Teleictus Network and the Programme for Prevention and Care of Chronic Patients (PPACP) in Catalonia.

Joan Escarrabill MD
Evaluation Area CAHIAQ
Master Plan for Respiratory Diseases (PDMAR)
jescarrabill@gencat.cat

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Catalonia

- Area: 32,107 km²
- Population (2011): 7,539,000
- Life expectancy (2011): 80.55 years
- Birth rate (2010): 1.47
- Gross Mortality rate (2010): 7.92
- Infant mortality (2010): 2.63

Health system: Universal coverage financed through taxes

High urban concentration (2009): 232,8 hab/km²

All high-tech centers

65% inhab

279 km

155 km

180 km

217 km

Agència d’Informació, Avaluació i Qualitat en Salut (AIAQS)
“Ciencia y Caridad” Pablo Picasso (1897)
From acute to long-term care

Acute care

Transitional care

Long-term care

Discharge

Hospice

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From acute to long-term care

- Acute care
- Transitional care
- Long-term care

Tele-stroke

Few patients
High tech
High impact

Agència d'Informació, Avaluació i Qualitat en Salut (AIAQS)
TeleStroke Network: Context

Stroke = A rapid loss of brain functions due to disturbance in the blood supply to the brain. It can be ischemic or hemorrhagic.

- **15,070 people** were diagnosed with **Ictus** (7% more than the previous year).
- 1st cause of death in women and 3rd in men
- 1st cause of disability in adults.
- 76% older than 65 years.
Not all the Catalan hospitals have neurology services available 24/7. This centers must send patients to referral hospitals to receive appropriate treatment. Urgent attention of neurologists is needed in the early hours to avoid the side effects of the disease (the maximum time to administer a thrombotic therapy is 3 hours).

The average time required to send and take care of the patient between two hospitals is 1,5 hours.

In many cases the delay is too large to implement an effective treatment for the patient and the consequences are irreversible.
TeleStroke Network

The technical solution is designed and adapted according to the neurologists requirements. It is based on a high-quality videoconferencing system installed in an emergency box of the regional hospital and a remote consultation system of digital images (PACS DICOM) to view the TAC that the patient from the regional hospital.
During 2009, 49 patients were treated through the TeleStroke system (7.7% of patients).

Thanks to the development of the TeleStroke Network, during the last year, 250 patients could benefit from this type of telemedicine.

Nowadays, the 22% of stroke patients in Catalonia may benefit from the TeleStroke Network.

![Evolution of hospitals with TeleStroke in Catalonia](image)
From acute to long-term care

Acute care
Transitional care
Long-term care

Discharge

Telemonitoring
High intensity
A lot of candidates
Impact on resources
Integrated care prevents hospitalisations for exacerbations in COPD patients

A. Casas*, T. Troosters*, J. Garcia-Aymerich*, J. Roca*, C. Hernandez*, A. Alonso*, F. del Pozo*, P. de Toledo*, J.M. Antó†, R. Rodríguez-Roisin*, M. Decramer* and members of the CHRONIC Project

Eur Respir J 2006; 28: 123–130
Adaptation of health services to chronic patients

shared care arrangements across the system
Renewing Health

Innovative telemedicine services using a patient-centred approach

Transitional care
Discharge planning
Reduce readmissions
From acute to long-term care

- **Acute care**
- **Transitional care**
- **Long-term care**

**Telemonitoring**
- High intensity: A lot of candidates. Impact on resources.

Hospice

Agència d’Informació, Avaluació i Qualitat en Salut (AIAQS)
Long-term follow up by specialists in LTOT

Impact of a Hospital-Based Home-Care Program on the Management of COPD Patients Receiving Long-term Oxygen Therapy*

Esa Forcero, MD, Joan Escudero, MD, FCCP; Enric Prats, MD; Marta Nadal, NU; and Frederic Mascren, MD

*Chest 2001; 119:364–369

Changes related to home care

Positive impact of nurse/respiratory therapist + telephone + home visit

Agència d’Informació, Avaluació i Qualitat en Salut (AIAQS)
Evaluation of a telemedicine system for heart failure patients: Feasibility, acceptance rate, satisfaction and changes in patient behavior.
Results from the CARME (CAtalan Remote Management Evaluation) study

Mar Domingo, Josep Lupón, Beatriz González, Eva Crespo, Raúl López, Anna Ramos, Agustín Urrutia, Guillem Pena, José Mª. Verdi, and Antoni Bayes-Genís
Evaluation of a telemedicine system for heart failure patients: Feasibility, acceptance rate, satisfaction and changes in patient behavior. Results from the CARME (CAtalan Remote Management Evaluation) study.

Mar Domingo<sup>a,b,c</sup>, Josep Lupón<sup>a,d</sup>, Beatriz González<sup>a</sup>, Eva Crespo<sup>a</sup>, Raúl López<sup>a</sup>, Anna Ramos<sup>b</sup>, Agustín Urmatia<sup>d</sup>, Guillem Pera<sup>e</sup>, José Mª. Verdi<sup>d</sup>,<sup>e</sup>, and Antoni Bayes-Genis<sup>d</sup>.

Noninvasive Remote Telemonitoring for Ambulatory Patients With Heart Failure: Effect on Number of Hospitalizations, Days in Hospital, and Quality of Life. CARMEN (CATalán Remote Management Evaluation) Study

Mar Domingo, José Lusuardi, Beatriz González, Inma Crespo, Raúl López, Anna Ramos, Agustín Urrutia, Guillem Pera, José M. Verdu, and Antoni Bayés-Genís

Rev Esp Cardiol. 2011;64:277-85
Results


Patients screened
N = 211

Patients randomized
N = 105

Patients included
N = 97

Group A
N = 51
Group B
N = 46

44 patients met exclusion criteria
62 patients didn’t consent to participate

8 patients withdrew consent prior to installation

5 patients voluntarily discontinued before completing 2 m of monitoring

92 patients
Analysis of hospitalizations and days admitted*

17 patients voluntarily discontinued during follow-up (3 subsequently died)
5 did not attend the final visit
2 died during follow-up

68 patients
Evaluation of changes in attitudes and satisfaction with the system
Evaluation of the questionnaires on quality of life*

65%
Telemonitoring: Lights and shadows

**Benefits**
- Serve more patients
- Save time
- Contacts increases

**Limitations**
- Not for all patients
- Not in all circumstances
Evaluation

The Outcome Measures Hierarchy

Porter EM. NEJM 2010;363:2477-81
Imagine that the exemple is COPD

The Outcome Measures Hierarchy

Dimensions

Survival

Degree of health or recovery

Primary Acute Knee Osteoarthritis Requiring Replacement

Mortality rate (inpatient)

Functional level achieved
Pain level achieved
Extent of return to physical activities
Ability to return to work

Porter EM. NEJM 2010;363:2477-81
The Outcome Measures Hierarchy

Porter EM. NEJM 2010;363:2477-81
### The Outcome Measures Hierarchy

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
</tr>
</thead>
</table>
| **Sustainability of health or recovery and nature of recurrences** | **Maintained functional level**  
| | **Ability to live independently**  
| | **Need for revision or reoperation**  
| **Long-term consequences of therapy** (e.g., care-induced illnesses) | **Loss of mobility due to inadequate rehabilitation**  
| | **Risk of complex fracture**  
| | **Susceptibility to infection**  
| | **Stiff knee due to unrecognized complication**  
| | **Regional pain syndrome**  

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Porter EM. NEJM 2010;363:2477-81
Measurements, Detection, Prediction

Important Decision Point!

"At home" / Patient Platform (e.g. MyHeart)

Telemedicine Platform (e.g. MOTIVA)

Value is created by closing the loop!

"At home" healthcare

Medical professionals

Analysis, Decisions

Therapy, Feedback

www.heartcycle.org
# Table 1. Services related to telemonitoring

<table>
<thead>
<tr>
<th>Service Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to share health data between professionals</td>
</tr>
<tr>
<td>Call centre that coordinates the connection between the patient and different health professionals</td>
</tr>
<tr>
<td>Direct patient access to health professionals (according a specific protocol)</td>
</tr>
<tr>
<td>E-mail</td>
</tr>
<tr>
<td>Telephone access</td>
</tr>
<tr>
<td>Ability to telemonitor vital signs (lung function, pulse oximetry, blood pressure or blood glucose, etc.)</td>
</tr>
<tr>
<td>Possibility of virtual teleconsultation</td>
</tr>
<tr>
<td>Access to educational tools for the patient</td>
</tr>
<tr>
<td>Facility for the patient to have the ability to access to their care plan (medication, settings of the medical devices available at home, etc.)</td>
</tr>
<tr>
<td>Mechanisms to generate alerts or reminders</td>
</tr>
</tbody>
</table>
Twenty years of telemedicine in chronic disease management – an evidence synthesis

Richard Wootton
Norwegian Centre for Integrated Care and Telemedicine, Tromsø, Norway

Journal of Telemedicine and Telecare 2012; 18: 211–220

Conclusion
The evidence base for the value of telemedicine in managing chronic diseases is on the whole weak and contradictory.
Appropriate package of care for individual patients at a local level
Thank you very much for your attention!!!

Casa Batlló. (Antoni Gaudí, 1906)