

# Quoi de neuf en 2015 ?

## Actualités en réhabilitation respiratoire adulte

**11<sup>ème</sup> Congrès Alvéole, Lyon, 11-03-2016**



**Pr. Christophe Pison**

*Clinique Universitaire de Pneumologie  
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# Centre Henri Bazire

➔ DÉCOUVRIR LE CENTRE



# Relations d'intérêts

- **Aides et Objets**
  - Travels, Meeting, Speakers fees to Pr. Ch. Pison
  - Clinical Research to my Hospital
  - COPD-Nutrition, Asthma, Pulmonary Hypertension, Lung Transplantation
  
- **Pharmas et contrat avec CHU des Alpes**
  - Actélion
  - Astra Zeneca
  - Bayer
  - Boehringer Ingelheim
  - Gilead
  - GlaxoSmithKline
  - Lilly
  - Novartis
  - Nutricia-Danone
  - Seb
  - Pfizer
  - Stallergenes
  
- **Dispositifs & Soins à domicile**
  - Therakos, PneumRx, Medwin, PumonX, Holaira AGIR@dom, Vitlalaire, Orkyn, Vitalaire, SOS Oxygène

# Sommaire

- Niveaux de preuve, Recommandations & Pratiques
- Outils & Concepts
- BPCO et autres maladies respiratoires chroniques

*PubMed 2014-2016, pulmonary rehabilitation : 2237 articles*



# La Cochrane Library ferme !



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On the other hand, the findings of subgroup analyses undertaken as part of this update do stimulate new and exciting questions and research opportunities in relation to pulmonary rehabilitation. Further factors that remain uncertain include the degree of supervision, the intensity of the training, and how long the treatment effect persists. These specific issues require further elucidation through randomised controlled trials and further meta-analysis.

# Audit Canada

## Pulmonary rehabilitation in Canada: A report from the Canadian Thoracic Society COPD Clinical Assembly

Pat G Camp PT PhD<sup>1,2,3</sup>, Paul Hernandez MDCM FRCPC<sup>4</sup>, Jean Bourbeau MD FRCPC<sup>5</sup>, Ashley Kirkham BSc<sup>1</sup>, Richard Debigare PT PhD<sup>6,7</sup>, Michael K Stickland PhD<sup>8,9</sup>, Donna Goodridge RN PhD<sup>10</sup>, Darcy D Marciniuk MD<sup>10</sup>, Jeremy D Road BSc MD<sup>11</sup>, Mohit Bhutani MD<sup>8</sup>, Gail Dechman PT PhD<sup>12</sup>

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PG Camp, P Hernandez, J Bourbeau, et al. Pulmonary rehabilitation in Canada: A report from the Canadian Thoracic Society COPD Clinical Assembly. Can Respir J 2015;22(3):147-152.

La réadaptation pulmonaire au Canada : un rapport de l'assemblée clinique sur la MPOC de la Société canadienne de thoracologie

**CONCLUSION :** Le présent sondage détaillé sur la RP au Canada fait état d'une augmentation du nombre de programmes et du total de patients inscrits par rapport au sondage précédent réalisé en 2005. Cependant, la capacité de RP ne répond pas à la demande, car seulement 0,4 % des Canadiens atteints d'une MPOC y ont accès.

- 63 improved after pulmonary rehabilitation by more than the MCID\*
- 20 improved after pulmonary rehabilitation but by less than the MCID
- 17 had no change or a reduction



- 61 improved after pulmonary rehabilitation by more than the MCID†
- 13 improved after pulmonary rehabilitation but by less than the MCID
- 26 had no change or a worse score



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respiratory Vol 4 March 2016***

- Audit 2015, 3 mois, 210 centres, 7000 patients
- 31% ne se présentent pas à l'évaluation initiale
- 40% quittent le programme
- Sous adressage massif
- Faillite du système de Santé !

# ATS ERS statements

*Am J Respir Crit Care Med Vol 192. Iss 11. pp 1373–1386. Dec 1. 2015*

## **An Official American Thoracic Society/European Respiratory Society Policy Statement: Enhancing Implementation, Use, and Delivery of Pulmonary Rehabilitation**

Carolyn L. Rochester, Ioannis Vogiatzis, Anne E. Holland, Suzanne C. Lareau, Darcy D. Marciniuk, Milo A. Puhon, Martijn A. Spruit, Sarah Masefield, Richard Casaburi, Enrico M. Clini, Rebecca Crouch, Judith Garcia-Aymerich, Chris Garvey, Roger S. Goldstein, Kylie Hill, Michael Morgan, Linda Nici, Fabio Pitta, Andrew L. Ries, Sally J. Singh, Thierry Troosters, Peter J. Wijkstra, Barbara P. Yawn, and Richard L. ZuWallack; on behalf of the ATS/ERS Task Force on Policy in Pulmonary Rehabilitation

- Reduced hospitalization
- Reduced unscheduled healthcare visits
- Improved exercise capacity
- Reduced symptoms of dyspnea and leg discomfort
- Improved limb muscle strength and endurance
- Improved health-related quality of life
- Improved functional capacity (e.g., activities of daily living)
- Improved emotional function
- Enhanced self-efficacy and knowledge
- Enhanced collaborative self-management
- Potential for increased daily physical activity levels

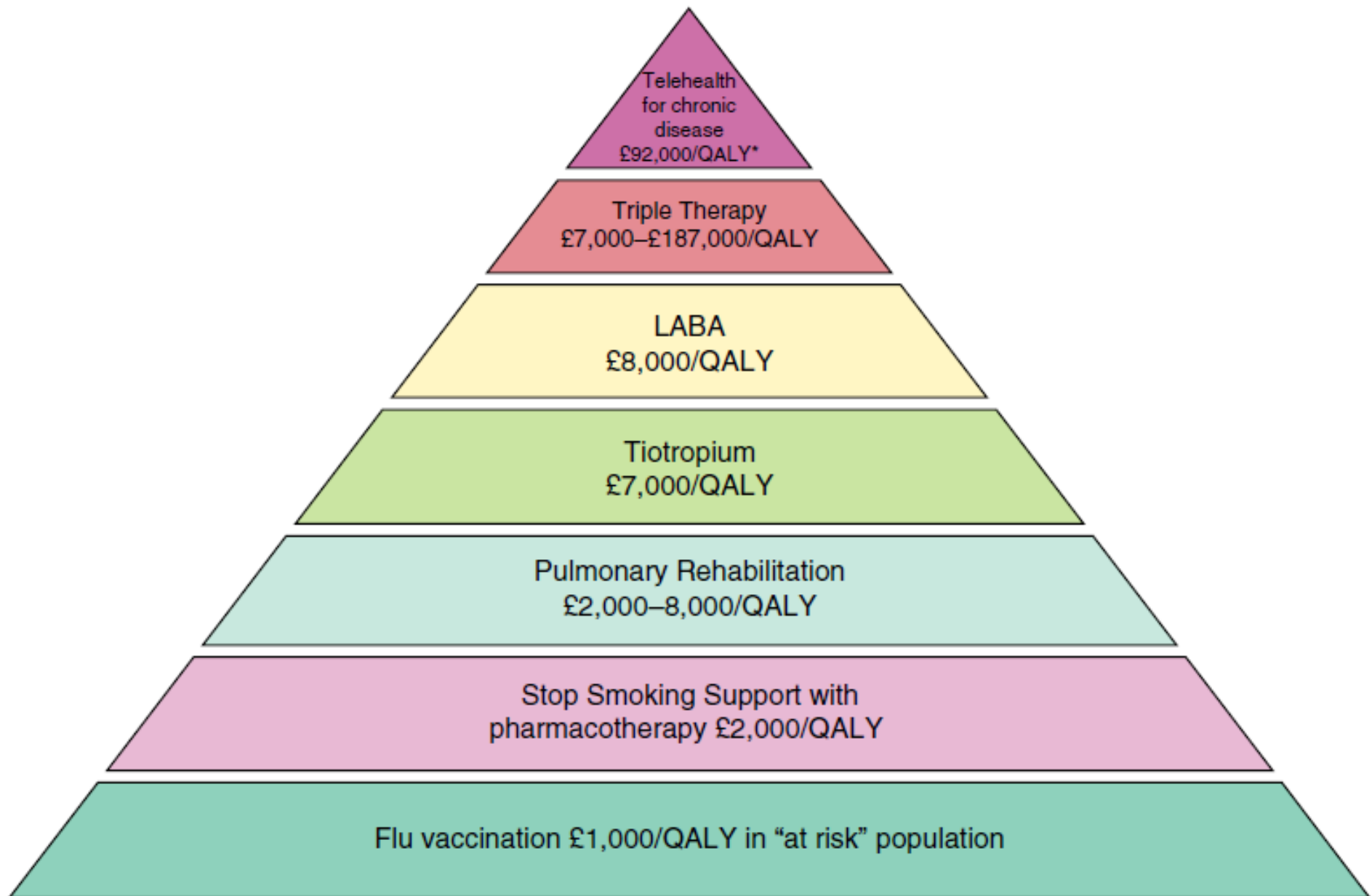
# ATS - ERS statements

*Am J Respir Crit Care Med Vol 192, Iss 11, pp 1373–1386, Dec 1, 2015*

1. Augmenter conscience et connaissance sur la réhabilitation pulmonaire lors de la formation initiale des professionnels de santé
2. Augmenter conscience et connaissance sur la réhabilitation pulmonaire des professionnels de santé dans la pratique clinique
3. Augmenter conscience et connaissance sur la réhabilitation pulmonaire des organismes payeurs
4. Augmenter conscience et connaissance sur la réhabilitation pulmonaire des patients
5. Augmenter l'accessibilité des patients à la réhabilitation pulmonaire
6. S'assurer de la qualité des programmes de réhabilitation pulmonaire
7. Future recherche sur la politique de la réhabilitation pulmonaire:  
*coût efficacité, accès, programme en cas de comorbidités multiples et lourds pbs psy, barrières / facilitation à l'accès, adhésion, impact des modes de financements.*

# ATS ERS statements

*Am J Respir Crit Care Med Vol 192, Iss 11, pp 1373–1386, Dec 1, 2015*



# **Preoperative inspiratory muscle training for postoperative pulmonary complications in adults undergoing cardiac and major abdominal surgery (Review)**

Katsura M, Kuriyama A, Takeshima T, Fukuhara S, Furukawa TA



We included 12 trials with 695 participants; five trials included participants awaiting elective cardiac surgery and seven trials included participants awaiting elective major abdominal surgery. All trials contained at least one domain judged to be at high or unclear risk of bias. Of greatest concern was the risk of bias associated with inadequate blinding, as it was impossible to blind participants due to the nature of the study designs. We could pool postoperative atelectasis in seven trials (443 participants) and postoperative pneumonia

We found evidence that preoperative IMT was associated with a reduction of postoperative atelectasis, pneumonia, and duration of hospital stay in adults undergoing cardiac and major abdominal surgery. The potential for overestimation of treatment effect due to lack of adequate blinding, small-study effects, and publication bias needs to be considered when interpreting the present findings.

# Neuromuscular electrical stimulation to improve exercise capacity in patients with severe COPD: a randomised double-blind, placebo-controlled trial

*Matthew Maddocks, Claire M Nolan, William D-C Man, Michael I Polkey, Nicholas Hart, Wei Gao, Gerrard F Rafferty, John Moxham, Irene J Higginson*



## Summary

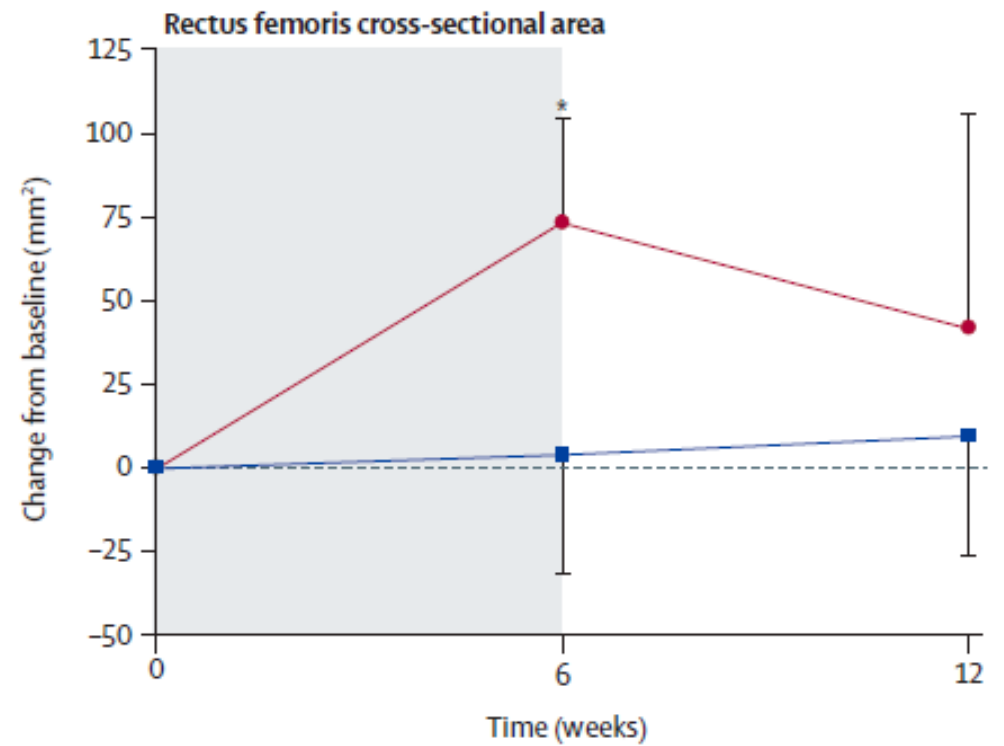
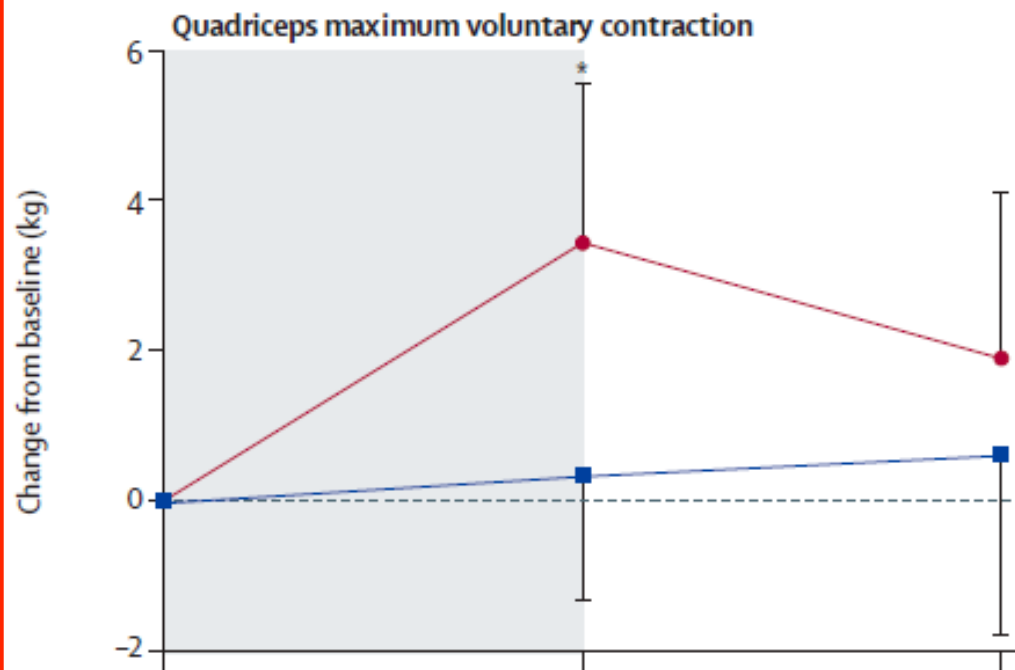
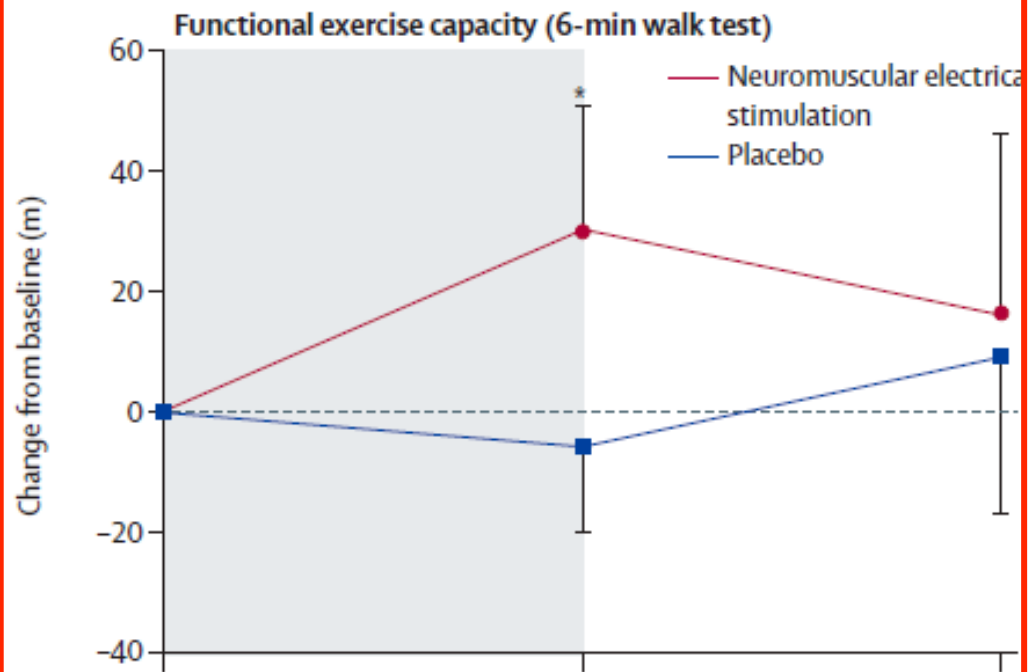
**Background** Skeletal muscle dysfunction and exercise intolerance are common in severe chronic obstructive pulmonary disease (COPD). We assessed the effectiveness of neuromuscular electrical stimulation (NMES) as a

*Lancet Respir Med 2016; 4: 27-36*

	Neuromuscular electrical stimulation (n=25)	Placebo (n=27)
Sex		
Men	11 (44%)	10 (37%)
Women	14 (56%)	17 (63%)
Age (years)	70 (11)	69 (9)
Weight (kg)	74.1 (20.1)	75.7 (20.1)
BMI (kg/m <sup>2</sup> )	25.7 (5.9)	27.8 (8.2)
Smoking status		
Current	5 (20%)	3 (11%)
Previous	19 (76%)	23 (85%)
Never	1 (4%)	1 (4%)
Pack-year history	49 (18)	49 (20)
Spirometry		
FEV <sub>1</sub> (L)	0.82 (0.29)	0.80 (0.49)
FEV <sub>1</sub> % predicted	30.8 (11.1)	30.7 (12.7)
FVC (L)	2.31 (0.79)	2.02 (0.90)
FVC % predicted	70.0 (19.0)	58.3 (21.0)
GOLD stage		
III	12 (48%)	11 (41%)
IV	13 (52%)	16 (59%)
SpO <sub>2</sub> on air	93 (3)	92 (8)
MRC score		
4	18 (72%)	16 (59%)
5	7 (28%)	11 (41%)

Charlson comorbidity index	1 (1-3)	1 (1-2)
Current medication		
Longacting bronchodilators	25 (100%)	27 (100%)
Shortacting bronchodilators	20 (80%)	25 (93%)
Inhaled corticosteroids	21 (84%)	22 (83%)
Oral steroids (maintenance)	7 (28%)	1 (4%)
Oxygen	8 (32%)	6 (22%)
Non-invasive ventilation	0	1 (4%)
Exacerbations previous year	4 (3-8)	3 (2-5)
Time since last exacerbation (weeks)	10 (4-21)	12 (10-32)
Total informal care (h per week)	17.4 (22.5)	13.8 (18.4)
Fat-free mass (kg)	49.5 (12.8)	46.9 (11.6)
Fat-free mass index (kg/m <sup>2</sup> )	17.1 (3.5)	16.7 (3.7)
6MWT		
Distance (m)	209.2 (98.6)	221.5 (100.8)



# Palliation – Dyspnée

## An integrated palliative and respiratory care service for patients with advanced disease and refractory breathlessness: a randomised controlled trial

*Irene J Higginson, Claudia Bausewein, Charles C Reilly, Wei Gao, Marjolein Gysels, Mendwas Dzingina, Paul McCrone, Sara Booth, Caroline J Jolley, John Moxham*

### Summary

**Background** Breathlessness is a common and distressing symptom, which increases in many diseases as they progress and is difficult to manage. We assessed the effectiveness of early palliative care integrated with respiratory services for patients with advanced disease and refractory breathlessness.



*Lancet Respir Med* 2014  
2: 979–87  
Published Online  
October 29, 2014

# Palliation – Dyspnée

Time	Type of contact with clinic	Content of meeting
Week 1	First outpatient clinic visit	<p><b>Before visit:</b> Patients were offered free transport or if required disabled parking for the clinic appointments</p> <p><b>At visit</b></p> <ul style="list-style-type: none"> <li>• welcome</li> <li>• 6 minute walk test</li> <li>• completion of Palliative care Outcome Scale by patient, to aid clinical assessment</li> </ul> <p><b>Contact with respiratory medicine physician</b></p> <ul style="list-style-type: none"> <li>• explore the symptom of breathlessness and its triggers</li> <li>• establish underlying cause of breathlessness</li> <li>• optimise disease-orientated management (check medications used correctly, appropriate treatments)</li> <li>• review of previous investigations</li> <li>• verbal and hand-written handover of notes from respiratory to palliative medicine physician to ensure patients do not have to repeat information</li> </ul> <p><b>Contact with palliative medicine physician</b></p>

# Palliation – Dyspnée

## **Contact with palliative medicine physician**

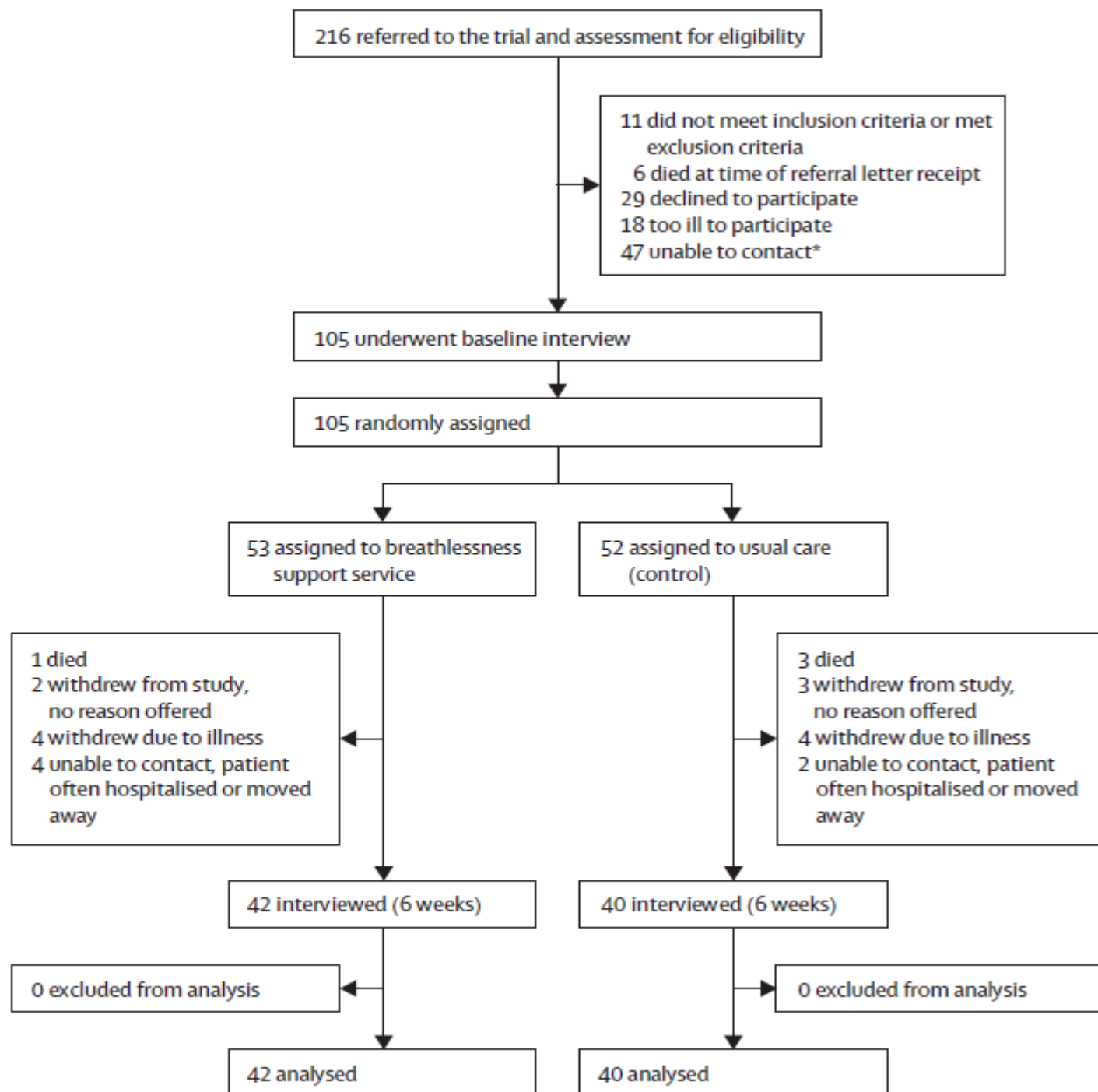
- experience of breathlessness
- development of crises plan
- burden on patient & family
- symptom burden (other than breathlessness), with recommendations to patients and GP of any appropriate treatments
- psychosocial & spiritual issues
- introduction of non-pharmacological measures such as the hand-held fan, water spray
- review together and provide breathlessness pack to take away, with information leaflets on managing breathlessness, a 'poem' (a mantra, laminated, to put up in the house and to read and follow when in acute breathlessness, developed by Jenny Taylor at St Christopher's Hospice), a chart of positions, laminated, to use when in acute breathlessness, fan/water spray

**Following visit** - After each clinic appointment a letter was sent to the patient (to reinforce self-management) summarising the diagnosis, assessment results and plan for treatment, with a copy sent to the referring clinicians and the general practitioner. This and an e-mail were also sent to physiotherapy/occupational therapy to aid their visit. If required, urgent contact/phone call with the GP was made.

Week 2 – 3	Home visit	<p>Based on the patients' needs as assessed during clinic attendance and then home visit:</p> <p><b>Physiotherapy input</b></p> <ul style="list-style-type: none"> <li>• review of the positions of breathlessness</li> <li>• provision of a walking aid</li> <li>• breathing control techniques and anxiety-panic cycle</li> <li>• management of exacerbations in COPD</li> <li>• home programme of exercise (DVD, personalised sheet)</li> <li>• cough minimisation techniques</li> <li>• pacing and fatigue management</li> <li>• sputum clearance techniques</li> <li>• ambulatory oxygen assessments</li> <li>• referral to pulmonary rehabilitation</li> </ul> <p><b>Occupational therapy input</b></p> <ul style="list-style-type: none"> <li>• assessment of Activities of Daily Living (ADL) (mobility/transfers, self-care and domestic ADL)</li> <li>• assessment for aids and minor adaptations and referral for provision of equipment</li> <li>• wheelchair prescription</li> <li>• education on planning, pacing and energy conservation techniques to patients and carers</li> <li>• referral to other community services (local/out of area), as appropriate</li> <li>• assess the need for social support and liaison with the BSS social worker, as appropriate</li> <li>• liaison with the BSS team regarding interventions and feedback</li> </ul>
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# Palliation – Dyspnée

Week 2-3	Telephone call	<b>Social worker input</b> <ul style="list-style-type: none"> <li>carer assessment including understanding of disease and symptoms &amp; information needs and coping strategies, if indicated at clinic assessment</li> </ul>
Week 4 - 5	Second outpatient clinic visit	<b>Contact with palliative medicine physician</b> <ul style="list-style-type: none"> <li>re-evaluation of breathlessness and other symptoms</li> <li>check use of fan, spray, pack, DVD etc, further guidance given</li> <li>change of medications recommended if required, with contact with GP regarding future planned treatments if required</li> <li>referral to medical and/or palliative care services if appropriate</li> <li>discharge from service</li> <li>provided with information on drop-in patient/family information centre for further resources</li> </ul> <p><b>Following visit</b> - After the clinic appointment a letter was sent to the patient (to reinforce self-management) summarising the progress made, further recommendations and plan for treatment, with a copy sent to the referring clinicians and the general practitioner.</p>



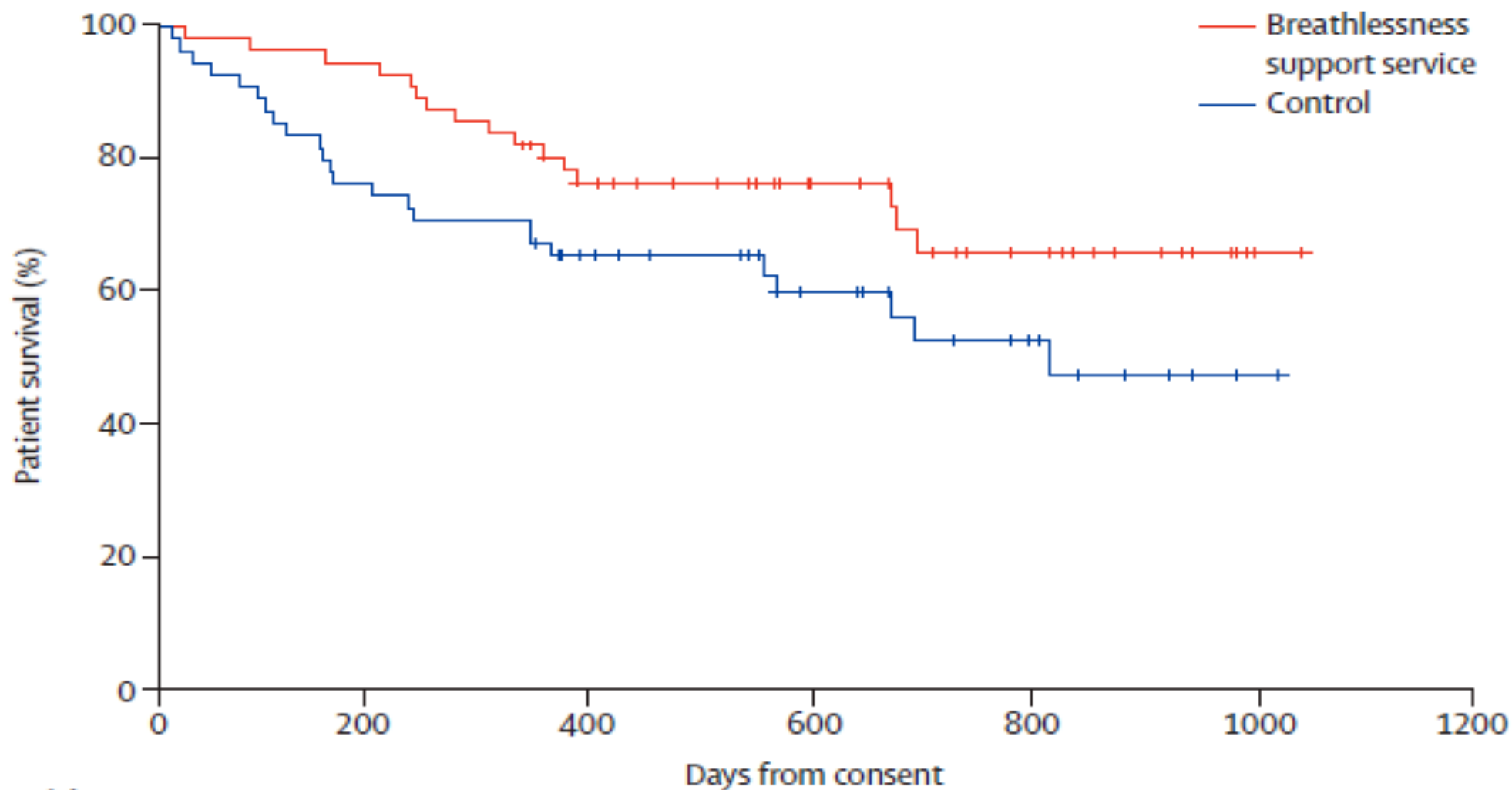
# Palliation – Dyspnée

	Overall (n=105)	Breathlessness support service group (n=53)	Control group (n=52)
Age (years)	67 (10)	66 (11)	68 (11)
Sex			
Men	61 (58%)	28 (53%)	33 (63%)
Women	44 (42%)	25 (47%)	19 (37%)
Diagnosis			
Chronic obstructive pulmonary disease	57 (54%)	29 (55%)	28 (54%)
Cancer*	21 (20%)	11 (21%)	10 (19%)
Interstitial lung disease	19 (18%)	7 (13%)	12 (23%)
Heart failure	5 (5%)	4 (8%)	1 (2%)
Other†	3 (3%)	2 (4%)	1 (2%)
Has carer or family member			
Yes	75 (71%)	38 (72%)	37 (71%)
No	30 (29%)	15 (28%)	15 (29%)
Clinical characteristics			
FEV <sub>1</sub> (L)‡	1.25 (0.70)	1.3 (0.78)	1.2 (0.65)
Predicted FEV <sub>1</sub> (%)‡	46.2 (23.3)	48.0 (24.3)	44.5 (22.4)
VC (L)‡	1.9 (0.96)	2.0 (1.0)	1.8 (0.9)
Predicted VC (%)‡	57.9 (25.7)	59.3 (25.5)	56.6 (26.0)

# Palliation – Dyspnée

	Breathlessness support service group (n=42)	Control group (n=40)	Difference between breathlessness support service and control (95% CI)	p value
Primary outcome (CRQ mastery)*†	4.15 (1.7)	3.57 (1.4)	0.58 (0.01 to 1.15)	0.048
Secondary outcomes				
NRS breathlessness average 24 h‡	5.38 (2.2)	5.71 (2.1)	-0.33 (-1.28 to 0.62)	0.49
NRS breathlessness worst at rest 24 h‡	4.12 (2.8)	4.47 (3.3)	-0.35 (-1.71 to 1.01)	0.61
NRS breathlessness on exertion 24 h‡	7.45 (2.4)	8.18 (1.8)	-0.73 (-1.69 to 0.22)	0.13
CRQ HRQL*	71 (19)	67 (20)	4.21 (-4.52 to 12.94)	0.34
CRQ dyspnoea*†	2.54 (1.1)	2.46 (0.9)	0.08 (-0.38 to 0.52)	0.75
CRQ emotion*†	4.07 (1.3)	3.93 (1.3)	0.14 (-0.42 to 0.71)	0.16
CRQ fatigue*†	3.09 (1.1)	3.07 (1.5)	0.02 (-0.56 to 0.62)	0.93
EQ-5D index*	0.44 (0.31)	0.35 (0.29)	0.092 (-0.23 to 0.04)	0.18
EQ-5D HRQL VAS*	56 (20)	55 (18)	1 (-6.67 to 10.34)	0.67
LCADL total score‡	45 (13)	50 (15)	-5 (-12.22 to 1.02)	0.10
POS total score‡	12.15 (6.8)	12.42 (6.5)	-0.27 (-3.29 to 2.75)	0.86
HADS anxiety‡	9.2 (2.8)	9.1 (2.7)	0.1 (-0.93 to 1.24)	0.78
HADS depression‡	10 (2.8)	11 (2.5)	-1 (-1.82 to 0.30)	0.16

# Palliation – Dyspnée



## Number at risk

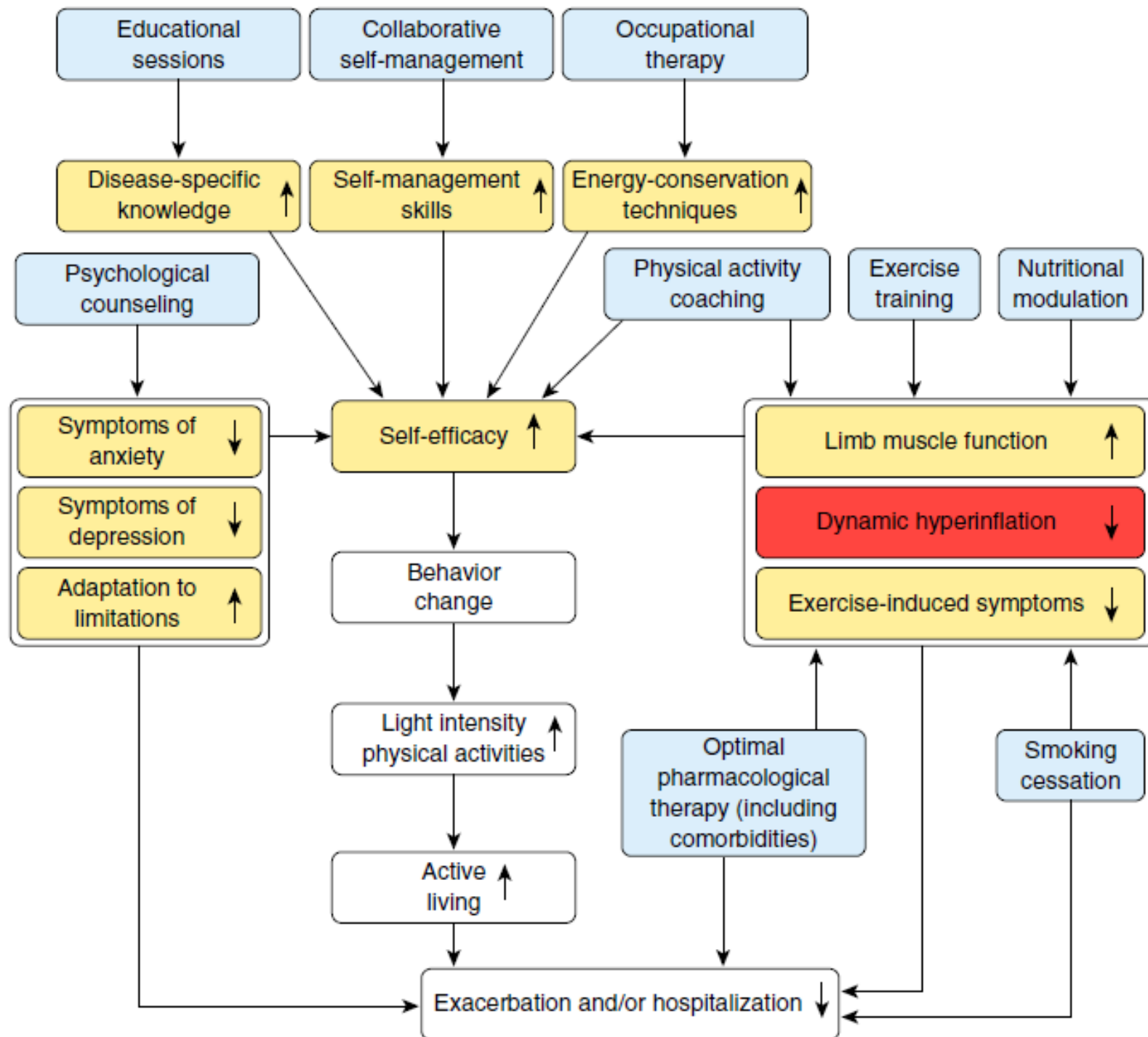
Breathlessness support service	53	50	35	24	13	4
Control	52	38	28	18	11	4

## Pulmonary Rehabilitation and Physical Activity in Patients with Chronic Obstructive Pulmonary Disease

Martijn A. Spruit<sup>1,2</sup>, Fabio Pitta<sup>3</sup>, Edward McAuley<sup>4</sup>, Richard L. ZuWallack<sup>5</sup>, and Linda Nici<sup>6</sup>

<sup>1</sup>Department of Research and Education, CIRO+, Center of Expertise for Chronic Organ Failure, Horn, the Netherlands; <sup>2</sup>REVAL–Rehabilitation Research Center, BIOMED–Biomedical Research Institute, Faculty of Medicine and Life Sciences, Hasselt University, Diepenbeek, Belgium; <sup>3</sup>Laboratory of Research in Respiratory Physiotherapy (LFIP), Department of Physiotherapy, Universidade Estadual de Londrina, Londrina, Brazil; <sup>4</sup>Department of Kinesiology and Community Health, University of Illinois at Urbana-Champaign, Urbana, Illinois; <sup>5</sup>Department of Pulmonary/Critical Care Medicine, Saint Francis Hospital, Hartford, Connecticut; and <sup>6</sup>Pulmonary/Critical Care Section, Providence VA Medical Center, Providence, Rhode Island

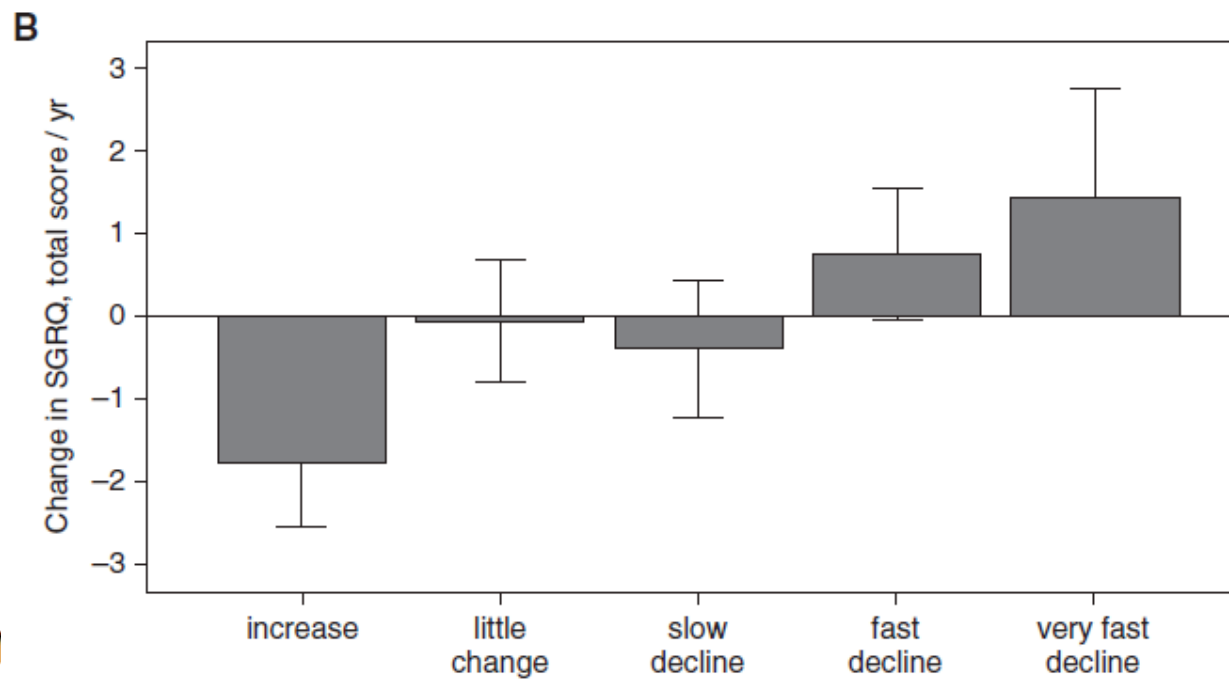
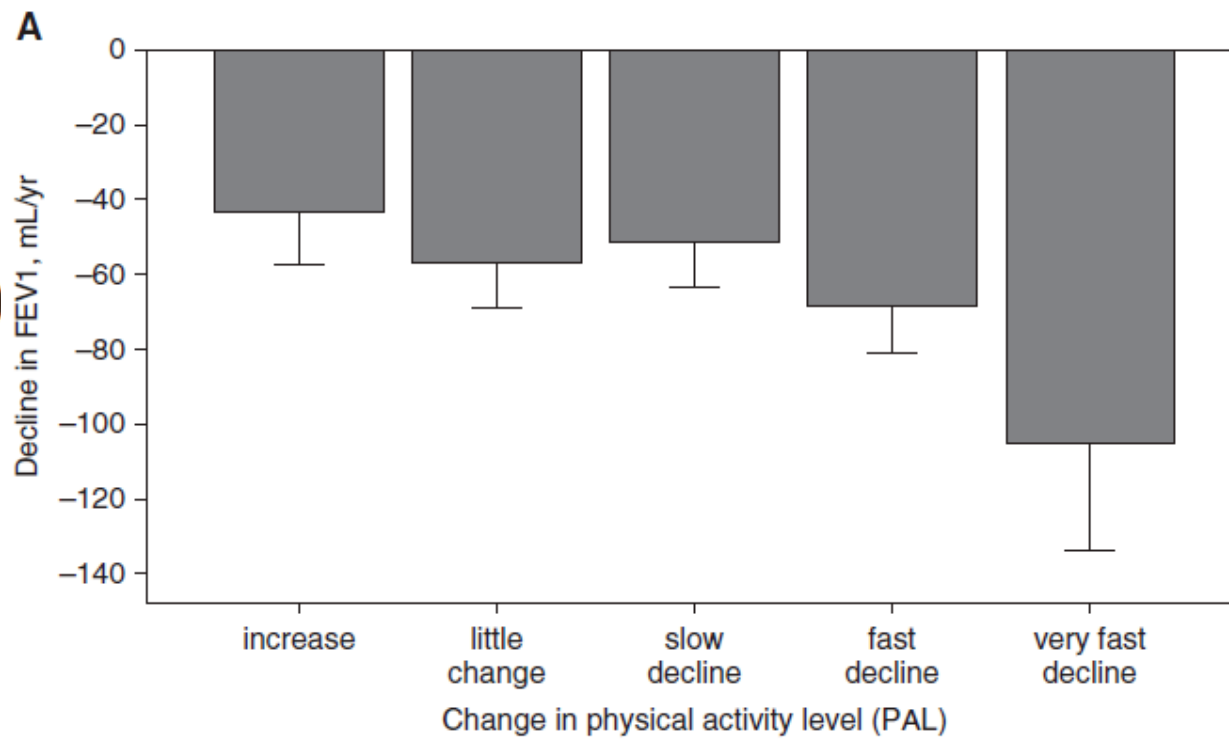
Changing physical activity behavior in patients with COPD needs an interdisciplinary approach, bringing together respiratory medicine, rehabilitation sciences, social sciences, and behavioral sciences.

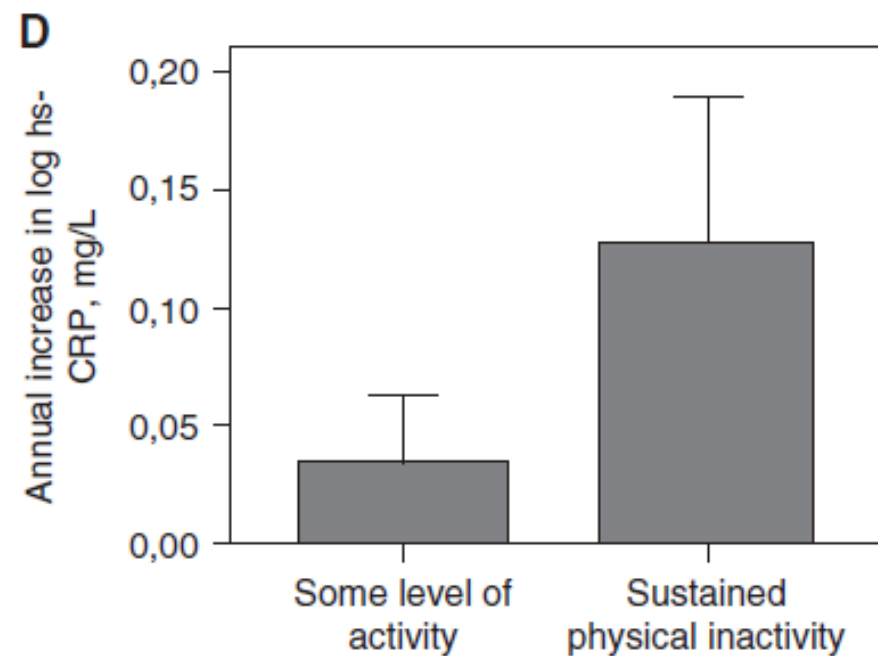
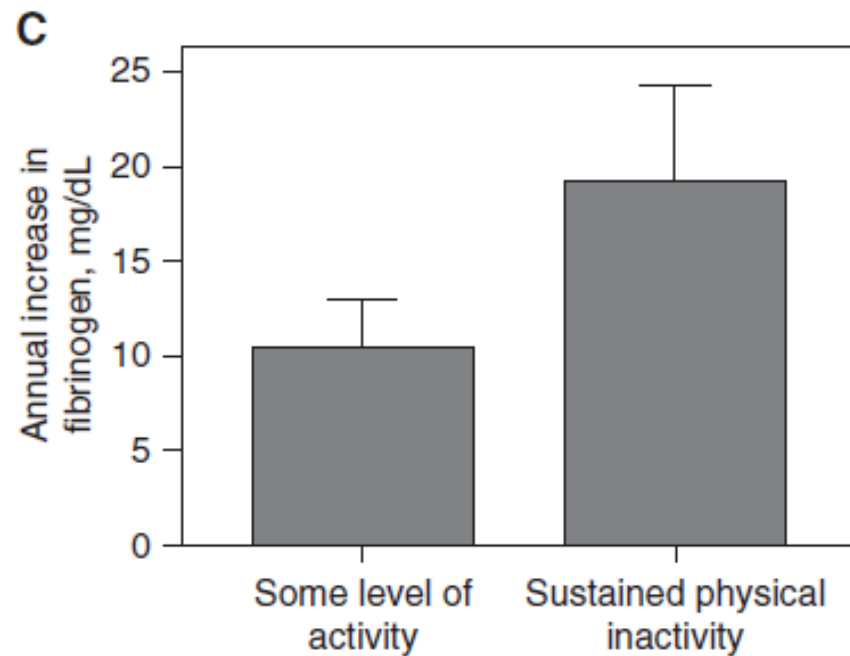
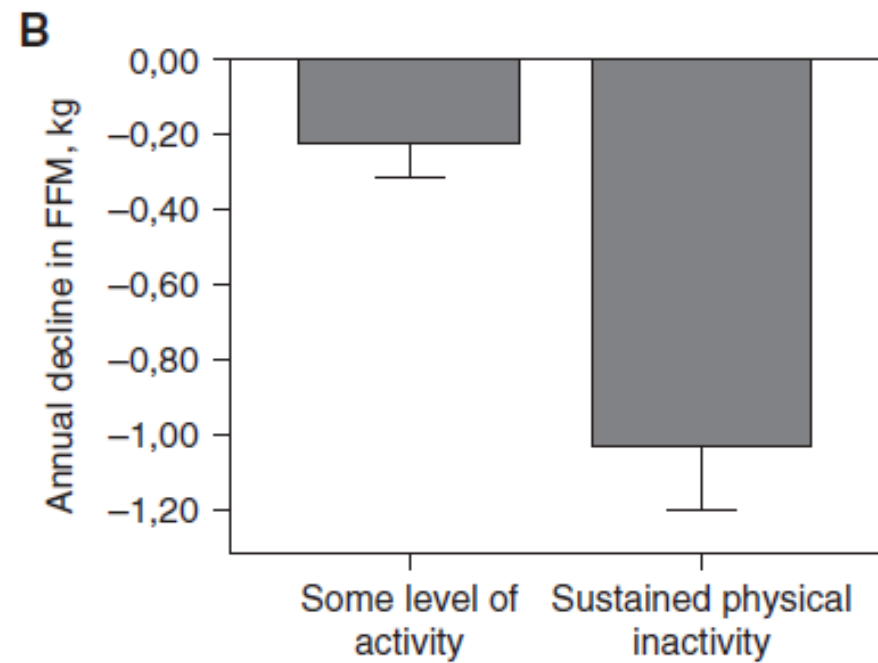
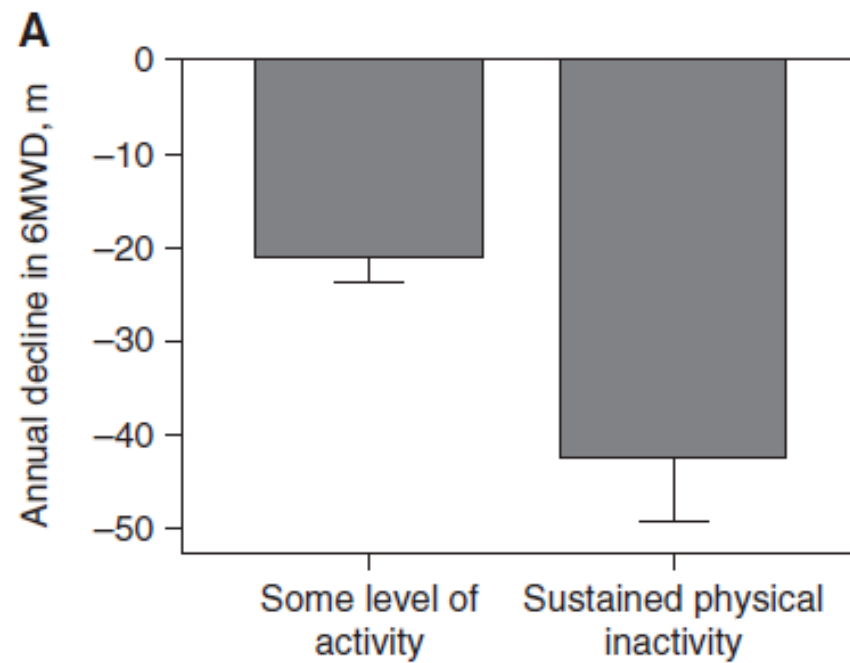


## **Disease Progression and Changes in Physical Activity in Patients with Chronic Obstructive Pulmonary Disease**

Benjamin Waschki<sup>1,2</sup>, Anne M. Kirsten<sup>1</sup>, Olaf Holz<sup>3</sup>, Kai-Christian Mueller<sup>2</sup>, Miriam Schaper<sup>1</sup>, Anna-Lena Sack<sup>1</sup>, Thorsten Meyer<sup>4</sup>, Klaus F. Rabe<sup>2</sup>, Helgo Magnussen<sup>1</sup>, and Henrik Watz<sup>1</sup>

<sup>1</sup>Pulmonary Research Institute, LungenClinic Grosshansdorf, Airway Research Center North, Member of the German Center for Lung Research, Grosshansdorf, Germany; <sup>2</sup>LungenClinic Grosshansdorf, Airway Research Center North, Member of the German Center for Lung Research, Grosshansdorf, Germany; <sup>3</sup>Fraunhofer Institute for Toxicology and Experimental Medicine, BREATH, Member of the German Center for Lung Research, Hannover, Germany; and <sup>4</sup>Institute for Epidemiology, Social Medicine and Health System Research, Hannover Medical School, Hannover, Germany





# Pulmonary rehabilitation for interstitial lung disease (Review)

Dowman L, Hill CJ, Holland AE

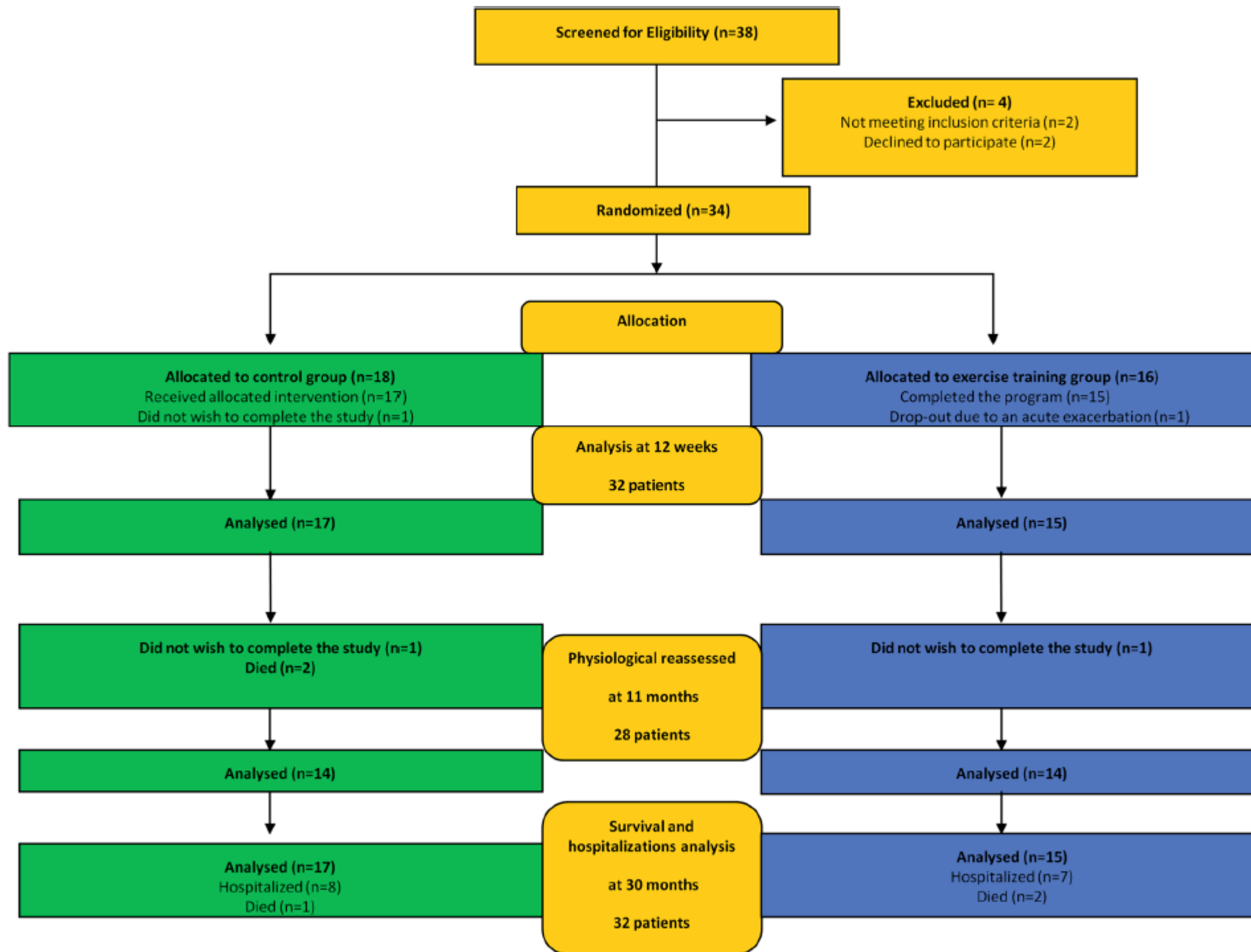


# Réhabilitation PID

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	Number of participants (studies)	Quality of the evidence (GRADE)
	Assumed risk	Corresponding risk			
	No pulmonary rehabilitation	Pulmonary rehabilitation			
<b>Change in 6-minute walk distance</b> 6-Minute walk test Follow-up: end of rehabilitation (8-12 weeks)	Mean change in 6-minute walk distance ranged across control groups from <b>-4 to 17 metres</b>	Mean change in 6-minute walk distance in the intervention groups was <b>44 higher</b> (26 to 63 higher)	<b>MD 44.34</b> (26.04 to 62.64)	168 (5 studies)	⊕⊕⊕○ <b>moderate<sup>a</sup></b>
<b>Change in peak oxygen uptake</b> Cardiopulmonary exercise test Follow-up: end of rehabilitation (8-12 weeks)	Mean change in peak oxygen uptake ranged across control groups from <b>-0.02 to 0.4 mL/kg/min</b>	Mean change in peak oxygen uptake in the intervention groups was <b>1.24 higher</b> (0.46 to 2.03 higher)	MD 1.24 (0.46 to 2.13)	80 (2 studies)	⊕⊕○○ <b>low<sup>b,c</sup></b>
<b>Change in maximum ventilation</b> Cardiopulmonary exercise test Follow-up: end of rehabilitation (8 weeks)	Mean change in maximum ventilation in control groups was <b>-1.04 L/min</b>	Mean change in maximum ventilation in the intervention groups was <b>4.71 higher</b> (0.1 to 9.32 higher)	MD 4.71 (0.10 to 9.32)	52 (1 study)	⊕⊕○○ <b>low<sup>d</sup></b>

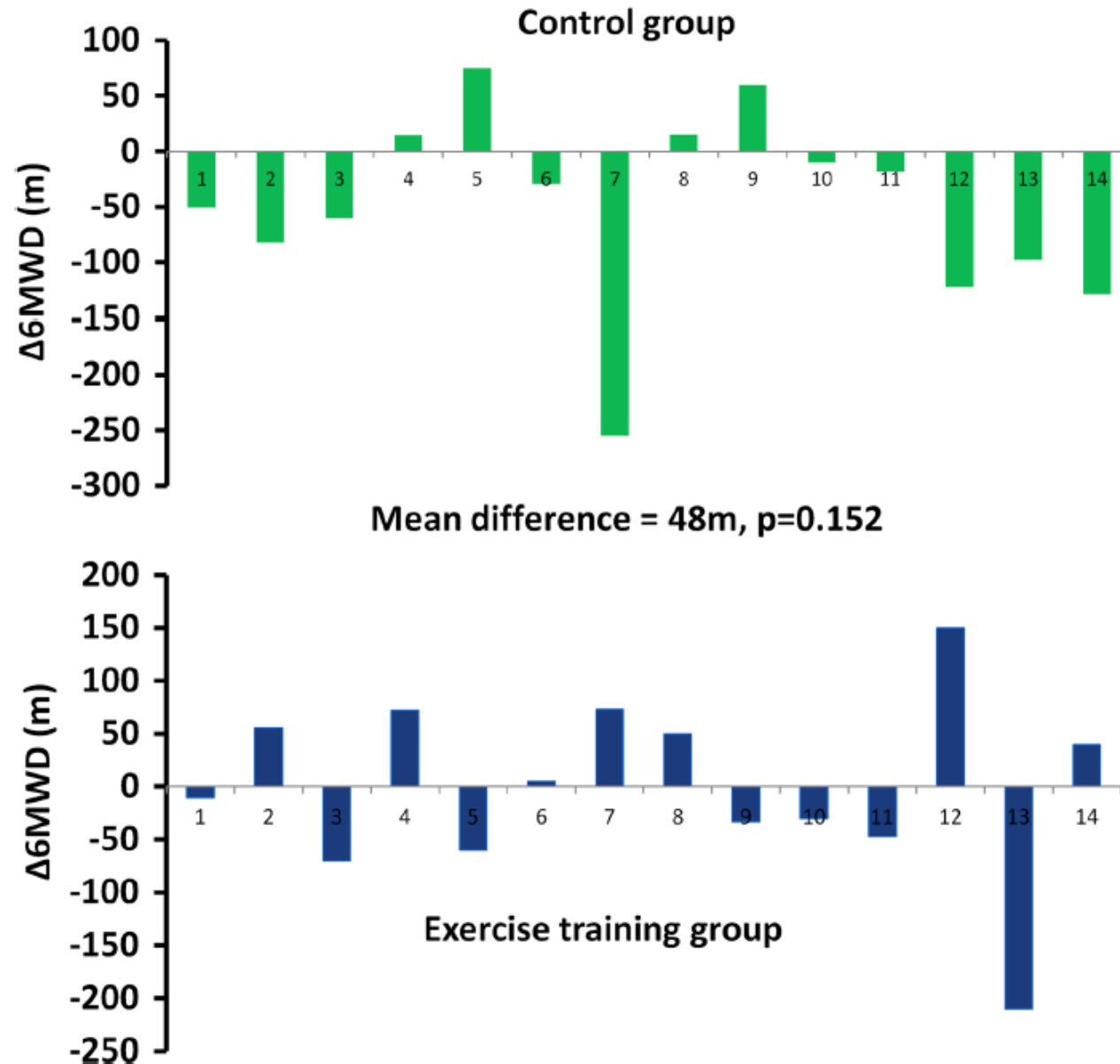
# Réhabilitation PID

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	Number of participants (studies)	Quality of the evidence (GRADE)
	Assumed risk	Corresponding risk			
	No pulmonary rehabilitation	Pulmonary rehabilitation			
<b>Change in dyspnoea score</b> Modified Medical Research Council Dyspnoea Scale Follow-up: end of rehabilitation (8-12 weeks)	Mean change in dyspnoea score ranged across control groups from <b>0.11 to 0.3 points</b>	Mean change in dyspnoea score in the intervention groups was <b>0.60 lower</b> (0.96 to 0.26 lower)	SMD -0.66 (-1.05 to -0.28)	113 (3 studies)	⊕⊕○○ <b>low</b> <sup>a,e</sup>
<b>Change in quality of life</b> Chronic Respiratory Disease Questionnaire (total score) Follow-up: end of rehabilitation (8-12 weeks)	Mean change in quality of life in control groups was <b>3.29 points</b>	Mean change in quality of life in the intervention groups was <b>8.9 higher</b> (3 to 14.8 higher)	SMD 0.59 (0.2 to 0.98)	106 (3 studies)	⊕⊕○○ <b>low</b> <sup>a,e</sup>
<b>6-Month survival</b>	<b>74 per 1000</b>	<b>67 per 1000</b> (10 to 353)	<b>RR 0.9</b> (0.13 to 4.77)	57 (1 study)	⊕⊕○○ <b>low</b> <sup>f</sup>
<b>Adverse events</b> Follow-up: 6 months	See comment	See comment	Not estimable	85 (2 studies)	See comment



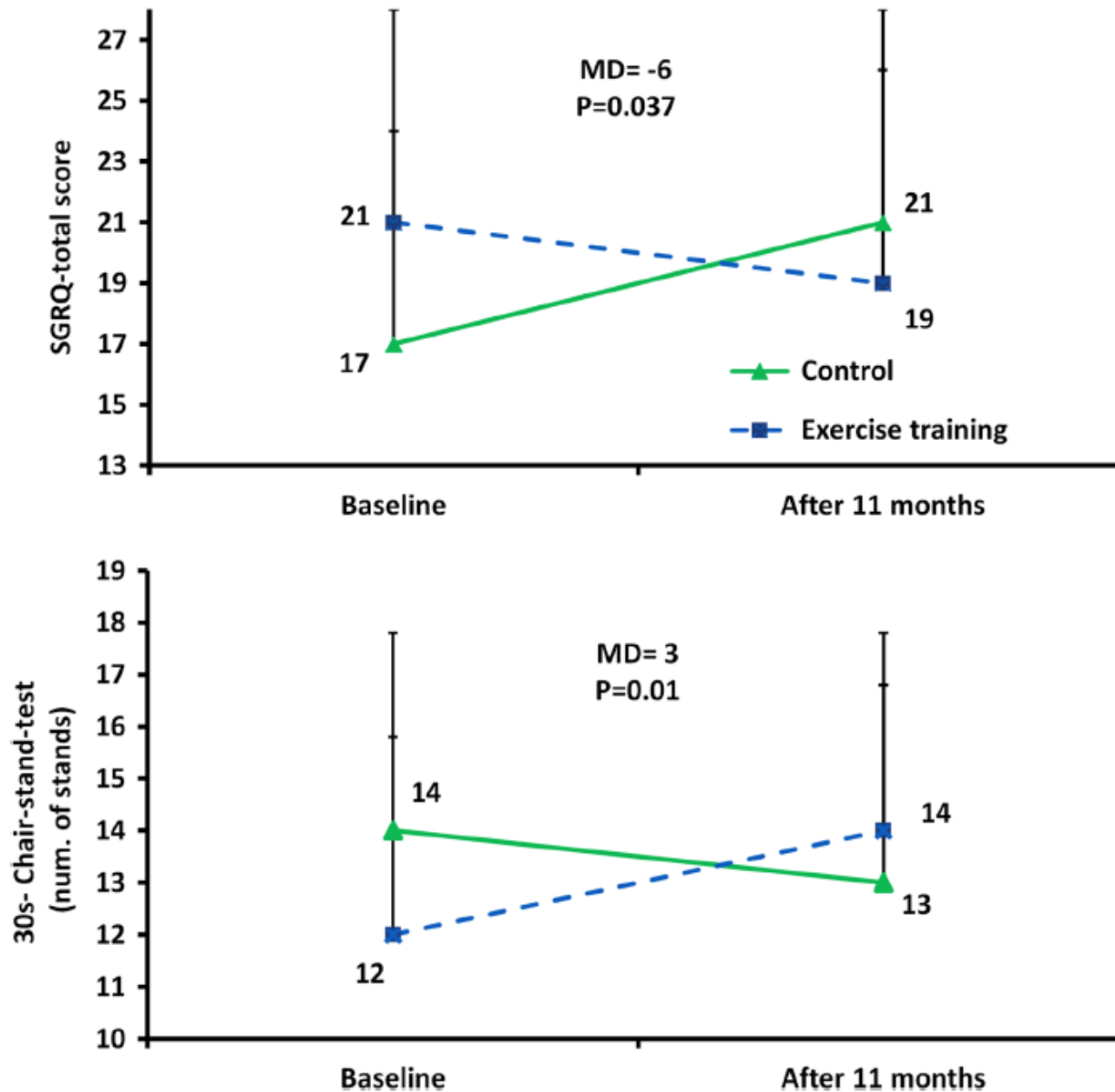
# Effets à long terme RP FPI

*Lung 2015;193:345-53*



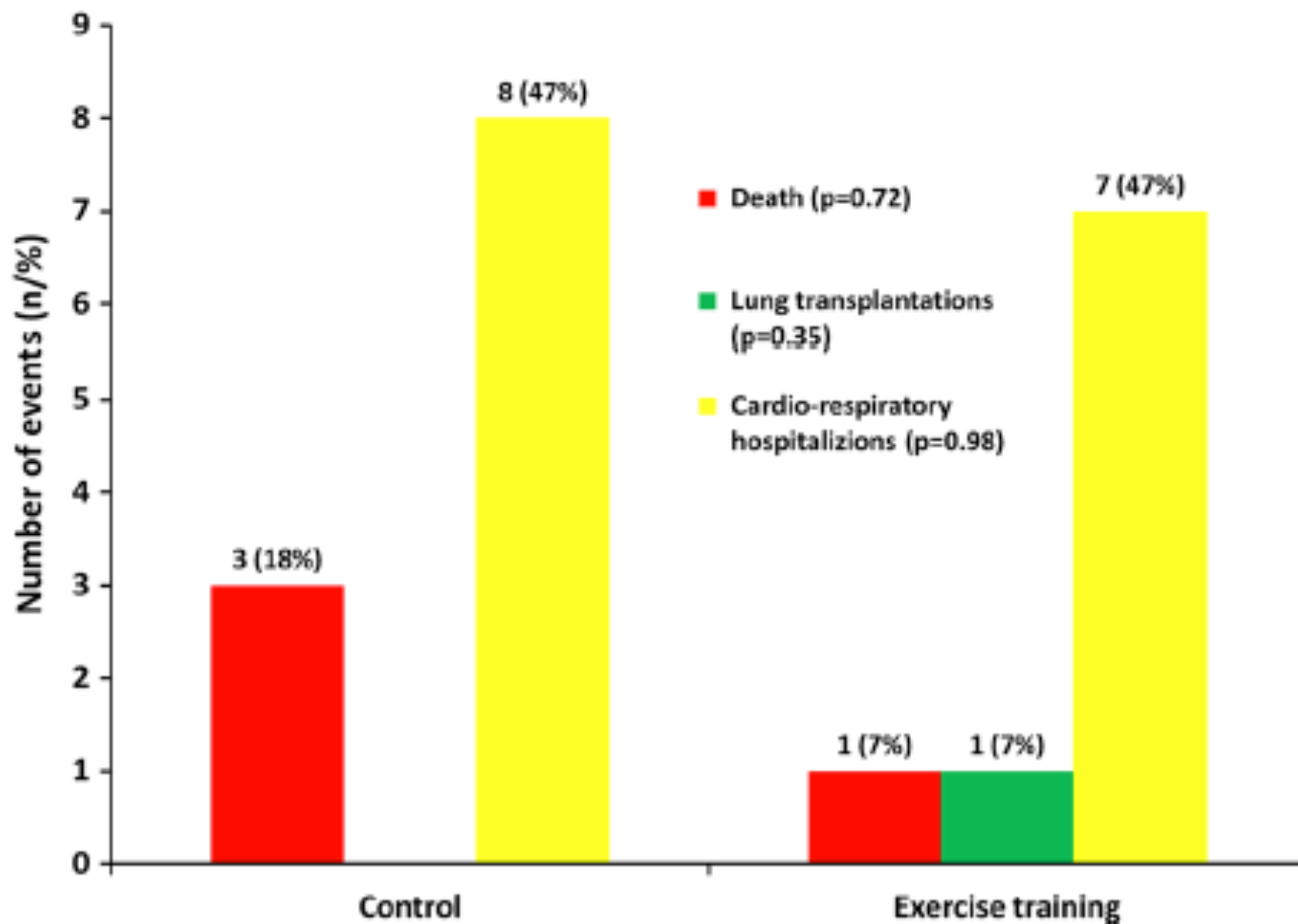
# Effets à long terme RP FPI

*Lung 2015;193:345-53*

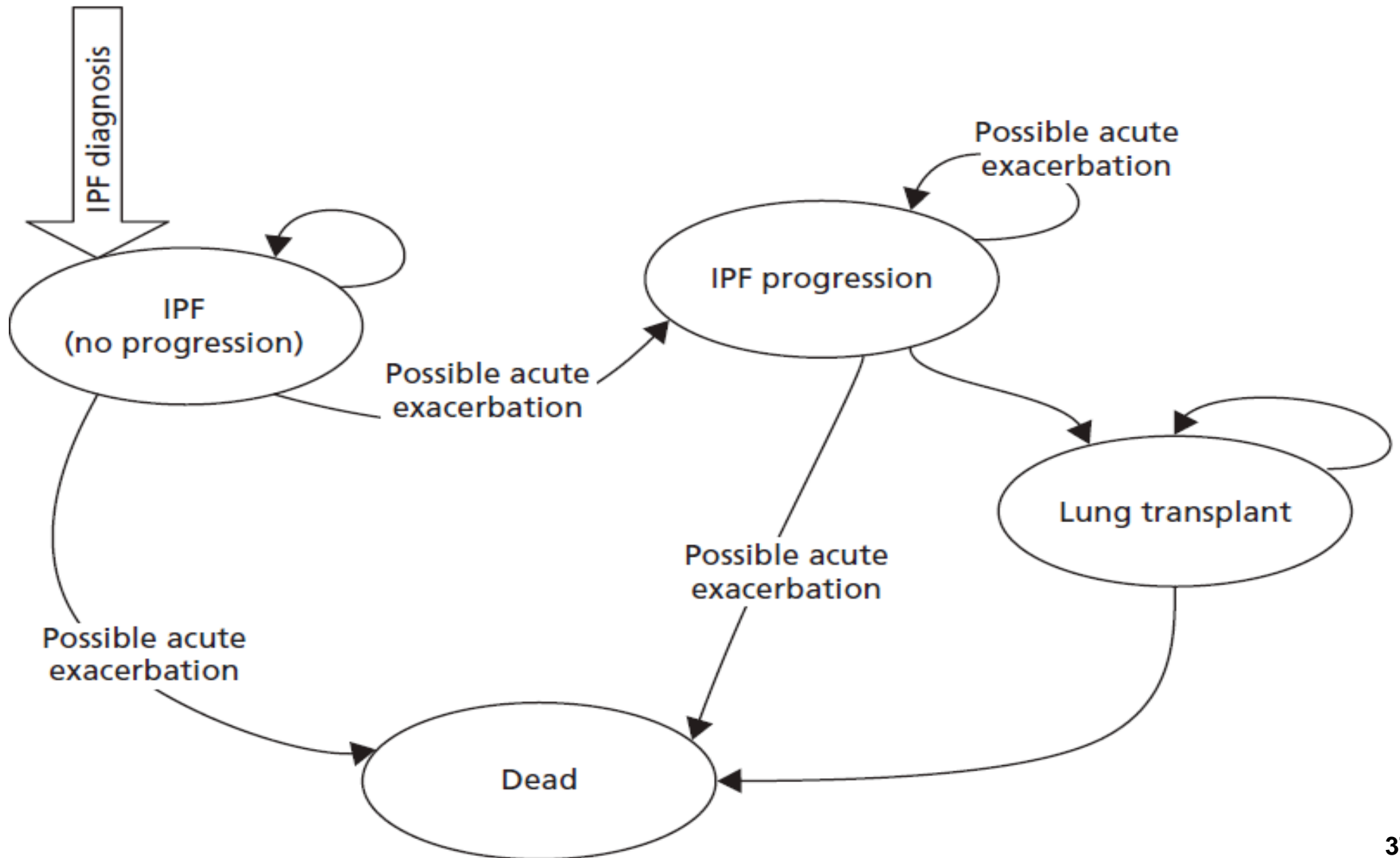


# Effets à long terme RP FPI

*Lung 2015;193:345-53*

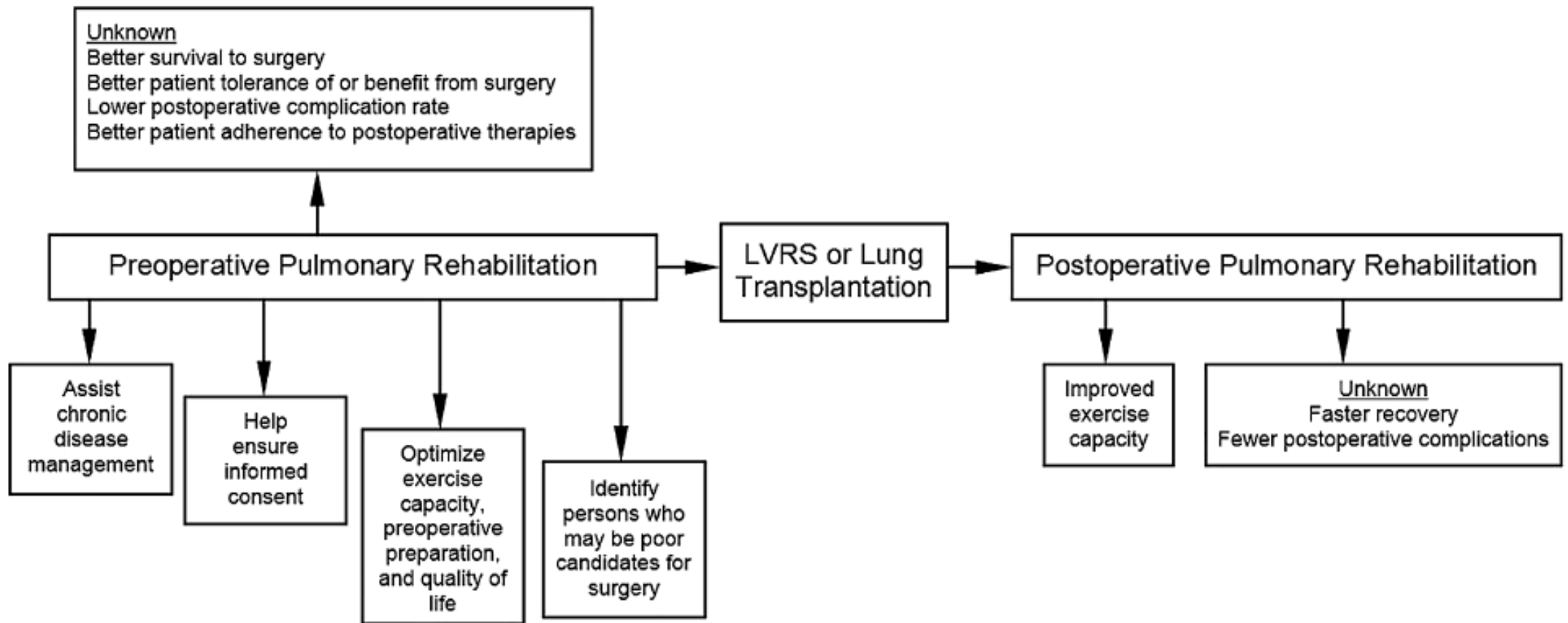


# Parcours patient



# Réhabilitation PID, pré/post Tx

## *un processus continu*



# Efficacité et Cout-Efficacité

## Abstract

**The clinical effectiveness and cost-effectiveness of treatments for idiopathic pulmonary fibrosis: a systematic review and economic evaluation**

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# Effacité et Cout-Effacité

Fourteen studies were included in the review of clinical effectiveness, of which one evaluated azathioprine, three N-acetylcysteine (NAC) (alone or in combination), four pirfenidone, one BIBF 1120, one sildenafil, one thalidomide, two pulmonary rehabilitation, and one a disease management programme.

The model base-case results show increased survival for five pharmacological treatments, compared with best supportive care, at increased cost.

# Effects of Exercise Training on Exercise Capacity in Pulmonary Arterial Hypertension: A Systematic Review of Clinical Trials



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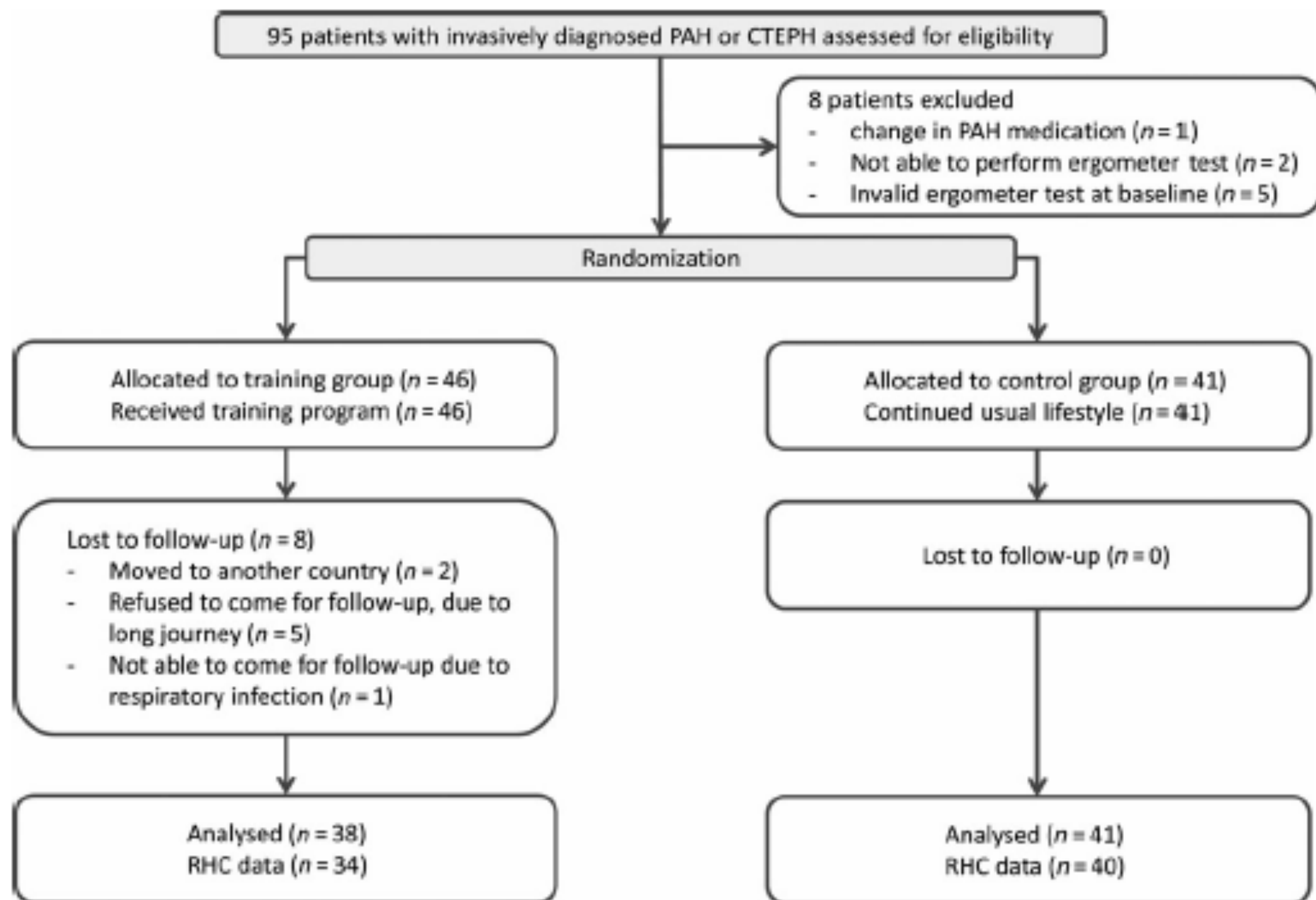
*Received 3 August 2015; received in revised form 24 October 2015; accepted 26 October 2015; online published-ahead-of-print 18 November 2015*

Author (year)	Number	Design	NYHA grade at enrolment	PH cause (n)	Intervention (Intensity)	Duration	Outcome measures	Results
Mereles et al. (2006)	30	RCT	II – IV	CTEPH (6), PAH (24)	Exercise + respiratory muscle training	3 weeks – institution-based and 12 weeks – home-based	6MWD SF36	85m increase after 3 weeks and 96m after 15 weeks (p<0.001)  Improved QoL in physical function and vitality (p<0.005)
Shoemaker et al. (2009)	2	Case report		iPH and PAH due to scleroderma	Cycle ergometry (50% peak workload)	6 weeks – institution-based, 3 days/week	peak VO <sub>2</sub> CAMPHOR SF36	4% and 14% increase  Improved
deMan et al. (2009)	19	Pre-post	II – III	iPH	Cycling and quadriceps muscle training while maintaining SpO <sub>2</sub> >85% and HR <120 bpm	12 weeks – institution-based	6MWD Workload at AT Quadriceps endurance and strength	4% increase (p=0.13)  Increase in workload of AT from 32 to 46 Watt; (p=0.003)  13% and 34% increase (p<0.05)
Martinez-Quintana et al. (2010)	8	Non-randomised controlled trial	II – III	Congenital heart disease	Interval training on bicycle and resistance training	2 days a week for 12 weeks – institution-based	6MWD SF12	No significant change in 6MWD and QoL
Mainguy et al. (2010)	5	Case series	II – III	iPH	Aerobic and resisted exercises (60% max workload and 70% MVC)	12 weeks – institution based	6MWD	58m improvement (p=0.01)
Fox et al. (2011)	22	Non-randomised controlled trial	II – III	iPH and CTEPH	Aerobic and resisted exercises + stair climbing (60-80% HRmax)	12 weeks – institution-based and home-based	6MWD peak VO <sub>2</sub>	32m and 1.1ml/Kg/min improvement (p<0.05)
Grunig et al. (2011)	58	Pre-post	II – IV	iPH	Aerobic and resistance training + respiratory muscle training	3 weeks – institution-based and 12 weeks – home-based	6MWD peak VO <sub>2</sub> SF36	87m and 2.1ml/Kg/min improvement (p<0.001)  Improvement in all domains of SF36 (p<0.05)
Grunig et al. (2012)	183	Pre-post	II – IV	PAH, CTEPH, PH due to lung and heart disease	Exercise + respiratory muscle training	3 weeks – institution-based and 12 weeks – home-based	6MWD SF36	68m increase after 3 weeks and 78m after 15 weeks (p<0.001)  Improved QoL (p<0.05)
Grunig et al. (2012)	21	Pre-post	II – IV	PAH due to CTD	Exercise + respiratory muscle training	3 weeks – institution-based and 12 weeks – home-based	6MWD SF36	67m increase after 3 weeks and by 71m after 15 weeks (p<0.05)  Improved QoL (p<0.05)

Nagel et al. (2012)	35	Pre-post	II – IV	CTEPH	Exercise + respiratory muscle training	3 weeks – institution-based and 12 weeks – home-based	6MWD peak VO2 SF36 NT-proBNP Survival	61m increase after 3 weeks and 71m after 15 weeks 1.9ml/Kg/min after 15 weeks Improved QoL (p<0.05) >20% reduction at 3 weeks 1,2 and 3year survival rates of 97%, 94% and 86%
Chan et al. (2013)	23	RCT	I-IV	PAH	Education versus exercise training	10 weeks	6MWD SF36 CAMPHOR	56m increase with exercise training (p=0.002) Improvements in both QoL measurements (p<0.05)
Becker-Grünig et al. (2013)	20	Pre-post	II – IV	PAH due to CHD	Exercise + respiratory muscle training	3 weeks – institution-based and 12 weeks – home-based	6MWD peakVO2 SF36 Survival	63m increase after 3 weeks and 67m increase after 15 weeks (p<0.001) Increased from 8.3L/min to 9.02 and 9.25L/min at 3 and 15 weeks respectively Significant improvement only in bodily pain 100% survival at years 1 and 2 Transplantation free survival 100% and 93% at years 1 and 2
Ley et al. (2013)	20	RCT	II-III	PAH, CTD, CTEPH, Portal hypertension	Exercise + respiratory muscle training	3 weeks	6MWD	91m improvement in the experimental group (p=0.008)
Weinsten et al. (2013)	24	RCT	I-IV	PAH, CTD	Education versus exercise training	10 weeks	6MWD Fatigue	53m increase (p=0.003) with exercise training Improved
Kabitz et al. (2014)	7	Case series	III-IV	PAH		3 weeks – institution-based and 12 weeks – home-based	6MWD Respiratory muscle strength	92m increase after 3 weeks and 81m increase after 15 weeks (p<0.001) Improved PImax by 1 kPa (p=0.086), PEmax by 2.3 kPa (p=0.021), SnPna by 1.3 kPa (p=0.025) at 15 weeks

# Exercise training improves peak oxygen consumption and haemodynamics in patients with severe pulmonary arterial hypertension and inoperable chronic thrombo-embolic pulmonary hypertension: a prospective, randomized, controlled trial

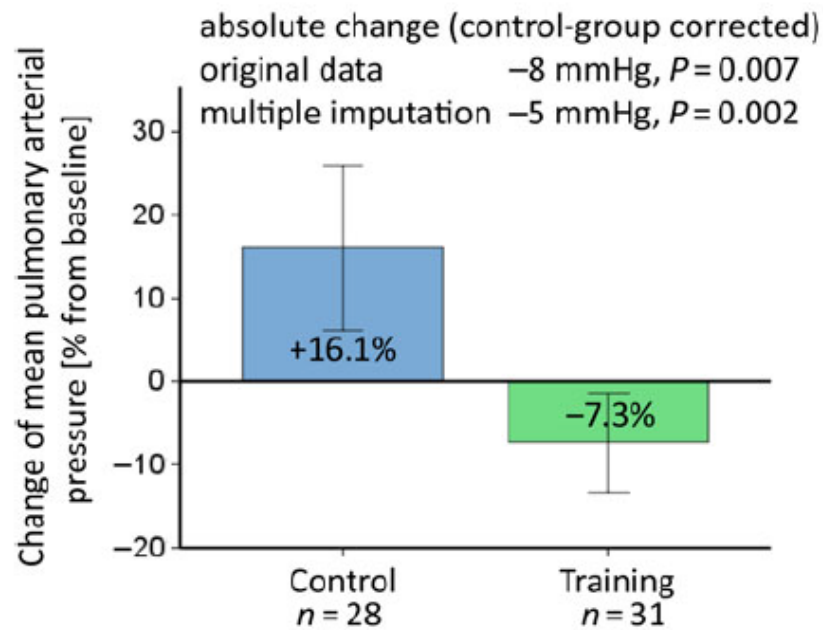
Nicola Ehlken<sup>1\*†</sup>, Mona Lichtblau<sup>1†</sup>, Hans Klose<sup>2†</sup>, Johannes Weidenhammer<sup>1</sup>, Christine Fischer<sup>3</sup>, Robert Nechwatal<sup>4</sup>, Sören Uiker<sup>4</sup>, Michael Halank<sup>5</sup>, Karen Olsson<sup>6</sup>, Werner Seeger<sup>7</sup>, Henning Gall<sup>7</sup>, Stephan Rosenkranz<sup>8</sup>, Heinrike Wilkens<sup>9</sup>, Dirk Mertens<sup>10</sup>, Hans-Jürgen Seyfarth<sup>11</sup>, Christian Opitz<sup>12</sup>, Silvia Ulrich<sup>13</sup>, Benjamin Egenlauf<sup>1</sup>, and Ekkehard Grünig<sup>1</sup>



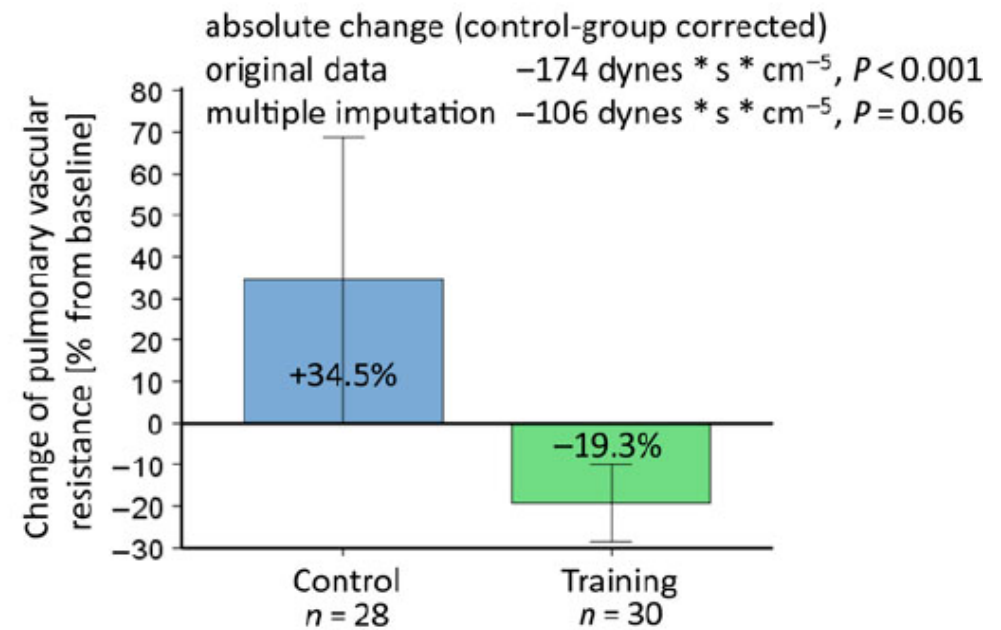
Baseline characteristics	Control	Training
Patients, <i>n</i>	41	46
Gender, male/female	20/21	20/26
Age (years)	57 ± 15	55 ± 15
Height (cm)	171 ± 8	170 ± 9
Weight (kg)	79 ± 18	75 ± 18
WHO functional class, no. (%) baseline		
II	6 (15%)	8 (18.2%)
III	30 (75%)	36 (81.8%)
IV	4 (10%)	0 (0%)
Diagnosis		
Pulmonary arterial hypertension	26 (63.4%)	35 (76.1%)
CTEPH	15 (36.5%)	11 (23.9%)
NT-proBNP (pg/mL)		
Baseline	1114 ± 1386	1163 ± 2520
Right heart catheterization		
Mean pulmonary arterial pressure (mmHg)	37.6 ± 11.8	41.0 ± 11.7
Pulmonary vascular resistance (dyn × s/cm <sup>5</sup> )	512 ± 338	540 ± 267
Central venous pressure (mmHg)	7.1 ± 4.7	7.5 ± 3.7
Pulmonary arterial oxygen saturation (%)	64.3 ± 9.4	64.7 ± 9.9
Pulmonary arterial wedge pressure (mmHg)	9.4 ± 3.8	9.4 ± 3.5
Cardiac index (L/min/m <sup>2</sup> )	2.69 ± 0.89	2.68 ± 0.73

PAH-targeted medication		
Endothelin receptor antagonists	29 (70.7%)	33 (71.7%)
Phosphodiesterase-5-inhibitors	30 (73.2%)	31 (67.4%)
Prostanoids inhaled	6 (14.6%)	3 (6.5%)
Prostanoids per os	0 (0%)	1 (2.2%)
Prostanoids intravenous	0 (0%)	0 (0%)
Calcium channel blockers	3 (7.3%)	5 (10.9%)
Imatinib	1 (2.4%)	0 (0%)
Soluble guanylate cyclase-stimulator	3 (7.3%)	6 (13%)
Combination therapy		
Monotherapy	14 (35%)	13 (33.3%)
Dual therapy	22 (55%)	20 (51.3%)
Triple therapy	4 (10%)	6 (15.4%)
Oxygen therapy, yes/no	20/21	17/25

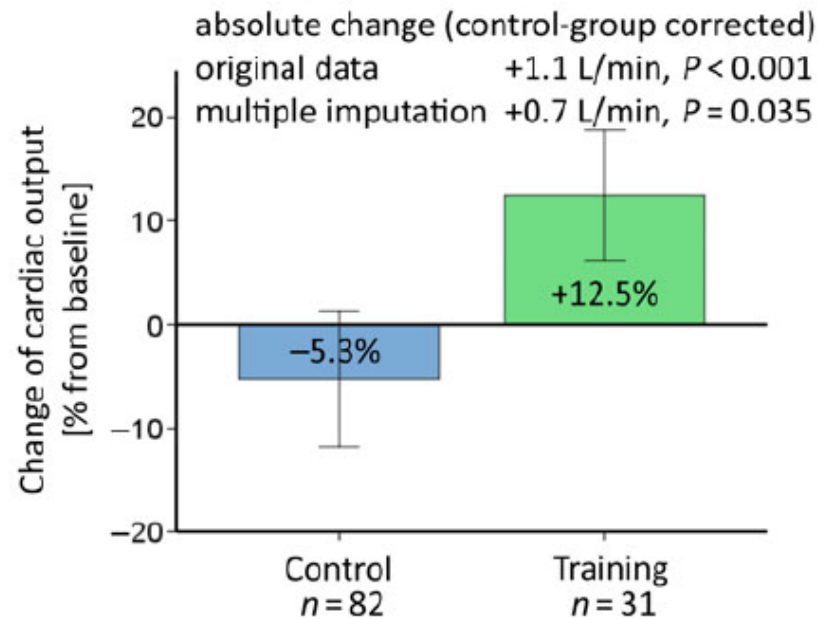
### A Change of mean pulmonary arterial pressure



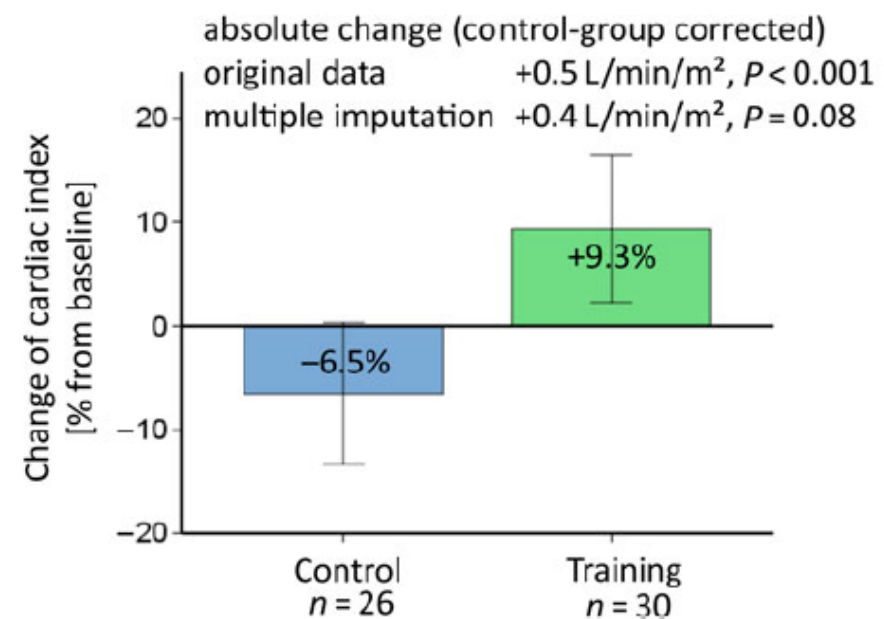
### B Change of pulmonary vascular resistance

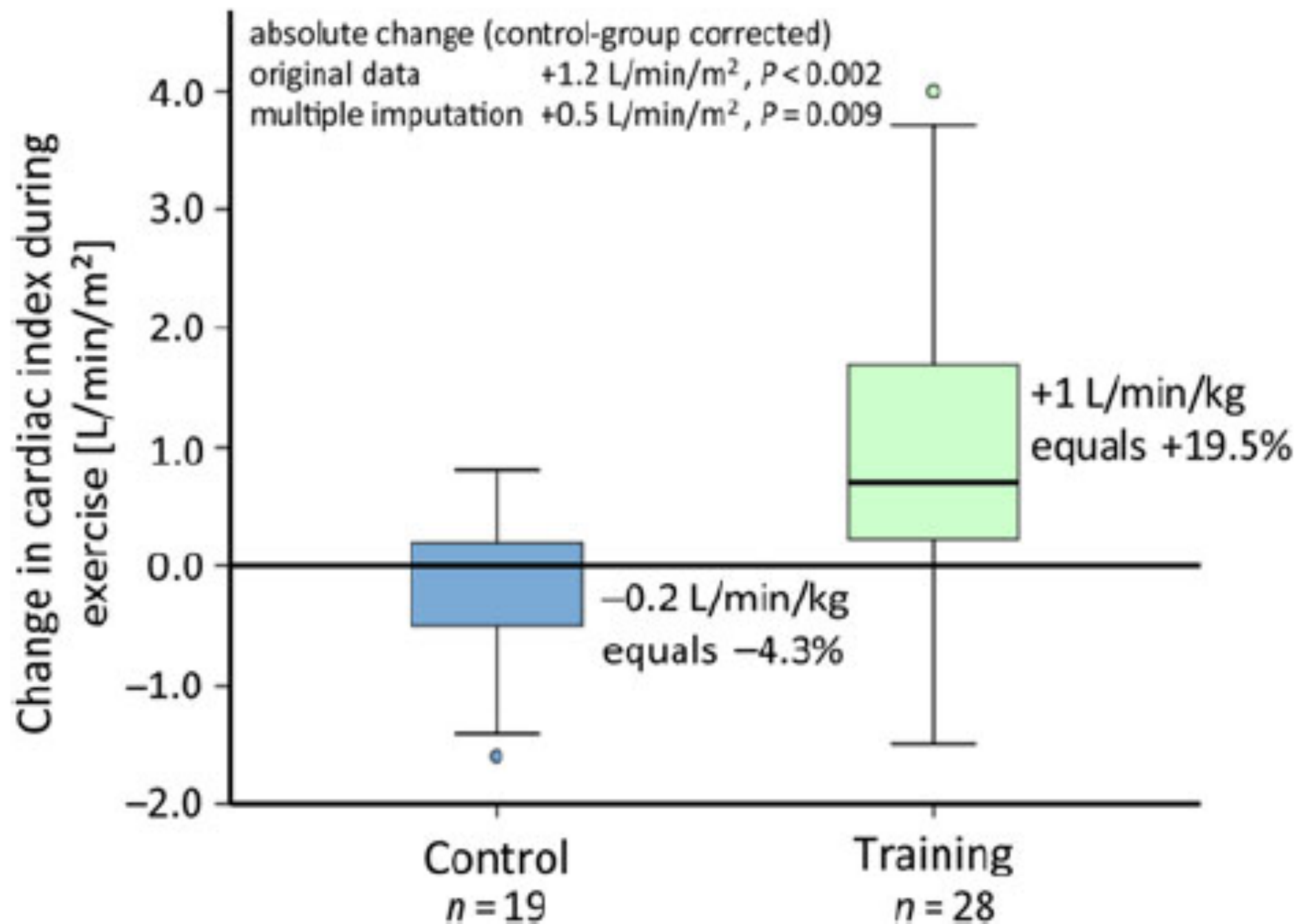


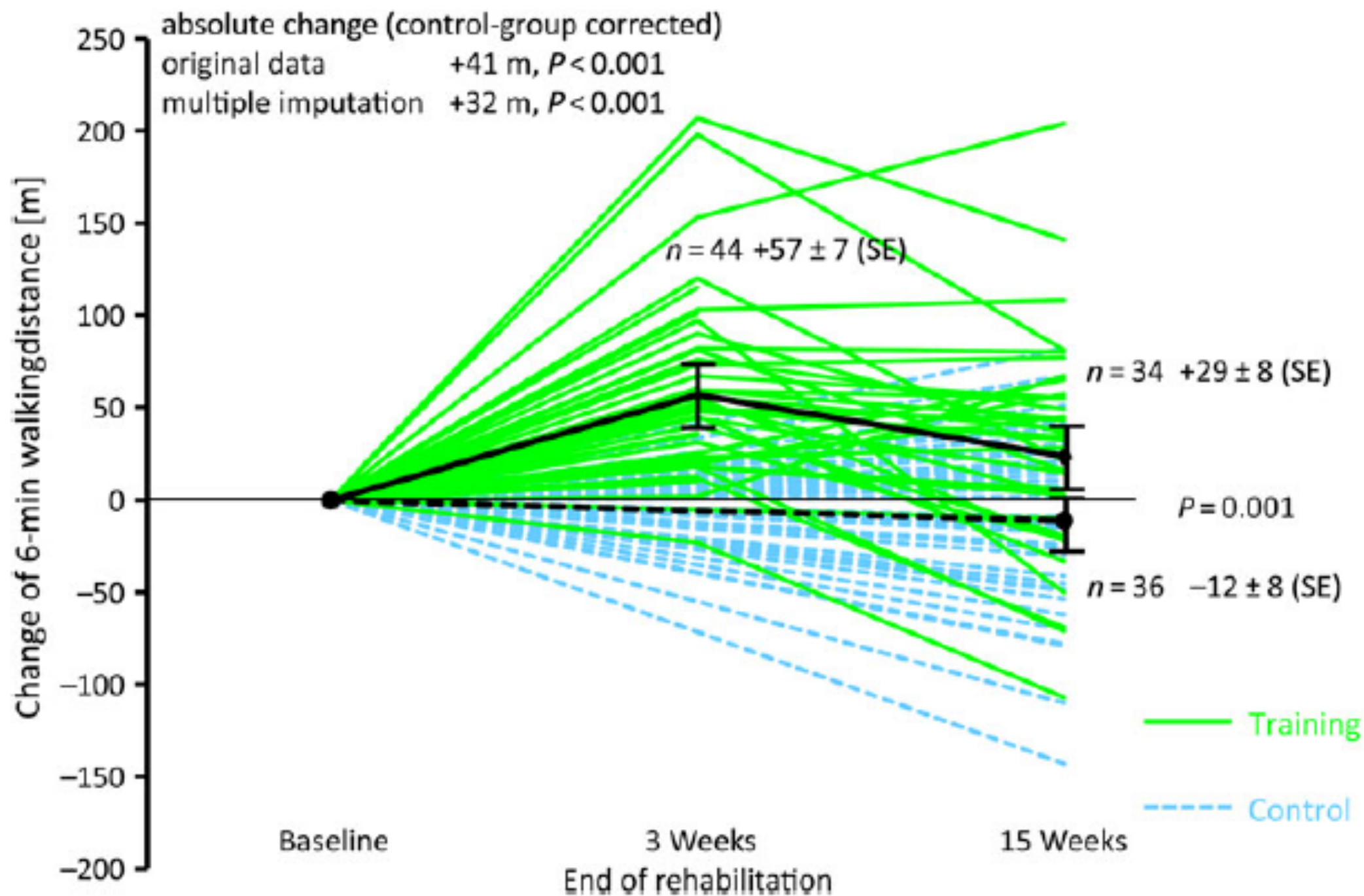
### C Change of cardiac output



### D Change of cardiac index







# Differential response to pulmonary rehabilitation in COPD: multidimensional profiling

Martijn A. Spruit<sup>1</sup>, Ingrid M.L. Augustin<sup>1</sup>, Lowie E. Vanfleteren<sup>1</sup>, Daisy J.A. Janssen<sup>1</sup>, Svetlana Gaffron<sup>2</sup>, Herman-Jan Pennings<sup>3</sup>, Frank Smeenk<sup>4</sup>, Willem Pieters<sup>5</sup>, Jan J.A.M. van den Bergh<sup>6</sup>, Arent-Jan Michels<sup>7</sup>, Miriam T.J. Groenen<sup>1</sup>, Erica P.A. Rutten<sup>1</sup>, Emiel F.M. Wouters<sup>1,8</sup> and Frits M.E. Franssen<sup>1</sup> on behalf of the CIRO+ Rehabilitation Network

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Dyspnoea, exercise performance, health status, mood status and problematic activities of daily life were assessed before and after a 40-session pulmonary rehabilitation programme in 2068 patients with COPD (mean forced expiratory volume in 1 s of 49% predicted). Patients were ordered by their overall similarity concerning their multidimensional response profile, which comprises the overall response on MRC dyspnoea grade, 6MWD, cycle endurance time, Canadian Occupational Performance Measure performance and satisfaction scores, Hospital Anxiety and Depression Scale anxiety and depression, and St George's Respiratory Questionnaire total score, using a novel non-parametric regression technique.

Patients were clustered into four groups with distinct multidimensional response profiles: n=378 (18.3%; "very good responder"), n=742 (35.9%; "good responder"), n=731 (35.4%; "moderate responder"), and n=217 (10.5%; "poor responder"). Patients in the "very good responder" cluster had higher symptoms of dyspnoea, number of hospitalisations <12 months, worse exercise performance, worse performance and satisfaction scores for problematic activities of daily life, more symptoms of anxiety and depression, worse health status, and a higher proportion of patients following an inpatient PR programme compared to the other three clusters.

A multidimensional response outcome needs to be considered to study the efficacy of pulmonary rehabilitation services in patients with COPD, as responses to regular outcomes are differential within patients with COPD.

Keywords: anxiety; depression; exercise; lung cancer; symptoms

## **Randomised controlled trial on the effectiveness of home-based walking exercise on anxiety, depression and cancer-related symptoms in patients with lung cancer**

H-M Chen<sup>1,2</sup>, C-M Tsai<sup>3,4</sup>, Y-C Wu<sup>4,5</sup>, K-C Lin<sup>6</sup> and C-C Lin<sup>\*,7</sup>

**Table 1. Demographic data and disease characteristics for all participants categorised based on the two groups (n = 116)**

Variables	Walking-exercise group, <i>n</i> = 58	Usual-care group, <i>n</i> = 58	<i>P</i> -value <sup>a</sup>
Age (years)			
Mean (s.d.)	64.76 (11.28)	63.57 (10.54)	0.559
Education (years)			
Mean (s.d.)	10.66 (4.73)	10.62 (4.66)	0.969
Sex ( <i>n</i> , %)			
Male	26 (44.8)	28 (48.3)	0.710
Female	32 (55.2)	30 (51.7)	
Employment ( <i>n</i> , %)			
No	42 (72.4)	34 (58.6)	0.118
Yes	16 (27.6)	24 (41.4)	
Marital status ( <i>n</i> , %)			
Married	48 (82.8)	48 (82.8)	1
Not married/single	10 (17.2)	10 (17.2)	
Cancer stage ( <i>n</i> , %)			
1	34 (58.6)	41 (70.7)	0.681
2	5 (8.6)	4 (6.9)	
3	6 (10.4)	5 (8.6)	
4	5 (8.6)	4 (6.9)	
Unknown	8 (13.8)	4 (6.9)	
Current treatment ( <i>n</i> , %)			
No treatment	19 (32.8)	17 (29.3)	0.889
Operation	30 (51.8)	33 (57.0)	
Chemotherapy	1 (1.7)	0 (0.0)	
Radiotherapy	2 (3.4)	2 (3.4)	
Target therapy	4 (6.9)	5 (8.6)	
Chemotherapy and radiotherapy	2 (3.4)	1 (1.7)	



## NEWS

# NICE recommends pulmonary rehabilitation programmes for patients with COPD

Jacqui Wise

London

Patients with stable chronic obstructive pulmonary disease (COPD) and exercise limitation due to breathlessness should be referred to a pulmonary rehabilitation programme, the National Institute for Health and Care Excellence (NICE) has recommended.

The updated quality standard from NICE<sup>1</sup> also recommended that patients admitted to hospital for an acute exacerbation of COPD should start a pulmonary rehabilitation programme within four weeks of discharge. NICE said that this reduces the short term risk of hospital readmission, as well as improving the quality of life and the short term exercise capacity of people with COPD.

or if they have often been exposed to harmful fumes, dust, or chemicals. Its prevalence increases with age, and the condition is closely associated with levels of deprivation.

The quality standard said that patients aged over 35 presenting with a risk factor and one or more symptoms of COPD should have a diagnosis confirmed by post-bronchodilator spirometry. To ensure early diagnosis the spirometry should be done in primary care, it added.

Other recommendations are that patients who have an inhaler prescribed should have their inhaler technique assessed when starting treatment and then regularly as treatment progresses. And people with stable COPD and a persistent resting stable