Robbie K. Melton, Ph.D. Bio

Robbie Melton has prepared a "Resource Center" with link containing apps, videos, articles, best practices, etc. for this webinar that can be accessed at http://mobilehealthsciences.weebly.com

Robbie K. Melton, Ph.D. is the Associate vice Chancellor of Mobilization Emerging Technology for Tennessee Board of Regents. Melton serves as the chief system level administrator to oversee the system's mission and initiatives for the Strategic Mobilization Planning and Business Models, Mobilization Quality Assurances, Faculty and Student Use of Mobile Devices related to teaching, learning, training, and workforce development, and the coordination of research, product testing, pilots and security safety networks. She has published and presented around the nation on the impact and value of mobilization for education and the workforce and has acquired a new distinction as an "Apologist" due to her study of the pedagogy and best teaching practices with mobilization, quality standards for the utilization of mobile apps, and for her creation of the Mobile App Education and Workforce Resource Center (50,000 + Apps that have been aligned with over ninety-five subject areas from Pre-K to Ph.D., including workforce careers, professional development and lifelong learning, according to one's mobile device of choice).

Melton is the winner of numerous awards the latest being CDE Top 30 2014 Technologists, Transformers and Trailblazers.

Emerging Mobile Technologies and Smart Health Care Apps and Gadgets Innovations for Science and Allied Health Programs

"Educational Enhancements or Technological Snake Oil?"

Dr. Robbie K. Melton
Associate Vice Chancellor for
Mobilization and Emerging Technologies

Webinar Topics

- Impact of Mobile Technologies in HealthCare
    - Smart Phones & Tablets
    - Mobile Apps

- Emerging Smart Health Tools & Gadgets
    - Fitness & Health Mobile Devices
    - Wearable Sensor Technology

- Standards of Quality and Safety for Emerging Technologies

- Enhancing Teaching and Learning with Emerging Technology
    - Resource Center: http://mobilehealthsciences.weebly.com
    - Evaluation and Assessment

- Questions & Feedback

To Start This Presentation
Pull Out Your Mobile Device

Mobile Health Apps & Gadgets

for Better (and Longer) Living

MEDICAL ENHANCEMENTS OR SNAKE OIL

Smart Gadgets

A growing number of gadgets promote greater physical activity, better sleep, reduced stress and nutritious eating, all in the name of living a healthy lifestyle. Many gadgets have spurred the self-monitoring movement that some have described as the Quantified Self (QS) -- http://quantifiedself.com/. Here people track and measure metrics such as foods consumted, activities completed and calories burned, then share this information online to build accountability, support and healthy competition.

See The Quantified Self: Fundamental Disruption in Big Data Science and Biological Discovery, Melanie Swan, MS Future Group, Palo Alto, CA, http://www.cs.swarthmore.edu/~jwaterman/cs97/f14/uploads/Main/qs.pdf
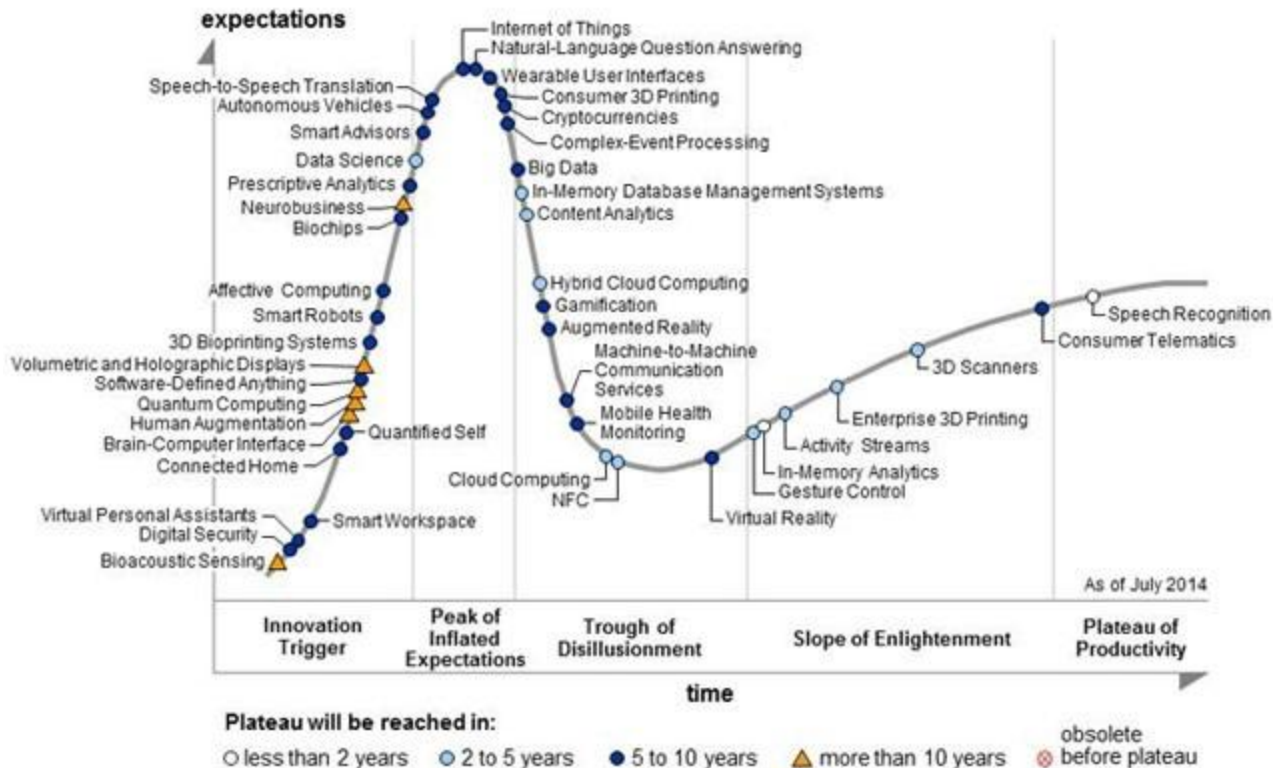
Gartner: Hype Cycle for Emerging Technologies

This Hype Cycle examines the status of, and prospects for, various **mobile device technologies**. It advises device vendors, mobile operators, application providers and others on the maturity of these technologies and their use.
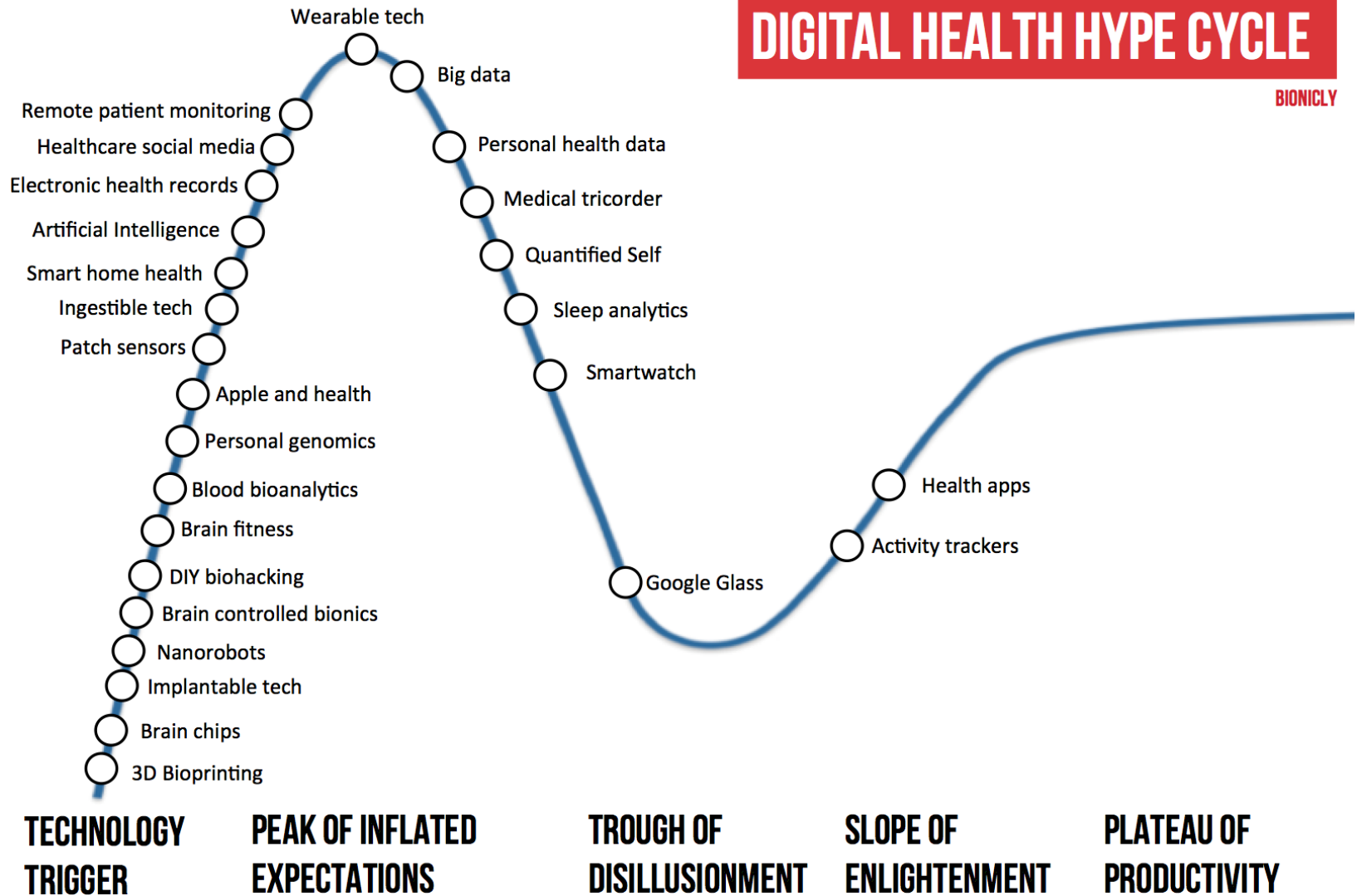

Hype cycle, WIKIPEDIA, https://en.wikipedia.org/wiki/Hype_cycle

See Gartner's 2014 Hype Cycle for Emerging Technologies Maps the Journey to Digital Business, Gartner, http://www.gartner.com/newsroom/id/2819918

DIGITAL HEALTH HYPE CYCLE

BIONICLY

Wearable tech

Big data

Remote patient monitoring

Personal health data

Healthcare social media

Medical tricorder

Electronic health records

Artificial Intelligence

Quantified Self

Smart home health

Sleep analytics

Ingestible tech

Patch sensors

Smartwatch

Apple and health

Personal genomics

Blood bioanalytics

Health apps

Brain fitness

Activity trackers

DIY biohacking

Brain controlled bionics

Nanorobots

Google Glass

Implantable tech

Brain chips

3D Bioprinting

TECHNOLOGY TRIGGER **PEAK OF INFLATED EXPECTATIONS** **TROUGH OF DISILLUSIONMENT** **SLOPE OF ENLIGHTENMENT** **PLATEAU OF PRODUCTIVITY**
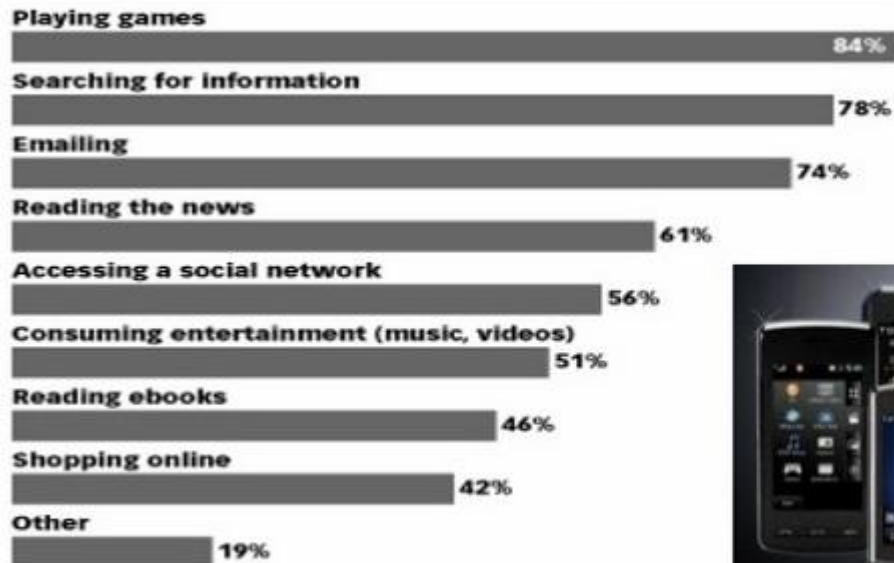
This Digital Health Hype Cycle has in no way been endorsed by Gartner, Inc.

See BIONIC.LY, Digital Health, The Digital Health Hype Cycle, December 29, 2014, Which emerging digital health technologies are hype or here?, http://bionic.ly/digital-health-hype-cycle/

Tablet Activities of US Tablet Owners, March 2011
% of respondents

Activity	%
Playing games	84%
Searching for information	78%
Emailing	74%
Reading the news	61%
Accessing a social network	56%
Consuming entertainment (music, videos)	51%
Reading ebooks	46%
Shopping online	42%
Other	19%

Source: AdMob, "Tablet Survey," April 7, 2011
126763

Educational Use **5%**

See Tablets Quickly Become Major Home Enetertainment Device, Most owners are using their PCs less, April 2011, eMarketer, http://www.emarketer.com/Article/Tablets-Quickly-Become-Major-Home-Entertainment-Device/1008350

Impact and Transformation of Mobile Devices in Higher Education

Learn and lead!

STANDARDS

SAFETY

HEALTHY

PRIVACY

POSSIBILITIES?

More than a Phone or for Games:
Phones as Educational and Workforce Tool

- ✓ Telescope
- ✓ Microscope
- ✓ Navigation
- ✓ Heart Monitor
- ✓ Blood Pressure
- ✓ Workforce Tools
- ✓ Musical Instruments
- ✓ Library
- ✓ Musical Instrument
- ✓ Science Lab

Magnification: 8X
Color: Black

INNOVATION

iDoctor on Your Phone

- One of the world's top physicians, Dr. Eric Topol, has a prescription that could improve your family's health and make medical care cheaper. The cardiologist claims that the key is the smartphone. Topol has become the foremost expert in the exploding field of wireless medicine. Dr. Nancy Snyderman reports.

  See iDoctor: Could a smartphone be the future of medicine? – http://www.nbcnews.com/video/rock-center/50582822#50582822

  How the Ditigal Revoluation Will Create Better Health Care, Eric Topol, M.D.

iStethoscope

- Researchers at Oxford University and South Africa's University of Cape Town tapped into cellphones' existing microphones to develop this mobile stethoscope. The app allows patients to record their own heartbeats, and then forward along the audio to doctors who can track the development of conditions, such as tuberculosis pericarditis.

  See Integrating low-cost sensors with mobile phones for remote monitoring of long-term conditions in resource-constrained environments – http://sydney.edu.au/engineering/events/ibbw/docs/Integrating-low-cost-sensors.pdf

HealthMap: Outbreaks Near Me

NETRA

- Hailing from MIT's Media Lab, the Near Eye Tool for Refractive Assessment, or NETRA, transforms smartphones into low-cost, portable diagnostic devices that can detect a host of vision disorders, including nearsightedness and farsightedness. The $2 clip-on eyepiece exploits the increasing resolution of smartphone screens to deliver a prescription for the appropriate corrective lenses in a few minutes. More than a half-billion people live with undiagnosed eye disorders, 90 percent of whom live in the developing world, and NETRA is a promising alternative to the costly diagnostics that have dominated the field for decades.

  See Eye Phone: MIT Researchers Develop Ultra-Cheap, Smartphone-based Eye Exam Tool, Fast Company, http://www.fastcompany.com/1663036/eye-phone-mit-researchers-develop-ultra-cheap-smartphone-based-eye-exam-tool

peek
portable eye examination kit
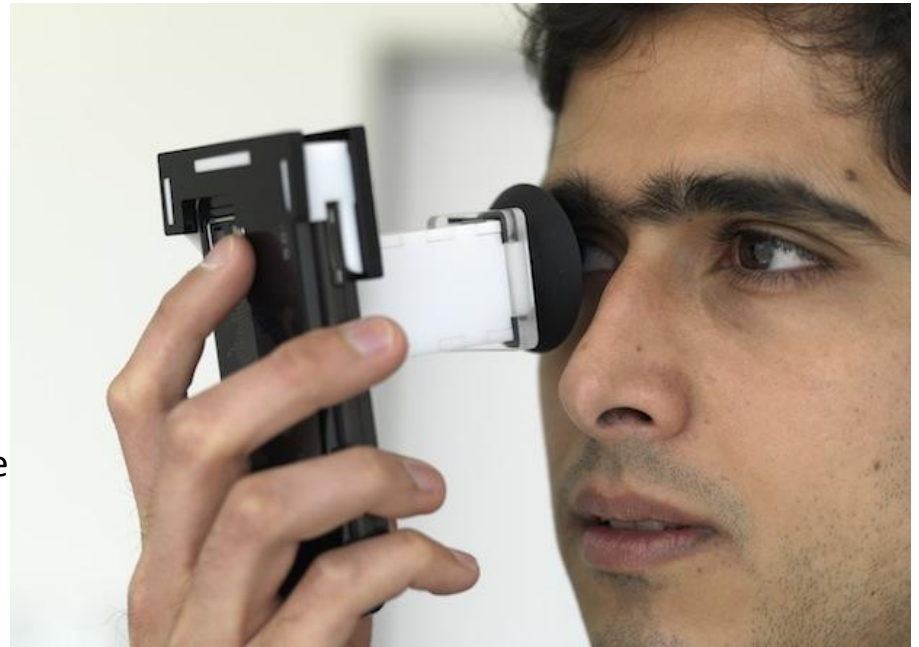
Making high quality eye care portable, cost effective and intuitive;
Leveraging mobile phone technology to extend the availability of a full range of ophthalmic diagnostic tests outside of high income hospital departments to anywhere in the world: hospital wards, GP surgeries, patient homes and we're even being tested in the Antarctic!

The Vision

To empower general health workers and eye care practitioners to diagnose eye diseases and provide a means for managing and monitoring the treatment of patients, anywhere in the world.

The Problem

285 million people worldwide are visually impaired

39 million of these people are blind

80% of blindness is avoidable

90% of blind people live in low-income countries

The Solution: Mobile Phones

PEEK – a smart-phone based system for comprehensive eye examinations in even the remotest of settings. It is easy to use, affordable and portable.

Evaluation and Testing of Mobile Blood Unit 2010
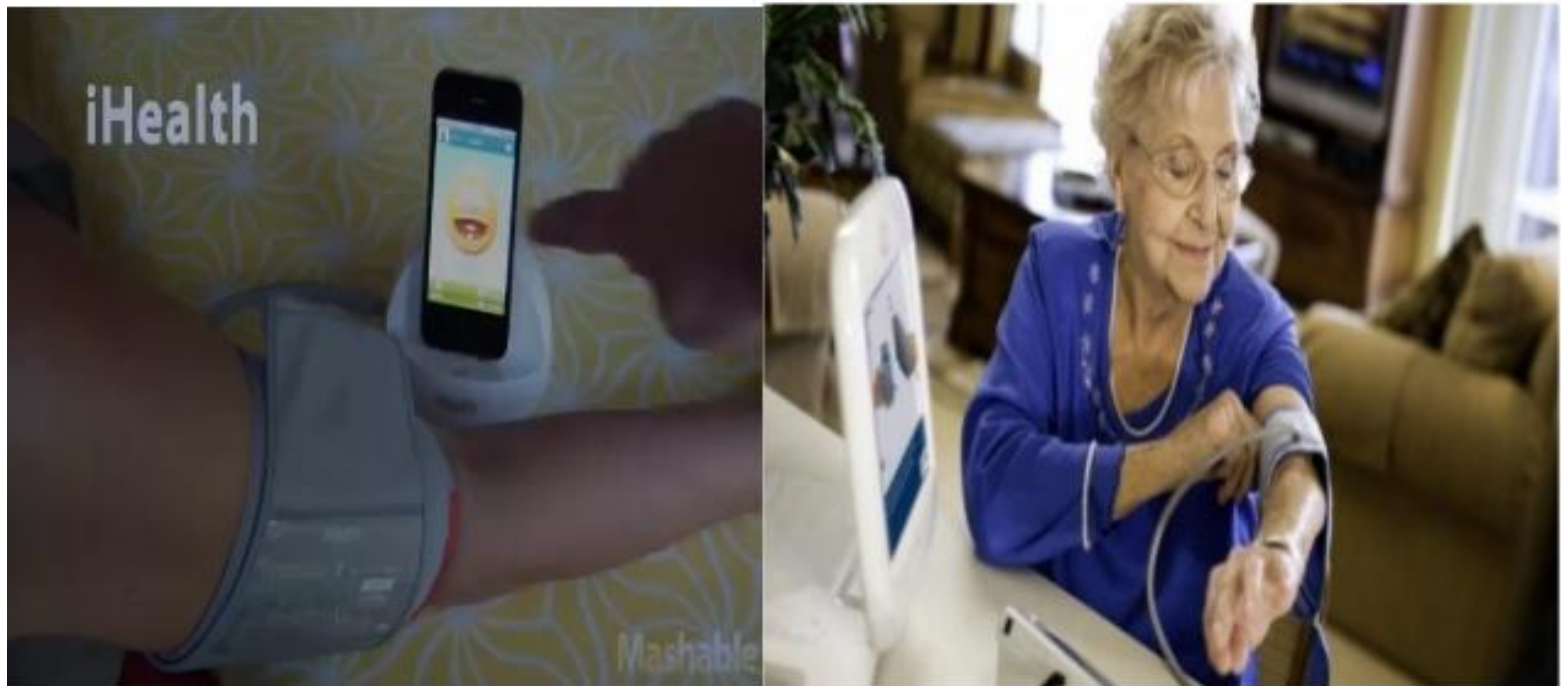
iHealth Mobile Products

THE ONE-STOP SHOP FOR TRACKING YOUR PERSONAL HEALTH
Weight. Blood pressure. Diet. Physical activities. They're all
aspects of your personal health and they're all interconnected.

MobiUS

- FDA-approved MobiUS is the first ultrasound imaging system to work on smartphones. The software, made by MobiSante, could be used for a slew of clinical applications, including confirming and tracking pregnancies and assessing kidney disorders. The iamges and video can be shared over email, or through a standard USB connection.

  See Taylor Soper, Mobisante raises $4.2M for smortphone-based ultrasound imaging system, GeekWire, June 5, 2013, http://www.geekwire.com/2013/mobisante-raises-smartphonebased-ultrasound-imaging-system/

GPCP 5 MHz
Depth: 10 cm

Imaged On: 04/16/2011
Patient Name: p d
Date of Birth: Unknown
Patient ID: 4572
Operator Name: L Z

MobiSante

EMERGING
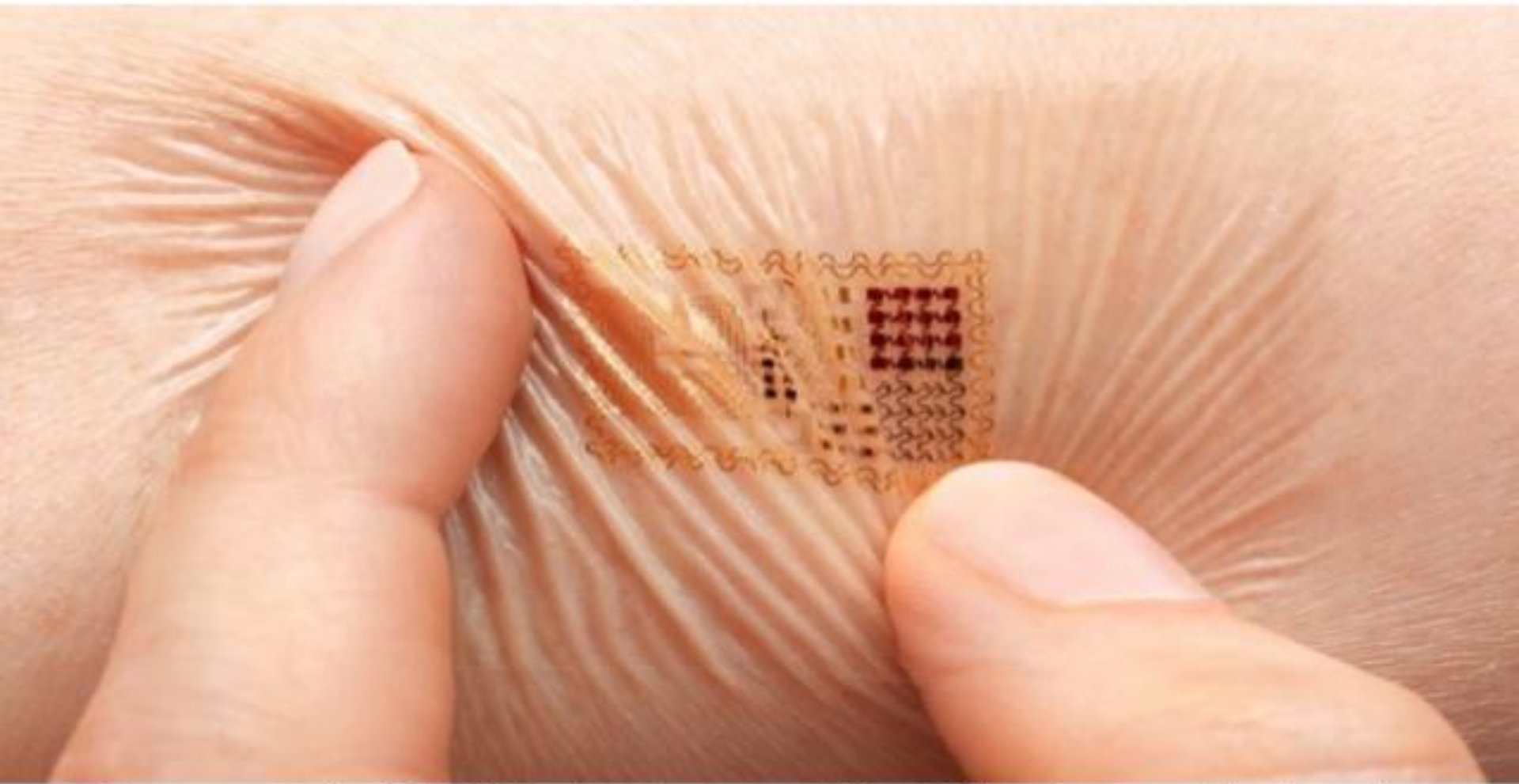
Biostamp by MC10, via dezeen: Flexible electronic circuits that stick directly to the skin like temporary tattoos and monitor the wearer's health. Potentially these could be used in healthcare to monitor patients in their normal environment and without tethering them to large machinery. **#Biotech #Biostamp**

DermoScreen Cancer Screening App

developed at the University of Houston

DermoScreen, **can detect skin cancer 85 percent** of the time. That's the same accuracy rate as at the dermatologist's office and is more accurate than a primary care physician's diagnosis, according to engineering technology Professor George Zouridakis, who started working on the project in 2005. *Len is $500

Finding Veins

- Vein visualization technology uses non-invasive infra-red technology to project an image of the donor's veins onto the skin's surface.

ReSound Hearing Aid & App

Say hello to the world's smartest hearing aid **ReSound LiNXTM** offers a superior sound experience, setting new standards for hearing aid performance.

This Made for iPhone® hearing aid provides direct sound streaming, personalized to your every need.

3D Printing

3D BIOPRINTING

3D bioprinting, which uses the same process, but instead of printing plastic, can print **human body parts**, vaccinations and living cells. 3D bioprinting will produce tissues such as blood vessels and organs such as the lungs, kidneys and heart muscles. Bioprinted organs and tissues could be made from a patient's own cells which would eradicate the risk of rejection like you would have if receiving from a third-party donor.

John Redfield is testing a prosthesis that he can adjust using an app on his smartphone, instead of a wrench at a doctor's office.
MATTHEW HEALEY FOR THE WALL STREET JOURNAL

Revolutionary Drowning Detection.

iSwimband is a wearable appcessory which will alert your Bluetooth-enabled phone, tablet, or music player if a swimmer has been submerged beyond a preset time limit, or if a non-swimmer (such as a toddler) enters the water.

Google Glass for Medical Use

By Tracking Sugar In Tears, Contact Lens Offers Hope For Diabetics

The latest project from **Google X is a smart contact lens**, a tiny, flexible computer capable of monitoring glucose levels in tears. Researchers at Google are hopeful that one day this technology might be used to help diabetes patients better control their disease.
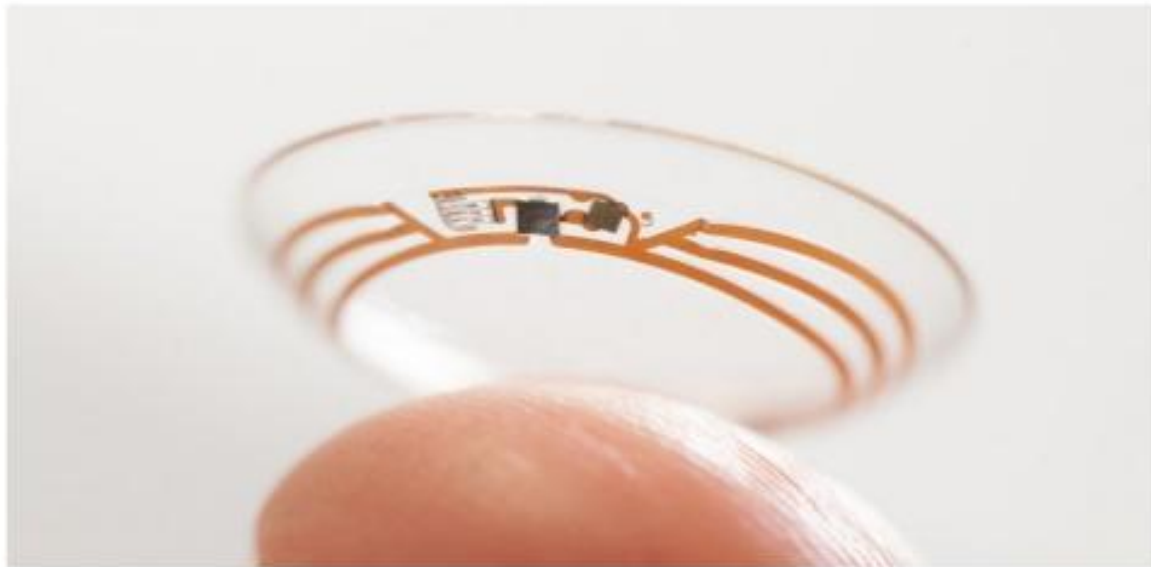
The Rise Of Wearable Tech

What is Wearable Tech?

Simply put, it's technology that you incorporate into things you wear on a day-to-day basis, and it could be anything from a smart watch, augmented reality glasses, or even a personal health monitor in the form of a bracelet.

The idea is that technology will increasingly become more part of our day-to-day lives, and it will become less intrusive, as it will be part of our clothing, and sometimes even part of our bodies!

- The advent of remote monitoring with smart wearable systems (SWS) has raised interest for adult chronic care for heart failure, diabetes, and ambient assisted living. The combination of escalation of health care costs and availability of microsensors and smart fabric has accelerated this potential of continuous, multi-parameter physiologic home remote monitoring of health, activity, and mobility. Wireless sensor networks (WSN) are also becoming more ubiquitous for telemedicine applications.

THE INTERNET OF THINGS

- A revolution in healthcare is quietly brewing. The "Internet of Things" – a global system that could eventually comprise billions of devices and applications – including sensors, actuators, microcontrollers, mobile-communication devices, nano-pumps and more – will make **health monitoring**, diagnostics and treatment more personalized, timely and convenience, while also lowering costs.

Connected Medical Devices in the Internet of Things

Emergency Response, Patient
Safety, Imaging, Surgery, Advanced Treatment

Your systems. Working as one.

"How would you be interested in wearing/using a sensor device, assuming it was from a brand you trust, offering a service that interests you?"

3% Tattooed on skin

4% Contact lenses

29% Clipped onto clothing

6% Around chest

10% Upper arm

28% Wrist

12% Glasses

12% Earbuds/ headphones

18% Clipped on shoe

12% Embedded in jewelry

15% Embedded into clothing
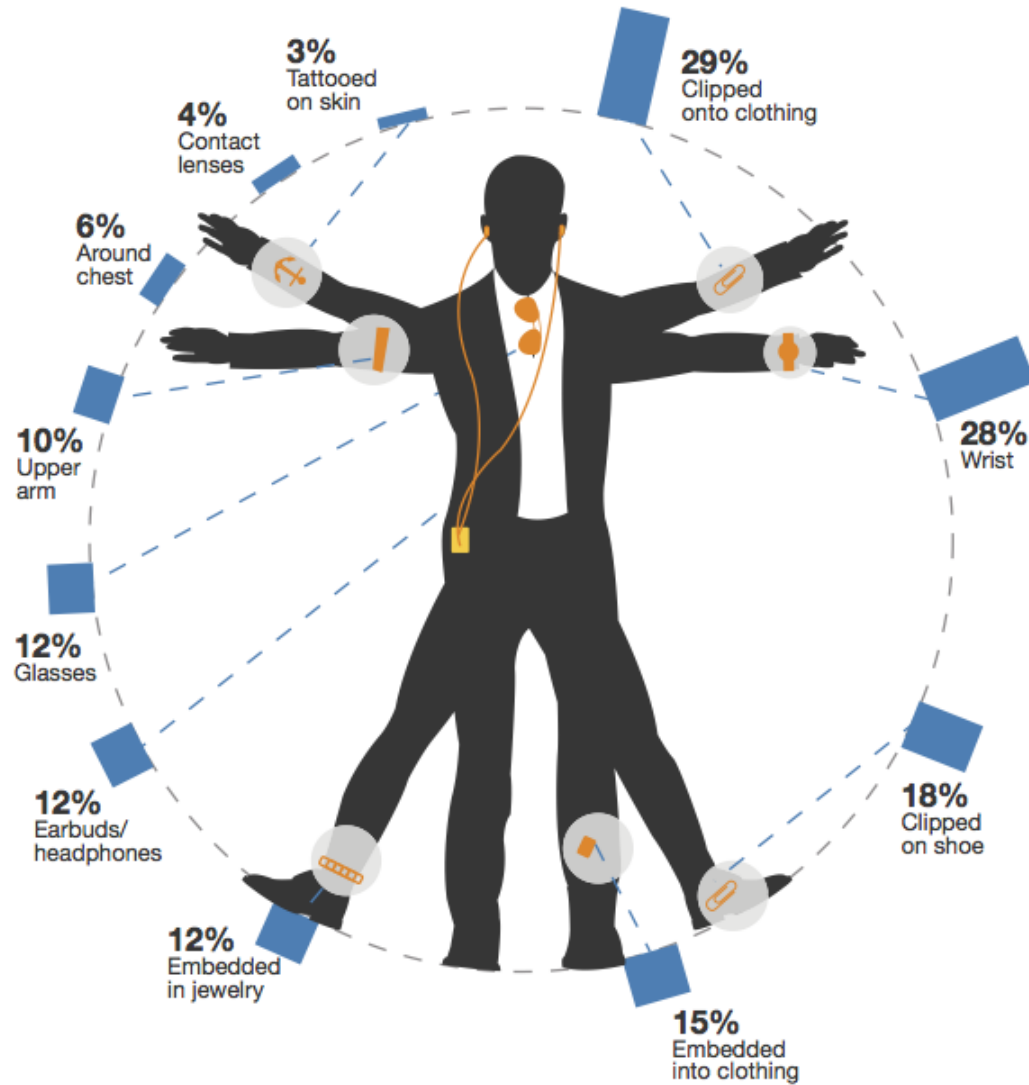
Base: 4,657 US online adults (18+)
(multiple responses accepted)

Source: North American Technographics® Consumer Technology Survey, 2013

97141   Source: Forrester Research, Inc.

Portal

Feedback

Decision support

Care & Coaching

Sensing

&
Database

BAN

BackEnd

(Hermens, 2008)
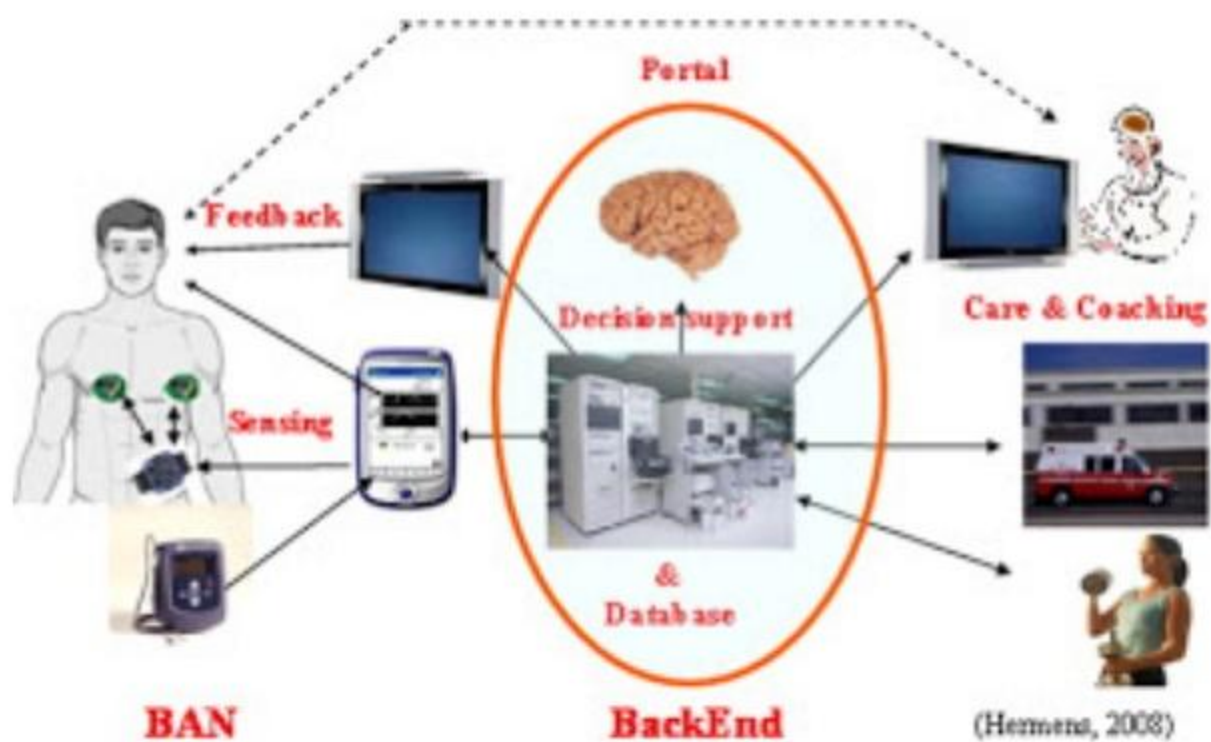
'Smart' Bed Tracks Patient Vitals, Activity

- The medical device company received approval from the United States Food and Drug Administration in February to market its flagship product, the LG1 Intelligent Medical Vigilance System, a patient safety technology that tracks heart rate, breathing rate and whether a patient is in bed or trying to get out of bed without hooking the patient up to electrodes or any other wiring system. The monitoring sensors are present in a pad-like device, or mattress coverlet, that can be sat on or lain upon. The sensors respond to physiological stimuli and are able to measure patient information through clothing, hospital gowns and sheets.

Smart Toilets: Doctors in Your Bathroom

Toto's new Intelligence Toilet II monitors weight, blood sugar levels, and other vital signs, transferring data to your computer for analysis via WiFi.

Smart Shoes

- Created by Ducere Technologies Pvt, the shoe hooks up with an app that syncs with Google Maps, tracks your steps and counts your calories burned. The shoe itself can be used for jogging around town.

Bluetooth enabled footwear
NAVIGATE • INTERACT • STAY FIT
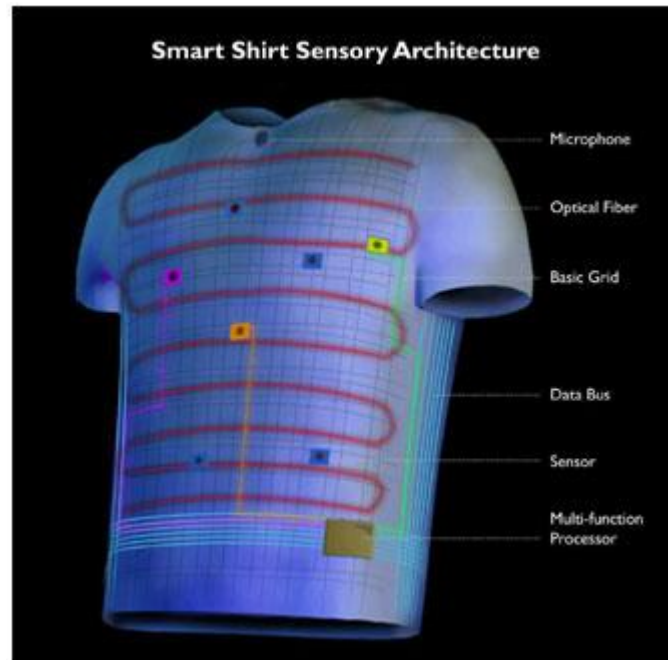
See Jacob Siegal, Forget the iWatch: This red-hot 'smart shoe' is the only wearable computer you need, August 8, 2014, BGR, http://bgr.com/2014/08/08/lechal-bluetooth-smart-shoes/

GoBe is the first and only wearable device that automatically **measures the calories you consume and burn, through your skin.**

- *Patient monitoring technology, such as "smart shirts," coupled with device apps and consumer technologies will result in more effective healthcare for patients and a much greater level of data for medical professionals with which to diagnosis potential concerns. (Credit: Maxim Integrated) -- https://twitter.com/maxim_ic/status/634117133966807040*

Fitbit Ultra

- Fitbit is more than a digital 3D pedometer that uploads your physical activity information online. You can clip the Fitbit almost anywhere on your clothes, and the newest version, Fitbit ultra, includes an altimeter sensor that knows when you're taking the stairs. Plus, you can wear the Fitbit at night to see how well you're sleeping.

BodyMedia FIT Armband

- BodyMedia FIT armband is a 3D activity monitor that uses sophisticated skin sensors to detect how many calories you are burning by measuring changes in skin temperature as well as perspiration. Its wireless Internet connectivity lets you upload your progress and share that information with friends and colleagues.

APPS

Intended Users for Apps in Medical Category

- 33.38% — Consumer/Patient
- 32.43% — Physician
- 17.22% — Medical Student
- 10.11% — Miscategorized/Not in English
- 3.65% — Other Health Professional
- 1.8% — Other
- 1.4% — Nurse

Legend:
- Consumer/Patient
- Physician
- Medical Student
- Miscategorized/Not in English
- Other Health Professional
- Other
- Nurse

MOBILE HEALTH REPORT

http://mobihealthnews.com/research/the-world-of-health-and-medical-apps/

mobile medical apps

PUSH DOWN & TURN

Smart Phone Apps

For Medical Assistants & Nursing
Professionals

09:45

FDA Mobile App Guidelines Announced

LGBTTech.org

75

FDA REGULATED
MOBILE MEDICAL
APPS

mobihealthnews
2012 REPORT

TEACHING & LEARNING WITH TECH TOOLS

www.NEARPOD.com

Join Session:

Walters State Community College
Apple Distinguished College Program

WALTERSSTATE
THE GREAT SMOKY MOUNTAINS COMMUNITY COLLEGE

Teaching and Learning with Mobilization
Website of teaching and learning (videos, etc.)

http://library.ws.edu/mnaturalscience

FDA
Approval as a
Medical Device

- **PMA Approvals:** Monthly listing of all new or high-risk medical devices that were approved via the premarket approval (PMA) pathway. These devices require a more rigorous premarket review than the 510(k) pathway.
  http://www.fda.gov/medicaldevices/productsandmedicalprocedures/deviceapprovalsandclearances/pmaapprovals/default.htm
- **510(k) Clearance:** Monthly listings of new devices that have been shown to be "substantially equivalent" to devices that are already marketed legally for the same use.
  http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/DeviceApprovalsandClearances/510kClearances/
- **Humanitarian Device Exemptions (HDE):** Listing of devices that have been approved to treat or diagnose a disease or condition that affects fewer than 4,000 individuals in the United States per year.
  http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/DeviceApprovalsandClearances/HDEApprovals/ucm161827.htm
- **De novo Classification Orders:** Listings of new devices for which a de novo has been granted.
  http://www.fda.gov/AboutFDA/CentersOffices/OfficeofMedicalProductsandTobacco/CDRH/CDRHTransparency/ucm232269.htm

MEDICAL MOBILE Resource Center:

http://mobilehealthsciences.weebly.com

COPY OF POWERPOINT

http://www.slideshare.net/rkmelton/robbie-melton-wichewebinaroutline

Higher Education Mobilization

LEARNING and Workforce

ON DEMAND and

IN YOUR HAND

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