



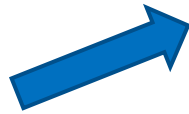
# **Biomedical Engineering in Commercial Healthcare IT Industry Startup Company's View**



**Antti Sarela    Managing Director, goACT Pty Ltd**

# My Career in Medical Device R&D

Psychology & Software



Biophysics & Hardware

2000-2006

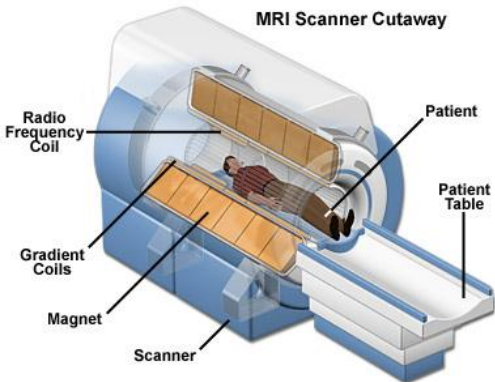
1997-2000

1993-1997

1990-1993

2006-2010

2010->



HOSPITAL



HOME CARE

DEVICES

SW

goACT Journal™ [Logout](#)

### Mood Entry

Rating:  [ 1: Worst .. 10: Best ]

Location:  Context:

Time:  Date:

**Your Last 2 Weeks Mood**

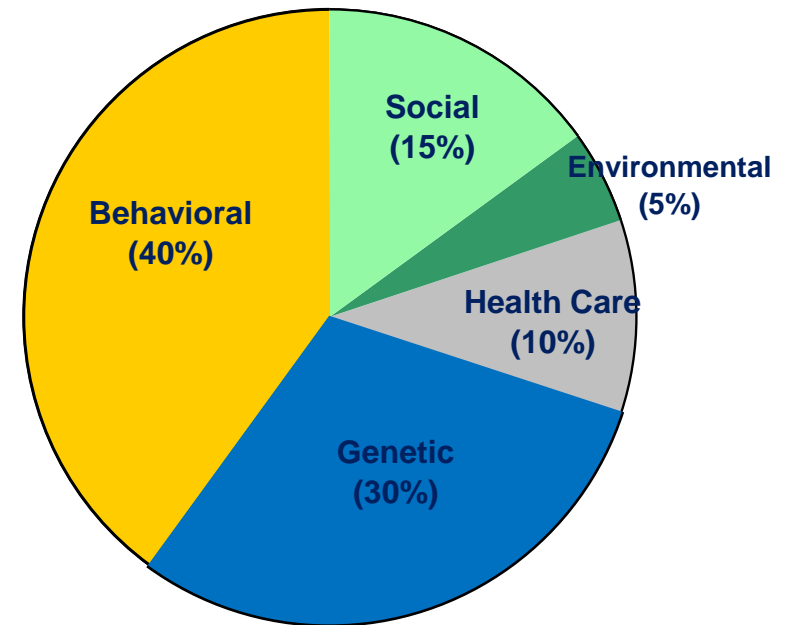
Day	Rating
Tue	4.5
Wed	5.5
Thu	6.5
Fri	5.5
Sat	4.5
Sun	3.5

# Chronic diseases

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- 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**

## Impacts of various domains on early deaths in the United States



McGinnis et al., *Health Affairs* 21(2), 2002



# Consumer as a co-producer of health

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## 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*



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## Case: goACT Journal for Depression and Anxiety Management



# Mental disorders, numbers

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- 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:

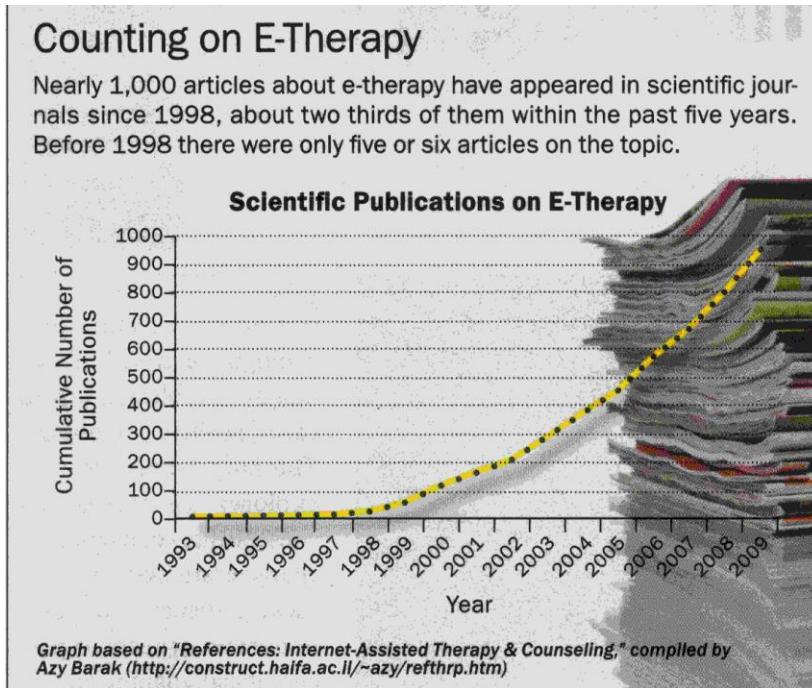
- Depression is the fourth most common problem managed in general practice
- **Total 1.3 Million** patients/year

- 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*





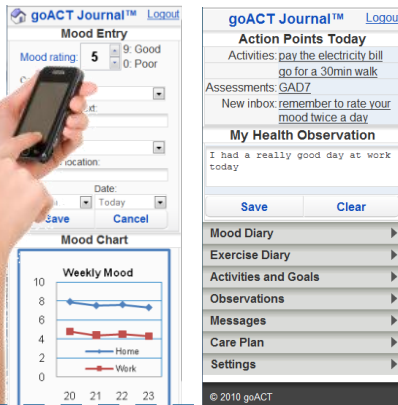
# goACT Journal: Communication Platform

**Clients**  
Mobile & home



**RECEIVE:**  
Coaching  
Counselling  
Education  
Motivation

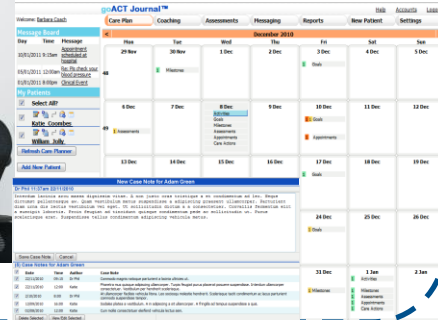
**SHARE:**  
Mood ratings  
Self-observations  
Exercise and other data



Calls and  
Video-  
conferencing



**Health Care Provider**



**Secure web-  
based services**



**Mobile Web**  
E-mail  
Sync  
SMS, MMS



**goACT Journal web-service:**



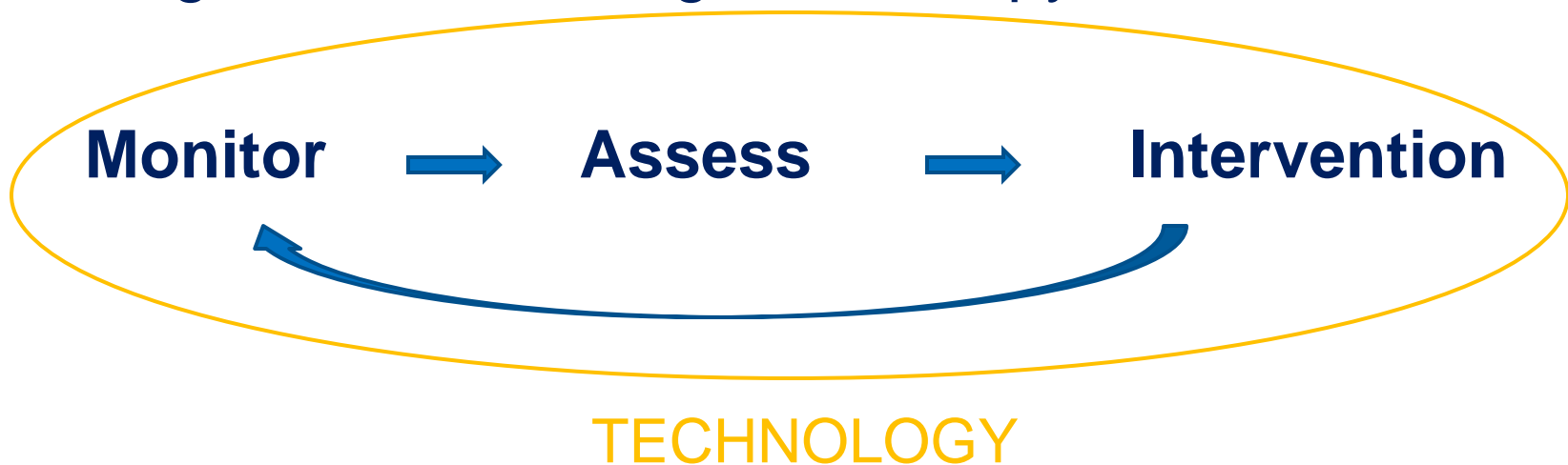
Mobile Health Diary  
Goal & activity planning  
Mobile messaging tools  
Educational material  
Remote assessments  
Care plan management



# Biomedical Engineering

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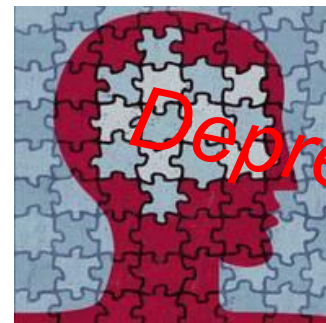
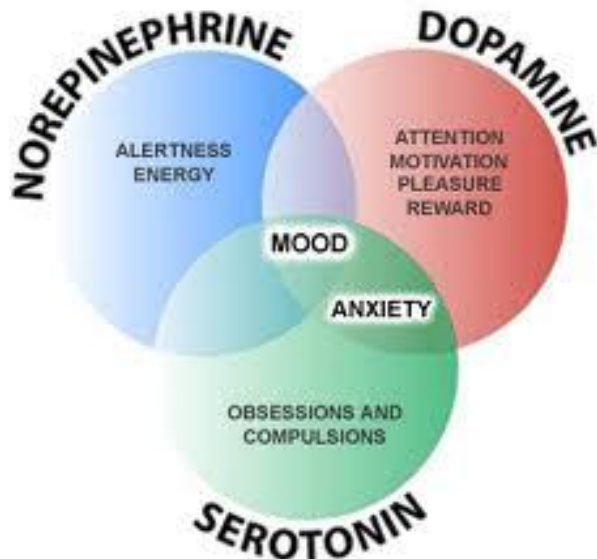
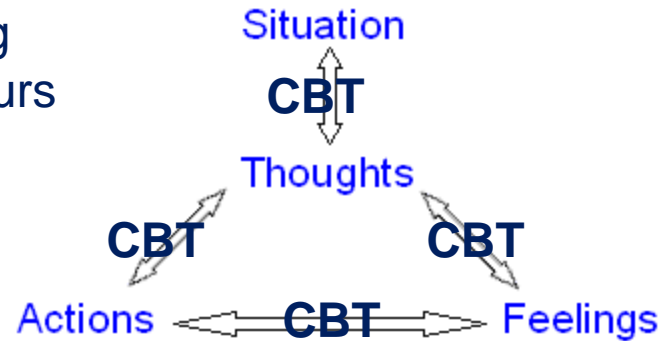
- Biomedical engineering combines the design and problem solving skills of engineering with medical and biological sciences to improve healthcare diagnosis, monitoring and therapy. *[Wikipedia]*



# Cognitive Behavioural Therapy (CBT) for Depression Management

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

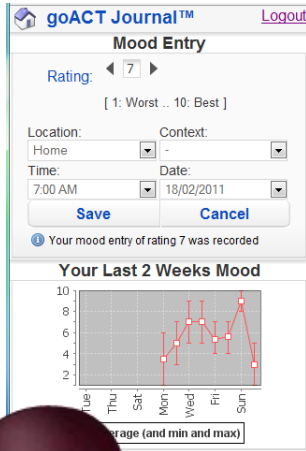
1. Monitor
2. Assess
3. Intervention



# Biomedical Engineering (ICT) approach in CBT with goACT Journal

## Monitoring:

- Mood mapping
- Diary



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**Mood Entry**

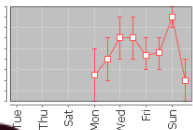
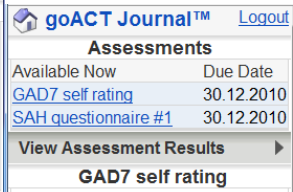
Rating:  [ 1: Worst ... 10: Best ]

Location: Home Context: -

Time: 7:00 AM Date: 18/02/2011

📍 Your mood entry of rating 7 was recorded

**Your Last 2 Weeks Mood**

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**Assessments**

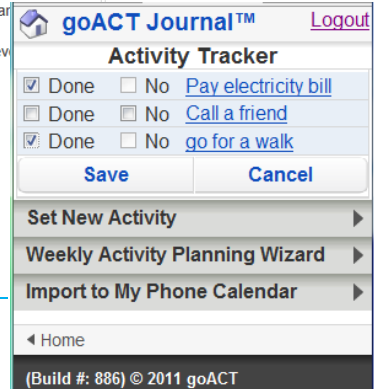
Available Now	Due Date
<a href="#">GAD7 self rating</a>	30.12.2010
<a href="#">SAH questionnaire #1</a>	30.12.2010

**View Assessment Results**

**GAD7 self rating**

Over the last 2 weeks, how often have you been bothered by any of the following problems?

- Feeling nervous, anxious or on edge?
  - Not at all
  - Several Days
  - More than half the days
  - Nearly every day
- Not being able to stop or control worrying?
  - Not at all
  - Several Days
  - More than half the days
  - Nearly every day
- Worrying too much about different things?
  - Not at all
  - Several Days
  - More than half the days
  - Nearly every day



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**Activity Tracker**

Done  No [Pay electricity bill](#)

Done  No [Call a friend](#)

Done  No [go for a walk](#)

**Set New Activity**

**Weekly Activity Planning Wizard**

**Import to My Phone Calendar**

◀ Home

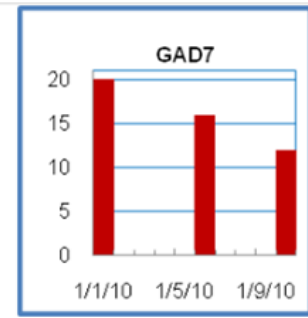
(Build #: 886) © 2011 goACT

## Assess:

- Questionnaires

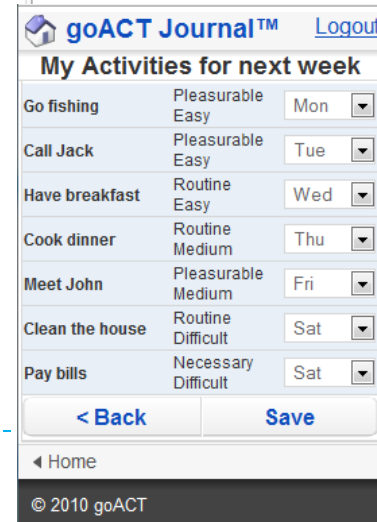


## Assessment Chart



## Intervention:

- Behavioural diary
- Goals & Coaching



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**My Activities for next week**

Go fishing	Pleasurable Easy	Mon
Call Jack	Pleasurable Easy	Tue
Have breakfast	Routine Easy	Wed
Cook dinner	Routine Medium	Thu
Meet John	Pleasurable Medium	Fri
Clean the house	Routine Difficult	Sat
Pay bills	Necessary Difficult	Sat

◀ Home

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# Biomedical Engineer in Health ICT startup

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- 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)?

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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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Antti Sarela

[antti@goact.com.au](mailto:antti@goact.com.au)

+61 41 6359000

goACT Pty Ltd

Suite2, 90 Vulture Street

4101 West End

QLD, Australia

