The Future of Telemedicine in Arkansas (and Beyond)

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Financial Disclosures

iHeartDoc, Inc.
The Doctor by Sir Luke Fildes.

The Physician training as an “Artisan”
- Takes the “clay” of signs and symptoms and “sculpts” them into a diagnosis.

The economic product of a physician’s work is a diagnosis. The “widget” produced by the factory of medicine.

Dr. Abraham Varghese: “A Doctor’s Touch” TED talk.
IBM’s Watson as your physician…

Analysis of digital data, symptoms, and genetics to determent likely diagnosis and recommend testing.

The physician reviews Watson’s recommendations and treats the patient.
Basic Medical Technology

- Stagnant use of “old technology” for our most basic measurements of health function.
  - Sphygmomanometer (BP Cuff): invented by Samuel Siegfried Karl Ritter von Basch in 1881
  - Stethoscope: invented in France in 1816 by René Laennec
  - Electrocardiogram: first practical model invented by Willem Einthoven in 1903. He received the Nobel prize in medicine for it in 1924.
Transformative Technology 2015

- The Age of the Smartphone
  - Medical Apps/Devices
- Telemedicine
- Digital Health/Big Data
- Human Genomics
- Nanotechnology
- Robotics/Bionics
Estimated number of mobile-cellular subscriptions, Internet users and fixed-telephone subscriptions, 2005-2013 (Billions)

- Population
- Mobile-cellular subscriptions
- Internet users
- Fixed-telephone subscriptions
mHealth
The delivery of healthcare via mobile communication devices.

Mobile smartphone use is growing rapidly throughout the world making MHealth possible.

4.5 billion mobile phones for an estimated worldwide population of 6.6 billion at the end of 2012. A market penetration of 64.7%.

Now a 1:1 ratio (100%) as of mid 2014.
mHealth

In 2012, 2.8 million people were already having their health monitored through a cellular connection.

By 2017, that number is estimated to grow by 26.9% per year.

9.4 million visits via cellular connections.
The Medical Smartphone

A hub of telecommunications convergence. It can text, email, or phone.

A remarkable number of devices all rolled into one gadget: camera, video recorder, GPS, calculator, watch, alarm clock, music player, voice recorder, photo album, flashlight, magnifying glass, and library of books.

When connected to a wireless network, this tiny device is a web surfer, word processor, video player, translator, dictionary, encyclopedia and gateway to the world's knowledge base. “A Universe of Data”.

In medicine it is capable of displaying all of one's vital signs in real time, conducting laboratory analyses, perform an EKG or an EEG, sequencing parts of one's genome, acquiring ultrasound images of one's heart, abdomen or unborn baby, or performing telemedicine visits.
Health and Fitness Apps

The fastest growing segment of the online app stores
Withings Body Media
Withings Body Media

- Wifi/Bluetooth equipped scale and BP Cuff
- Withings App:
  - Weight
  - Body Fat
  - BMI
  - Heart Rate
  - Blood Pressure
Jawbone Up
AliveCor ECG
iPhone/Android case with FDA approved ECG
Airstrip Vital Signs
Peak Vision
Cellscope Oto

Limited Time Offer
$299
One year Expert subscription and warranty included.

Risk Free – 30-Day Money Back Guarantee!
Scanadu Scout

- Developed using NASA Mars Rover Infrared technology
- Blood Pressure
- Heart rate
- Electrical heart activity/EKG
- Heart rate variability
- Temperature
- Blood oxygenation (pulse oximetry)
- Available Feb. 2015
Scanadu Scout
“Our cars give us continuous feedback via sensors monitoring every aspect of its function yet our healthcare is episodic.”

Digital Health: Digitized health information monitored by sensors and apps and delivered via internet connected devices.

Big Data: An enormous collection of health data obtained via digital health devices predictively analyzed to provide early warning of health conditions.

Your credit card company’s analysis applied to health data.
In the early 1960's, 40% of all patient-physician encounters were house calls at the patient’s home.

By 1980, only 0.6% were via house calls.

Can technology bring the house call back by directly connecting providers with patients via telemedicine?
“Doc, a trip to the Doctor's office is not any fun".

“A day of lost work.”
“Redundant paperwork.”
“A long wait in a crowded waiting room.”
“Exposure to folks who look really sick.”
“Just not very convenient.”
Telemedicine In Arkansas

- ANGELS (Antenatal and Neonatal Guidelines, Education, and Learning System) program provides Neonatal care to rural Arkansas from UAMS.

- Arkansas SAVES (Stroke Assistance Through Virtual Emergency Support) Stroke Care

- Did you know?? In 2010, University of Arkansas for Medical Science (UAMS) received a three-year $102 million federal stimulus grant for broadband equipment and installation in more than 450 institutions across the state, making Arkansas the second most wired state in the nation for telehealth, second only to Alaska.
Tele-health Today

- Only covered for rural patients
- Expensive equipment
- Limited availability
- Similar staffing and patient wait times for visits.
- Patient satisfaction issues.
Covered For Rural Consultation ONLY.

A rural Health Professional Shortage Area (HPSA) located either outside of a Metropolitan Statistical Area (MSA) or in a rural census tract; or

A county outside of a MSA.
Telehealth consultations, emergency department or initial inpatient HCPCS codes G0425–G0427

Follow-up inpatient telehealth consultations furnished to beneficiaries in hospitals or SNFs HCPCS codes G0406–G0408

Subsequent hospital care services, with the limitation of 1 telehealth visit every 3 days CPT codes 99231–99233

Office or other outpatient visits CPT codes 99201–99215

Annual, face-to-face intensive behavioral therapy for cardiovascular disease, individual, 15 minutes HCPCS code G0446

Smoking cessation services HCPCS codes G0436 and G0437 and CPT codes 99406 and 99407
Provider Information

John Doe

555889910

Cardiologist

412, North Boulevard, NH 654983

Dec 06, 2013, 12:00 PM

Add to Calendar

Notes

Schedule
UPCOMING

*John Doe*

Cardiologist

412, North Boulevard, NH 654983

Dec 06, 2013, 12:00 PM
My Appointments

UPCOMING

⭐ Patient Patient

200 E MAIN ST, PHOENIX AZ 85123, USA

Dec 06, 2013
12:00 PM
Housecall Use Today

- Primary Provider/Specialist Consultation
- CHF Outpatient Management
- Diabetes Management
- Chronic Disease Management (Cardiac, Renal, Endocrine, Wound Care)
- Lifestyle Management/Weight Loss Clinic/Smoking Cessation
- Surgical Follow Up Visits
- Concierge Medicine/Added Value Service/Follow Up Office Visit
The app cost is currently free.
Available in the Apple App Store and coming soon to the Android store.
Free unlimited use for patients.
Provider cost is $9.99 per month per provider.
  Discounted for long term service purchase up to a year @ $99.99.
  Patient/Provider interaction is controlled through a free scheduling module.
Withings and Up Band modules are included free.
  Future device modules will be available as an In-App purchase.
Free scheduling access through web portal.
Can be rebranded to fit the organization. (Clinic, Hospital, Insurance, or Business)
Secure HIPPA-compliant, encrypted connection with AES Cipher 128 bit encryption of audio and video and HMAC-SHA1 to verify data integrity.

Web RTC as the backbone for the telemedicine component through Tokbox. SRTP protocol for media traffic encryption and DTLS-SRTP for key negotiation.

Dedicated servers for reliable uptime service via Rackspace. SOC 2 Report, SOC 3 Report, FIPS 140-2, and ISO27001 security certification.

Can be integrated into EMRs like Epic or NextGen.
Future Integration

- Apple Health App and upcoming iWatch
- FitBit
- Garmin Fitness Band
- Misfit Shine
- Glucose Monitors
- GPS Exercise Apps
- Weight Loss Apps

The hottest segments of the 2014 and 2015 Consumer Electronics Shows (CES) was wearable medical technology. Many new devices are headed to market.
Human Genomics
The Blueprint of Life

- The Human Genome Project began in 1984 and was completed in 2003.
- 20,500 Human Genes
- 3.3 Billion Base Pairs
- Multiple diseases have a genetic basis or a genetic predilection.
The Cost of Human Gene Sequencing
Pharmacogenetics

Drug Metabolism has a genetic determine

**CYP2D6**: fluoxetine, sertraline, paroxetine hydrochloride, bupropion hcl, hydrocodone, amitriptyline, haloperidol, metoprolol, propafenone, tamoxifen, fexofenadine hcl, and diphenhydramine hcl.

**CYP2C9**: warfarin, phenytoin, glimepiride, isoniazid, sulfa, ibuprofen, amitriptyline, losartan potassium-hctz, THC (tetrahydrocannabinol), naproxen, and sildenafil.

**CYP2C19**: clopidogrel, carisoprodol, diazepam, phenytoin, and lansoprazole.

**CYP3A4 and CYP3A5**: are two closely related drug-processing enzymes which are responsible for the metabolism of about half of the most commonly prescribed drugs, including medications used to treat heart disease, pain, cancer and infectious disease.
Nano-Sensors

Tiny sensors imbedded under the skin, in the GI tract or the blood stream to detect the early markers of disease

- Detect future heart attacks or strokes by detecting the molecular signature of vessel closure and cellular damage.
- Detect pancreatic cell destruction in patients at risk for diabetes.
- Detect the markers of breast cancer, colon cancer or blood cancers at heretofore pre-detection levels.
Medical care in the past has been driven by large trials aimed at treating large populations of patients in a standardized fashion.

We used standard techniques, standard medication and standard doses. Our protocols were uniform.

The medicine of the future will be individualized for you based on your digital health data, and your genetics.
The Healthcare Visit of the Future

- Probably not done in an office.
  - The “well patient” is at home or work.
  - Telemedicine visits are the norm.
- Almost certainly not done in a hospital.
  - Only the very sick are in hospitals. We can monitor you as well as today’s ICU at home.
The Healthcare Visit of the Future

- Your digital data is analyzed prior to the visit. Apps, devices, and imbedded sensors provide a complete digital picture of you.

- Your doctor has a computer analysis of your most likely diagnosis based on your symptoms, genetics, and digital data before the visit.
  - Watson as a doctor…

- Your treatment is based on genetic based drug metabolism. No more trial and error of medications.
  - Or perhaps a genetically matched organ or a machine….
Bionics/Robotics
“You make a difference in the world by making a difference for the person in front of you now.”

–Bob Caldwell
Questions?
Thank You for your attention.