The Internet of Health

Wearables, Apps, Engagement and Population Health
Who I am

Jacob Buckley-Fortin
CEO, eHana LLC

Behavioral Health IT Entrepreneur • 15 years
All-around Geek • 30 years
These are early days

- This is a snapshot
- Think creatively
- The future is wide open
The Rise (and Rise) of Mobile
WhatsApp

$19,000,000,000

Acquisition price by Facebook
2/19/2014
@PKessel81 thanks for the selfie Phil!!! 🖤🖤🖤🖤

7:19 PM - 9 Nov 2014

Sean Gentille @seangentille
Phil Kessel, ladies and gentlemen (via r/leafs).
11:45 AM - 10 Nov 2014

60 RETWEETS 66 FAVORITES
"Violent Crime Drops to Lowest Level Since 1978"

TIME, November 10, 2014
"Possible reasons for the decline include... an increased use of cell phone videos capturing incidents."

Attn #JP #JamaicaPlain these 2 have been going around robbing unlocked cars.  
ift.tt/14qWfu6
Percentage of the US population carrying cameras everywhere they go, every waking moment of their lives:

In the last few years, with very little fanfare, we've conclusively settled the questions of flying saucers, lake monsters, ghosts, and Bigfoot.
“Violent Crime Drops to Lowest Level Since 1978”

TIME, November 10, 2014
“Possible reasons for the decline include... an increased use of cell phone videos capturing incidents.”
The Internet of Health

Sensors + The Cloud
Sensors
2010 Sensors & Technology

- GPS
- Cameras
- Microphones
- 6-axis accelerometer
- Compass
- Light sensor
- Proximity sensor
- Wi-Fi & 3G
- Bluetooth
2014 Sensors & Technology

- 50x faster CPU
- 84x faster graphics
- NFC
- Barometer
- 4G/LTE
- Bluetooth Low Energy
- Motion Coprocessor
• A new iPhone CPU has 625 more transistors than a 1995 Pentium

• On iPhone 6 launch weekend Apple sold 25x more transistors than existed in all PCs on earth in 1995

• Everyone now has a pocket supercomputer
Smart Devices

Internet of Health 1.0
Harris RTX2010 Processor (lander)

- Released in 1988
- Data rate 16 kbit/sec
- 2x2 Mbyte RAM
- Radiation-hardened
- Backup computer
Withings Smart Scale
Withings Blood Pressure
Glooko MeterSync
Who tracks their health?

- 45% of U.S. adults live with at least one chronic condition.

- Of those who are living with two or more conditions, 78% have high blood pressure and 45% have diabetes.

Source: Pew Research
Who tracks their health?

- 19% of U.S. adults reporting no chronic conditions say they track health indicators or symptoms
- 40% of U.S. adults with 1 condition track
- 62% of U.S. adults with 2+ conditions track

Source: Pew Research
“Wearables”

Show of Hands
Fitbit One, Charge & Surge
Microsoft Band
Android Wear
The Pavlok Band
WEARABLE TECH MARKET

276 NUMBER OF DEVICES
$319 AVERAGE PRICE (USD)

Source: http://vandricio.com/database
Common Sensors

- Heart rate sensor
- Accelerometer
- BTLE + Wifi
- GPS (Phone)
Age of Wonders

Our Amazing Future
“Invisibles”

● Minimal, simple, intuitive
● Seamlessly integrated into the human body
● Potential for better adoption and engagement
MC10, Inc.

$61M in venture capital raised
Google Contacts

Measures glucose in tears
“Ingestibles”

- Sensors operate within the body
- Often powered by stomach acid
- Diagnose, observe med adherence, monitor symptoms
Proteus Helius

$120M funding raised, cleared by FDA
Data Silos vs. Aggregators
Data Silos

- Hardware-specific
- Closed system
- Proprietary protocols
- Must be installed (lower adoption)
Data Silos (Runkeeper, Withings, Fitbit)
Aggregators (Apple HealthKit/Google Fit)

- Hardware-agnostic
- Open system
- API-Driven (HealthKit, Google Fit)
- Included with OS
“Apple to fix Health app after blood glucose measurement issue”

“Diabetics are being warned that Apple’s Health app is not compatible with some blood glucose measurements, meaning [some users] could see inaccurate readings.” – CNET, October 15, 2014
HealthKit/Epic Integration

- Patient is downloads the MyChart app
- Doctor “prescribes” tracking of certain data points
- EHR notifies doc if data is “abnormal”

“I’m sorry, there was nothing we could do for the patient. We tried our hardest, but they had an iPhone 4S. We can’t get their data.”
Avoiding readmissions of CHF patients by monitoring weights at home via Withings scales

Alert docs and pharmacists when weight goes up (likely water retention) to titrate medication

“O-bar” for support a la Genius Bar
Startup Case Studies
“Health care and education, in my view, are next up for fundamental software-based transformation... We believe both of these industries, which historically have been highly resistant to entrepreneurial change, are primed for tipping by great new software-centric entrepreneurs.”

Marc Andreessen, “Why Software is Eating the World”
“Suppose you develop a new technology that is valuable to some industry. The old approach was to sell or license your technology to the existing companies in that industry. The new approach is to build a complete, end-to-end product or service that bypasses existing companies.”

Chris Dixon, “The Full-Stack Startup”
Full-stack startups “eating” established industries

- Airbnb
- Uber
- Amazon.com
- Zen Payroll
- Instacart
- Coursera
Wellframe – Clinical Tracking

- Payer-, provider-, pharma-driven
- Mobile app for health data collection
- Customizable, flexible clinical protocol
- EHR Integration
Hi Keith, I'm checking up to make sure you remember to get your foot exam!

Keith Hellickson

Thanks Alice, I just had the exam a few hours ago. Things are feeling good!
- Keith
Omada Prevent – Prediabetes

- 16-week program targeted at pre-diabetes (8 month self-directed afterwards)
- Smart scale + group chat/cohort
- Based on CDC research
Propeller Health – COPD

- Provider- and payer-driven
- Monitors inhaler use automatically
- Population health tracking (environment, etc)
Lively – Home Care

- Patient-driven
- Smartwatch included (med reminders, step counting, fall detection)
- Smart sensors available (pill boxes, motion sensors, door sensors, etc)
Lively Circle
Specific family members and caregivers can be provided "Circle" access.

Notifications
Set up notifications to be delivered by email, text or mobile app.

Safety Watch
Indicates safety—watch status, including whether it's being worn.

Home/Away
Know when your loved one is home or away.

Daily Activity
Displays certain daily activity patterns—and offers more detail when needed.

LivelyGram
Pictures submitted to create a personalized photo mailer, delivered through the postal mail each month.
Behavioral Health
“You can now count your steps, measure your glucose levels, monitor your blood pressure and track your caloric intake from your phone or high-tech wristband. But for those dealing with depression rather than diabetes, or trying to keep tabs on their bipolar disorder rather than their weight, the pickings are slimmer.”

Newsweek, November 21st 2014
Tracking Behavioral Health

- 25% of adults experiencing from some form of Mental Illness

- 6% of adults suffer from SMI (schizophrenia, major depression or bipolar disorder)

- 89.3 million U.S. residents lack access to mental health care.
Mood Tracking & Basic Interventions
Ginger.io

- Provider-driven
- Leverages smartphone data for behavioral analytics & alerts
- Enables more timely interventions
PRIORI – Passive voice monitoring

- Joint research from University of Michigan Department of Psychiatry and College of Engineering

- Uses voice recognition to monitor for manic or depressive states

- Based on MIT research – 10 second review of vocal patterns w/ 98.6% accuracy for Parkinson’s
Emotiv Insight

- Consumer EEG & inertial sensor
- Bluetooth integration with smartphone
- Available via API
Internet of Behavioral Health

- Passive data (location, movement, communication patterns, etc) & physiological markers (heart rate, skin temp, weight, language use, brain data, etc.)

- Integrated with best-of-breed apps for co-occurring conditions (SU, COPD, diabetes, hypertension)

- Big data analytics for rich provider dashboards & alerts
Challenges

- Pace of change
- Client engagement & device adoption
- Payment challenges
- IT expertise
- Partnerships / integrated care
- Privacy, consents, HIPAA, 42 CFR
Beware the “Full Stack” startups

- Enables incumbents
- Distributes value
- Low satisfaction

- Eliminates incumbents
- Consolidates value
- High satisfaction
Technology Learning Community

- 20 agencies nationwide
- 25 consumers ea.
- Tracking data for diabetes or hypertension via smartphone apps
Q&A / Contact

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