

Present Realities and Future Trends in Medical Electronics and Medical Technology

Dr. Bill Mason
Sage Healthcare
Cambridge UK

The Medical Technology Market

- \$120 bn annual market
- Drivers include:
 - an aging population living longer, often with chronic diseases
 - health care providers' drive to increase the quality of care and decrease the overall cost;
 - vast improvements in medical technology through miniaturization and information technology

The Medical Technology Market

- Foundation for much of today's market has been the semiconductor industry:
 - embedded technology (specifically, chips designed for use inside of devices) and
 - microfluidics/micro- electromechanical systems (MEMS)

Themes for Present & Future

- Wireless Technologies
- Imaging Technologies
- Neurology
- Cardiovascular
- Diagnostics
- Future Trends

Wireless Technologies

- In-body wireless health monitoring
- Emphasis on ultralow-power RF technologies for cameras that can be swallowed and
- Devices that can be implanted

Wireless Technologies



m-Health allows for wireless monitoring of a variety of distributed sensors and devices. The blue pager-sized device receives and interprets Bluetooth signals, converting them to GSM or GPRS before sending over the Internet for remote monitoring. (IBM)

Imaging Technologies

- Novel imaging modalities
- Improving existing modalities
- Improved sensors and scanners
- Real time sensing
- Chemical and molecular sensing
- Non-invasive imaging
- Surgical planning

Neurology

- Neuropathic pain management using novel implantable and wireless technologies for neuromodulation
 - Back pain
 - Post-surgical pain
 - Patient empowerment
- Treatment of alternative illnesses including epilepsy, incontinence, Alzheimer's and Parkinson's Disease (DBS), spasticity
- Neurostimulation market \$3.8bn in 2010

Cardiovascular

- The “hottest” space in med tech?
- Drug-eluting stents
- Artificial hearts
- Ventricular assist devices
- Monitoring
- Pacemakers
- Implantable cardioverter defibrillators (ICDs)
- \$8.3 bn market in 2005 (J.P. Morgan) for interventional cardiology

Diagnostics

- Personalised medicine
- DNA and Protein Microarrays
 - CMOS
 - Optical
- Lab On A Chip
 - Rapid detection
 - Multi-analyte; Multi-plexed
 - High Throughput and High Content Screening
- Non Invasive, Continuous Measurement on Whole Body

Future Trends

- Application of semiconductor technologies to medicine – biosensors and biomarkers
- Wireless technologies – in body monitoring
- DSP architectures – portable non-invasive diagnostic and monitoring equipment
- Rapid diagnostics and biosensors
- Drug delivery
- Medication tracking
- Internet tracking of physiology
- Surgical planning and automation