Biomedical Engineering in Commercial Healthcare IT Industry
Startup Company's View

Antti Sarela  Managing Director, goACT Pty Ltd
My Career in Medical Device R&D

1990-1993
Biophysics & Hardware

1993-1997

1997-2000
Psychology & Software

2000-2006

2006-2010

2010->

DEVICES
SW

HOSPITAL
HOME CARE

MRI Scanner Cutaway
Radio Frequency Coil
Gradient Coils
Magnet
Scanner
Patient
Patient Table
Chronic diseases

- According to the WHO, 77% of the disease burden are accounted for disorders related to lifestyles.

- Chronic or long-term conditions cause 70% of all health care costs

McGinnis et al., Health Affairs 21(2), 2002
Consumer as a co-producer of health

Traditional Medical Model
- Told
- Informed
- Compliant
- Doing to
- Reactive
- Clinician centred
- Options presented

Managed Care Model
- Asked
- Guided
- Active
- Doing with
- Proactive
- Patient centred
- Informed choice

Source: Pfizer Health Solutions
Case: goACT Journal for Depression and Anxiety Management
Mental disorders, numbers

- Prevalence:
  - 50% of the Australians have experienced mental illness.
  - 2.3 million (14%) have an anxiety disorder and 1.4 million (9%) have depression in the previous 12 months. **Total 3.7 Million** patients/year.
  - Mental disorders and suicide account for 14% of total health burden.
  - Depression will be the number one cause of disability by 2030 (WHO)

- Treatment:
  - Depression is the fourth most common problem managed in general practice
  - **Total 1.3 Million** patients/year

- Problem: 3.7 >> 1.3
Solution: Distance Therapy

- Remote coaching and self management using e-mental health solutions.

Distance Therapy Comes of Age, Recent studies show that psychotherapy delivered through electronic devices can benefit patients, R Epstein, Scientific American, Mind May/June 2011
Internet tools can reduce the symptoms

Current ICT approach in e-mental health

Therapist’s assistance improves the treatment effect

Care planning

Self care through web

Face-to-face or telephonic counselling

goACT Journal

Self care through web

goACT Journal
goACT Journal: Communication Platform

Clients
Mobile & home

RECEIVE:
- Coaching
- Counselling
- Education
- Motivation

SHARE:
- Mood ratings
- Self-observations
- Exercise and other data

Health Care Provider

Calls and Video-conferencing

Secure web-based services

goACT Journal web-service:
- Mobile Health Diary
- Goal & activity planning
- Mobile messaging tools
- Educational material
- Remote assessments
- Care plan management

Clients
Mobile & home

Secure web-based services

Health Care Provider

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Biomedical Engineering

- Biomedical engineering combines the design and problem solving skills of engineering with medical and biological sciences to improve healthcare diagnosis, monitoring and therapy. [Wikipedia]
Cognitive Behavioural Therapy (CBT) for Depression Management

CBT solves problems concerning dysfunctional emotions, behaviours and cognitions through a goal-oriented, systematic procedure:

1. Monitor
2. Assess
3. Intervention

![Diagram of CBT and its impact on emotions, thoughts, and actions. The diagram shows the interconnection between situations, thoughts, feelings, actions, and the goal of CBT to manage depression.]

CBT helps in monitoring dysfunctional patterns, assessing the impact, and intervening to modify these patterns to manage depression effectively.
Biomedical Engineering (ICT) approach in CBT with goACT Journal

Monitoring:
- Mood mapping
- Diary

Assess:
- Questionnaires

Intervention:
- Behavioural diary
- Goals & Coaching
Biomedical Engineer in Health ICT startup

- Data analysis and presentation challenges (less low level signal processing)
- User interface design, for both patients and clinicians
- Design new ways of behavioural interventions via ICT
- Emerging regulations → quality system development

- Technical skills: Software Development, User Interaction
- Biology skills: Psychology
Why start an ICT company (and in healthcare)?

Inspiring case: Atlassian & JIRA ([www.atlassian.com/about/history.jsp](http://www.atlassian.com/about/history.jsp))

Health ICT company:
- 1.5 Years, $300,000
- R&D skills required:
  - PC & Web Software
  - Clinical domain knowledge
- Fast & cheap prototyping
- Regulations only emerging
- Rapidly growing market
- Space for smaller players with innovative niche products

Medical Device company:
- 5 Years, $5 million
- R&D skills required:
  - Electronics
  - Mechanics
  - Embedded SW
  - PC & Web Software
  - Clinical domain knowledge
- Slow & expensive prototyping
- Highly regulated: FDA,MDD,TGA
- Mature markets
- Dominated by big multinationals
Thank You

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