

Integration of Telecare & Telehealth user requirements & outcome-driven system development

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User/Client requirement

- Support
 - Clinical advice
 - Measurements
 - Education and additional information
- Device
 - Accessible and easy to use for all
 - Unobtrusive
- Feedback
 - Tailored to personal need
- Access determined by patient/client

Commissioner requirement

- Reducing bed numbers
- Concentration of specialised services
- Affordable health services
 - Integrated services
- Stratagem for
 - Care of elderly
 - Increase in long term conditions
 - Expectation and relative reduction of resource

Professional requirement

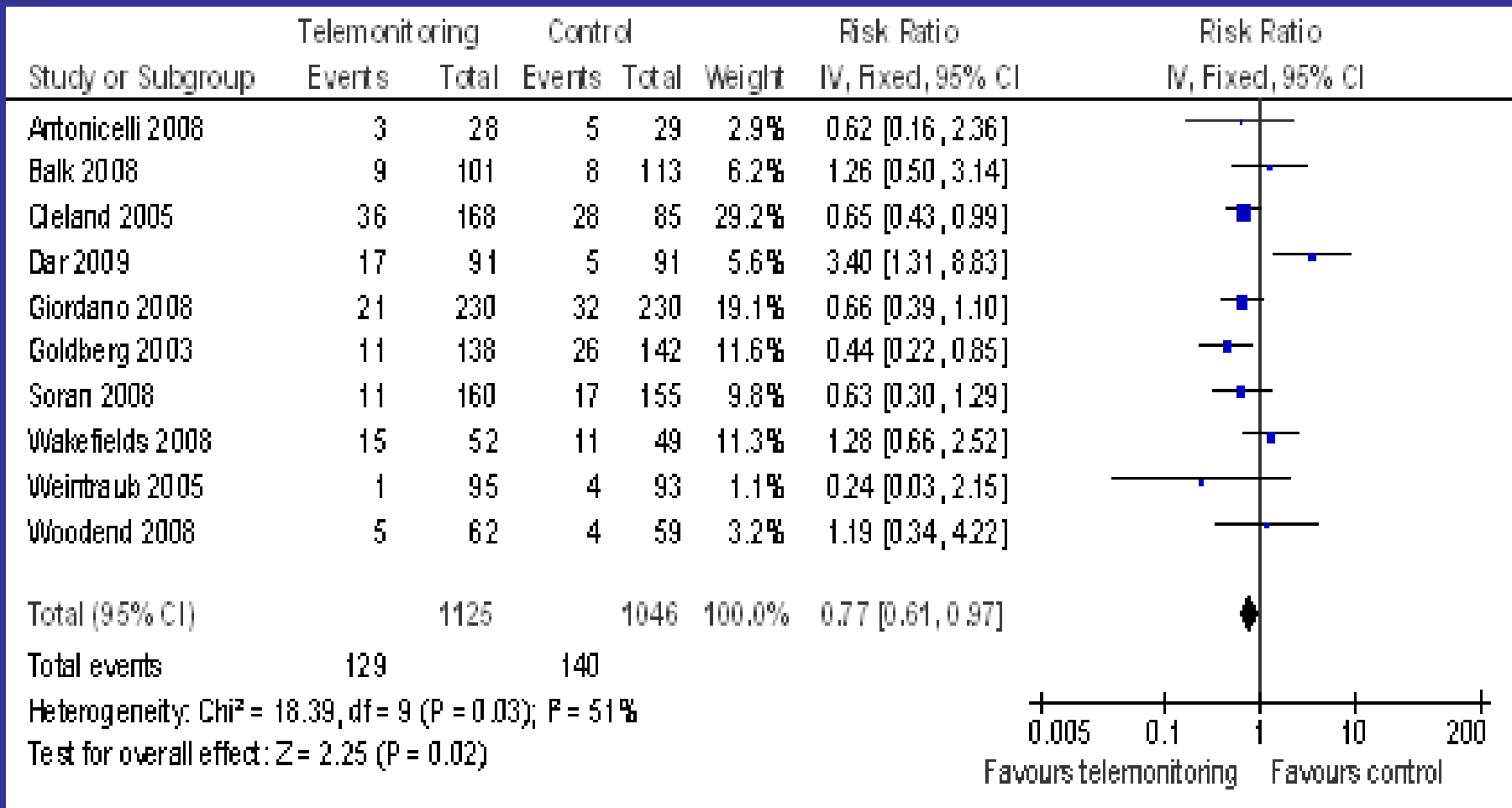
- Clinically valuable
 - Convincing evidence of improved clinical outcomes and improved quality of life for patients/clients
- Cost effective and affordable
- Achievable changes in delivery of care
- New patient/client pathways become the norm

Evidence

- Meta-analysis*
- Systematic search yielded 13 papers reporting RCT of sufficient size to be included
- 3480 patients included in the meta analysis

- Systematic Review of Studies on Telemonitoring of Patients with Congestive Heart Failure: A Meta-Analysis
- Journal of Telemedicine and Telecare Volume 17:1 2011

Data



Outcomes

- Overall reduction in all cause mortality (0.77, 0.61 to 0.98, $P=0.02$).
- Few of the studies reported significant reduction in all cause hospital admission (0.99, 0.88 to 1.11, $P=0.84$)
- Reduction in CHF hospital admission (0.73, 0.62 to 0.87, $P=0.0004$).
- No reduction in all cause emergency admission (1.04, 0.86 to 1.26).
- No observed difference in length of stay in hospital, medication adherence or cost.

Deduced

- Monitoring is a tool and only as good as the service
- Many trials bring service where there was little or no service
- Service development – nurses learn
- Applied to small number of worst case patients
- Current systems expensive, bulky, cumbersome, limited functionality

What can we do/measure?

- Activity
 - Movement monitors
 - Alarms
 - Domestic
 - Video
- Wellness
 - Dietary support
 - Exercise programme
 - Quality of life

Illness

- BP: pulse: weight: T°: glucose: peak flow: pO₂: peak flow/spirometry: ECG
- Compliance
- Post operative care
- Dementia
- Mental illness
- High risk patients

Communication

- Telephone
 - Land line
 - Mobile
- Broad band
- Utility meter

- Standards
 - IEEE & Continua

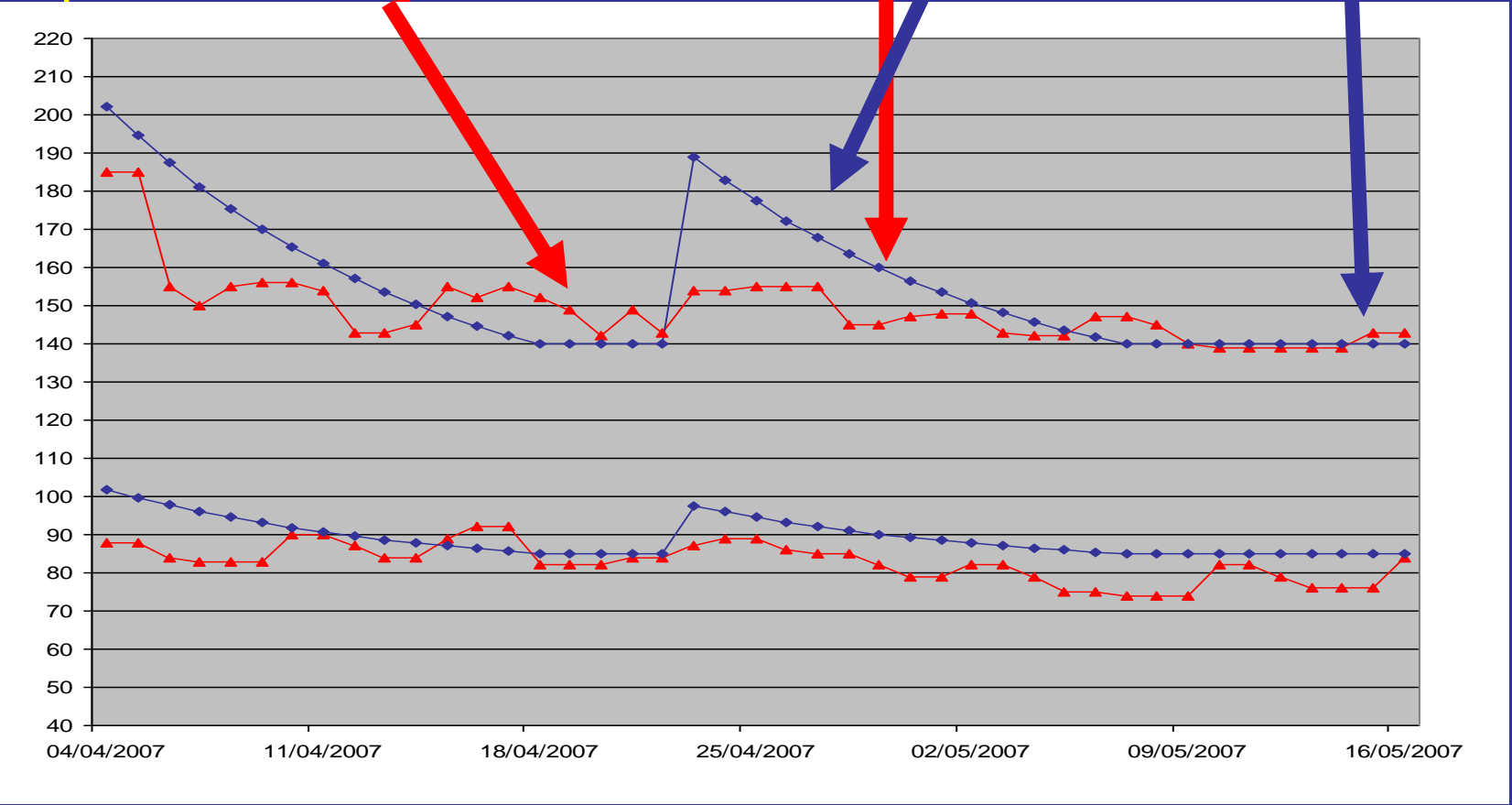
Automated Intervention Protocol

EHTEL – Nov 2011

RPM data and case history

Apply Target filter to patient data
Reviewed and intervention occurs

Target line is BPST
Target 140/85

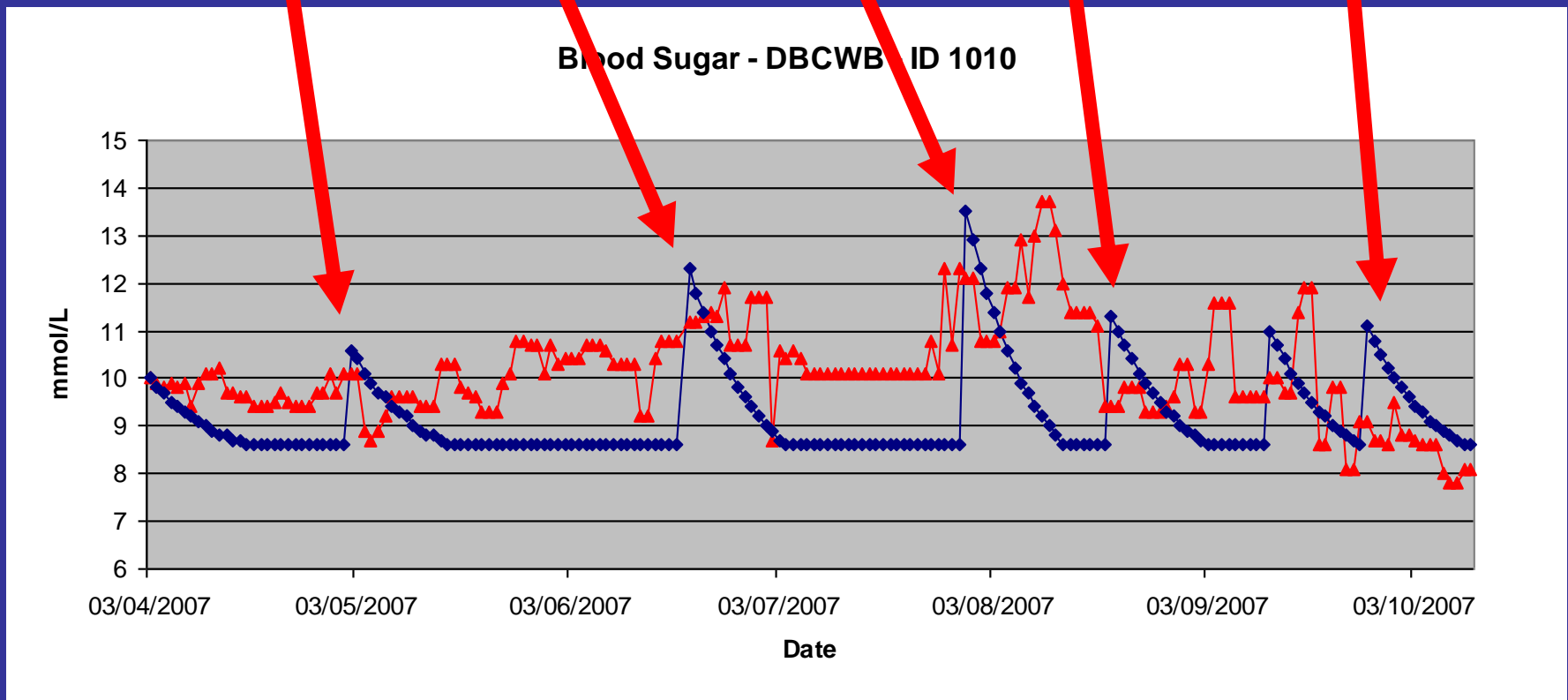


Diabetes & vascular

Poor long term control

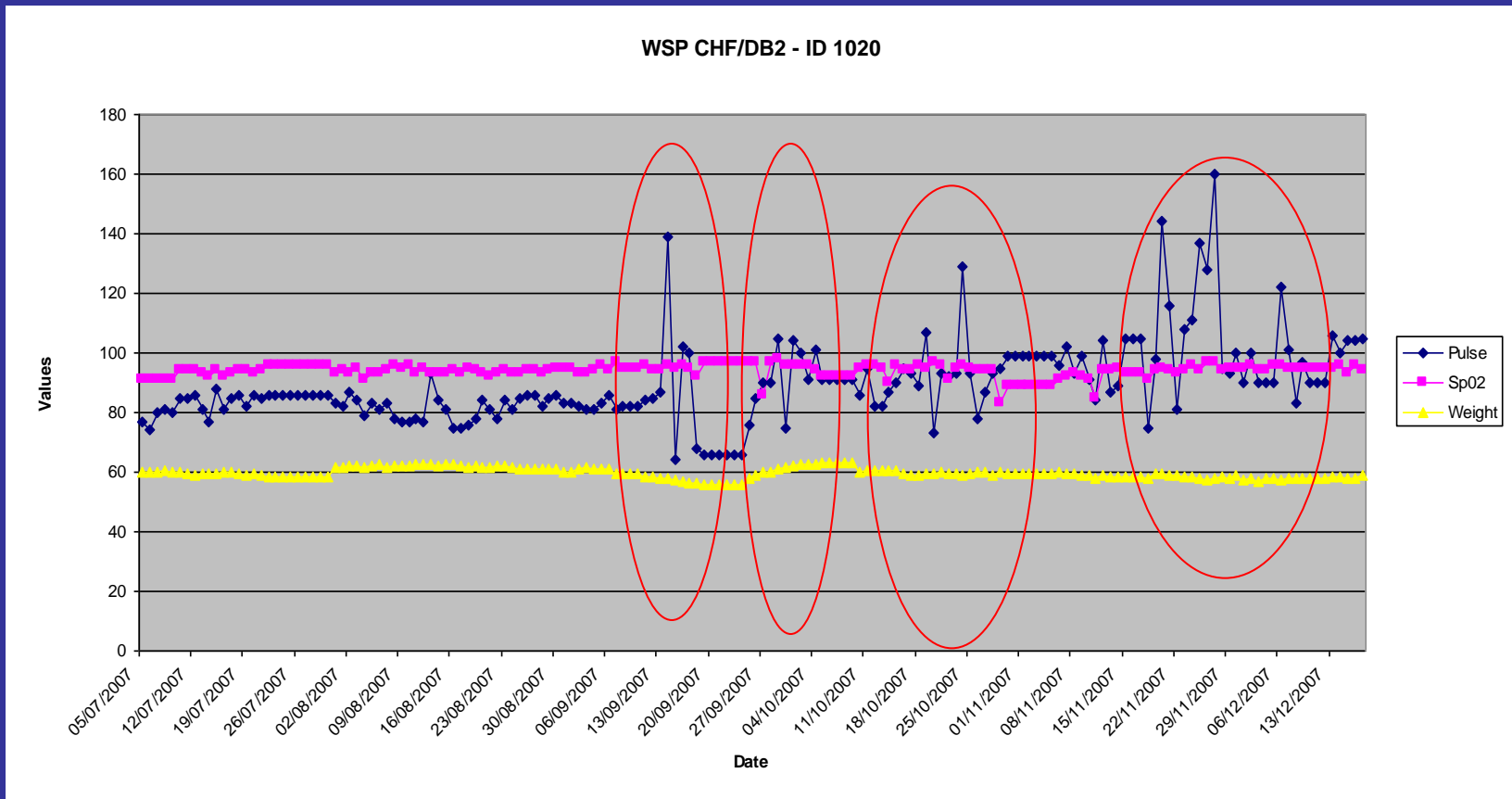
- Confined to wheelchair
- Vascular problems

#1: Faulty Blood Glucose Monitor #2: Increase in #3: Infection #4: Rotator Injuries #5: Poor Diet #6: Metformin



Heart failure

- Acute exacerbations in heart failure



Results

- **37% required intervention**
 - Medication review
 - Health Advice
 - 1 Referral
 - 2 Emergency hospital admissions
- **Blood Pressure**
 - Mean shift reduction >11mm for Systolic & 2mm for Diastolic
 - Systolic↓10mm & Diastolic↓5mm = risk reduction of 40% for stroke and 30% for vascular diseases
- **Diabetes**
 - Mean Shift reduction > 0.4% HbA1c
 - Reduction of 1% HbA1c = 14% risk reduction of all cause morbidity

Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7), Hypertension. 2003;42:1206

Stratton IM, Adler AI, Andrew H, Neil W, Mathews DR, Manley SE, Cull CA, Hadden D, Turner RC, Holman RR. Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study, British Medical Journal 2000; 321: 405-412

If 40% intervention level

- Result

- ↑ 1^o care workload
- ↑ 1^o care referral
- ↑ 1^o care cost

- Response

- Redesign 1^o care and its education
- ↑ use of 1^o care diagnostics
- 2/3^o care supports 1^o care by video consultation
- Thus ↓ the 40% intervention level

- Overall gain: reduced 2/3^o care work load

Reducing the intervention level in the Reaction project

- **ChorleywoodActivityResponseLoop**
 - Monitoring data
 - Electronic Patient Record
 - Questionnaire data – dietary, exercise
 - Advice
 - Patient self care

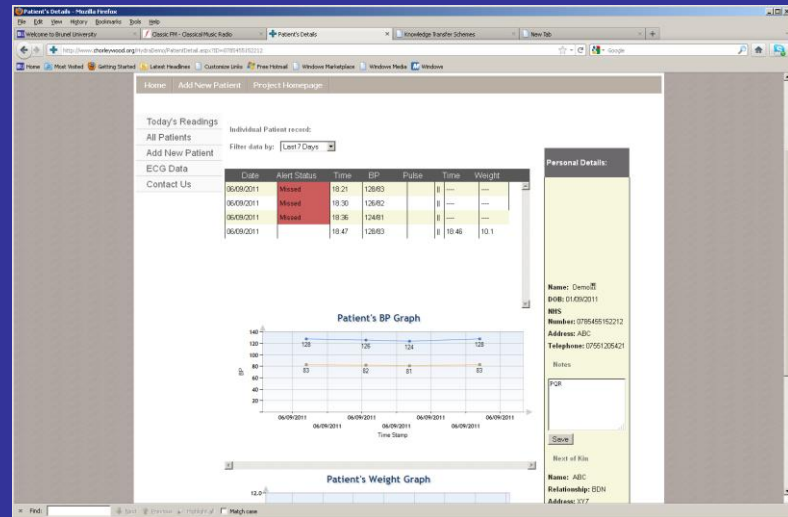
What is needed?

- Increase the range of monitoring devices
 - Physiological, environment, safety
(eg: CHF patients will sleep in a chair)
- Increase confidence to purchase
 - Protect investment
 - Flexible and extensible
- Simple to install and use
 - No house visit
 - Almost no training
 - Pass the Granny test
 - Fits routine
- Cheap

How is it done?

- Use the standards
 - IEEE 11073, IHE, Continua Alliance
- Redesign the concept
 - Consider what the patient wants
 - Get rid of the computer
 - Exploit the changing infrastructure

Completing the loop - CARL



A business case

- Telehealth console
= €1,000
- Installation and training
= €500
- Cost per patient installed
= €1,500
- Plug in gateway
= €100
- Installation and training
= €0
- Re-use factor = 5
- Cost per patient = €20

Gains

- Generic platform
- Adaptable and flexible
- Standards adopted
- Integrated/Shared usage – health and social care
- Cheap
- Unobtrusive
- Appropriate placing of sensors

Clinical challenges

- Service structure
 - New ways of working in community
 - New patient/client pathways
 - New responsibilities
 - Innovative primary care
 - Forging partnership across the care organisations

Goal – is it achieved?

- A seamless and almost invisible system that delivers a varying programme of care throughout a person's life and embraces social and clinical services as well as carers and family.