Technology and Innovation in General Practice

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Signposts

Point of Care Diagnostic Devices

Wireless Technologies

International Technology and Innovation
What is Technology?

“The application of scientific knowledge for practical purposes, especially in industry”

“Machinery and devices developed from scientific knowledge”

- Cost effective
- Reliable
What is Innovation?

“The action or process of innovating”

“The process of translating an idea or invention into a good or service that creates value or for which customers will pay.

To be called an innovation, an idea must be replicable at an economical cost and must satisfy a specific need.”
POC Diagnostic Devices #1: Stethoscope

Stethos - Greek “front of the chest”
Skopos - Greek “watcher”
POC Diagnostic Devices #1: Stethoscope

1800s - Chest examination via palpation, percussion and immediate auscultation

- Issues with positioning of the ear and lack of amplification
- Issues with requiring direct physical contact
POC Diagnostic Devices #1: Stethoscope

Rene Laennec

- Improvises a tube out of a rolled sheet of paper (24 pages) = “Le Cylindre”

- Rene was a skilled wood turner and developed the Stethoscope further.
Breathe on
Stethoscope has come a long way since its invention 200 years ago

Origin: Greek
phonendoscope

1800 - Prior to the invention of the stethoscope, doctors used auscultation technique.

1816 - French physician Rene Théophile Hyacinthe Laennec, inventor of the stethoscope, created a device made of a rolled sheet of paper, which was replaced with a hollow tube of wood.

1851 - French physician Arthur Leonard invented the medical stethoscope made of thin, flexible rubber tubing called a rubber latex.

1852 - New York-based physician George T. Crampton perfected the design for commercial production, with hand-sewn connections to metal tubes for better sound conduction.

1873 - The design by reputable and popular medical instrument maker improved the stethoscope's functionality, allowing for the differentiation of various sounds, such as heartbeats, breath sounds, and murmurs.

1945 - The design by a reputable and popular medical instrument maker improved the stethoscope's functionality, allowing for the differentiation of various sounds, such as heartbeats, breath sounds, and murmurs.

1970 - Dr. Leonard introduced the Cardiologic stethoscope.

2015 - Palestinian Canadian inventor Saba Lutfi developed an open-source, 3D-printed stethoscope, which costs less than $100.

1960 - Dr. W. O. Osmond, a Harvard Medical School professor, created a stethoscope that was user-friendly and included improved acoustic properties.

1999 - Richard Carlson patented the Cardiologic stethoscope, which was the first open-source stethoscope.

Research: Andy M. Bishop
Image: E. Dunlop

Note: The timeline is approximate and does not represent all developments in stethoscope technology.
POC Diagnostic Devices #1: Stethoscope

3D Printed Stethoscope

- Developed due to a lack of supplies in the region.

- Audio testing indicates comparable to Littman Cardiology III

- Dr Tarek Loubani - London trained Gaza Doctor
POC Diagnostic Devices #1: Stethoscope

3D Printed Stethoscope

- 3,777 Australian Medical Students Commenced in 2015
- Total Cost 3D Printed Stethoscope = $9442.50
- Total Cost Cheapest Stethoscope on medshop.com.au = $336,153
POC Diagnostic Devices #1: Stethoscope

Digital Stethoscopes

- Spirit, Littman, Welch Allyn
  - ~$260 - $700

- Thinklabs One
  - ~$500

- Variety of Companion Apps
  - ThinkLink

- Bluetooth and Recording Functions
POC Diagnostic Devices #1: Stethoscope

Digital Stethoscopes

- Convert Analog to Digital
- EkoCore
  - $200
  - Uses the Eko App
POC Diagnostic Devices #1: Stethoscope

Digital Stethoscopes

- Hearing Impaired
- Teaching
- Telemedicine
- Amplification
- Noise Reduction
- Recording Functionality
POC Diagnostic Devices #2: Ultrasound

Ultrasound

- Increasing application and reducing costs
- Dr Steinmetz and Dr Lewis - Canadian Family Physicians
  - Bedside Ultrasound Course
  - The Happy Baby Screening Tool
POC Diagnostic Devices #2: Ultrasound

Ultrasound
- i.e. Fujifilm Sonosite
- Mobile Phone Ultrasound
  - Mobisante - FDA approved US
POC Diagnostic Devices #2: Ultrasound

Ultrasound

- Applications

- Primary Care: Abdomen, Aorta, Kidneys, Gallbladder, Thyroid, Soft Tissue, Vascular, Small organs, Implants, Foreign Bodies, Bladder

- OB/GYN: Pregnancy confirmation/Dates, Viability, Placenta, Fetal presentation, Ectopic pregnancy, Amniotic Fluid Assessment

- Emergency Medicine: FAST exam to detect impact of trauma, Vascular, Small organs, Chest, OB/Gyn, Cardiac
Wireless Technologies: Biometrics

- Vscan Imaging Device
- Digital Stethoscopes
- Airstrip Technology, Aerotel
  - ECG, Pulse Oximetry, End Tidal CO2, standard vitals.
- Zio Patch
  - 7-14 day holter monitoring
- Medtronic M-link
Wireless Technologies: Other

- Health Buddy
  - Provider to Patient connection
  - Medication and Lifestyle Compliance
- Microchip Compliance Capsules
International Technology: Health Informatics

- Australia
  - NEHTA (National E-Health Transition Authority)
  - My Health Record
- Practice Incentive Payment available
- Opt-out Patients
- Patients are able to control their health records to a certain extent
International Technology: Health Informatics

- Denmark

- Primary Care Physicians
  - Gatekeepers and Co-ordinators

- Physicians - Specialists - Pharmacies - Laboratories - Hospitals

- Patients have access online

- Use in information gathering and quality assurance.

- Why does it work?

- Smaller population - 5.5 million

- Rapid clinical acceptance
  - Developed in close consultation with clinicians

- Financial incentives

- Technical Support - On-Site

- Multiple databases - Medcom acts as a data integrator
International Technology: Health Informatics
The End...or the Beginning?

Any Questions?

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