

Wireless Health: Technologies, Trends and Take-Up



Peter Lewis, Hydrix



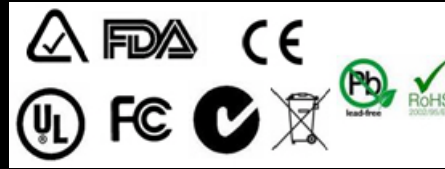
A message from my sponsor:

Hydrix is the largest software & electronics design consultancy in Australia

Experienced : Design track record of safety-critical medical devices
- Class I through to Class III

Qualified :

ISO 14971
ISO 13485
IEC 60601
IEC 62304



Clients :



Wireless Health or mHealth sits at the
intersection of traditional healthcare,
telecommunications & technology

Five different areas
are combining to
create a vibrant
wireless health
sector:

Devices
Connectivity & Networks
Consumer Interest
Increased use of IT by Doctors
Rising Health Costs

And these five factors are in massive collision right now ...

Devices

Smartphones

Tablet PCs

PDA's

Sensors

= ultra portable
ultra small
ultra low power
ultra powerful



Connectivity & Networks

Short range



Long range



Wired



= easy to get data from the patient to the device to the doctor

Connectivity & Networks



Wifi / 802.11 / Wireless LAN

- Local Area Networking technology
- Wireless extension of ethernet (50m - 100m)
- 54MB/s - optimised for Tx of large data files
- Topology: Point to Hub
- Complexity: High (device and app impact)
- Power: High
- Connection: 3-5 secs



Connectivity & Networks



Zigbee

- Mesh networking technology
- Control and monitoring (10-100m)
- Self -configuring & healing networks
- Topology: Ad hoc, peer to peer, star or mesh
- Complexity: Low
- Power: Ultra-low
- Connection: <30ms



Connectivity & Networks



Bluetooth

- Personal Area Networking technology
- Cable replacement btw devices (<100m)
- Standard for PCs and smartphones
- Topology: Ad hoc, v. small networks (8)
- Complexity: High
- Power: Medium
- Connection: up to 10 secs



Connectivity & Networks



RFID (Radio Frequency Identification)

- Tracking technology
- Passive (3m) or active (100m)
- Topology: tag to reader
- Complexity: very low
- Power: Zero or very low
- Connection: v. fast



Connectivity & Networks



Cellular

- Wide Area Networking (WAN) technology
- 10 - 15km
- Topology: Point to point
- Complexity: high
- Power: high
- Connection: slow

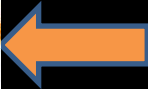


Connectivity & Networks









































Wired Cable

- Wide Area Networking (WAN)
- Fibre to every premises
- Topology: Point to point
- Complexity: high
- Power: high
- Connection: slow



Consumer Interest

Apps for:
iPhone
Android
Nokia
etc

 Medical Encyclopedia Medical Updated 28 August 2009 FREE	 Calculate (Medical Calc... Medical Updated 23 September 2010 FREE	 iFitness Healthcare & Fitness Updated 09 October 2010 \$2.49 BUY	 Medical Wizards Library Medical Updated 07 October 2010 FREE	 MedCalc (medical calculator) Medical Updated 07 September 2010 FREE
 ECG Guide Medical Updated 05 October 2010 \$1.19 BUY	 Cardio Calc Medical Updated 24 July 2010 FREE	 Skyscape Medical Res... Medical Updated 14 September 2010 FREE	 Pedi STAT Medical Updated 14 October 2010 \$3.99 BUY	 MediMath Medical Calculator Medical Updated 16 September 2010 \$5.99 BUY
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 Taber's Medical Diction... Medical Updated 16 August 2010 FREE	 iDoctor - Medical Logb... Medical Released 23 June 2010 \$12.99 BUY	 Heme Calc Medical Updated 24 July 2010 FREE	 GI Calc Medical Updated 24 July 2010 FREE	 Medical Terminology and ... Medical Updated 10 August 2010 \$1.19 BUY
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 Harrison's Manual of M... Medical Updated 18 August 2010 FREE	 Taber's Medical Diction... Medical Updated 16 August 2010 FREE	 Diagnosaurus Ddx Medical Updated 11 August 2010 \$1.19 BUY	 NEJM This Week Medical Released 15 June 2010 FREE	 The Merck Manuals -- Unb... Medical Updated 20 September 2010 FREE
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 BenCao: Chinese Herb... Medical Updated 07 August 2009 \$36.99 BUY	 Oxford Handbook of Cli... Medical Released 14 July 2009 \$74.99 BUY	 HARRISON'S MANUAL OF MEDICINE Medical Updated 16 July 2010 \$74.99 BUY	 Carter's Encyclopaedia... Healthcare & Fitness Updated 12 October 2010 \$12.99 BUY	 Oxford Handbook of Emer... Medical Updated 03 September 2010 \$74.99 BUY

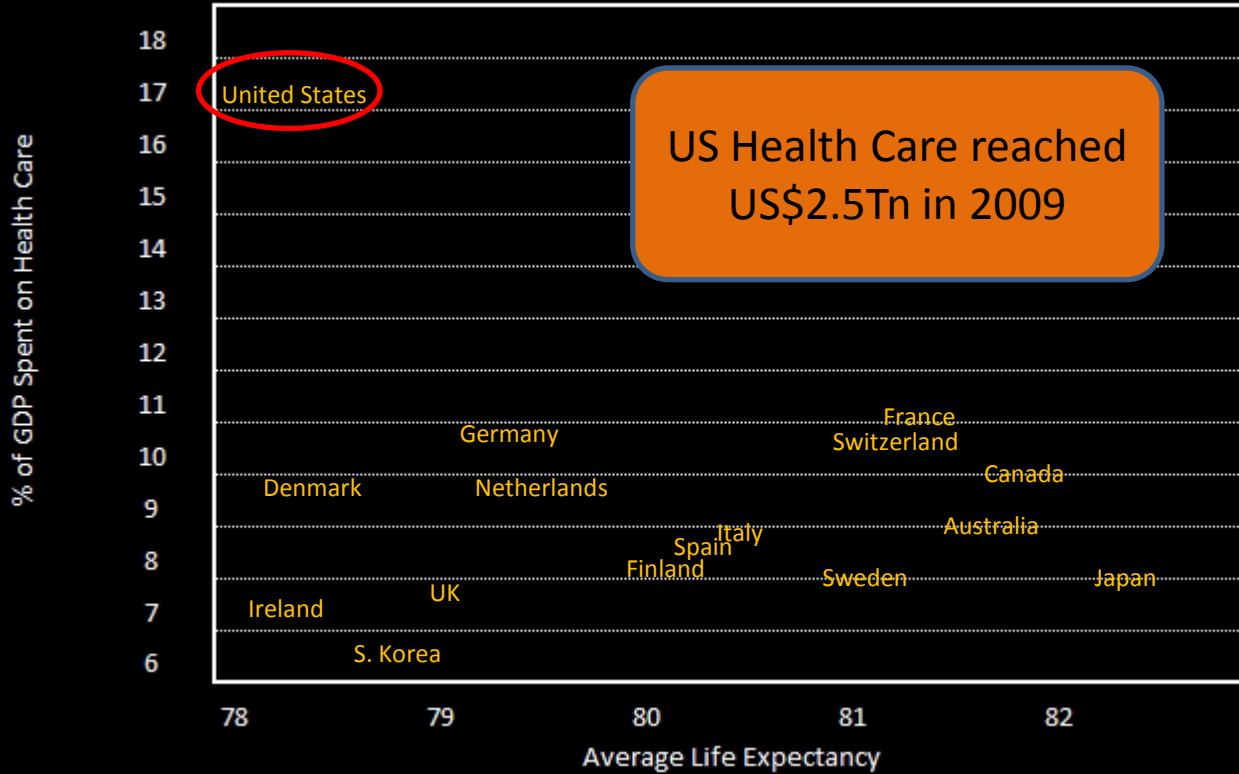
Increased use of IT by Doctors



99% of doctors physicians use the internet in their practices

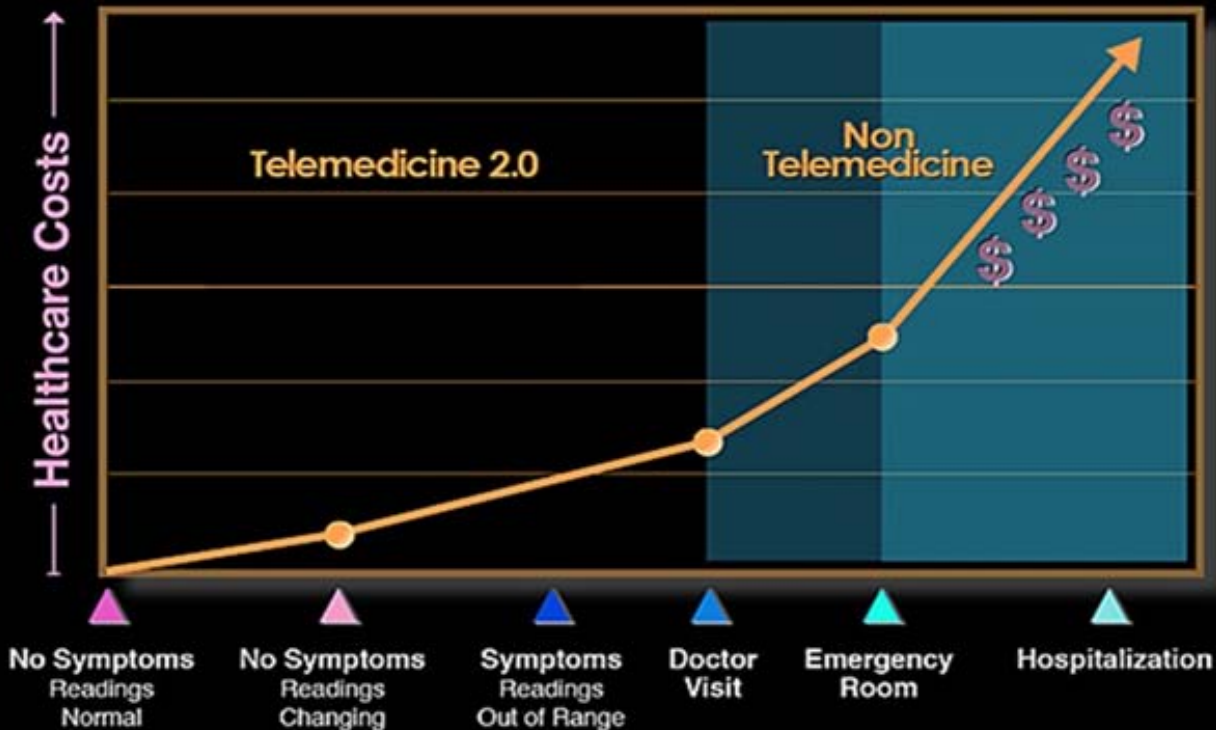
80+% of nurses direct patients to health-related websites

Rising Health Costs



Rising Health Costs

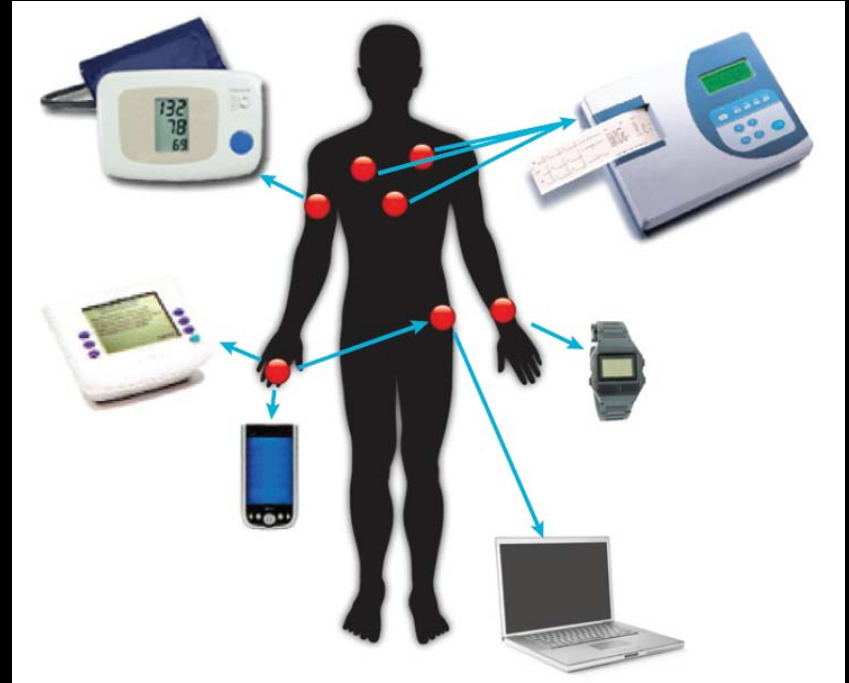
Telemedicine 2.0 Allows Early Intervention / Reduces Healthcare Costs



The combination of the five driving forces
of wireless health is causing a steady
migration of point of care from
the hospital → the home → the body

As a result we are seeing innovation across many areas:

- ➔ Monitoring
- ➔ PERS
- ➔ Telemedicine
- ➔ Mobile Medical Equipment
- ➔ Mobile Health Info
- ➔ RFID Tracking
- ➔ Health & Fitness SW



How Big is the Wireless Health Opportunity ?



But what about the three 100 lb gorillas in the corner?



And increasingly the 4th 100 lb gorilla:

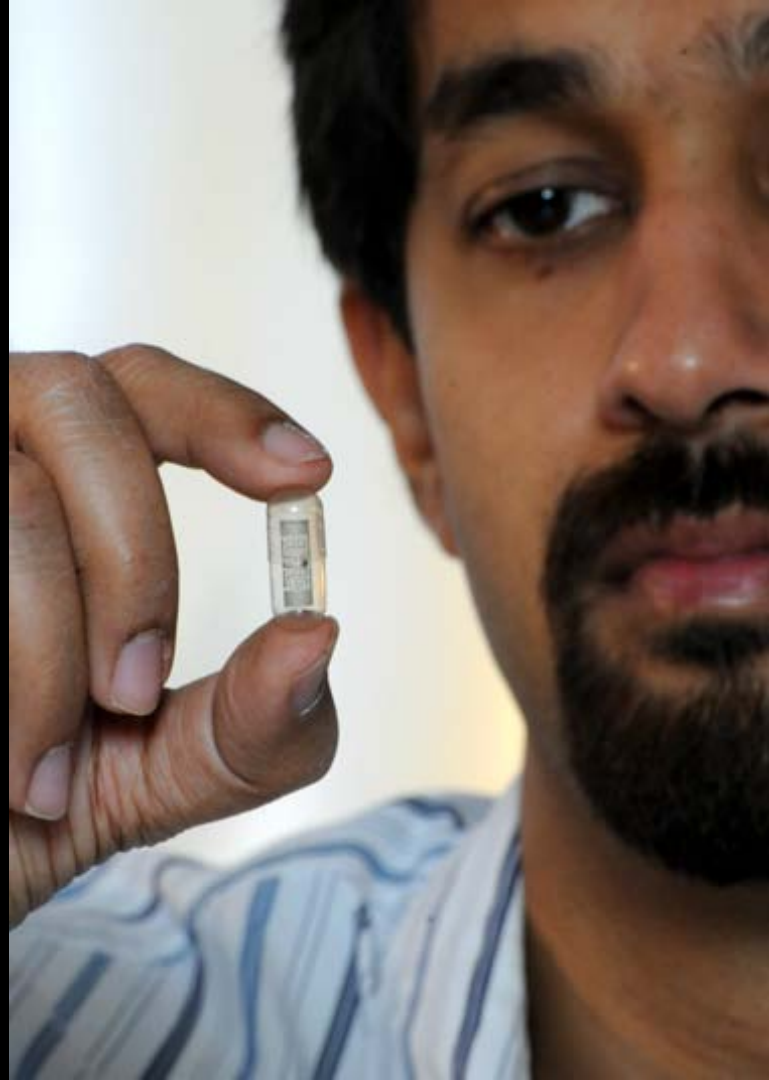


So what are the sort of applications
and devices we are starting to see in
the market ?

University of Florida researchers have created a pill capsule designed to signal when a patient has swallowed it

The pill works by communicating from inside the body with a stand-alone device worn by the patient.

Technology: Unknown – probably proprietary or RFID





Japanese firm Scalar Corp has developed a the AirMicro wireless microscope that can transmit video to the iPad or iPhone.

The microscope is equipped with a 50x lens for precise imaging, enabling users to examine skin textures and blemishes on one or more mobile devices.

Technology: WiFi

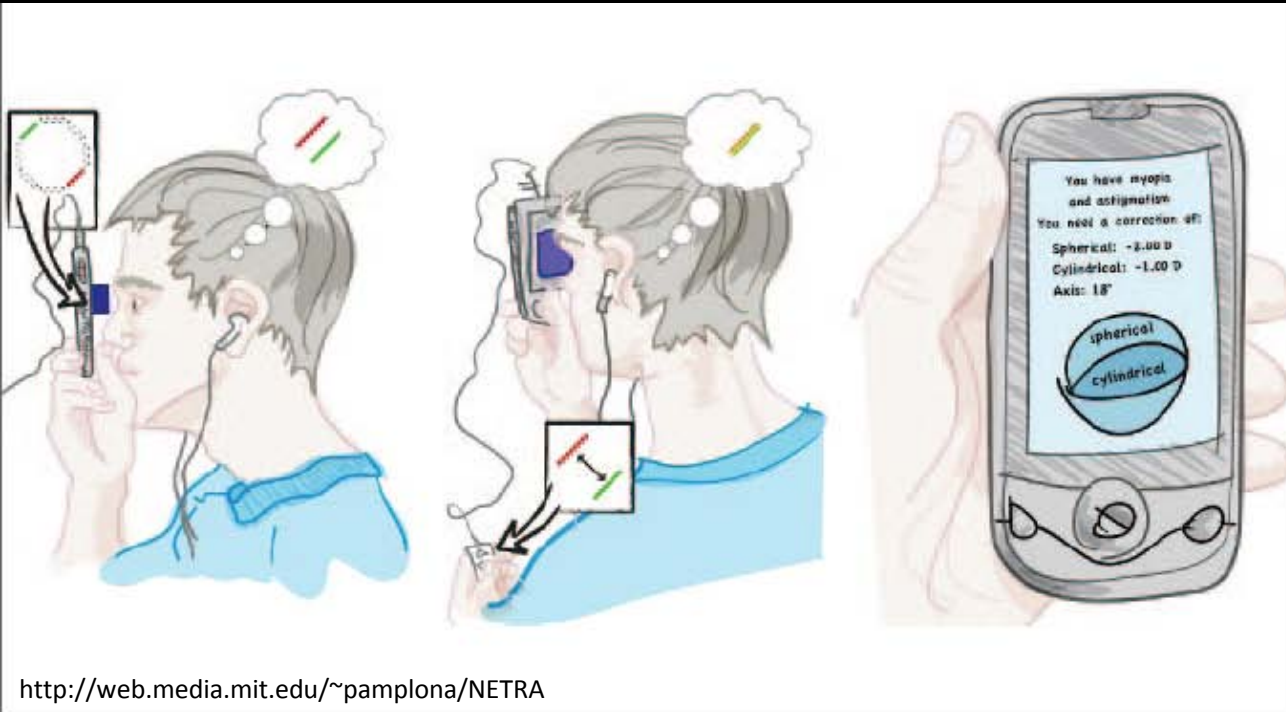
The AirStrip series of applications for Smart phones are a collection of mobile services that allow doctors to monitor patient status information remotely in real-time.

Technology: Cellular, Bluetooth or Wifi



The NETRA tool from MIT provides eyesight tests on a smartphone

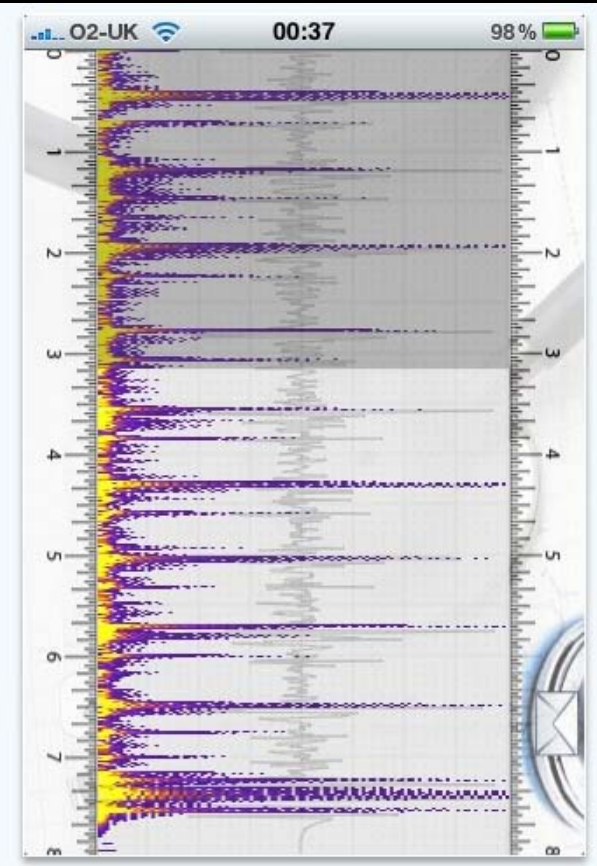
Technology – built in camera and image processing dsp



An app invented by Peter Bentley from London's University College turns an Apple iPhone into a stethoscope.

“...Experts say the software, a major advance in medical technology, has saved lives and enabled doctors in remote areas to access specialist expertise....”

Technology: Software



The OsiriX Radiology App for the iPhone was unveiled at the end of 2009

Invented by radiologists, the app allows doctors look at x-rays, ultrasounds, CT and MRI images on handheld devices or mobile phones with special software, enabling radiologists, for example, to diagnose acute appendicitis from remote locations.

Technology: Cellular, Wifi





A new iPhone App being developed by Star Analytical Services is designed to diagnose respiratory disease using the sound of a cough

Users cough into the microphone and the acoustic properties of the coughing sound are compared against a large database of coughs which can then indicate various diseases

Technology: Inbuilt app probably with Wifi or cellular updates



Thank You !

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