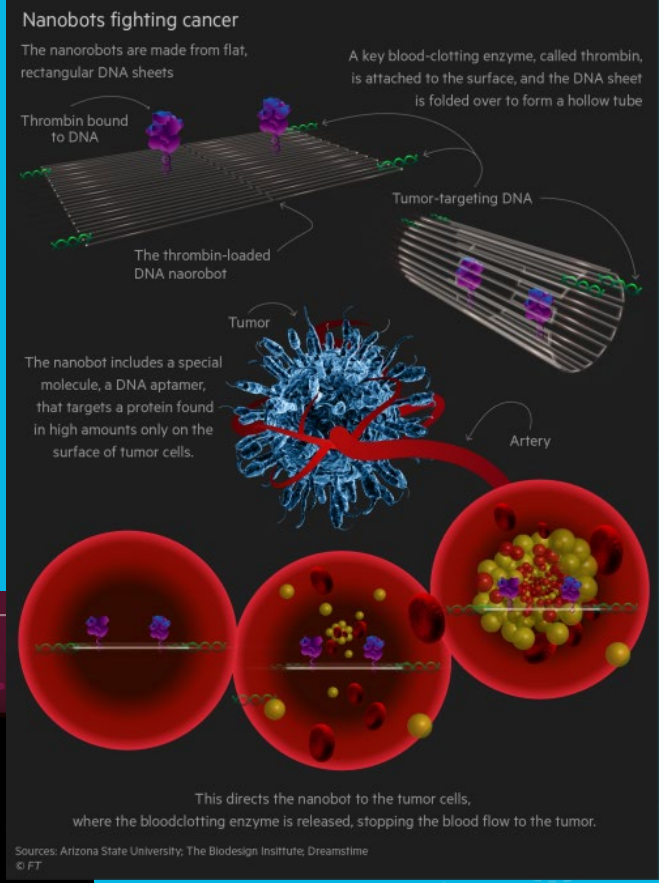
Magnetic Micro Surgery

Around the world, researchers are developing specialized nanobots to perform a wide variety of surgeries using external magnetic fields to direct the bots

Performing Eye Surgeries

Clearing Blocked Arteries

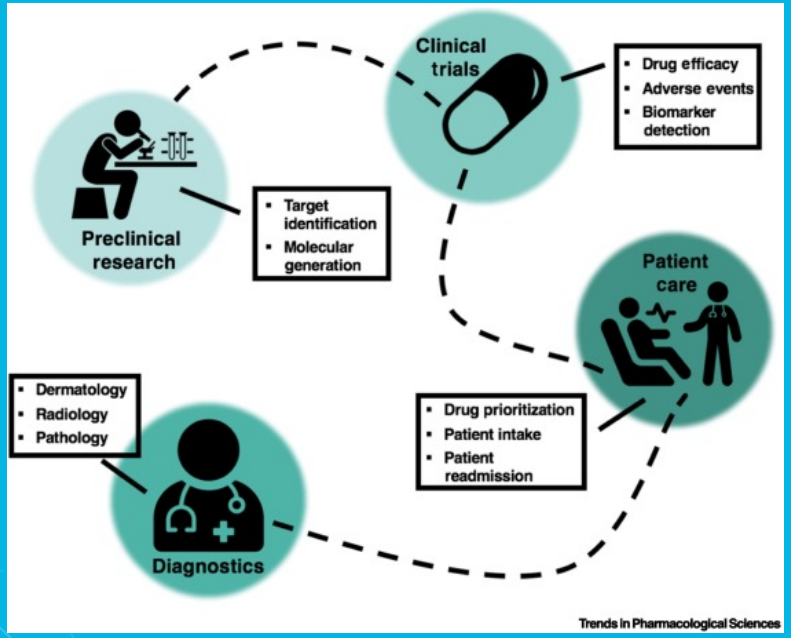
Collecting Biopsies

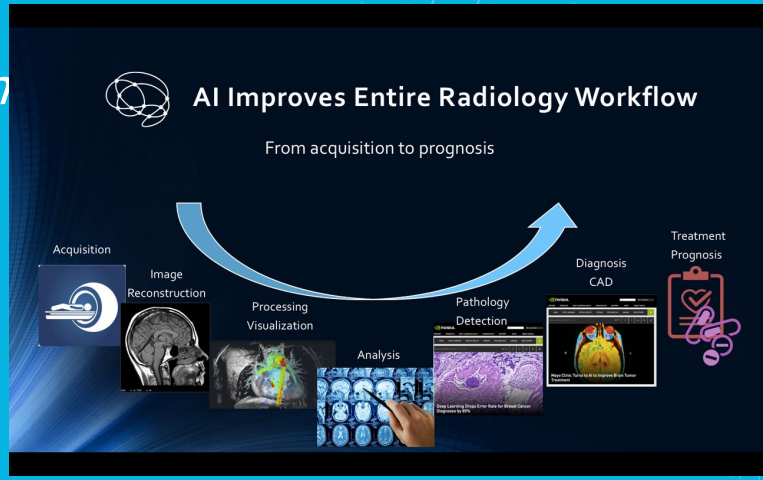


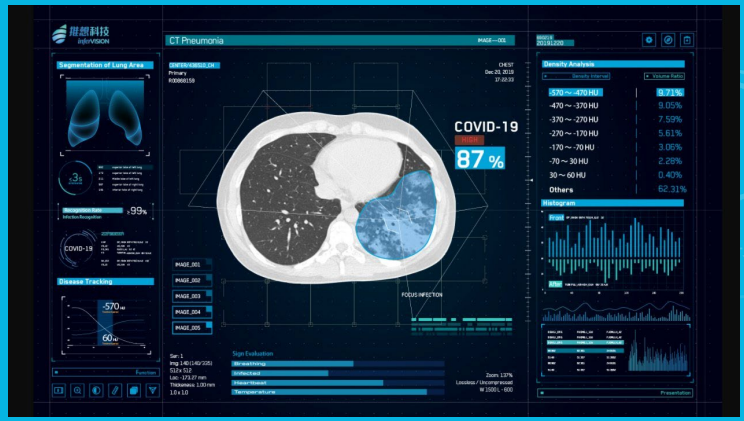
Artificial/ Augmented Intelligence (AI)

AI

Diagnosis, Prognosis, Treatment, Research







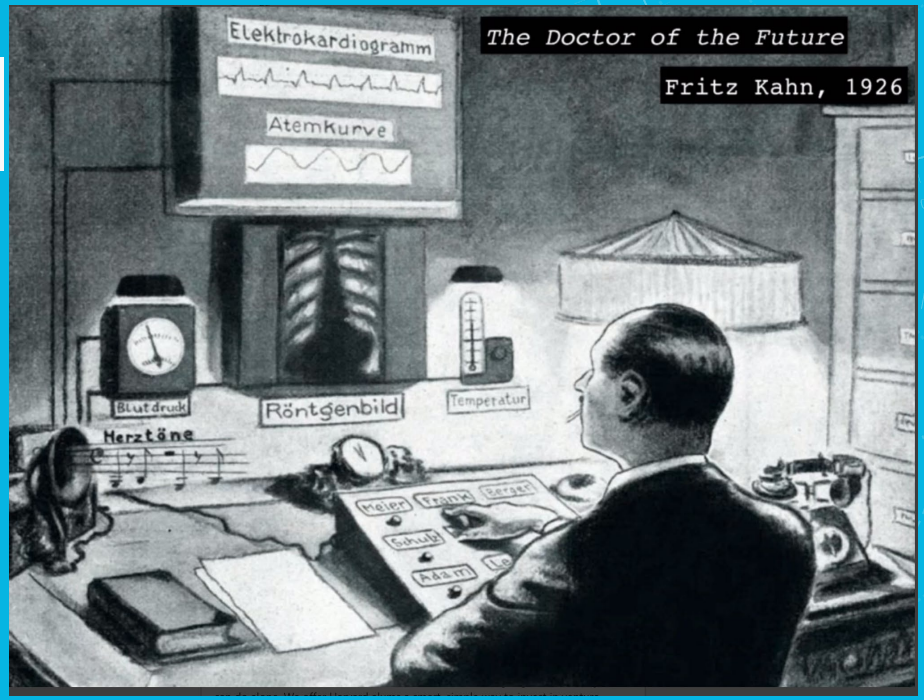
AI

How far will we go?

The Reinvention Of Medicine: Dr. Algorithm Vo-7 And Beyond

Posted Sep 22, 2014 by Vinod Khosla (@vkhosla)

NYT: Can Computers Replace Doctors?



Conclusion

The Future of Healthcare

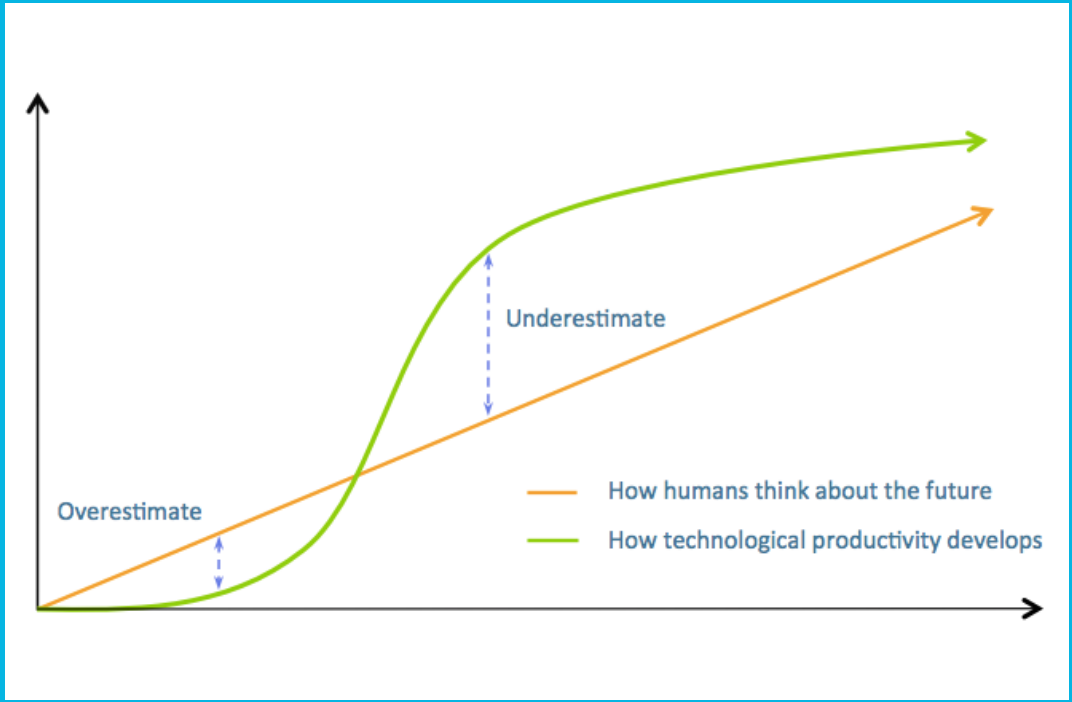
What to expect…

- **The "Tricorder"**
  - *Biometrics + Labs + Imaging = Detect faster, better, cheaper*
  - *Ambulatory: Predict and Prevent*
  - *Hospital: Track objects and people*
- **Robo-Doc**
  - *Replacing Doctors: Automation of routine, repeatable care*
  - *Augmenting Doctors: Finding edge cases, New Treatments…*
- **Bio-hacking**
  - *Cyborg (man-computer interface)*
  - *CRISPR for gene editing*
  - *Nanotechnology for diagnosis and treatment*
  - *Regenerative medicine (eg stem cells) for arthritis and other repairs*

- ***What if computers could manage 80% of health care?***
- ***What if we cured heart disease or cancer?***
- ***What if most people lived to 120?***

AMARA'S LAW

We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run



THANK YOU

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