



Project  
**INTEGRATE**

# Integrated Care for people with COPD in Barcelona

**A. Alonso**  
**Hospital Clínic**



# Moving towards Integrate Care

## Reasons / influences behind the choice

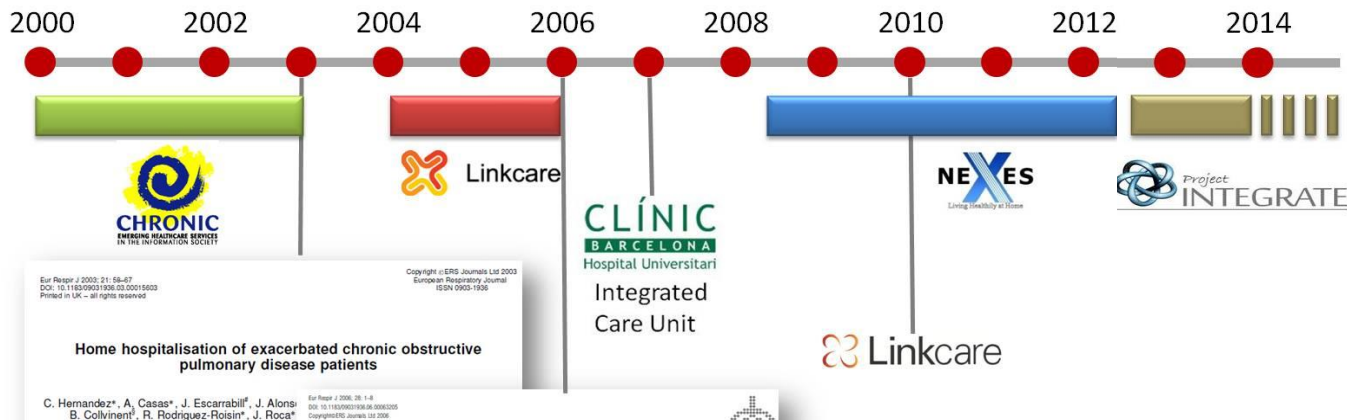
- A problem in allocation of resources: Seasonal exacerbations of COPD patients altering the surgical procedures planning in a tertiary university hospital.
- Poor management of exacerbated COPD patients: Up to 30% of patients discharged were readmitted in the following 8 weeks.

## Why and how this approach was adopted

- To reduce number of readmissions / need for emergency room care (decrease in direct costs)
- Diffusion of the work of Wagner and colleagues.
- Better management of COPD patients, holistic approach (co-morbidities, social issues, other...)

# Implementation overview

## Aspects of redesign and implementation



Eur Respir J 2003; 21: 58-67  
DOI: 10.1183/09031536.03.00215603  
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### Home hospitalisation of exacerbated chronic obstructive pulmonary disease patients

C. Hernandez\*, A. Casas\*, J. Escarabill\*, J. Alonso\*, B. Colvinent\*, R. Rodriguez-Roisin\*, J. Roca\*

*Home hospitalisation of exacerbated chronic obstructive pulmonary disease (COPD) exacerbations admitted at the Emergency Department (ER) could facilitate a better outcome than conventional hospitalisation.*

**ABSTRACT:** It was postulated that home hospitalisation (HH) of obstructive pulmonary disease (COPD) exacerbations admitted at the ER could facilitate a better outcome than conventional hospitalisation. To this end, 222 COPD patients (32% female; 71±10 yrs) randomly assigned to HH or conventional care (n=111). Data care was delivered by a specialised nurse with the patient's free-phone number for an 8-week follow-up period.

Mortality (HH: 4.1%; controls: 6.9%) and hospital readmissions (controls: 8.36 vs 9.79) were similar in both groups. However, at the end period, HH patients showed: 1) a lower rate of ER visits (0.15 vs 0.41).

### Integrated care prevents hospitalisations for exacerbations in COPD patients

A. Casas\*, T. Troosters\*, J. Garcia-Aymerich\*, J. Roca\*, C. Hernández\*, A. Alonso\*, F. del Pozo\*, P. de Toledo\*, J.M. Anta\*, R. Rodriguez-Roisin\*, M. Decramer\* and members of the CHRONIC Project

**ABSTRACT:** Hospital admissions due to chronic obstructive pulmonary disease (COPD) exacerbations have a major impact on the disease evolution and costs. The current authors postulated that a simple and well-standardised, low-intensity integrated care intervention can be effective to prevent such hospitalisations.

Therefore, 155 exacerbated COPD patients (17% females) were recruited after hospital discharge from centres in Barcelona (Spain) and Leuven (Belgium). They were randomly assigned to either integrated care (IC; n=65; age mean ± SD 70 ± 9 yrs; forced expiratory volume in one second (FEV1) 1.1 ± 0.5 L, 43% predicted) or usual care (UC; n=90; age 72 ± 9 yrs; FEV1 1.1 ± 0.05 L, 41% pred). The IC intervention consisted of an individually tailored care plan upon discharge shared with the primary care team, as well as accessibility to a specialised nurse case manager through a web-based call centre.

After 12 months' follow-up, IC showed a lower hospitalisation rate (1.5 ± 2.6 versus 2.1 ± 3.1) and a higher percentage of patients without re-admissions (49 versus 31%) than UC without differences in mortality (19 versus 16%, respectively).



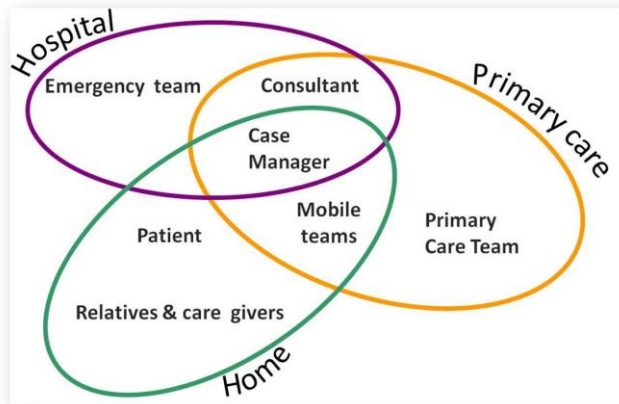
Linkcare

- ### Milestones
- 2003 – Clinical pilot Home Hospitalisation in COPD patients
  - 2006 – Clinical pilot prevention of exacerbations in COPD
  - 2007 – Creation of the integrated care unit
  - 2010 – Creation of a spin-off Linkcare for the ICT solution
  - 2013 – Comprehensive ICS (extended conditions), Introduction of rehabilitation

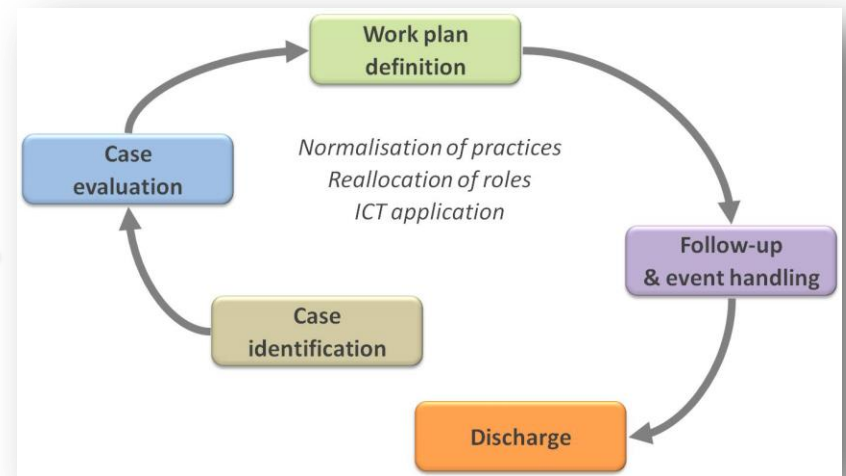
# Implementation overview

## Aspects of redesign and implementation

### Creation of case managers (2000)



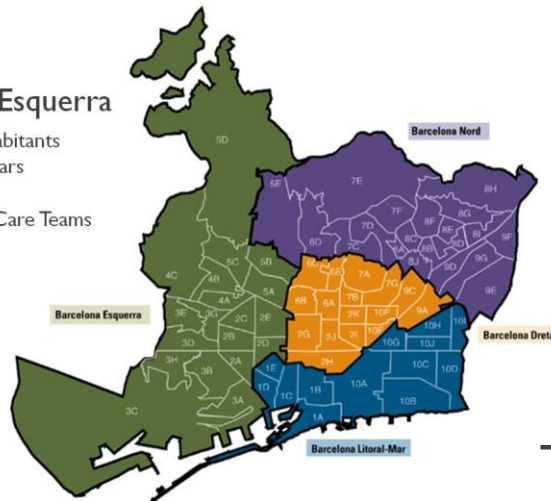
### Concept of programmes / ICS (2007)



### Barcelona Esquerra

534.955 inhabitants  
21% > 65 years

19 Primary Care Teams  
4 Hospitals



### Territorial (2013)

# Integrated Care for COPD at present

- The term most often used is Integrated Care Service (ICS).
- It is defined as a set of well standardised patient-centered actions to be applied to each patient on the basis of his/her predefined health condition and social circumstances, referred as inclusion and exclusion criteria.
- Each ICS targets specific service objectives; and any given patient can be associated to one or more integrated care service.
- Target group: COPD
  - Home Hospitalisation / Early discharge
  - Prevention of exacerbations (aka frail patients' programme)
  - Wellness-Rehab (pilot experience)

# Home hospitalisation /Early discharged

## Goal:

- Provide acute, home-based, short-term intervention aiming at fully (hospital avoidance) or partially (early discharge) substituting conventional hospitalisation.

## Aims at:

- Reduced number of readmissions / need for emergency room care
- Shorter length of overall stay (hospital stay + home-based stay)

## Includes:

- Comprehensive assessment of patient at ER/discharge (Severity, comorbid conditions, social support) translated into an individually tailored care plan.
- Educational programme on self-management
- Home visits by hospital nurses/specialist.
- Accessibility to the control centre (case manager nurse) by phone / ICT equipment –monitoring vital signs-.

Coordination with Primary Care at discharge of the programme

Reimbursement as flat rate (aprox 1/3 of in-hospital admission)

# Prevention of frail patients

## Goal

- Low intensity programme aiming at reducing number of exacerbations and decrease the use of health care resources (Admissions, Emergency room, outpatient clinics, primary care)

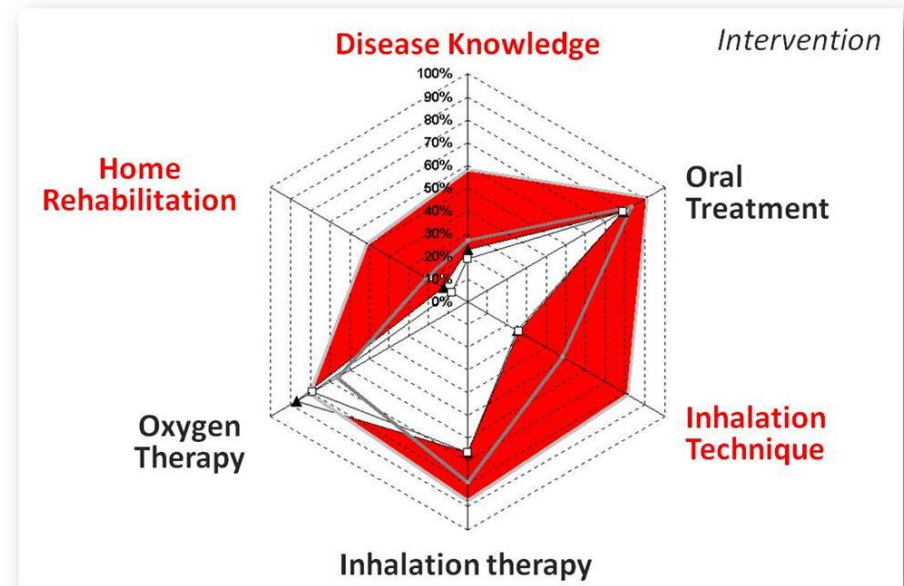
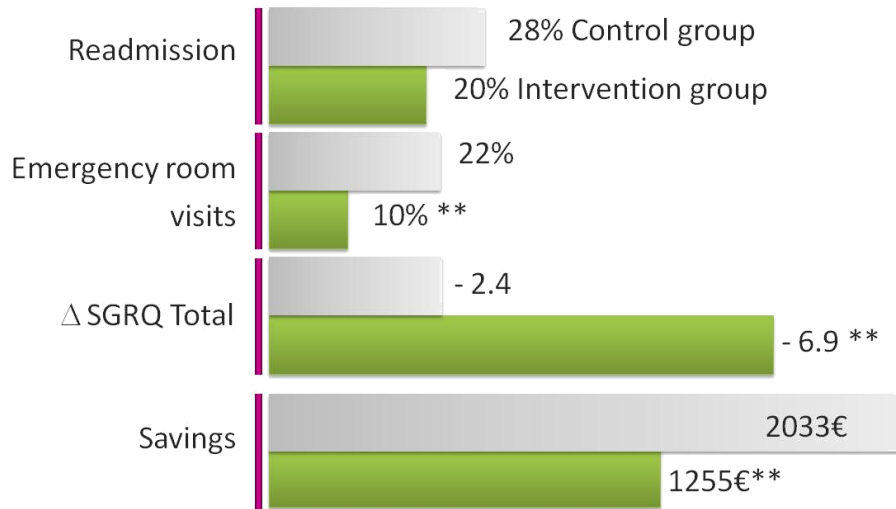
## Includes:

- Comprehensive assessment of patient at discharge (Severity, comorbid conditions, social support)
- Educational programme on self-management
- Agreement on individually tailored care plan, shared across the system via interaction between the specialised nurse case manager and the primary care team
- Accessibility of the specialised nurse to patients/carers and primary care professionals during follow up period (Facilitated through ICT platform)
- Accessibility to the control centre (case manager nurse) by phone / ICT equipment –monitoring vital signs-

Payment: Patient – provider encounters

# Impact

## Home hospitalisation COPD (2003)

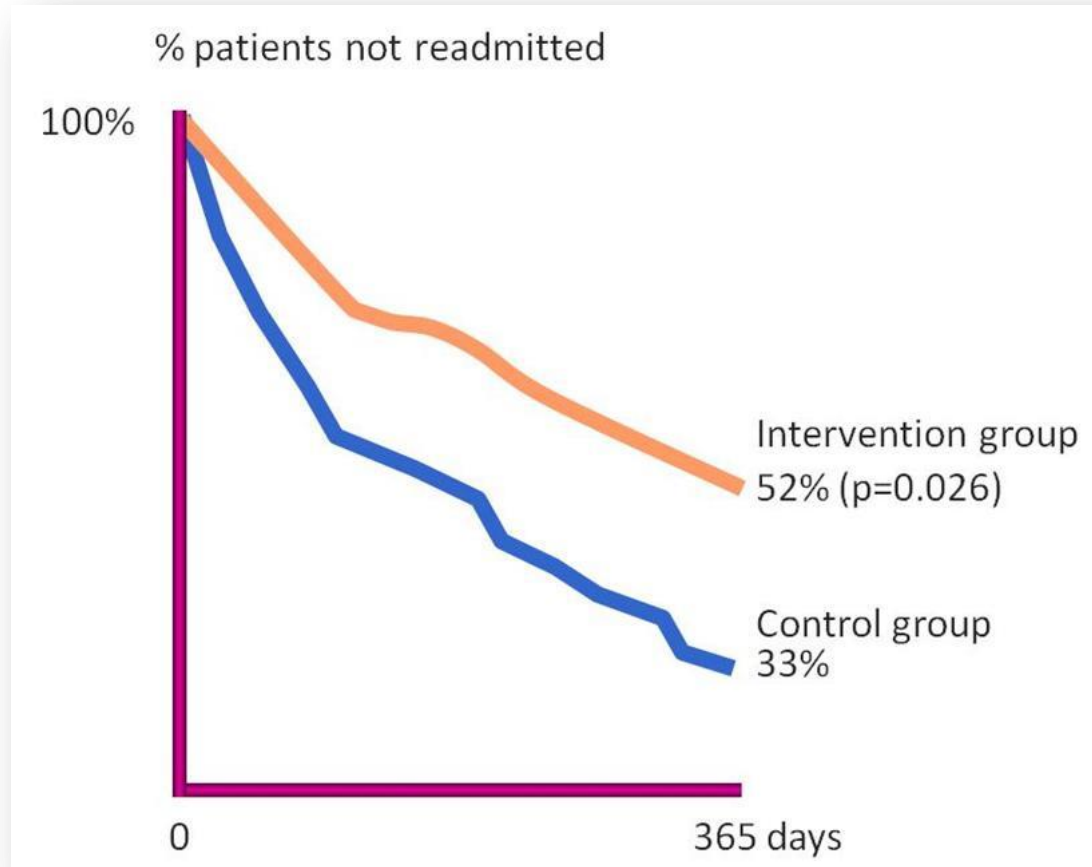


Hernandez C, Casas A, Escarrabill J, Alonso J, Puig-Junoy J, Farrero E, et al. Home hospitalisation of exacerbated chronic obstructive pulmonary disease patients. *Eur Respir J* 2003 Jan;21(1):58-67.



# Impact

## Prevention of exacerbations COPD (2006)



Casas A, Troosters T, Garcia-Aymerich J, Roca J, Hernandez C, Alonso A, et al. Integrated care prevents hospitalisations for exacerbations in COPD patients. *Eur Respir J* 2006 Jul;28(1):123-30.

# Impact

## Cost study COPD (2007)

**Table 4** Expected cost per patient for different levels of disease

Patient type	Variables values according to severity levels			Predicted cost by intervention group		Savings <sup>a</sup>
	FEV <sub>1</sub>	Total SGRQ score	Admissions previous year (number)	HH	CH	
Slight	70	35	1	842.4	1,300.3	457.8 (143.6–685.7)
Moderate	50	55	2	1,364.7	2,139.3	774.5 (265.7–1,143.6)
Severe	30	85	3	2,348.3	3,767.4	1,419.1 (543.5–2,054.2)
Average	41.40	49.5	0.71	1,153.7	1,800.9	647.1 (216.9–959.1)

Costs are expressed in euros at year 2000 prices. The smearing estimator has been applied

*FEV1* forced expiratory volume during the first second at 8 weeks of follow-up, *Total SGRQ score* total Saint George Respiratory Questionnaire score, *HH* home hospitalization, *CH* conventional hospitalization

<sup>a</sup> 95% confidence interval

Puig-Junoy J, Casas A, Font-Planells J, Escarrabill J, Hernandez C, Alonso J, et al. The impact of home hospitalization on healthcare costs of exacerbations in COPD patients. *Eur J Health Econ* 2007 Dec;8(4):325-32.

# Impact

## Patient / Carers

- Since first pilot experiences, patients' and carers' satisfaction has always been very high:
  - 99 % of the subjects treated in the HH/ED programme reported that the treatment received was very good;
  - 90% of patients and 94% of carers stated that they would repeat the experience if needed.

## Professionals

- Initial resistances to implementation from both Hospital and Primary Care staff markedly decreased over time.
- Professionals of the Integrated Care Unit showed high degree of satisfaction throughout the deployment period.

## Management

- Dedicated hospital resource created in (end of) 2006 (staff: Case manager, 4 nurses, 1 internist, 1 admin)
- Director of Chronic Care since 2013 (link Hospital – Primary care)

# Use of ICT

The screenshot displays the Linkcare web application interface. At the top, there is a navigation menu with links for Home, About Us, Research, Products, Linkcare Patient, Linkcare Professionals, Linkcare Corp, Education Online, News, and Contact. Below the menu, there is a section for 'Access Linkcare' with a login field and a 'Log in' button. The main content area is titled 'Linkcare' and includes a 'Linkcare Schedule' table. The table lists various medical activities with columns for 'Fecha/Hora inicio', 'Prestación', and 'Estado'. A legend indicates that green rows represent 'Area no realizada' and red rows represent 'Area no realizada'. The table also includes a 'Products for patients' section with links to 'Linkcare Alliance' and 'Useful Links'.

Fecha/Hora inicio	Prestación	Estado
29/06/2010 10:31:00	RECUERDAI	Enviada
28/06/2010 17:21:00	RECUERDAI	Realizada
25/06/2010 17:31:00	Pulsoxiometria Cont. (Sat)	Agnado/no realizado
01/07/2010 12:36:00	RECUERDAI	Enviada
02/06/2010 19:30:00	Pulsoxiometria Cont. (Sat)	Realizada
01/07/2010 16:34:00	RECUERDAI	Realizada
25/06/2010 17:35:00	RECUERDAI	Realizada
01/07/2010 10:02:00	RECUERDAI	Enviada
01/07/2010 12:01:00	Pulsoxiometria Cont. (Sat)	Enviada
02/07/2010 00:00:00	Pulsoxiometria (Sat)	Sin asignar
01/07/2010 00:00:00	RECUERDAI	Realizada
01/07/2010 00:00:00	RECUERDAI	Realizada
02/07/2010 17:47:00	Pulsoxiometria Cont. (Sat)	Realizada
02/07/2010 11:02:00	Pulsoxiometria Cont. (Sat)	Enviada
01/07/2010 17:03:00	EuroQoL	Realizada
18/06/2010 11:00:00	Pulsoxiometria Cont. (Sat)	Enviada
28/06/2010 17:02:00	General	Realizada
01/07/2010 10:04:00	General	Enviada
02/07/2010 11:01:00	EuroQoL	Realizada
02/07/2010 11:04:00	RECUERDAI	Realizada
01/07/2010 18:39:01	RECUERDAI	Realizada
28/06/2010 17:15:00	Pulsoxiometria Cont. (Sat)	Agnado/no realizado
02/07/2010 17:46:00	EuroQoL	Realizada

The screenshot shows a Nokia XpressMedia XX smartphone displaying a mobile application interface. The screen is titled 'Acciones Opcionales' and features a list of medical actions with corresponding icons: 'Cuestionario 1', 'Espirometría', 'Glucosa', 'Peso corporal', 'Presión sanguínea', 'Pulsioximetría', and 'Pulsioximetría'. At the bottom, there are buttons for 'Volver' and 'Siguiente'.

# Conclusions

- ICS are a safe option to be considered for COPD patients admitted in a hospital.
- Both efficacy and cost-containment have been demonstrated.
- Organisational changes aiming at implementing territorial care, as a model of interactions between hospital and community, are needed.
- Health professionals with adequate skills to support the program are needed.
- Specific logistics to support the tasks involved in the program must be in place.
- An open ICT platform supporting organizational interoperability and collaborative tools across healthcare tiers is needed as a key enabler of the program implementation.
- Sustainability is linked to the formulation of a business case including novel reimbursement policies



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