Réhabilitation respiratoire:

Patients non répondeurs, vraiement ?

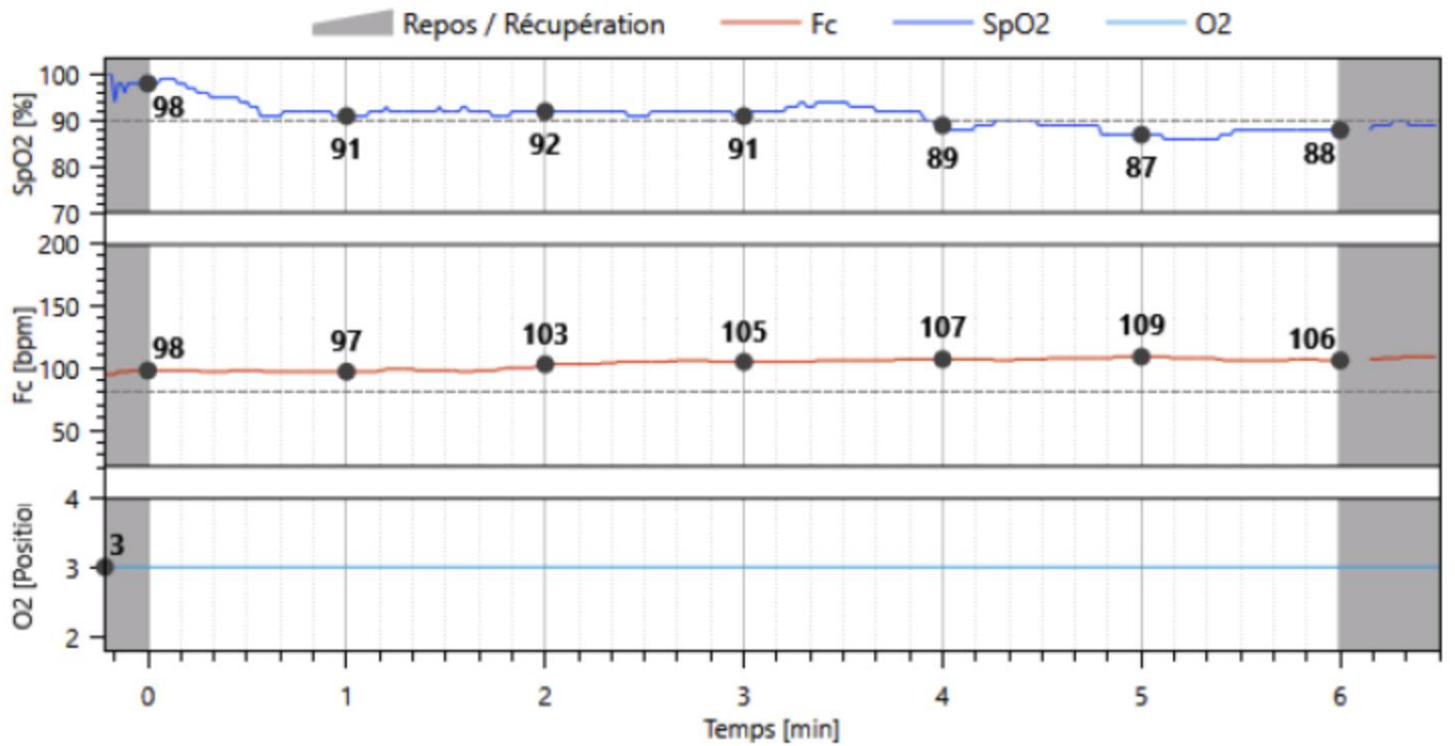
B. Egger 20.11.2025

Composition de la présentation

- Introduction :
  - impacts de la réhabilitation respiratoire
  - différences cliniques minimales
  - paramètres variables
- Non-répondeurs :
  - importance du problème – chronicité
  - critères unique ou multiples
  - caractéristiques – clusters à risque de non-réponse
- Solutions
- Conclusions

Cas 1

Patiente 1966
Dysfonction chronique du greffon
stade 3 phénotype BOS

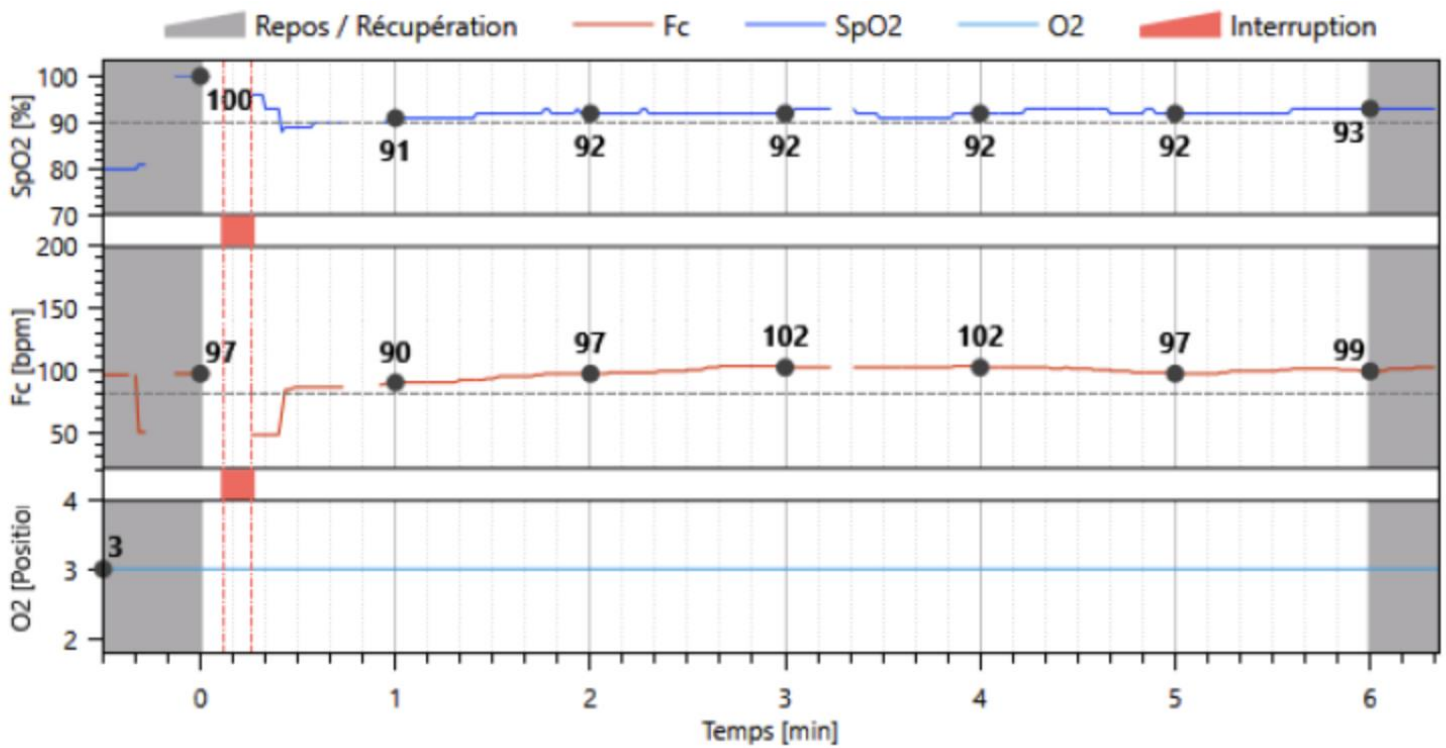


Résultats

Oxygène	3 (Inogen One G4)	Déambulateur	Non
Dyspnée (Borg)			
Repos	2	Récupération	8
Repos			
SpO2 moy.	98 %	Fc moy.	97 bpm
Effort			
SpO2 min.	86 %	Fc max.	109 bpm
SpO2 moy.	91 %	Fc moy.	103 bpm
Delta (récupération - repos)			
SpO2	-8 % = -8 % vr	Fc	9 bpm = 10 % vr
Distance			
Parcourue	300 m (56 % D.Th)	Vitesse moy.	0,83 m/s
Théorique (Enright)	532 m	Théorique min.	393 m

Question en fin de RR = avez-vous profiter de la prise en charge ici ?

=> Absolument, comme à chaque fois, tout était magnifique et je continue en ambulatoire



Résultats

Oxygène	3 (Inogen One G3)	Déambulateur	Non
Dyspnée (Borg)			
Repos	1	Récupération	9
Repos			
SpO2 moy.	100 %	Fc moy.	90 bpm
Effort			
SpO2 min.	88 %	Fc max.	103 bpm
SpO2 moy.	92,1 %	Fc moy.	97 bpm
Delta (récupération - repos)			
SpO2	5,6 % = 6 % vr	Fc	9 bpm = 10 % vr
Distance			
Parcourue	330 m (62 % D.Th)	Vitesse moy.	0,92 m/s
Théorique (Enright)	532 m	Théorique min.	393 m

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Impact de l'activité physique

CHEST

Original Research

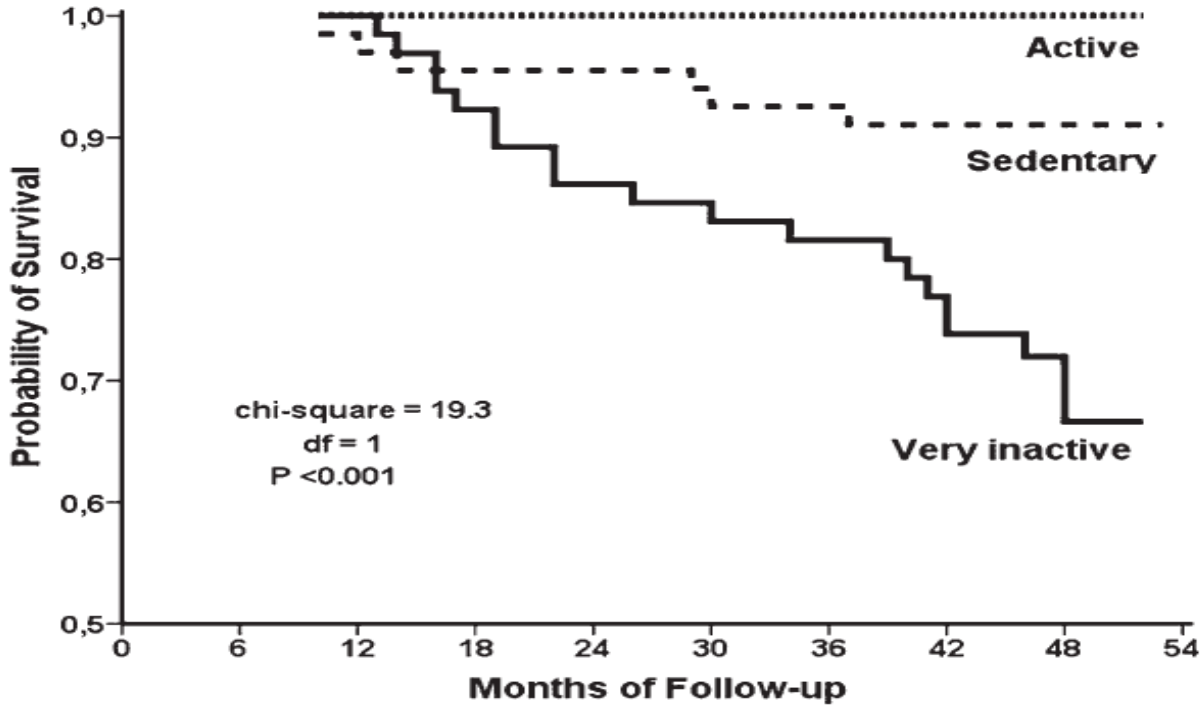
COPD

Physical Activity Is the Strongest Predictor of All-Cause Mortality in Patients With COPD

A Prospective Cohort Study

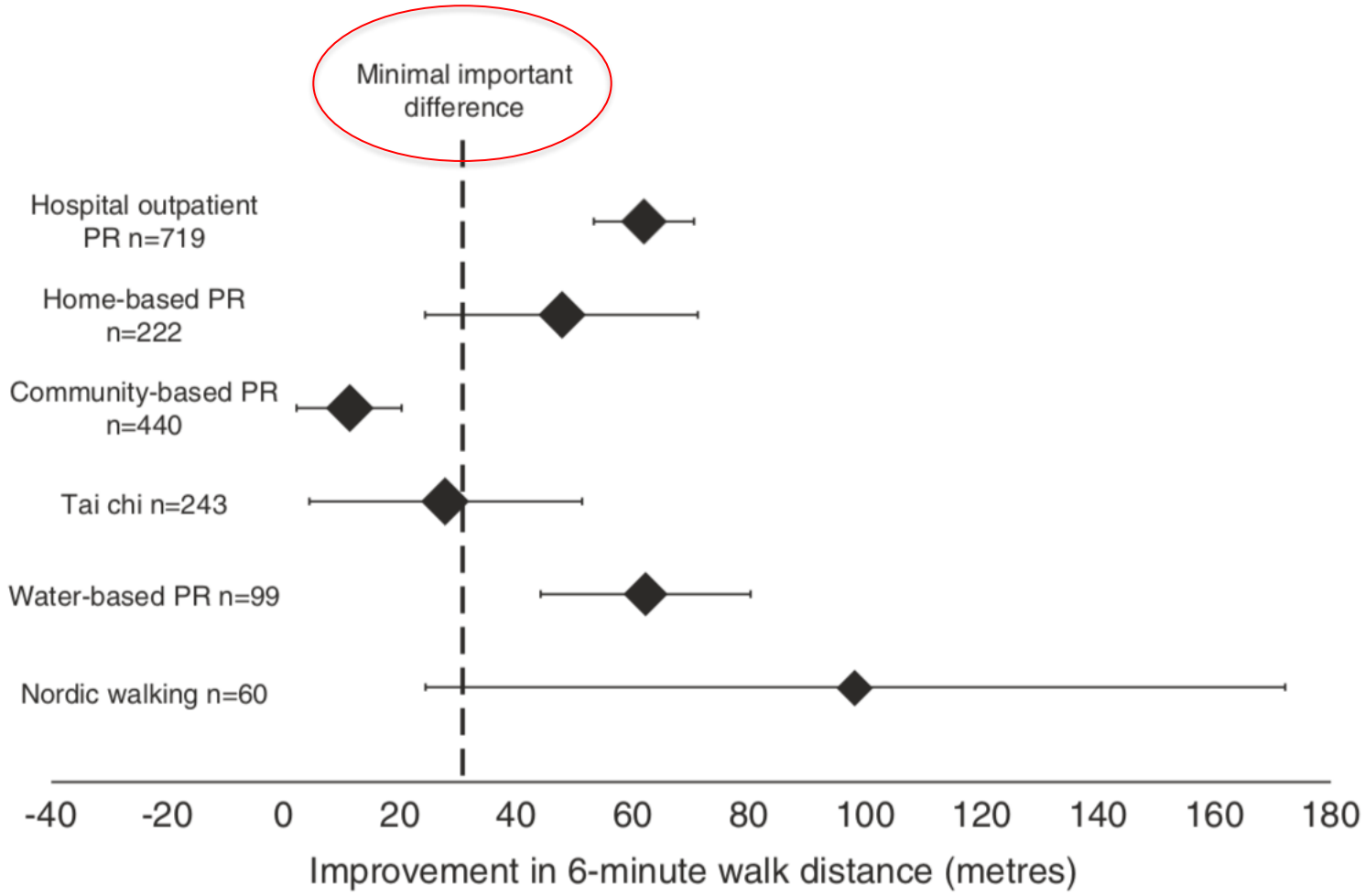
Benjamin Waschki, MD; Anne Kirsten, MD; Olaf Holz, PhD; Kai-Christian Müller, PhD; Thorsten Meyer, PhD; Henrik Watz, MD; and Helgo Magnussen, MD

Chest 2011; 140/2: 331



Impact de la Réhabilitation respiratoire (TM6')

Fig. 22.1 Improvement in 6-min walk distance following traditional pulmonary rehabilitation and alternative programs in people with COPD. Data are means and 95% confidence intervals taken from systematic reviews [1, 5, 26, 31] and original studies [35]. *Dotted line* represents minimal important difference; *n* represent the number of participants



Impact de la Réhabilitation respiratoire (QdV)

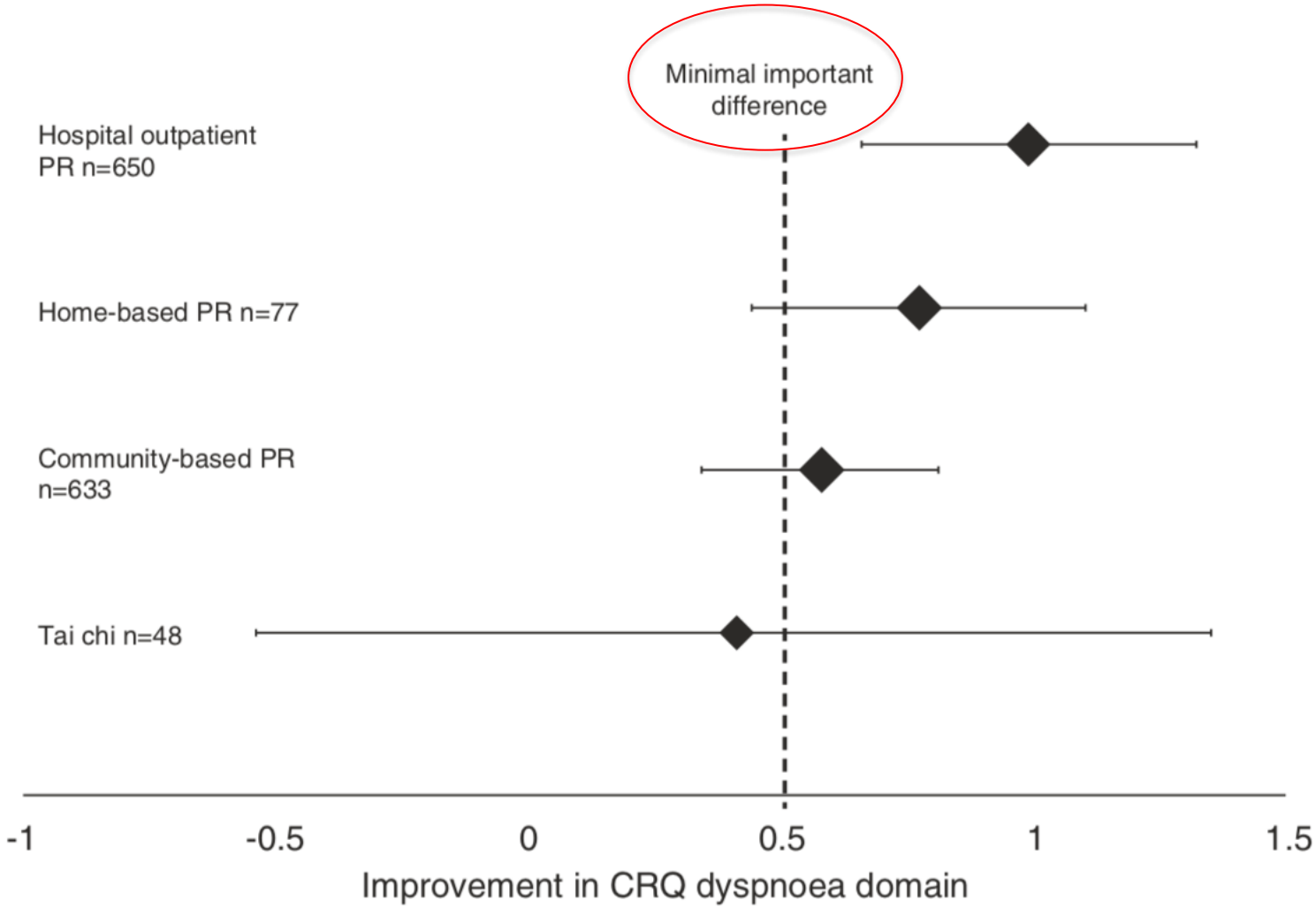


Fig. 22.2 Improvement in health-related quality of life following traditional pulmonary rehabilitation and alternative programs in people with COPD. Data are means and 95% confidence intervals for the Chronic Respiratory Questionnaire Dyspnoea domain, taken from systematic [1, 5, 31]. *Dotted line* represents minimal important difference; *n* represent the number of participants. CRQ—chronic respiratory questionnaire

Meta-Analysis › Ann Am Thorac Soc. 2023 Feb;20(2):307-319.
doi: 10.1513/AnnalsATS.202206-545OC.

Safety and Efficacy of Inpatient Pulmonary Rehabilitation for Patients Hospitalized with an Acute Exacerbation of Chronic Obstructive Pulmonary Disease: Systematic Review and Meta-analyses

Débora Petry Moecke [1 2], Kai Zhu [1 2], Jagdeep Gill [1 2], Shanjot Brar [1 2], Polina Petlitsyna [2], Ashley Kirkham [2], Mirha Girt [3], Joel Chen [4], Hannah Peters [2], Holly Denson-Camp [2], Stephanie Crosbie [2], Pat G Camp [1 2]

Impact de la RR en exacerbation

Abstract

Rationale: Pulmonary rehabilitation (PR) during hospitalization for acute exacerbations of chronic obstructive pulmonary disease (AECOPD) occurs during a period of disease instability for the patient, and the safety and efficacy of PR, specifically during the hospitalization period, have not been established. **Objective:** The purpose of this review is to determine the safety and efficacy of PR during the hospitalization phase for individuals with AECOPD. **Methods:** Scientific databases were searched up to August 2022 for randomized controlled trials that compared in-hospital PR with usual care. PR programs commenced during the hospitalization and included a minimum of two sessions. Titles and abstracts followed by full-text screening and data extraction were conducted independently by two reviewers. The intervention effect estimates were calculated through meta-analysis using a random-effect model. **Results:** A total of 27 studies were included (n = 1,317). The meta-analysis showed that inpatient PR improved the 6-minute-walk distance by 105 m (P < 0.001). Inpatient PR improved the performance on the five-repetition sit-to-stand test by -7.02 seconds (P = 0.03). Quality of life (QOL), as measured by the 5-level EuroQoL Group-5 dimension version (EQ-ED-5L) and the St. George's Respiratory Questionnaire, was significantly improved by the intervention. Inpatient PR increased lower limb muscle strength by 33.35 N (P < 0.001). There was no change in the length of stay. Only one serious adverse event related to the intervention was reported. **Conclusions:** This review suggests that it is safe and effective to provide PR during hospitalization for individuals with AECOPD. In-hospital PR improves functional exercise capacity, QOL, and lower limb strength without prolonging the hospital length of stay.

Impact de la RR post exacerbation

JAMA | Original Investigation

Association Between Initiation of Pulmonary Rehabilitation After Hospitalization for COPD and 1-Year Survival Among Medicare Beneficiaries

Peter K. Lindenauer, MD, MSc; Mihaela S. Stefan, MD, PhD; Penelope S. Pekow, PhD; Kathleen M. Mazor, EdD; Aruna Priya, MA, MSc; Kerry A. Spitzer, PhD, MPA; Tara C. Lagu, MD, MPH; Quinn R. Pack, MD, MSc; Victor M. Pinto-Plata, MD; Richard ZuWallack, MD

JAMA. 2020;323(18):1813-1823. doi:10.1001/jama.2020.4437

Figure 1. Patient Selection in a Study of Pulmonary Rehabilitation After Hospitalization for COPD

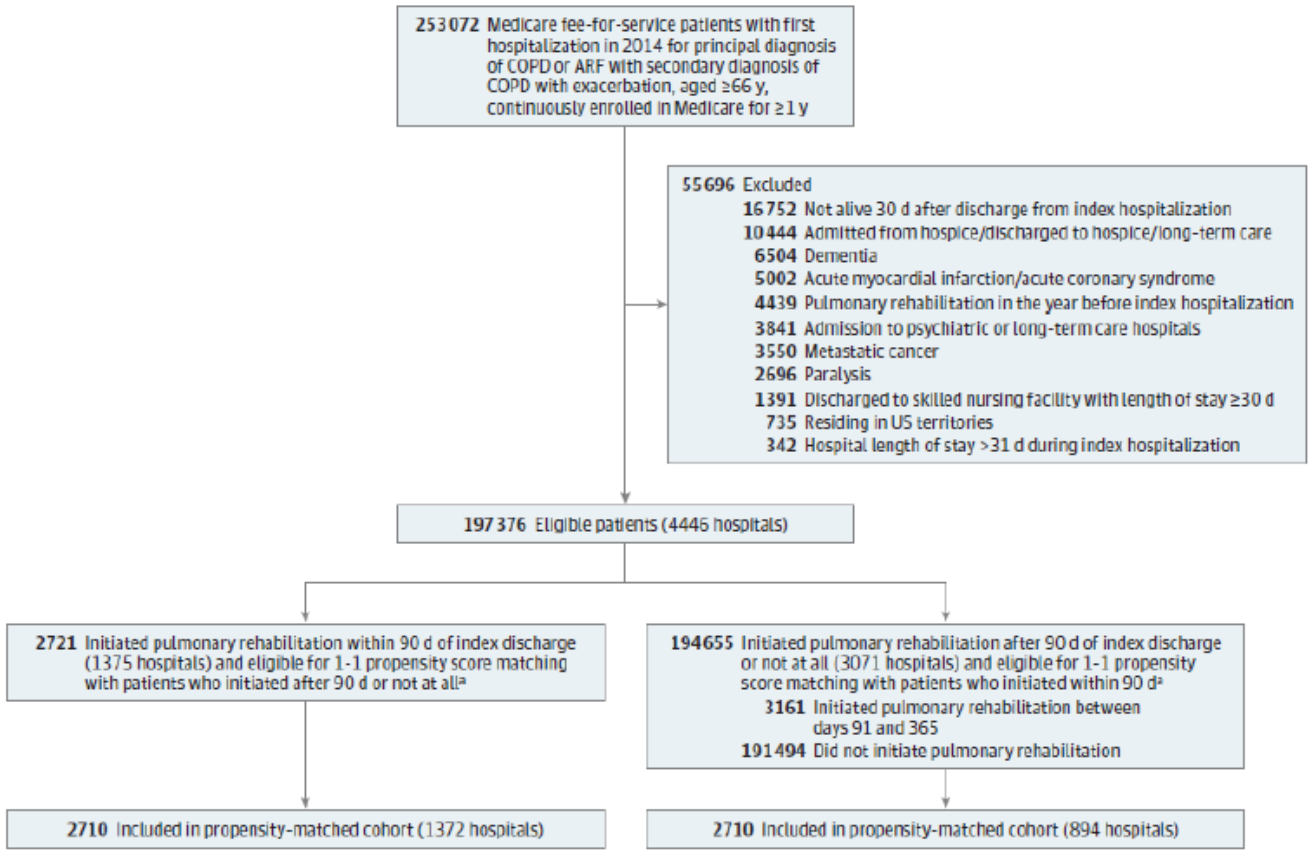
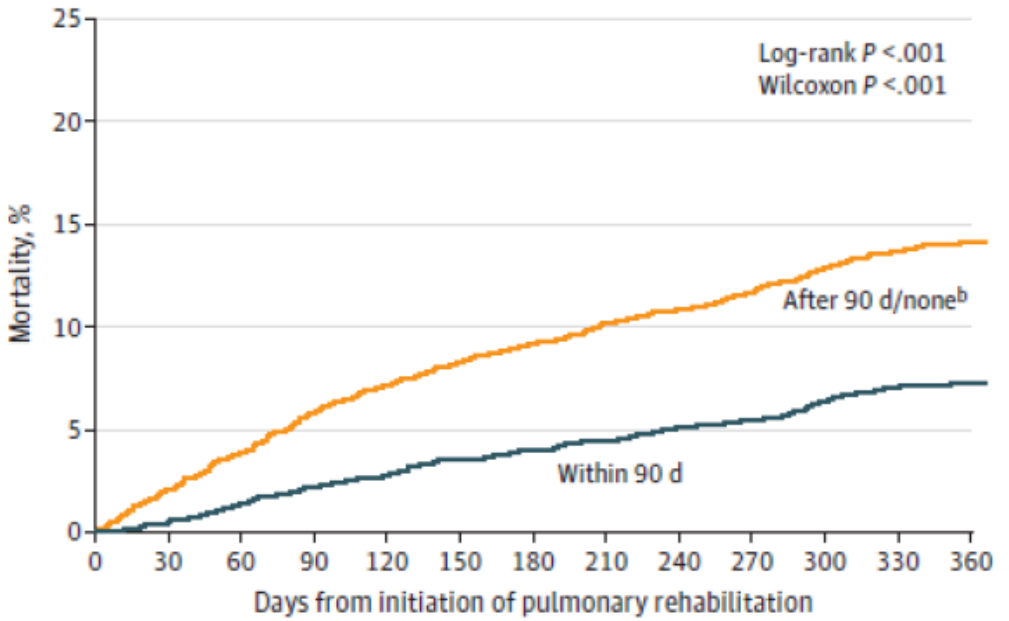


Figure 3. One-Year Mortality After Initiation of Pulmonary Rehabilitation in the Propensity-Matched Cohort[a]



No. at risk				
After 90 d/none[b]	2710	2538	2449	2361
Within 90 d	2709	2645	2591	2538

Impact du maintien

Maintenance Pulmonary Rehabilitation: An Update and Future Directions

Marilyn L Moy

RESPIRATORY CARE • JUNE 2024 VOL 69 NO 6

Conclusions :

Post RR, on doit proposer à tous les patients de continuer à suivre un programme de RR/entretien

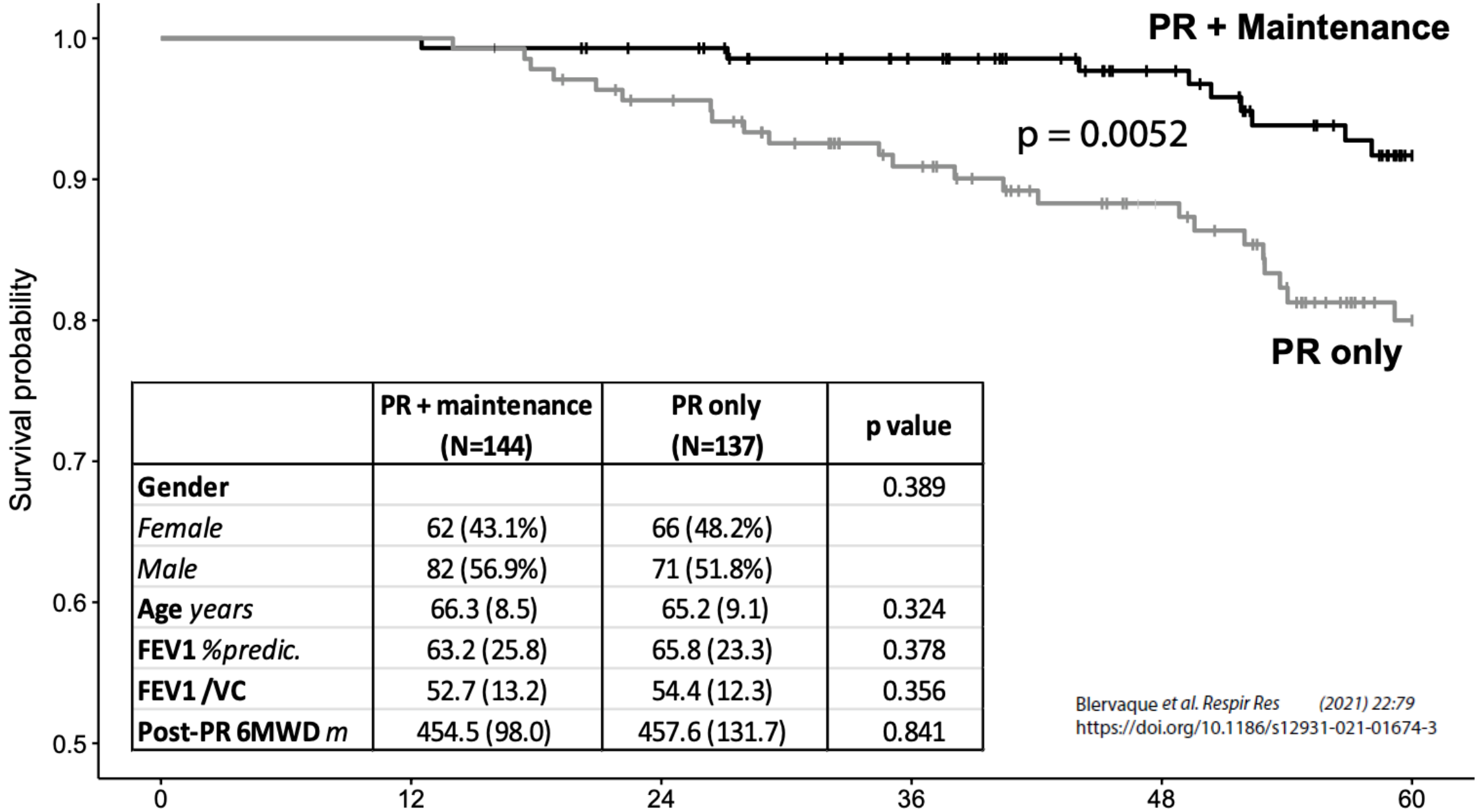
Actuellement, la fréquence optimale, le contenu et l'intensité de l'exercice, ainsi que le mode d'exécution de la RR d'entretien chez les personnes atteintes de BPCO et d'autres maladies respiratoires chroniques sont encore inconnus.

Dans le cadre des ressources limitées, un équilibre doit être trouvé entre les priorités concurrentes des RR intensives et les programmes de RR d'entretien

Table 6 Systematic reviews of maintenance PR: summary of selective studies

Study	No of trials	Review question		Results
Malaguti, 2021[185]	21	Supervised maintenance programmes following pulmonary rehabilitation compared with usual care for COPD.	+	Supervised maintenance programmes not associated with increased adverse events, may improve health-related quality of life, and could improve exercise capacity at 6–12 months. Strength of evidence was limited (high risk of bias and small sample size).
Imamura, 2020[186]	7	Long-term efficacy of pulmonary rehabilitation with home-based or low frequent maintenance programmes in COPD patients compared with those who had no maintenance programme.	+	PR with maintenance significantly improved 6MWT, but not HRQOL was observed.
Jenkins, 2018[187]	8	Efficacy of supervised maintenance exercise programmes following pulmonary rehabilitation compared with usual care on healthcare use.	+	Supervised maintenance exercise led to clinically important reduction in the rate of respiratory-cause hospital, overall risk of an exacerbation and mortality).
Busby, 2014[188]	8	Review of existing maintenance interventions following pulmonary rehabilitation	(+)	Most studies showed initial positive intervention effects, which declined to non-significance within 3–12 months after completion of maintenance.

COPD, chronic obstructive pulmonary disease; HRQOL, health-related quality of life; 6MWT, 6 min walk tests; PR, pulmonary rehabilitation.



	PR + maintenance (N=144)	PR only (N=137)	p value
Gender			0.389
Female	62 (43.1%)	66 (48.2%)	
Male	82 (56.9%)	71 (51.8%)	
Age *years*	66.3 (8.5)	65.2 (9.1)	0.324
FEV1 *%predic.*	63.2 (25.8)	65.8 (23.3)	0.378
FEV1 /VC	52.7 (13.2)	54.4 (12.3)	0.356
Post-PR 6MWD *m*	454.5 (98.0)	457.6 (131.7)	0.841

Blervaque *et al. Respir Res* (2021) 22:79
https://doi.org/10.1186/s12931-021-01674-3

Fig. 3. 5-year survival probability for the "PR + maintenance" and "PR only" groups. Curves: Kaplan–Meier analysis; gray line: "PR only" group; black line: "PR + maintenance" group. Table: Comparison of main clinical characteristics of the "PR + maintenance" and "PR only" groups

En résumé

TABLE 1 Benefits and evidence levels of pulmonary rehabilitation outcomes in chronic obstructive pulmonary disease (COPD)

Benefits	Evidence
Improves exercise capacity	A
Reduces the perceived intensity of breathlessness	A
Improves health-related quality of life	A
Reduces the number of hospitalisations and hospital days	A
Reduces anxiety and depression associated with COPD	A
Strength and endurance training of the upper limbs improves arm function	B
Benefits extend well beyond the immediate period of training	B
Improves survival	B → A
Respiratory muscle training can be beneficial, especially when combined with general exercise training	C

Category A: randomised controlled trials, rich body of data; Category B: randomised controlled trials, limited body of data; Category C: nonrandomised trials or observational studies. Reproduced from [3] with permission from the publisher.

Eur Respir Rev 2013; 22: 128, 178–186
DOI: 10.1183/09059180.00000513

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Différences cliniques minimales

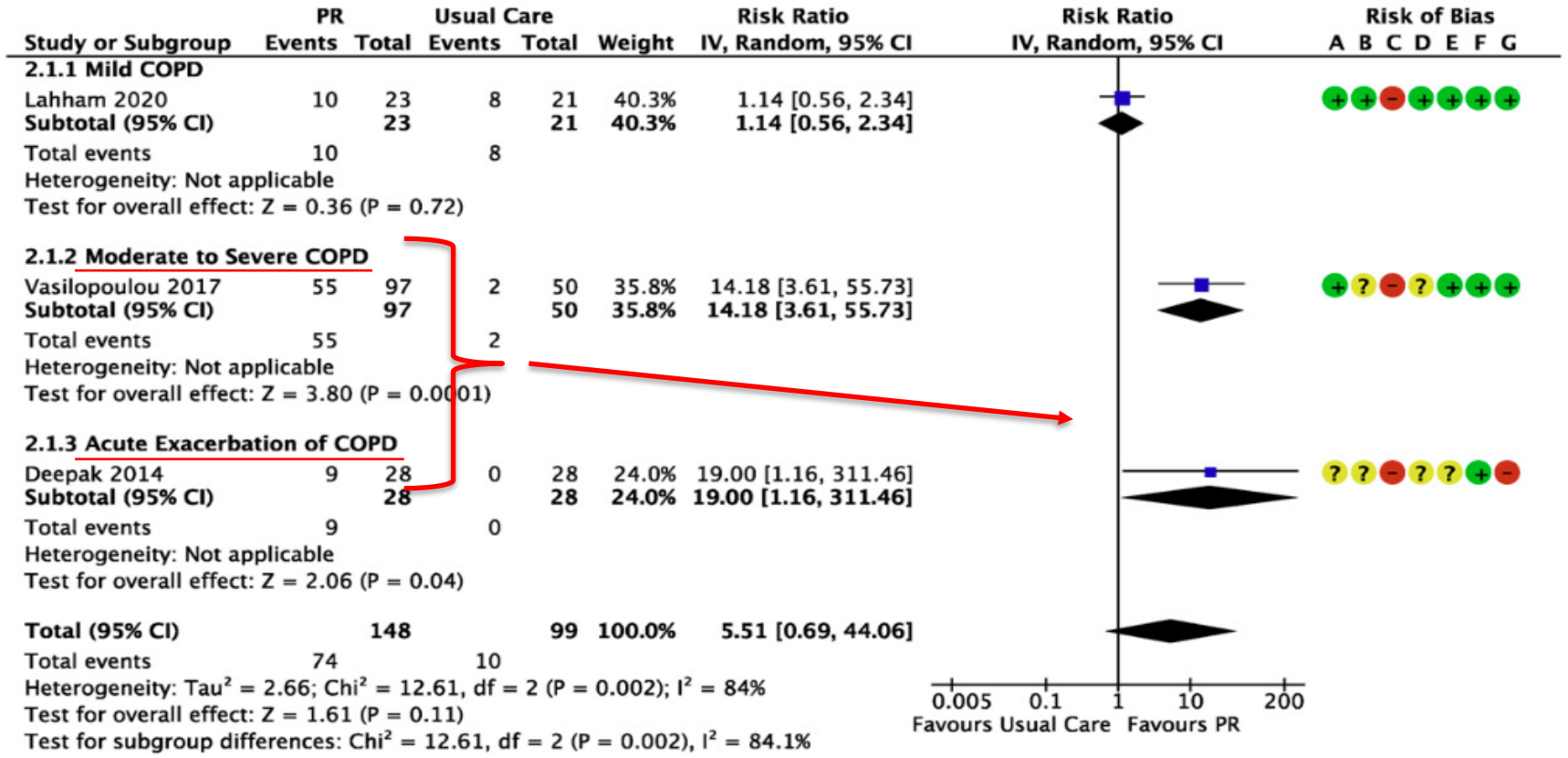
Table 1: Minimal Clinically Important Differences for Commonly Used Outcomes in Chronic Obstructive Pulmonary Disease

Endpoint	MCID (Improvement)	Method of Estimation	Reference
Lung function			
Trough FEV_1	100 ml	Anchor-based (exacerbations, patient perception, 2-yr decline in lung function)	9
Inspiratory capacity (IC)	150 mL		
Exacerbations	No validated MCID	—	—
Dyspnea			
TDI total score	1 unit	Anchor-based (physician's global evaluation score), distribution-based (SEM, 0.5 SD), expert preference	19
mMRC	1 unit		
UCSD SOBQ	5 units	Anchor-based (CRQ dyspnea domain, TDI), distribution-based (SEM, Cohen's effect size), estimate by experienced users	20
Health status			
SGRQ total score	4 units	Anchor-based (MRC dyspnea grade, CRQ dyspnea domain, mortality rate), expert and patient preference	23
CRQ domain scores	0.5 units (average)*	Anchor-based (patient perspectives), distribution-based (SEM, Cohen's effect size), expert panel-based	24
Exercise capacity			
6-min walk distance	26 ± 2 m (patients with severe COPD)	Anchor-based (SGRQ, UCSD SOBQ), distribution-based (SEM, Cohen's effect size, empirical rule effect size)	31
Incremental shuttle walking test	47.5 m	Anchor-based (patient perception)	32
Endurance shuttle walking test	45–85 s	Anchor-based (patient perception), distribution-based (0.5 SD)	33
Constant-load cycling endurance tests	46–105 s	Distribution-based (0.5 SD)	8
Dyspnea during exercise tests			
Modified Borg scale	1 unit	Distribution-based (Cohen's effect size)	39
Visual analog scale	10–20 units	Distribution-based (Cohen's effect size)	39

Definition of abbreviations: COPD = chronic obstructive pulmonary disease; CRQ = Chronic Respiratory Questionnaire; MCID = minimal clinically important difference; MRC = Medical Research Council; SGRQ = St George's Respiratory Questionnaire; TDI = Transition Dyspnea Index; UCSD SOBQ = University of California, San Diego Shortness of Breath Questionnaire.
*The MCIDs for the individual domains differ around this mean estimate.

Am J Respir Crit Care Med Vol 189, Iss 3, pp 250–255, Feb 1, 2014

A:



B:

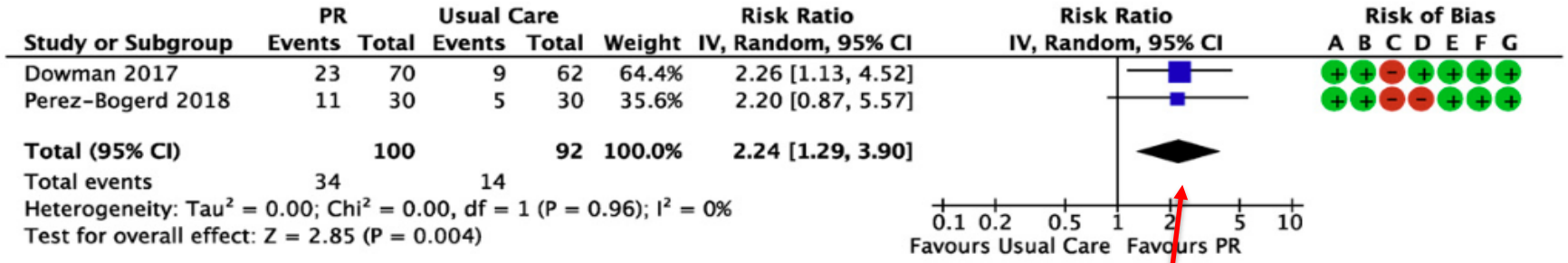


Figure 2. Meta-analysis of the number of participants to achieve MCID in 6MWT following A) pulmonary rehabilitation vs usual care in COPD; B) pulmonary rehabilitation vs usual care in ILD;

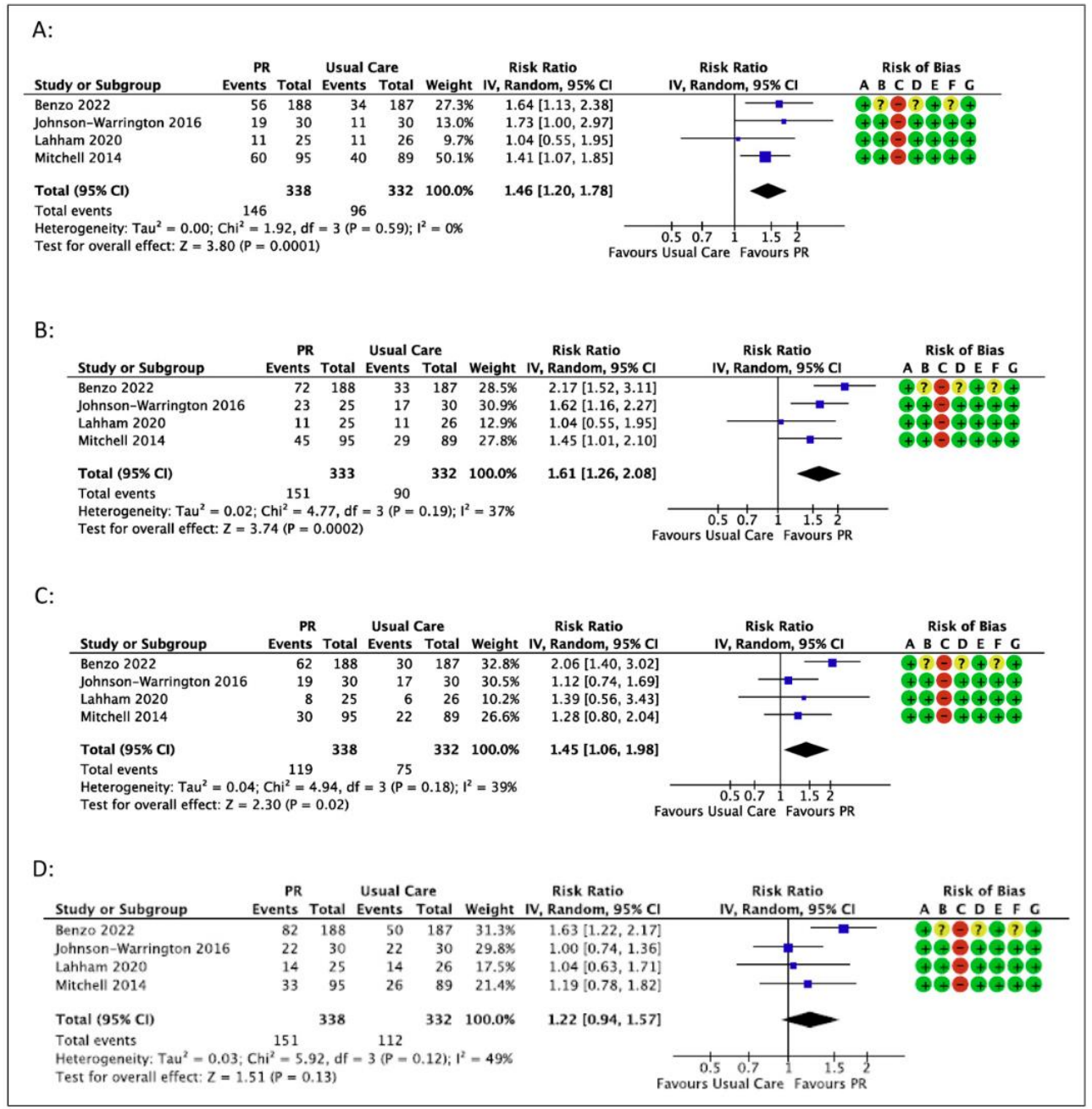


Figure 3. Meta-analysis of the number of participants to achieve MCID following pulmonary rehabilitation vs usual care in COPD in A) CRQ-Dyspnea B) CRQ-Fatigue C) CRQ-emotional function; or D) CRQ-Mastery. Events = number of participants in group to achieve MCID; Totals = total number of participants in group.

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Variétés des programmes de RR

enseignements

exercices physiques

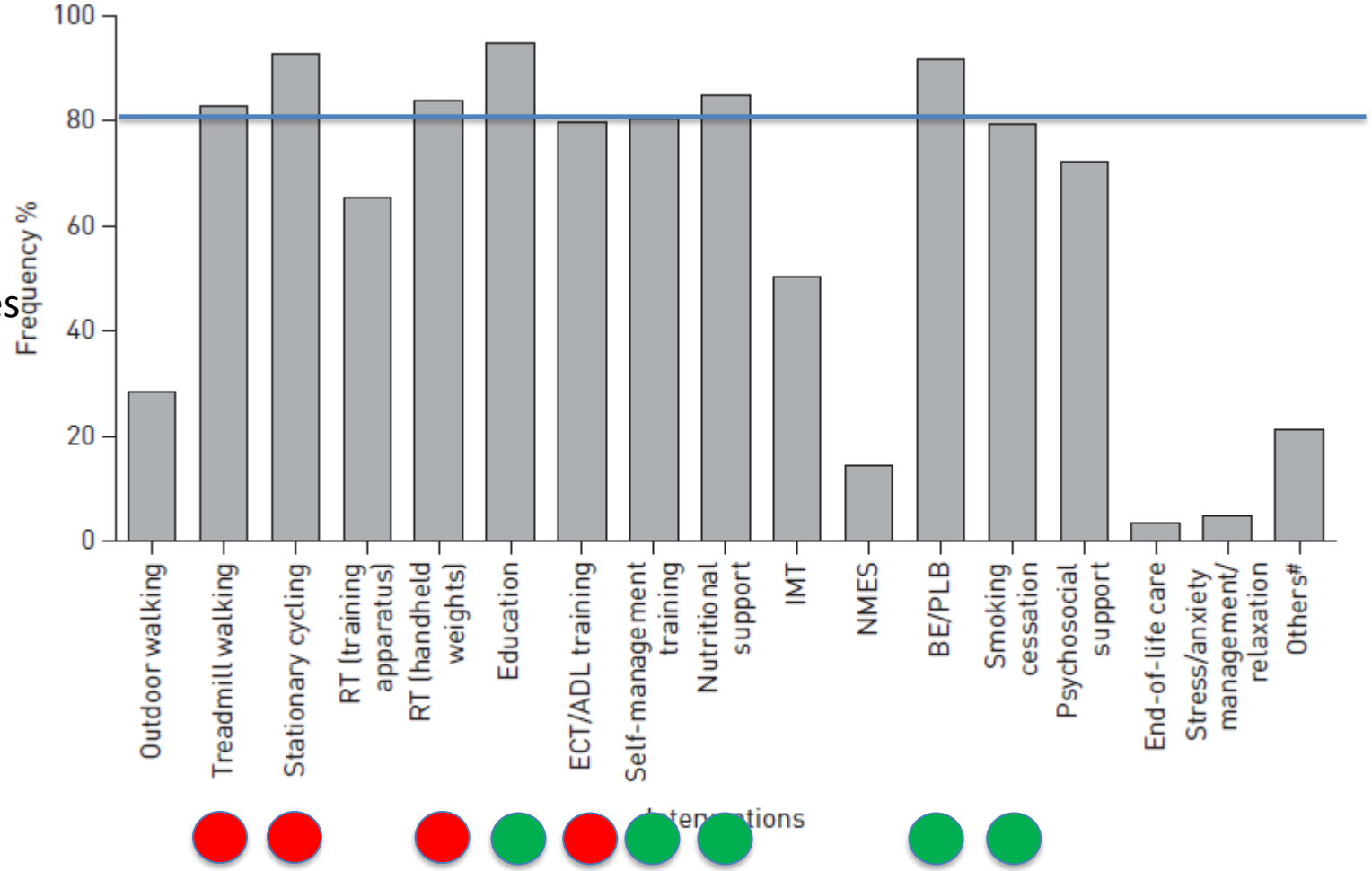

FIGURE 6 Frequency of the types of interventions in the pulmonary rehabilitation programme. RT: resistance training; ECT: energy conservation techniques; ADL: activities of daily life; IMT: inspiratory muscle training; NMES: neuromuscular electrical stimulation; BE: breathing exercise; PLB: pursed lips breathing; #: includes, but not limited to, other types of physical exercise training, goal setting, airway clearance techniques, water therapy, psychomotor therapy, enhanced art therapy, arm cranking and support group.

Respir J 2014; 43: 1326–1337

Variétés des indicateurs en RR

Indicateurs régulièrement retrouvés pour mesurer l'efficacité de la RR :

- Symptômes :
  - MRC/mMRC
  - fatigue (FACIT-F)
  - COPD assessment test (CAT)
- QdVie :
  - CRQ - SGRQ
- Psychologique :
  - symptômes d'anxiété et dépression par échelle HADS-A/D.
- Capacité d'effort :
  - capacité fonctionnelle : « sit-to-stand » (STS)
  - déconditionnement : test de marche de 6 minutes (6MWT)
  - temps d'endurance à vélo
  - force de préhension et contraction isométrique volontaire maximale du quadriceps (QMVC)

Variétés des patients

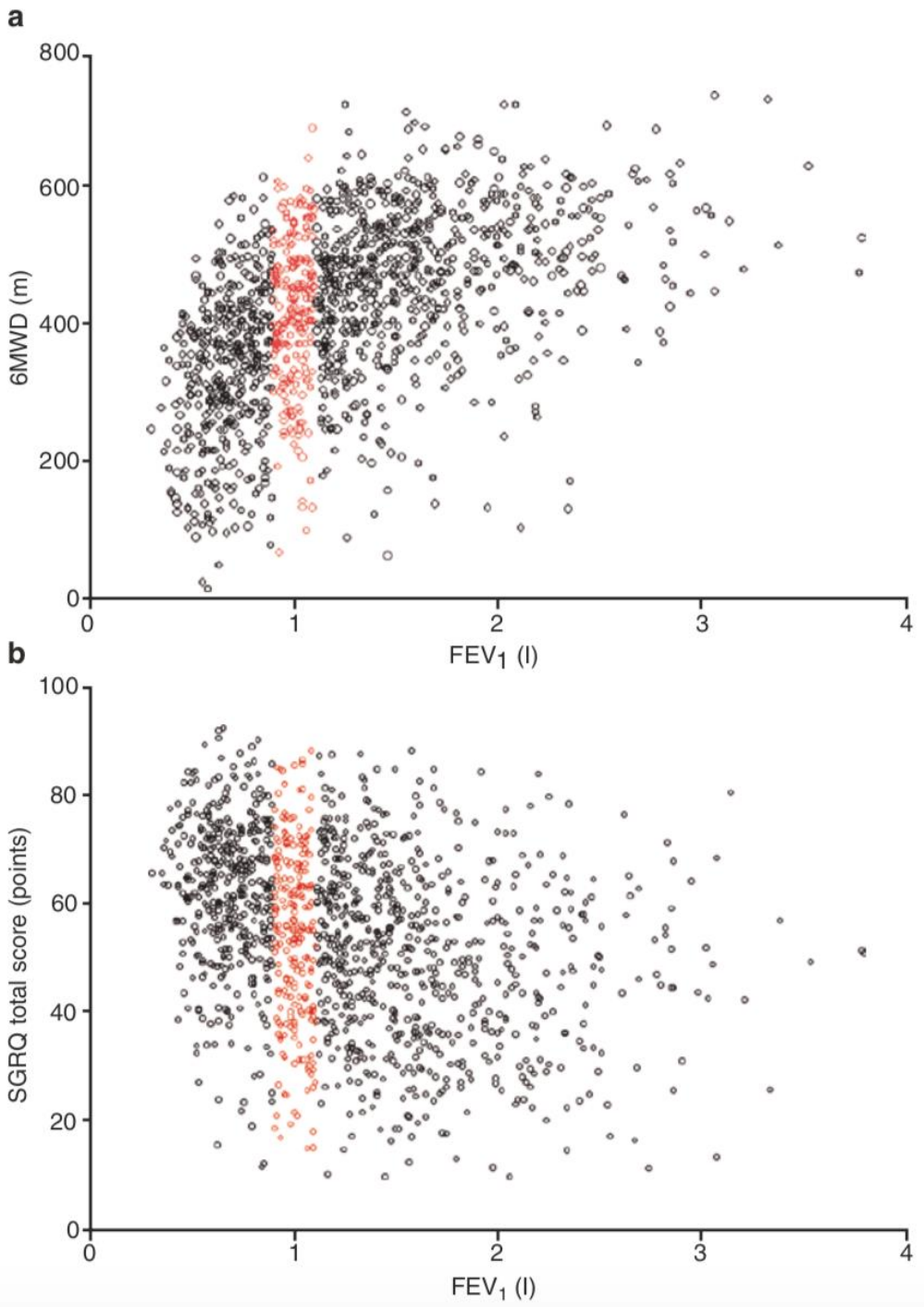

Fig. 4.1 1326 patients with COPD from the CIRO® dataset. (**a**) Correlation between forced expiratory volume in the first second: FEV1 and 6-min walking distance. (**b**) Correlation between FEV1 and SGRQ: St. George Respiratory Questionnaire (Courtesy of Dr. Martijn Spruit)

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Importance des non-répondeurs

DISABILITY AND REHABILITATION
2022, VOL. 44, NO. 16, 4389–4397
https://doi.org/10.1080/09638288.2021.1907455

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RESEARCH PAPER

Experiences in responders and non-responders to pulmonary rehabilitation among people with chronic obstructive pulmonary disease: a clinical study with convergent mixed analysis

Charlotte Simonÿ[a,b], Claus Riber Højfeld[a], Brian Clausen[a], Regner Birkelund[b,c] and Uffe Bodtger[b,d,e]

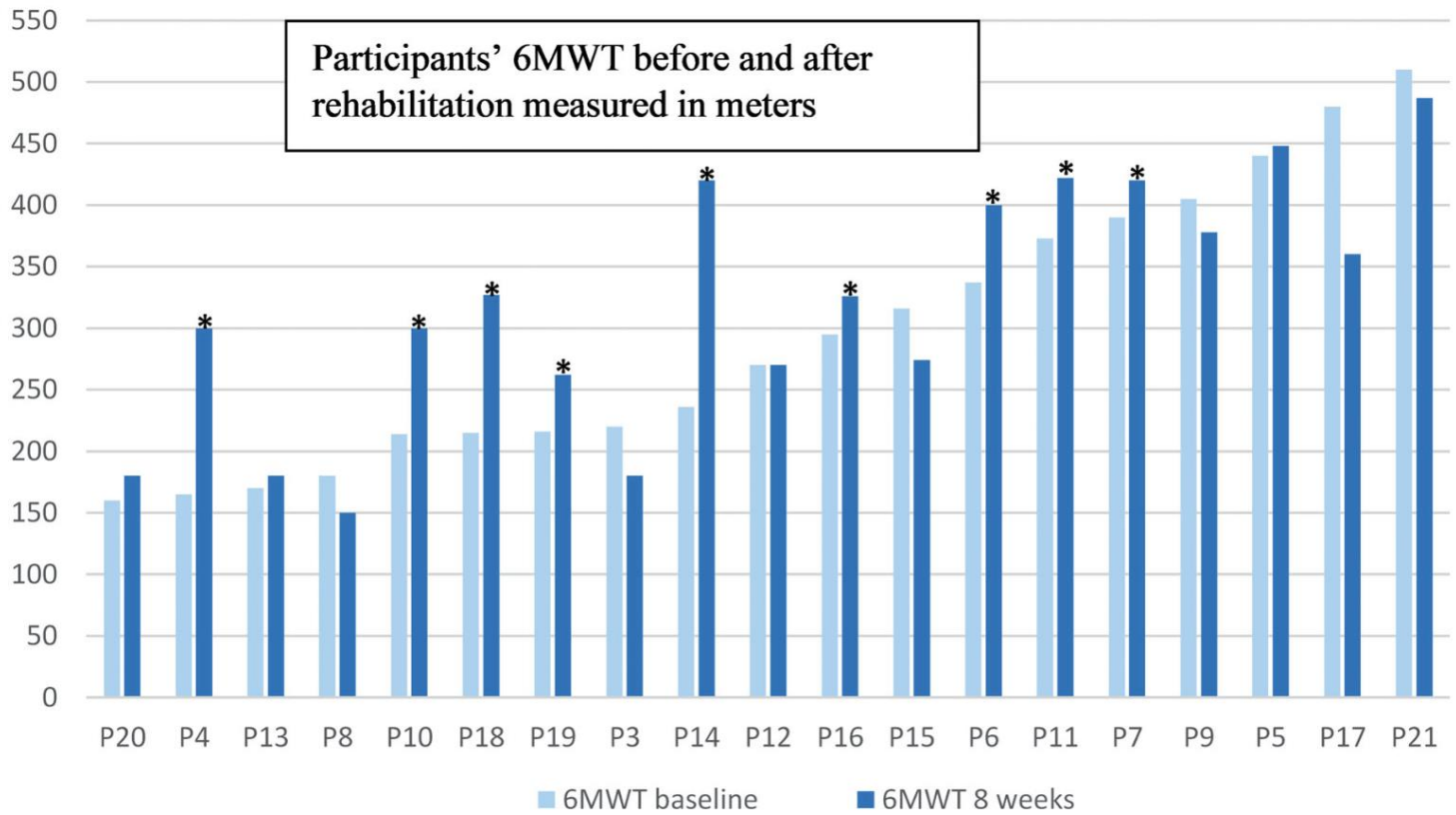

Figure 1. An outline of responders and non-responders, base on 6MWT results. Participants are sorted according to their baseline 6MWT result (lowest to highest). *Responders. Classified by changes from baseline $\geq$ 30 meters.

Conference Abstract Free

Non-responders to outpatient pulmonary rehabilitation: a retrospective, controlled cohort study

Kristina Gugg | R. H. Zwick

European Respiratory Journal 2020 56(suppl 64): 715; DOI: https://doi.org/10.1183/13993003.congress-2020.715

Abstract

Background: Outpatient pulmonary rehabilitation is well established in COPD as part of an integrated treatment approach, but data on responders and non-responders are scarce.

Objectives: The aim of our study was to determine the characteristics of non-responders to outpatient pulmonary rehabilitation.

Methods: Data on 516 COPD patients were analysed retrospectively. Definition of non-response was according to their 6-minute-walking-test (6MWT) improvement (minimal important difference (MID) < 25m). Within the non-responders, we defined 2 subgroups: patients with an improvement of 1-24m in their 6MWT and non-improvers, whose 6MWT deteriorated. Statistical analysis was performed with SPSS (Version 24).

Results: 306 (59%) patients were responders, 210 (41%) patients non-responders. Within the non-responders, 122 (57,8%) patients improved and 89 (42,2%) patients did not improve. Non-responders showed higher initial 6MWT (female: p=0.002, male: p= 0.006). Analysis of COPD GOLD stages I-IV showed 38.5% of COPD I°, 40.8% of COPD II°, 42% of COPD III° and 37.1% of COPD IV° patients to be non-responders. For COPD GOLD A-D, 41.4% patients in GOLD A, 44.7% in GOLD B, 28.2% in GOLD C, and 46.8% of patients in GOLD D were non-responders.

Conclusions: The non-responder rate in our cohort is low. The best value of predicting a non-responder is the 6MWT, which is equally reliable for men and women. The non-responder rate within COPD I-IV is around 40% and therefore independent of lung function. Within COPD A-D, group C shows a disproportionately high responder rate.

Review Article

Chronic Respiratory Disease

Clinically important changes and adverse events with centre-based or home-based pulmonary rehabilitation in chronic respiratory disease: A systematic review and meta-analysis

Chronic Respiratory Disease
Volume 21: 1–18

DOI: 10.1177/14799731241277808
journals.sagepub.com/home/crd
Sage

Table 3. Percentage of participants achieving minimal clinical important differences in exercise capacity and health-related quality of life.

Pulmonary rehabilitation (PR) vs. usual care (UC)

	6MWD		ISWT		ESWT		CRQ-D		CRQ-F		CRQ-E		CRQ-M		SGRQ	
Study	PR	UC	PR	UC	PR	UC	PR	UC	PR	UC	PR	UC	PR	UC	PR	UC
Benzo 2022							30	18	38	18	33	16	44	27		
Cedeno de Jesus 2022	75	47														
Deepak 2014	32	0													82	4
Dowman 2017	33	15					42	30	59	23	45	38	57	33		
Gottlieb 2011															23	35
Johnson-Warrington 2016			50	41	50	47	63	37	92	57	63	57	73	73		
Lahham 2020	43	38					44	42	44	42	32	23	56	54		
Mitchell 2014			20	10	35	17	63	45	47	33	32	25	35	29		
Perez-Bogerd 2018	37	15														
Vasilopoulou 2017	57	4														

Journal of
Clinical Medicine

MDPI

Article

High Prevalence of Non-Responders Based on Quadriceps Force after Pulmonary Rehabilitation in COPD

Marion Desachy [1,2,*], François Alexandre [2], Alain Varray [1], Virginie Molinier [2], Elodie Four [3], Laurène Charbonnel [3] and Nelly Héraud [2]

J. Clin. Med. **2023**, *12*, 4353.

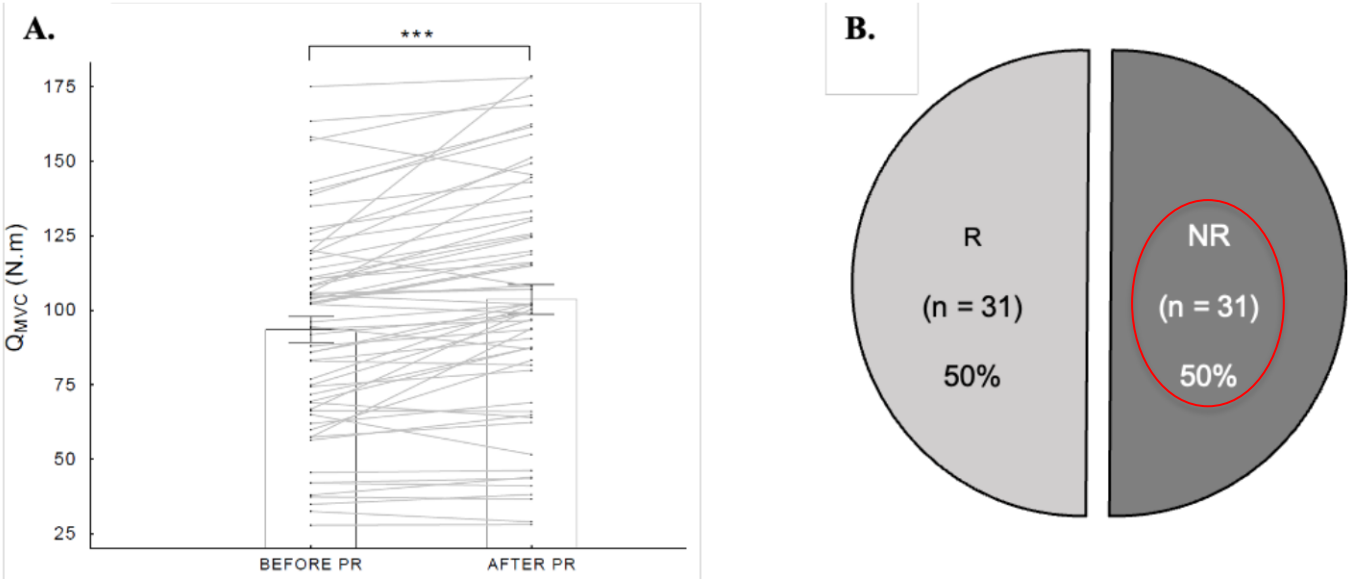

Figure 2. Effects of pulmonary rehabilitation on muscle force:(**A**) average increase in Q_{MVC} before and after pulmonary rehabilitation; (**B**) prevalence of non-responders (NR) and responders (R). Abbreviations: R: responders; NR: non-responders; $Q_{MVC:}$ quadriceps maximal voluntary contraction. ***: $p < 0.001$.

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Non-répondeurs toujours ?

Respiratory Medicine 190 (2021) 106678

Contents lists available at ScienceDirect

Respiratory Medicine

journal homepage: www.elsevier.com/locate/rmed

Trajectories of COPD patients' response to repeated pulmonary rehabilitation programs

Yara Al Chikhanie [a,b], Sébastien Bailly [b], Ines Amroussia [b], Daniel Veale [a,b], Frédéric Hérengt [a,b,1], Samuel Verges [b,*,1]

[a] *Cardiopulmonary Rehabilitation Center Dieulefit Santé, Dieulefit, France*
[b] *Univ. Grenoble. Alps, Inserm U1300, CHU Grenoble Alps, Hp2, 38000, Grenoble, France*

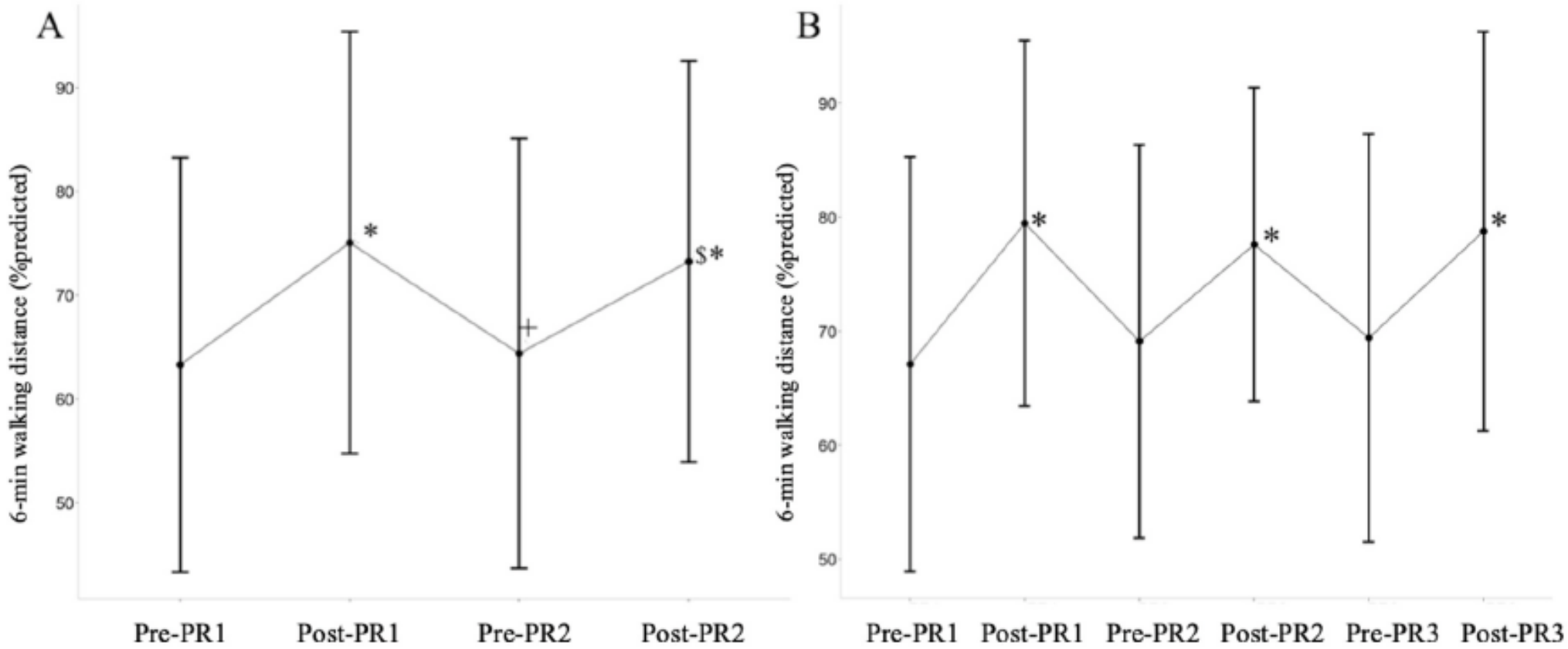

Fig. 2. Mean (±standard deviation) 6-min walking distance (in % predicted) pre and post each pulmonary rehabilitation (PR) program: Panel A with 2 PRs over 2 years (n = 190), and Panel B with 3 PRs over 3 years (n = 62). Every point represents pre- or post-PR values. *significantly different compared to pre-PR1, $^{+}$significantly different compared to post-PR1, $^{\$}$significantly different compared to pre-PR2 ($p < 0.05$).

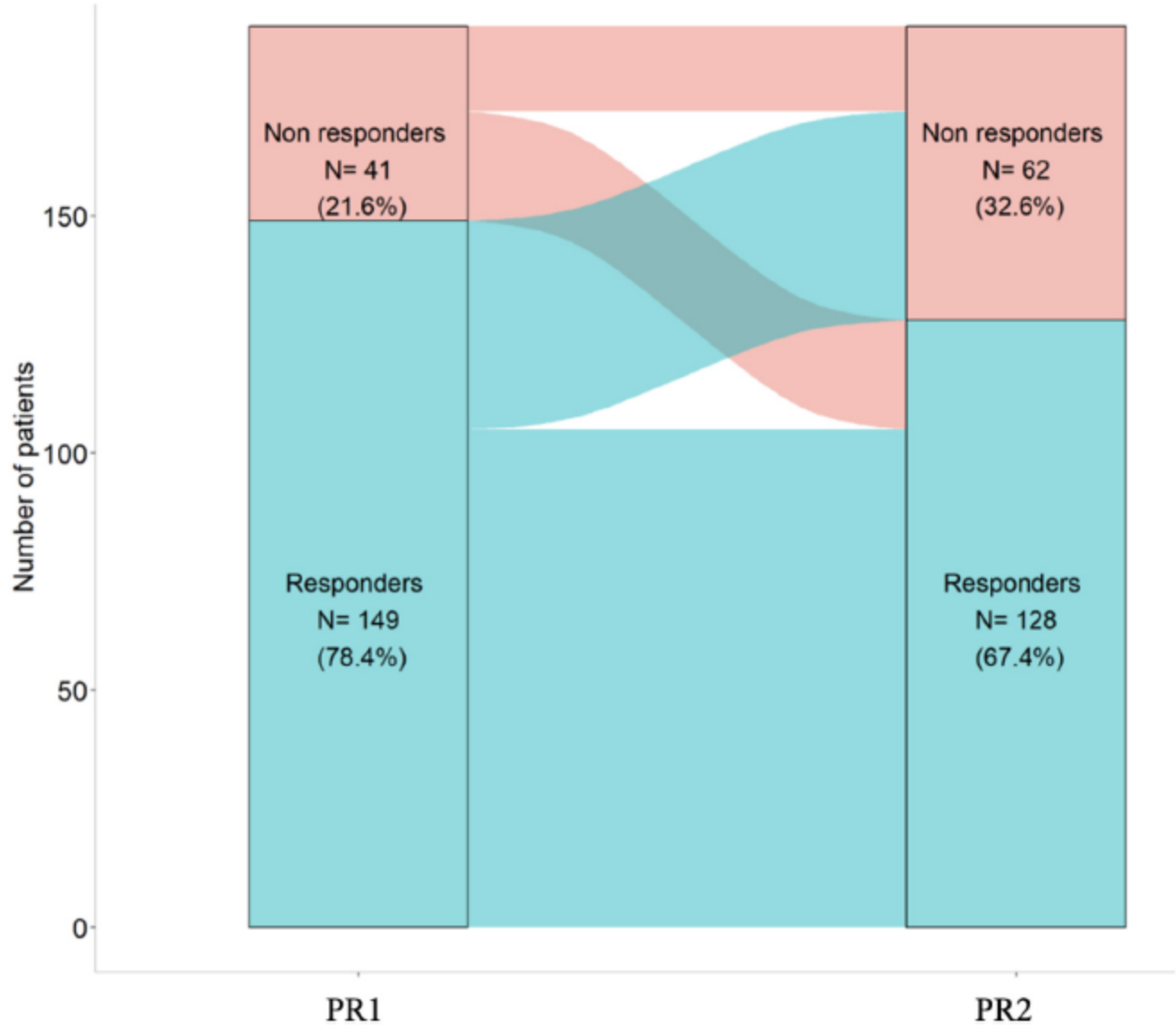

Fig. 3. Alluvial plot showing distinct trajectories of 190 patients having performed two pulmonary rehabilitation (PR) programs based on their post-PR changes in 6-min walking distance (responder ≥30 m, non-responder < 30 m).

Table 4
Characteristics of the four classes based on repeated-PR responses.

	NR1-NR2 n = 18 (10%)	NR1-R2 n = 23 (12%)	R1-NR2 n = 44 (23%)	R1-R2 n = 105 (55%)	p-value
Sex	13M/5F	8M/15F	19M/25F	49M/56F	0.10
Age (years)	66 [58; 72]	68 [59; 77]	70 [60; 77]	65 [59; 74]	0.55
LTOT (n, %)	8 (44)	7 (30)	11 (25)	22 (21)*	0.03
BMI ($kg{\cdot}m^{-2}$)	24 [18; 27]	23 [19; 29]	26 [21; 31]	24 [21; 31]	0.52
TLC (% predicted)	117 [103; 132]	111 [95; 122]	105 [98; 131]	109 [92; 126]	0.60
FEV1 (% predicted)	40 [29; 59]	45 [29; 63]	52 [41; 65]	49 [33; 65]	0.41
6-min walking test pre-PR1					
6MWD (m)	348 [309; 546]	450 [349; 513]	388 [290; 440]	377 [310; 455]	0.23
6MWD (% predicted)	66 [49; 76]	76 [49; 88]	65 [53; 74]	63 [50; 75]	0.24
Minimal SpO_2 (%)	89 [85; 93]	90 [86; 93]	87 [84; 91]	89 [85; 92]	0.11
Maximal HR (bpm)	122 [104; 137]	115 [97; 127]	108 [98; 120]	109 [101; 118]	0.13
End-of-test dyspnea	6 [5; 7]	6 [4; 7]	5 [3; 6]	5 [4; 7]	0.04

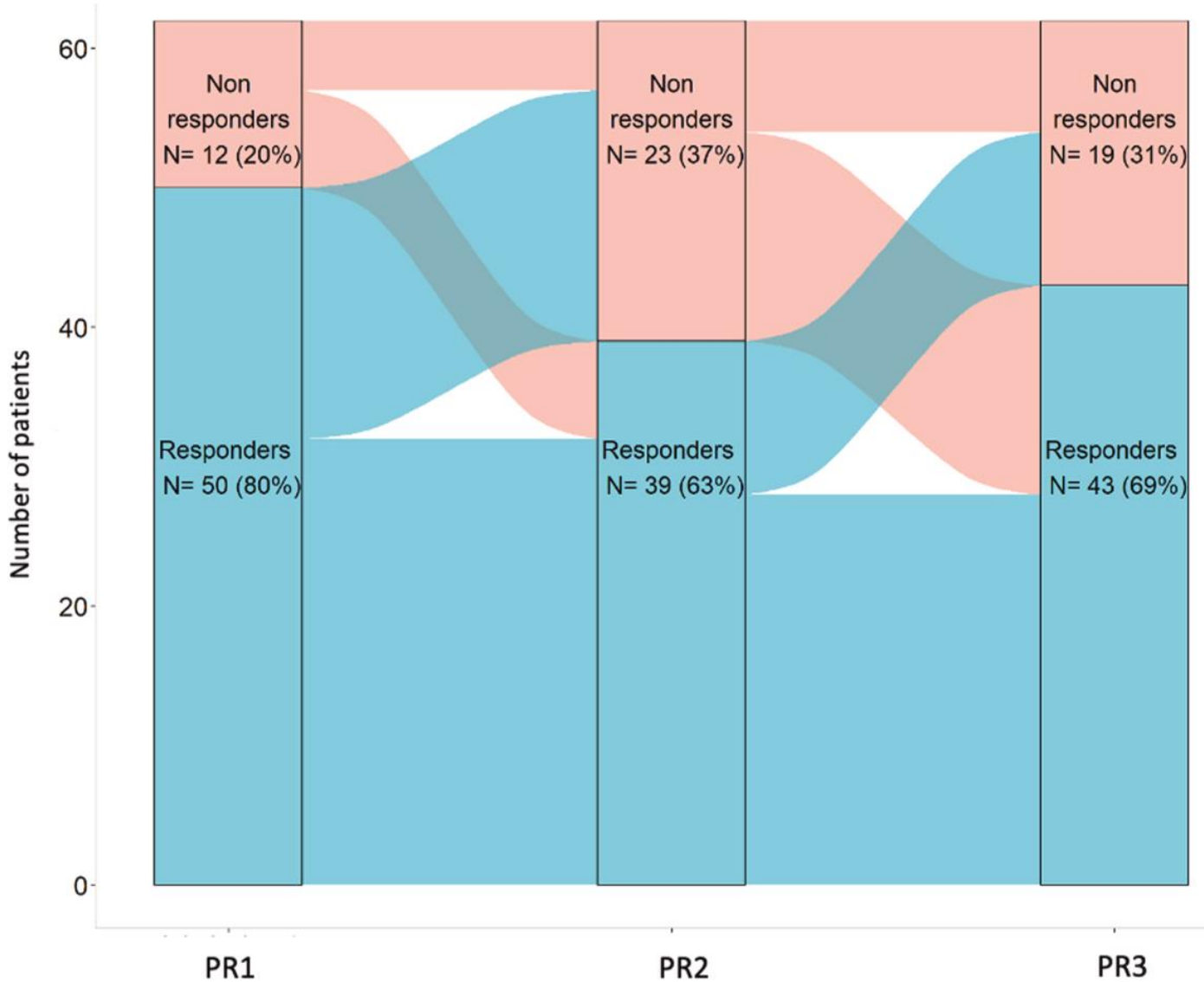

Fig. 4. Alluvial plot showing distinct trajectories of 62 patients having performed three pulmonary rehabilitation (PR) programs based on their post-PR changes in 6-min walking distance (responder ≥30 m, non-responder < 30 m) compared to PR1 and PR2.

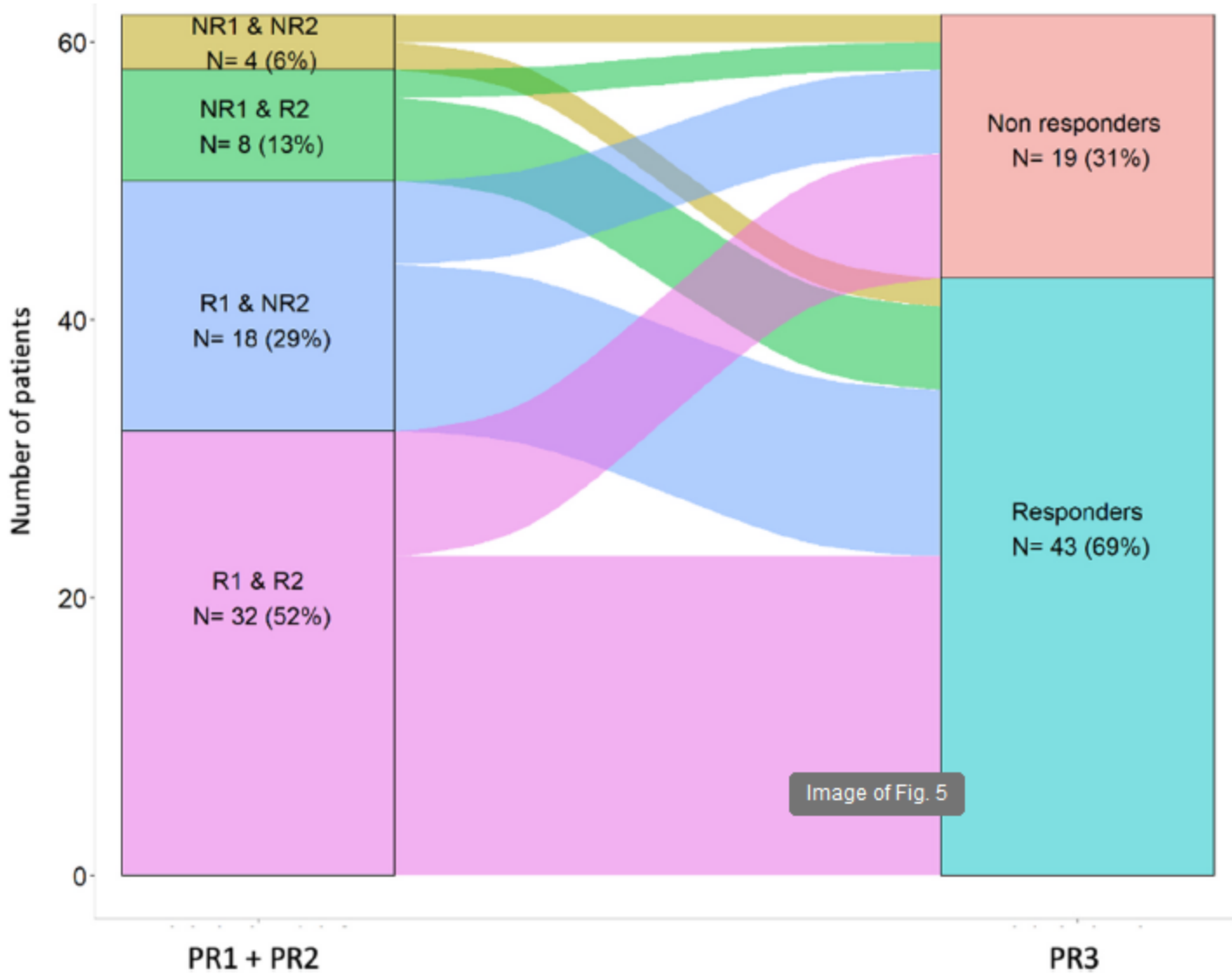

Fig. 5. Alluvial plot showing distinct trajectories of 62 patients having performed three pulmonary rehabilitation (PR) programs based on their post-PR changes in 6-min walking distance (responder ≥30 m, non-responder < 30 m) compared to PR1 + PR2.

Composition de la présentation

- Introduction :
  - impacts de la réhabilitation respiratoire
  - différences cliniques minimales
  - paramètres variables
- Non-répondeurs :
  - importance du problème – chronicité
  - critères unique ou multiples
  - caractéristiques – clusters à risque de non-réponse
- Solutions
- Conclusions

Comment apprécier la réponse à la RR ?

LES INDICATIONS DE LA RÉHABILITATION

Comment distinguer les patients répondeurs à la réhabilitation respiratoire ?

- Evaluations portant sur des axes différents :
  - Effort (TM6 – lever de chaise – VO2max – navette – force musculaire)
  - Niveau d'activité physique
  - Qualité de vie liée à la santé
  - Consommation de soins – exacerbations – mortalité
  - État nutritionnel

  } Réponses pluri-dimensionnelles

- Amélioration globale et/ou non mesurée par l'un des domaines explorés
- Réponses dissociées : amélioration de l'effort mais perte de qualité de vie
- Réponses différentes selon le test choisi pour explorer la même dimension
- Impact de bonnes mesures initiales (p.ex TM6)
- Rôle des autres problématiques cognitives – psychiatriques – exacerbations – comorbidités (musculo-squelettiques…) dans la continuité/compliance

Revue des Maladies Respiratoires Actualités (2014) 6, 262-264

Pulmonary Rehabilitation
Timing, Location, and Duration

Thierry Troosters, PT, PhD[a,b,*], Miek Hornikx, MSc, PT[a,b], Heleen Demeyer, MSc, PT[a,b], Carlos A. Camillo, MSc, PT[b], Wim Janssens, MD, PhD[a]

Clin Chest Med 35 (2014) 303–311

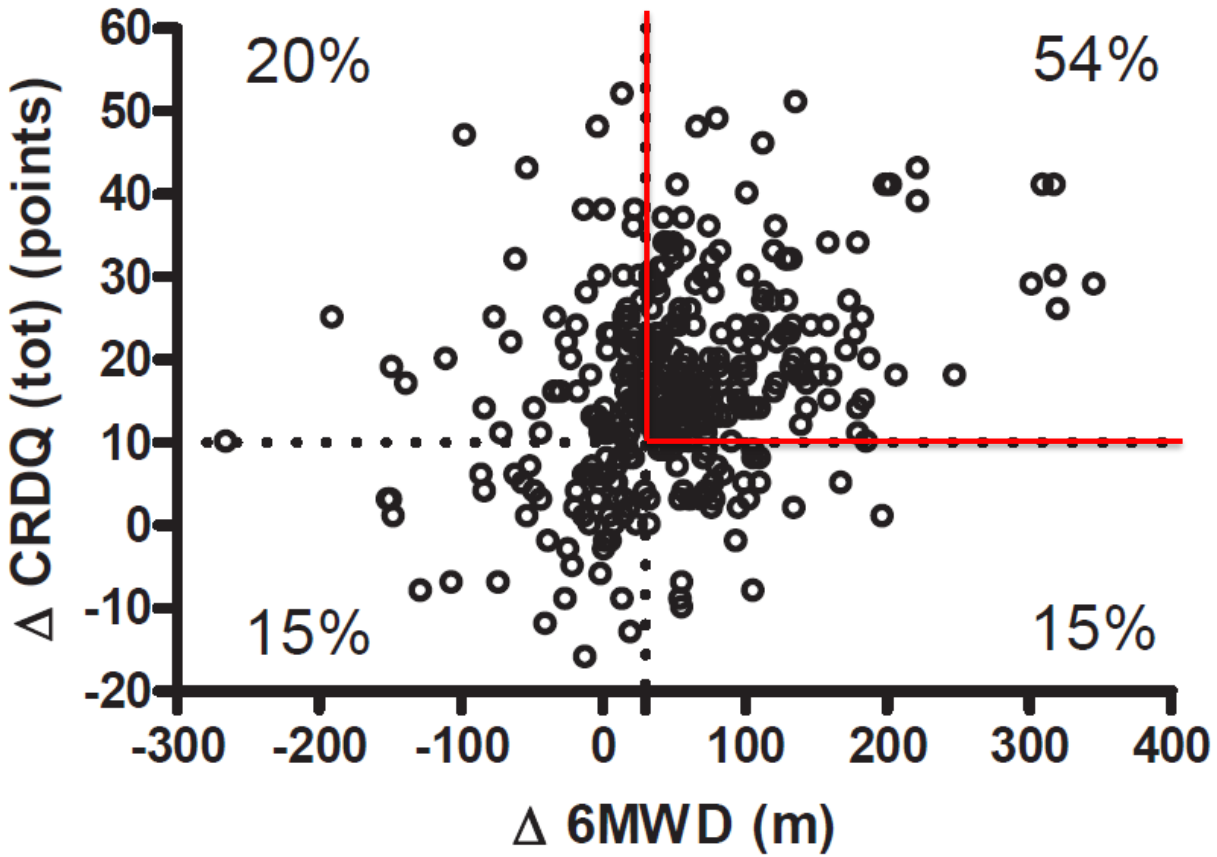

Fig. 1. Effects of 3 months' (3 week^{-1}) outpatient rehabilitation on functional exercise capacity and on health-related quality of life in 352 consecutive patients with COPD referred for pulmonary rehabilitation. Approximately 35% of patients had less than 30 meters improvement in 6-minute walk distance (6MWD), and approximately 26% of patients had less than 10 points' improvement in health-related quality of life. Only 15% of patients did not meet both criteria, whereas 54% did meet both criteria. CRDQ, Chronic Respiratory Disease Questionnaire; tot, total.

Composition de la présentation

- Introduction :
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- Solutions
- Conclusions

Profil non répondeur ?

Respiratory Medicine (2009) 103, 1564–1571

available at www.sciencedirect.com

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journal homepage: www.elsevier.com/locate/rmed

Drop-out and attendance in pulmonary rehabilitation: The role of clinical and psychosocial variables

Maarten J. Fischer [a,*], Margreet Scharloo [a], Jannie J. Abbink [b], Alex J. van 't Hul [c], Dirk van Ranst [c], Arjan Rudolphus [d], John Weinman [e], Klaus F. Rabe [f], Adrian A. Kaptein [a]

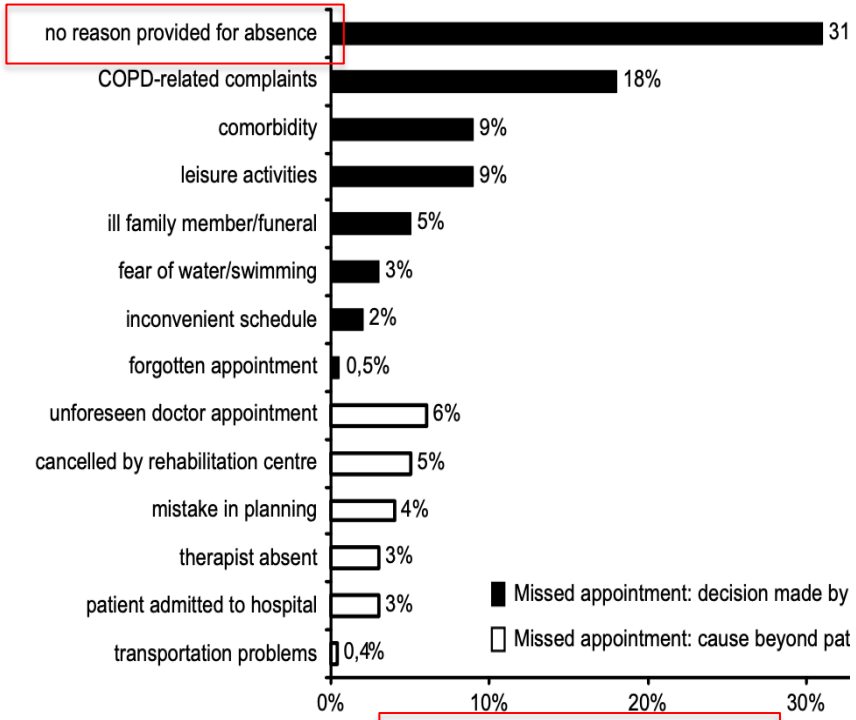


Figure 1 Causes for missed appointments.

Table 2 Characteristics of high vs. poor attendance group (*t*-test).

	High attendance (n = 79)	Min–max	Poor attendance (n = 80)	Min–max	p-value
Sex					
Female	37%		50%		
Male	63%		50%		0.09#
Age	64.3		61.9		0.10
Education (range 1–5)	2.19	1–5	1.96	1–5	0.13
Living with partner	82%		66%		0.02#
Current smoker	7.8%		16.5%		0.06#
Pack years	38.4	4–126	42.9	3–113	0.26
Travel distance (km)*	13.9	1–75	10.8	1–45	0.20
Travel time (min)*	24	5–60	21	5–60	0.20
FEV_1 (l)	1.30	0.51–3.07	1.24	0.43–3.09	0.47
$FEV_{1\%}$pred	47.1%	20%–88%	44.8	12%–98%	0.44
6MWD (m)	378	108–575	389	119–612	0.53
BMI (kg/m^2)	28.1	18.9–52.3	26.3	13.1–41.5	0.04
FFMI (kg/m^2)	17.6	11.6–33.6	16.5	11.8–23.7	0.01
MRC dyspnoea (range 1–5)	3.36	1–5	3.24	1–5	0.54

Chi^2-test; *outpatients only. FEV_1, forced expiratory volume in 1 s; $FEV_{1\%}$pred, percentage of predicted FEV_1; 6MWD, 6 min walk distance; BMI, Body Mass Index; FFMI, Fat Free Mass Index.

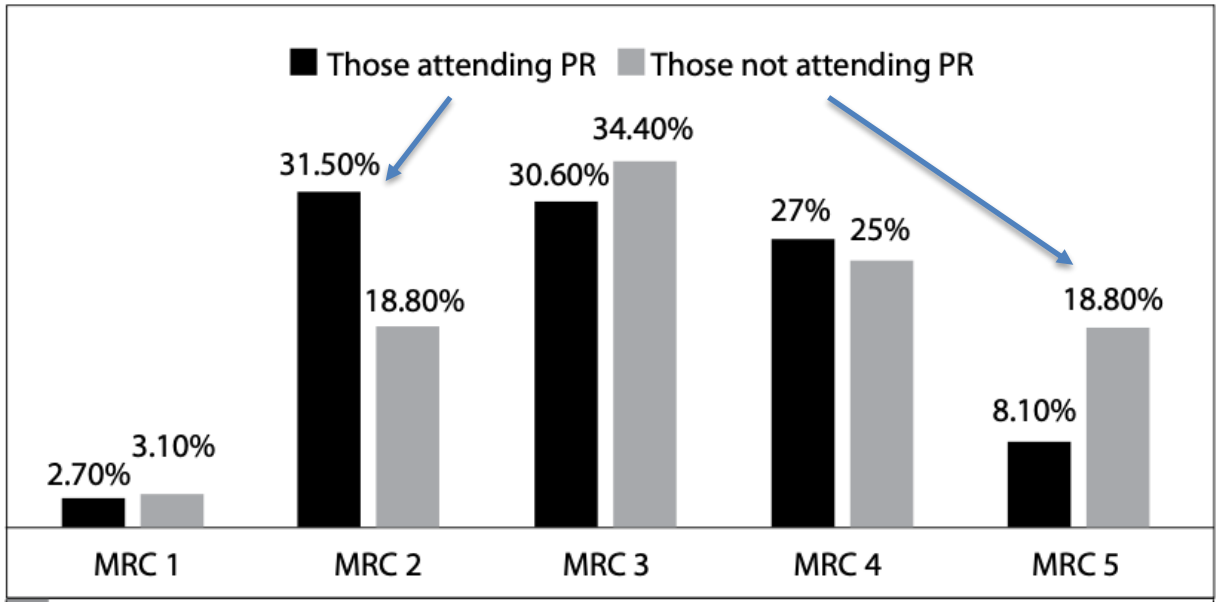


Figure 2. The distribution of the groups according to the Medical Research Council (MRC) dyspnea scale
PR: pulmonary rehabilitation

Table 2. Descriptive statistics of the initial evaluation data of the patients attending and not attending the PR program and the between-group comparison

	Those attending the PR	Those not attending PR	p
N	111	32	
Smoking history (pack-years)	34.4±28.8	49±36.8	0.074
FEV_1 %	39.7±18.1	37±16	0.213
ISWT (m)	241±128.9	183.4±119.9	0.024
ESWT (min)	7.03±6.32	4.89±5.36	0.027
- Symptom	64.1±16.8	70±14.1	0.321
- Activity	74±19.9	78.3±17.6	0.170
- Being influenced	54.1±21.2	62.7±19.9	0.045
- Total	61.9±17.7	68.8±15.7	0.091
Anxiety	13 (11.7%)	6 (18.8%)	0.445
Depression	14 (12.6%)	9 (21.8%)	0.323
BMI (kg/m^2)	24.1±5.8	25.8±6.6	0.087
FFBMI (kg/m^2)	18.1±2.4	18.7±2.6	0.065
MRC	3.0±1.2	3.4±1.6	0.012

BMI: Body mass index; ESWT: endurance shuttle walking test; FEV_1: forced expiratory volume in 1 sec; FFBMI: fat-free body mass index; ISWT: incremental shuttle walking test; MRC: Medical Research Council dyspnea scale; PR: pulmonary rehabilitation; SGRQ: St. George's Respiratory Questionnaire

Eur Respir J 2006; 27: 788–794
DOI: 10.1183/09031936.06.00130605

Predictors of success and failure in pulmonary rehabilitation

R. Garrod*, J. Marshall*, E. Barley# and P.W. Jones#

TABLE 2 Changes in health following pulmonary rehabilitation for patients with mild, moderate or severe disease

	Subjects n	Disease severity			p-value
		Mild (MRC grade 1/2)	Moderate (MRC grade 2/3)	Severe (MRC grade 5)	
6MWD % pred of normative values	51	7.8±6.5	10.0±11.3	5.2±11.9	0.003
6MWD m	51	54.7±45.0	68.0±74.2	32.6±74.8	0.002
Quadriceps torque Nms	51	1.6±19.6	3.1±33.8	6.5±18.7	NS
SGRQ score#	51	-7.5±10.3	-7.0±8.4	0.7±11.2	0.03
MIP % pred	48	11.1±22.9	2.7±10.3	1.9±10.5	NS
MEP % pred	49	-0.0±22.7	10.1±17.9	11.3±31.5	NS
Grip % pred	51	-0.9±11.4	3.1±12.3	-0.6±19.8	NS
COPDSE	49	0.4±0.5	0.1±0.9	0.1±0.7	NS
LCADL#	51	-0.4±3.9	-1.1±7.5	0.7±8.5	NS

Data are presented as mean difference±SD between follow-up and baseline. A positive score=improvement, unless otherwise indicated (#: negative score=improvement). p-values represent the significance of disease severity in a generalised linear model with score at follow-up as the dependent variable, disease severity as the independent variable and baseline score as a covariate (nonsignificant (NS)=p>0.05). MRC: Medical Research Council; 6MWD: 6-minute walk distance; SGRQ=St George's Respiratory Questionnaire; MIP: maximal inspiratory pressure; MEP: maximal expiratory pressure; COPDSE: Chronic Obstructive Pulmonary Disease Self-Efficacy Scale; LCADL: London Chest Activity of Daily Living Scale.

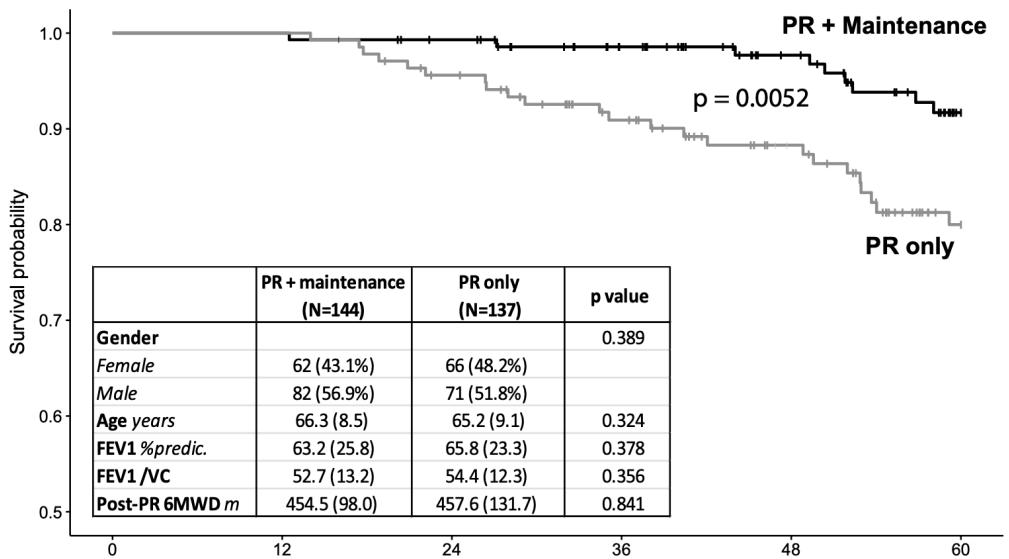
Blervaque *et al. Respir Res* (2021) 22:79
https://doi.org/10.1186/s12931-021-01674-3

Respiratory Research

RESEARCH Open Access

Efficacy of a long-term pulmonary rehabilitation maintenance program for COPD patients in a real-life setting: a 5-year cohort study

Léo Blervaque[1], Christian Préfaut[2], Hélène Forthin[3], Francis Maffre[3], Marion Bourrelier[3], Nelly Héraud[4], Matthias Catteau[1], Pascal Pomiès[1], Dany Jaffuel[5], Nicolas Molinari[6], Maurice Hayot[7] and Fares Gouzi[7*]



	PR + maintenance (N=144)	PR only (N=137)	p value
Gender			0.389
Female	62 (43.1%)	66 (48.2%)	
Male	82 (56.9%)	71 (51.8%)	
Age *years*	66.3 (8.5)	65.2 (9.1)	0.324
FEV1 *%predic.*	63.2 (25.8)	65.8 (23.3)	0.378
FEV1 /VC	52.7 (13.2)	54.4 (12.3)	0.356
Post-PR 6MWD *m*	454.5 (98.0)	457.6 (131.7)	0.841

Fig. 3. 5-year survival probability for the "PR + maintenance" and "PR only" groups. Curves: Kaplan–Meier analysis; gray line: "PR only" group; black line: "PR + maintenance" group. Table: Comparison of main clinical characteristics of the "PR + maintenance" and "PR only" groups

Table 2 Baseline characteristics of the "PR + maintenance" COPD patients by trajectory class

	Non-responders (N = 30)	Responders (N = 114)	p value
Sex ratio *(%males)*	80.0%	50.9%	0.004
Age *years*	67.83 (10.21)	65.84 (7.97)	0.254
BMI *kg/m*	25.87 (5.20)	26.80 (5.32)	0.416
FEV_1 *%pred*	50.79 (23.66)	66.20 (25.48)	0.006
FEV_1/VC	46.74 (12.47)	54.47 (13.03)	0.028
Disease severity (GOLD)			0.022
I	11.5%	29.0%	
II	38.5%	41.1%	
III	26.9%	24.3%	
IV	23.1%	5.6%	
Smoking history *pack-year*	51.48 (27.32)	34.64 (24.55)	0.018
BODE Index	4.55 (1.77)	2.15 (1.58)	< 0.001
6MWD *m*	356.70 (87.13)	483.04 (81.43)	< 0.001
6MWD *%pred*	55.44 (12.53)	79.97 (13.96)	< 0.001
MRC	3.46 (1.21)	2.16 (1.12)	< 0.001
VQ11	29.83 (7.97)	24.40 (8.02)	0.004
Comorbidities *n (% total)*			
Mean number of comorbidities per patient	1.70 (2.14)	2.41 (1.57)	0.043
Pulmonary	7 (23.3%)	59 (51.8%)	0.005
Cardiovascular	14 (46.7%)	72 (63.2%)	0.101
Metabolic	7 (23.3%)	40 (35.1%)	0.222
Neurologic	1 (3.3%)	6 (5.3%)	0.662
Joint disorders	0 (0.0%)	16 (14.0%)	0.030
Others	2 (6.7%)	21 (18.4%)	0.118

Data are presented as means (SD). Disease severity classified according to the GOLD guidelines: stage I, mild, FEV1 > 80% of predicted normal value; stage II, moderate, FEV1 50–79%; stage III, severe, FEV1 30–49%; stage IV, very severe, FEV1 < 30%

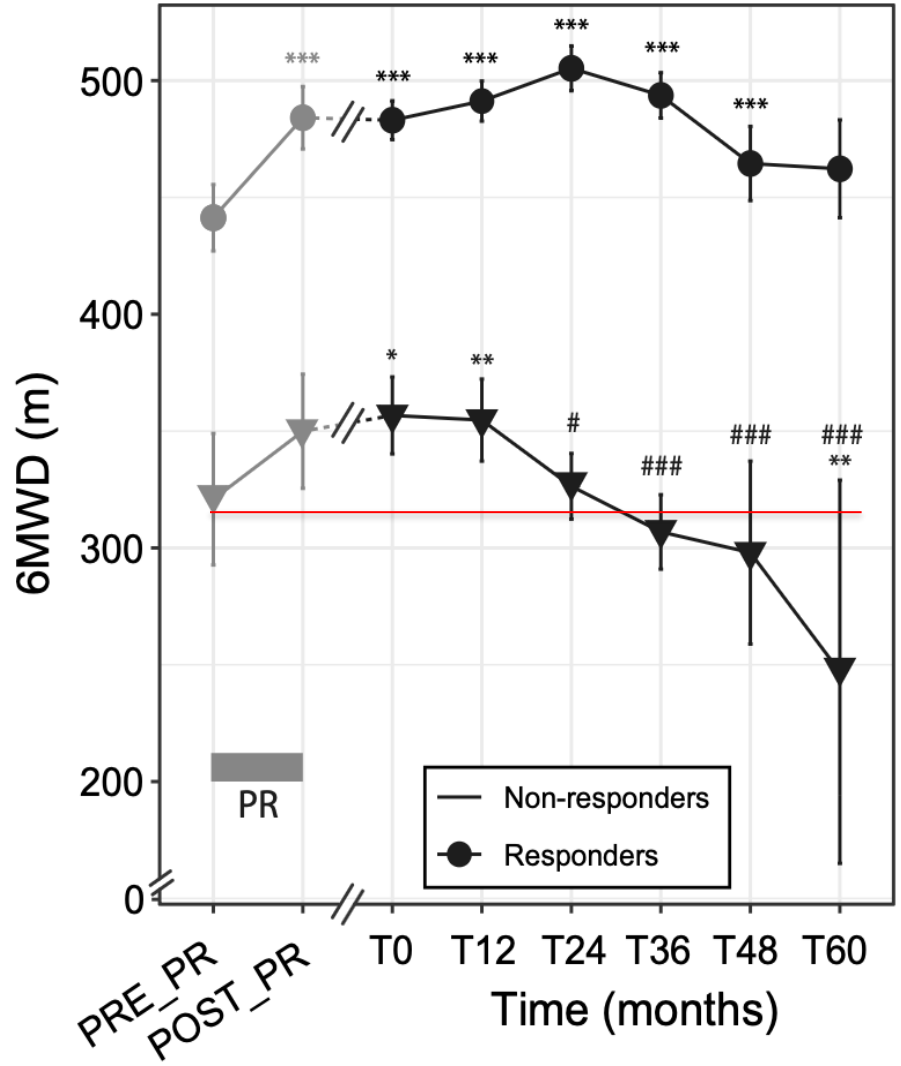


Fig. 4 Two-class model showing the mean trajectory of the primary outcome (6-min walking distance) over 5 years of follow-up. PR: pulmonary rehabilitation. Gray box: pulmonary rehabilitation (PR) program. Gray dots and lines: pre- and post-PR values. Black dots and lines: values during the maintenance program. Linear mixed effects model: group × time: group/time interaction effect, $p < 0.001$. Post-hoc: different from pre-PR: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. Different from T0: $^{\#}p < 0.05$; $^{\#\#\#}p < 0.001$

Composition de la présentation

- Introduction :
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Respiratory Medicine 198 (2022) 106861

Contents lists available at ScienceDirect

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journal homepage: www.elsevier.com/locate/rmed

Original Research

Clustering of COPD patients and their response to pulmonary rehabilitation

Yara Al Chikhanie [a,b], Sébastien Bailly [b], Ines Amroussa [b], Daniel Veale [a,b], Frédéric Hérengt [a,b,1], Samuel Verges [b,*,1]

[a] Cardiopulmonary Rehabilitation Center Dieulefit Santé, Dieulefit, France
[b] Univ. Grenoble. Alpes, Inserm, CHU Grenoble Alpes, HP2, Grenoble, France

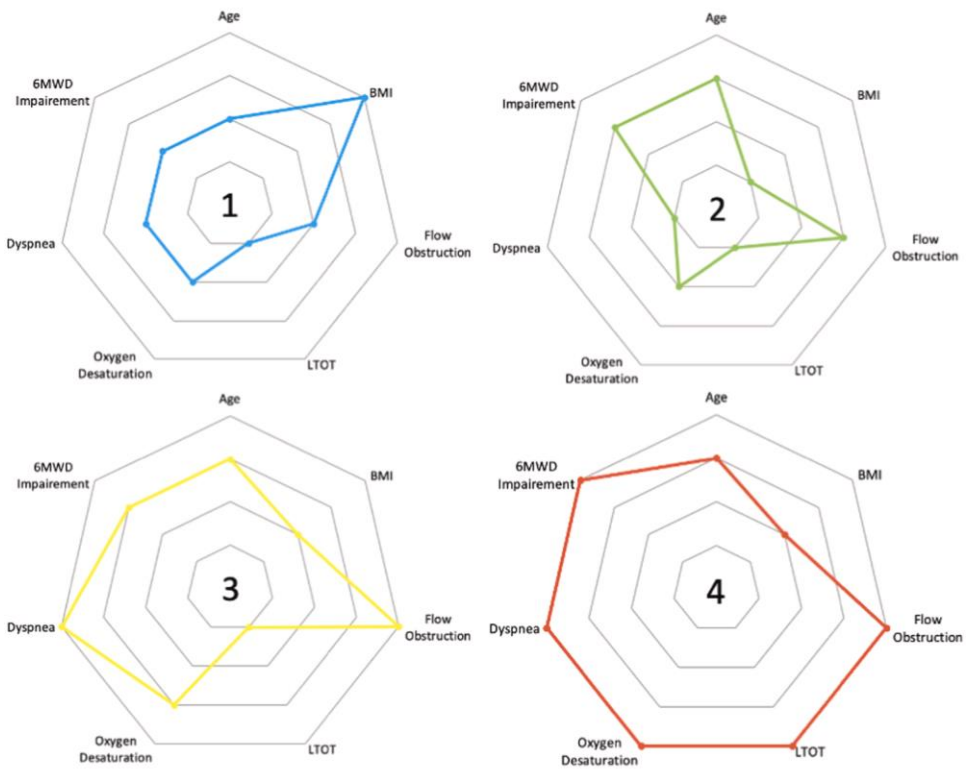


Fig. 1. Radar presentation of the 4 identified clusters. The classification is on a scale of 1–4. The closest to the center, the less severe the variables are. The further from the center, the more severe they are. BMI, body mass index; LTOT, long-term oxygen therapy; 6MWD, 6-min walking distance.

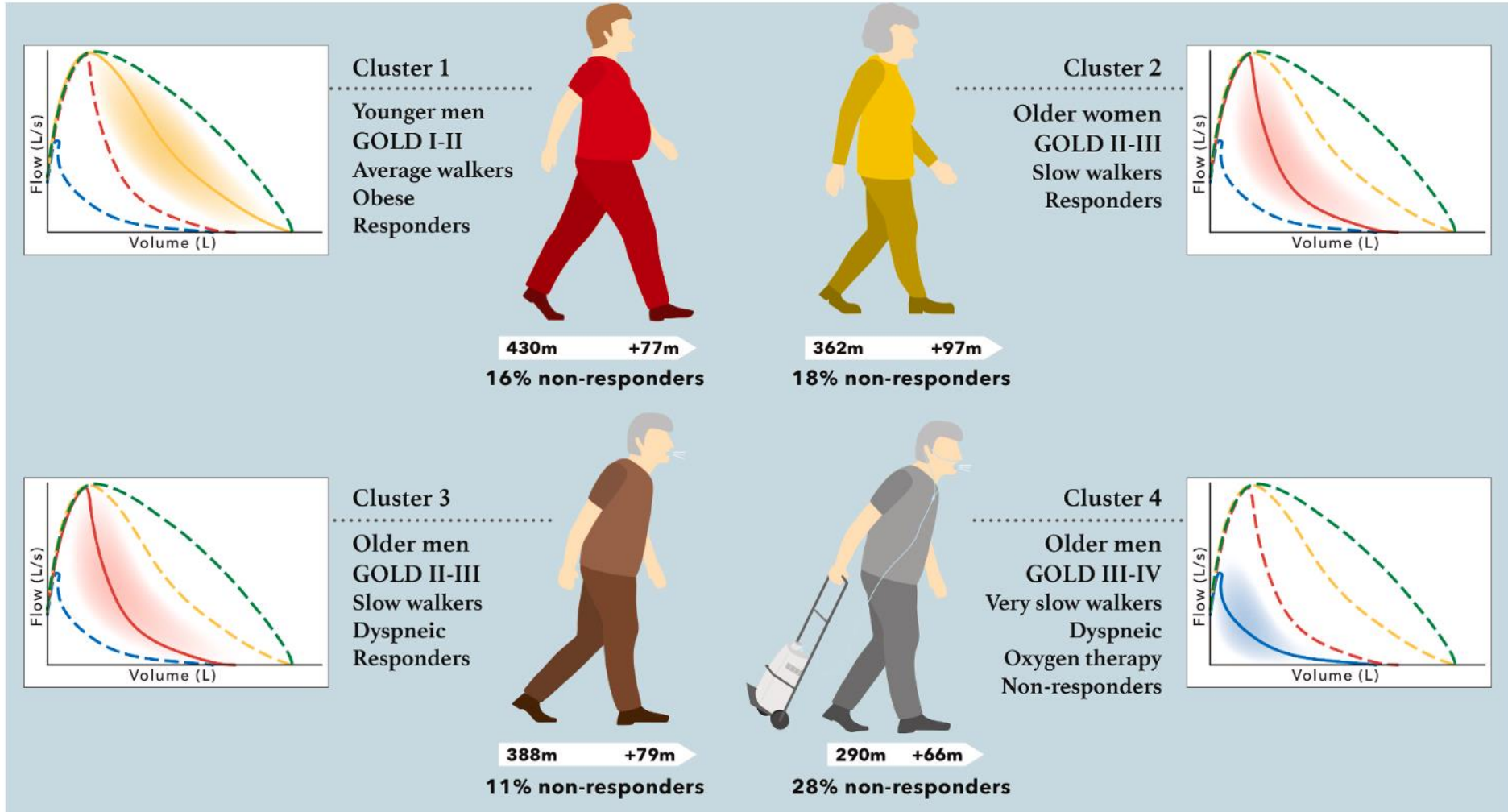


Fig. 2. Infographic illustrating the four identified clusters of COPD patients and their respective 6-min walking distance response to pulmonary rehabilitation.

Respiratory Medicine 206 (2023) 107086

Contents lists available at ScienceDirect

Respiratory Medicine

journal homepage: www.elsevier.com/locate/rmed

Original Research

The presence of extra-pulmonary treatable traits increases the likelihood of responding to pulmonary rehabilitation

Sara Souto-Miranda [a,b,c,d], Vânia Rocha [a,b], Maria Aurora Mendes [a,e], Paula Simão [f], Vitória Martins [g], Martijn A. Spruit [d,h], Alda Marques [a,b,*]

- 102 personnes atteintes de BPCO ont été incluses - VEMS 47 [36 - 60] % de la valeur prédite
- Médiane de 3 (sur 9) TT par personne et chaque patient a répondu en moyenne à 5 (sur 9) critères
- Les personnes présentant des TT ont mieux répondu que celles qui n'en présentaient pas pour tous les résultats (p < 0,05), à l'exception du test de lever en 1 minute
- La présence de TT a multiplié par 4 à 20 la probabilité d'être un bon répondeur

Table 1
Cut-offs and minimal important clinical differences used to define treatable traits and response to pulmonary rehabilitation in each outcome measure in people with chronic obstructive pulmonary disease.

Treatable trait	Cut-off used for the treatable trait	Minimal clinical important difference
Severe dyspnoea	mMRC ≥2 points [22]	Difference in mMRC ≥1 point [23]
Clinically relevant fatigue	FACIT-F ≤43 points [24]	Difference in FACIT-F ≥4.7 points
Symptoms of anxiety	HADS sub score ≥8 points [25]	Difference in HADS ≥1.5 points [26]
Symptoms of depression	HADS sub score ≥8 points [25]	Difference in HADS ≥1.5 points [26]
Poor functional capacity	1-min STS <70% predicted [27]	Difference in 1-min STS ≥3 repetitions [28]
Deconditioning	6MWT <70% predicted [27]	Difference in 6MWT ≥30 m [29]
Poor balance	Brief-BESTest ≤16.5 points [30]	Difference in Brief-BESTest ≥3 points [31]
Poor health status	CAT ≥18 points [32]	Difference in CAT ≥2 points [33]
Poor health-related quality of life	SGRQ ≥46 points [32]	Difference in SGRQ ≥4 points [34]

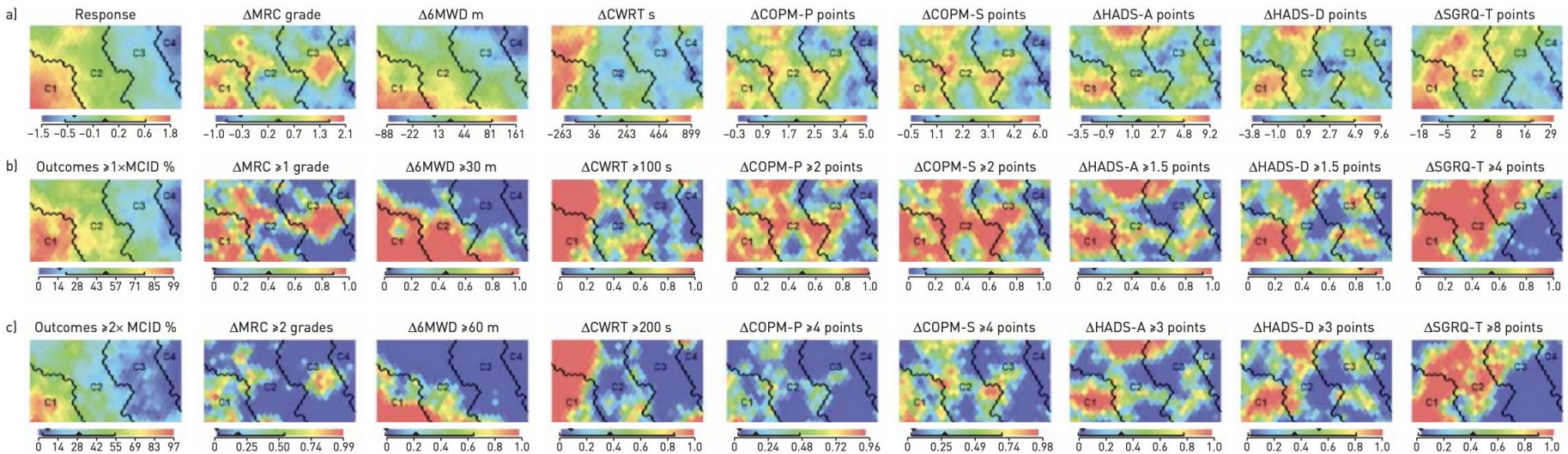
Table 3

Response to pulmonary rehabilitation defined by the minimal important clinical differences of each outcome measure, according to the presence or absence of each treatable trait in people with chronic obstructive pulmonary disease (n = 102).

Treatable trait	Mean/ $Median_{diff}$	p-value	Non-responders, n (%)	Responders, n (%)	p-value	OR [95%CI]	Non-responders % adherence	Responders % adherence	p-value[a]
mMRC, score									
<2 points	0.0 [0.0; 0.0]	<0.001	29 (76.3)	9 (23.7)	0.003	4.14 [1.69; 10.15]	88.0 [71.0; 92.0]	100.0 [83.0; 100.0]	0.182
≥2 points (severe dyspnoea)	−1.0 [-1.0; 0.0]		28 (43.8)	36 (56.3)			81.0 [74.0; 89.0]	88.0 [75.0; 96.0]	
FACIT-F, score									
≤43 points (clinically relevant fatigue)	5.0 [0.0; 8.8]	<0.001	40 (48.8)	42 (51.2)	<0.001	19.95 [2.55; 156.05]	88.0 [75.0; 96.0]	85.5 [72.0; 95.0]	0.819
>43 points	0.0 [-3.0; 1.2]		19 (95.0)	1 (5.0)			88.0 [77.0; 92.0]	67.0 [67.0; 67.0]	
HADS, Anxiety score									
<8 points	0.0 [-2.0; 2.0]	<0.001	50 (73.5)	18 (26.5)	<0.001	6.67 [2.67; 16.62]	88.0 [75.0; 96.0]	88.0 [73.0; 94.3]	0.362
≥8 points (symptoms of anxiety)	−2.5 [-5.0; 0.0]		10 (29.4)	24 (70.6)			79.0 [69.0; 94.3]	81.0 [70.0; 89.0]	
HADS, Depression score									
<8 points	0.0 [-2.0; 2.0]	<0.001	41 (69.5)	18 (30.5)	0.001	4.25 [1.84; 9.82]	88.0 [83.0; 96.0]	88.0 [75.0; 95.0]	0.767
≥8 points (symptoms of depression)	−3.0 [-4.0; −1.0]		15 (34.9)	28 (65.1)			79.0 [67.5; 88.0]	81.0 [70.0; 95.3]	
1-min STS, % predicted									
<70% (poor functional capacity)	4.0 [2.0; 7.0]	0.046	21 (39.6)	32 (60.4)	0.245	1.72 [0.78; 3.78]	79.0 [71.0; 88.0]	88.0 [81.0; 96.0]	N.A.
≥70%	2.0 [-1.0; 5.0]		26 (53.1)	23 (46.9)			90.0 [79.0; 96.0]	83.0 [71.0; 93.0]	
6MWT, % predicted									
<70% (deconditioning)	81.0 [43.5; 117.0]	0.005	4 (17.4)	19 (82.6)	0.009	4.87 [1.52; 15.62]	81.0 [79.0; 86.3]	83.0 [71.0; 94.0]	0.729
≥70%	29.6 [2.5; 65.4]		40 (50.6)	39 (49.4)			83.0 [74.0; 93.0]	88.0 [75.0; 95.0]	
Brief-BESTest									
<16.5 points (poor balance)	4.0 [3.0; 6.0]	<0.001	9 (21.4)	33 (78.6)	<0.001	6.81 [2.75; 16.89]	83.0 [75.0; 88.0]	83.0 [71.0; 95.0]	0.251
≥16.5 points	1.0 [0.0; 3.0]		39 (65.0)	21 (35.0)			88.0 [73.0; 92.0]	92.0 [79.0; 100.0]	
CAT, score									
<18 points	−1.6 ± 6.0	<0.001	32 (46.4)	37 (53.6)	<0.001	8.65 [2.41; 31.03]	88.0 [79.0; 97.0]	88.0 [71.0; 96.0]	0.281
≥18 points (poor health status)	−6.2 ± 5.1		3 (9.0)	30 (90.9)			79.0 [77.0; 85.5]	81.0 [71.0; 92.0]	
SGRQ, score									
<46 points	−6.0 [-11.4; 4.0]	0.005	37 (72.5)	14 (27.5)	0.003	9.27 [1.98; 43.32]	92.0 [80.0; 100.0]	83.0 [75.0; 92.0]	0.193
≥46 points (poor health-related quality of life)	−10.4 [-15.4; −5.1]		2 (4.0)	49 (96.1)			91.5 [87.3; 95.8]	88.0 [71.0; 95.0]	

Differential response to pulmonary rehabilitation in COPD: multidimensional profiling

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



Eur Respir J 2015; 46: 1625–1635

TABLE 2 Outcomes of pulmonary rehabilitation

Outcome	All patients	Very good responder	Good responder	Moderate responder	Poor responder
Patients n (%)	2068 (100)	378 (18.3)	742 (35.9)	731 (35.4)	217 (10.5)
ΔMRC dyspnoea grade	−0.4±1.1	−1.3±1.2	−0.5±1.0[#]	−0.2±1.0[#,¶]	0.2±1.0[#,¶,+]
−1 grade % patients	40.9	73.4	46.1[#]	27.9[#,¶]	17.8[#,¶]
−2 grades % patients	16.0	39.7	13.7[#]	11.3[#]	2.5[#,¶,+]
Δ6MWD m	27±57	96±52	36.1±34.1[#]	3±36[#,¶]	−48±45[#,¶,+]
⩾30 m % patients	45.4	95.5	55.5[#]	22.3[#,¶]	1.4[#,¶,+]
⩾60 m % patients	23.2	74.7	23.0[#]	3.5 [#,¶]	0.0[#,¶,+]
ΔCWRTs	208±328	525±326	290±313[#]	39±193[#,¶]	−17±222[#,¶,+]
⩾100 s % patients	51.9	87.7	68.5[#]	27.9[#,¶]	17.9 [#,¶,+]
⩾200 s % patients	37.1	79.1	48.9[#]	12.9[#,¶]	10.5[#,¶]
ΔCOPM-P points	2.0±1.7	3.3±1.5	2.3±1.4[#]	1.3±1.4[#,¶]	0.4±1.2[#,¶,+]
⩾2 points % patients	49.8	81.8	61.3[#]	32.7[#,¶]	10.5[#,¶,+]
⩾4 points % patients	12.8	36.2	13.7[#]	3.3[#,¶]	0.5[#,¶]
ΔCOPM-S points	2.6±2.1	4.1±1.9	3.1±1.8[#]	1.8±1.7[#,¶]	0.5±1.6[#,¶,+]
⩾2 points % patients	61.6	88.8	74.2[#]	47.7[#,¶]	16.8[#,¶,+]
⩾4 points % patients	26.2	53.4	33.0[#]	11.8[#,¶]	2.1[#,¶,+]
ΔHADS-A points	−1.4±3.5	−3.2±3.6	−1.9±3.4[#]	−0.7±3.1[#,¶]	1.3±2.8[#,¶,+]
⩾−1.5 points % patients	43.5	65.0	48.8[#]	35.6[#,¶]	13.4[#,¶,+]
⩾−3.0 points % patients	31.8	53.0	35.5[#]	24.1[#,¶]	7.0[#,¶,+]
ΔHADS-D points	−1.4±3.5	−3.4±3.5	−2.1±3.4[#]	−0.5±2.9[#,¶]	1.6±2.8[#,¶,+]
⩾−1.5 points % patients	44.8	69.9	52.1[#]	34.6 [#,¶]	9.1[#,¶,+]
⩾−3.0 points % patients	33.3	58.2	39.8[#]	21.3 [#,¶]	6.4 [#,¶,+]
ΔSGRQ-T points	−5.3±12.6	−16.0±12.7	−7.9±10.2[#]	−0.4±10.7 [#,¶]	5.3±9.0[#,¶,+]
⩾−4 points % patients	53.6	84.1	66.5[#]	36.1[#,¶]	14.9[#,¶,+]
⩾−8 points % patients	39.7	74.1	49.5 [#]	22.3[#,¶]	4.8[#,¶,+]

TABLE 3 Baseline characteristics after stratification for multidimensional response clusters

Baseline	Very good responder	Good responder	Moderate responder	Poor responder
Patients n (%)	378 (18.3)	742 (35.9)	731 (35.4)	217 (10.5)
Age years	62.9±8.8	63.7±9.0	64.2±8.7	64.4±9.1
Sex % women	41.8	43.9	42.7	42.4
FEV_1 L	1.31±0.64	1.31±0.54	1.31±0.57	1.27±0.56
FEV_1 % predicted	47.4±20.2	48.9±17.8	48.8±18.3	47.9±18.8
*K*co % predicted	67.7±22.7	67.0±23.8	64.9±21.9	64.1±22.2
LTOT use % patients	21.7	15.9	12.2#	12.4#
Pa_{O_2} kPa	9.6±1.4	9.7±1.4	9.6±1.3	9.7±1.3
Pa_{CO_2} kPa	5.2±0.7	5.2±0.6	5.2±0.6	5.3±0.8
Sa_{O_2} %	94.9±2.6	95.0±2.4	95.1±2.1	95.0±2.1
MRC grade	3.7±1.1	3.3±1.1#	3.2±1.1#	3.2±1.1#
Exacerbation <12 m n	2.5±2.6	2.1±2.5	2.0±2.4#	2.0±1.9
Admission <12 m n	1.1±1.8	0.7±1.2#	0.6±1.3#	0.7±1.3#
CC index points	1.4±1.2	1.4±1.2	1.4±1.1	1.4±1.1
BMI $kg \cdot m^{-2}$	26.3±5.6	25.9±5.5	25.1±5.0#,¶	24.8±4.6#,¶
FFMI $kg \cdot m^{-2}$	17.1±2.7	16.8±2.4	16.6±2.3#	16.5±2.2#
6MWD m	405±123	452±113#	461±112#	457±104#
6MWD % predicted	63.3±17.4	71.4±15.6#	72.3±16.0#	71.7±15.7#
PWR watts	68.2±32.3	73.5±31.4	72.9±30.5	70.4±28.3
PWR % predicted	50.5±22.7	59.1±27.0#	57.7±24.3#	57.3±26.3#
V'_{O_2} % predicted	64.2±24.6	70.5±32.7	68.3±31.1	69.8±34.1
Ventilation %MVV	84.3±22.3	84.0±21.2	83.9±20.8	87.2±22.6
CWRT s	295±173	320±225	326±265	296±238
COPM-P points	3.8±1.3	4.2±1.3#	4.5±1.3#,¶	4.5±1.4#,¶
COPM-S points	3.2±1.6	3.6±1.7#	4.0±1.7#,¶	4.1±1.8#,¶
HADS-A points	8.4±4.3	7.2±4.2#	6.8±4.3#	6.3±4.3#,¶
⩾8 points % patients	57.0	45.0#	38.0#,¶	36.0#
HADS-D points	8.0±4.1	6.7±4.0#	6.4±4.0#	5.9±3.9#,¶
⩾8 points % patients	55.0	40.0#	36.0#	32.0#
SGRQ points	61.5±15.2	53.6±16.5#	50.2±17.1#,¶	50.4±17.0#
BODE index points	4.0±2.3	3.4±2.1#	3.3±2.1#	3.4±2.0#
ADO index points	4.7±1.8	4.3±1.8#	4.3±1.6#	4.4±1.7
Inpatient/outpatient %	in 64/36	41/59#	31/69#,¶	25/75#,¶ out

Composition de la présentation

- Introduction :
  - impacts de la réhabilitation respiratoire
  - différences cliniques minimales
  - paramètres variables
- Non-répondeurs :
  - importance du problème – chronicité
  - critères unique ou multiples
  - caractéristiques – clusters à risque de non-réponse
- Solutions
- Conclusions

Approche personnalisée et non « universelle » dans les maladies respiratoires chroniques.

Personalised pulmonary rehabilitation in COPD

Emiel F.M. Wouters[1,2], Birgit B.R.E.F. Wouters[3], Ingrid M.L. Augustin[2], Sarah Houben-Wilke[2], Lowie E.G.W. Vanfleteren[1] and Frits M.E. Franssen[1,2]

Number 5 in the Series "Personalised medicine in respiratory diseases"
Edited by Renaud Louis and Nicolas Roche

Eur Respir Rev 2018; 27: 170125

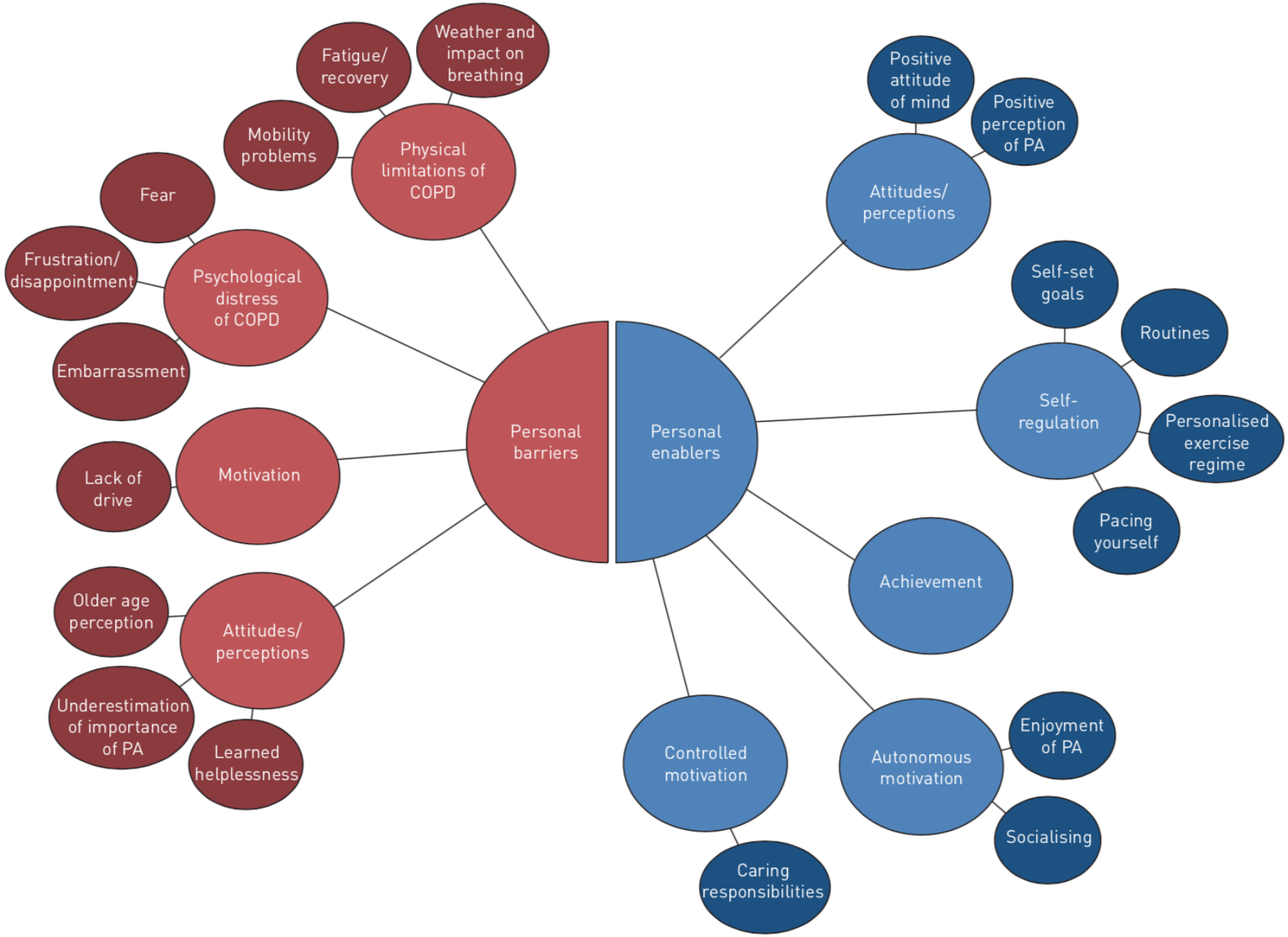


FIGURE 1 Examples of personal barriers and enablers that both encourage and limit participation in physical activity for patients with chronic obstructive pulmonary disease (COPD). PA: physical activity. Reproduced from [37] with permission.

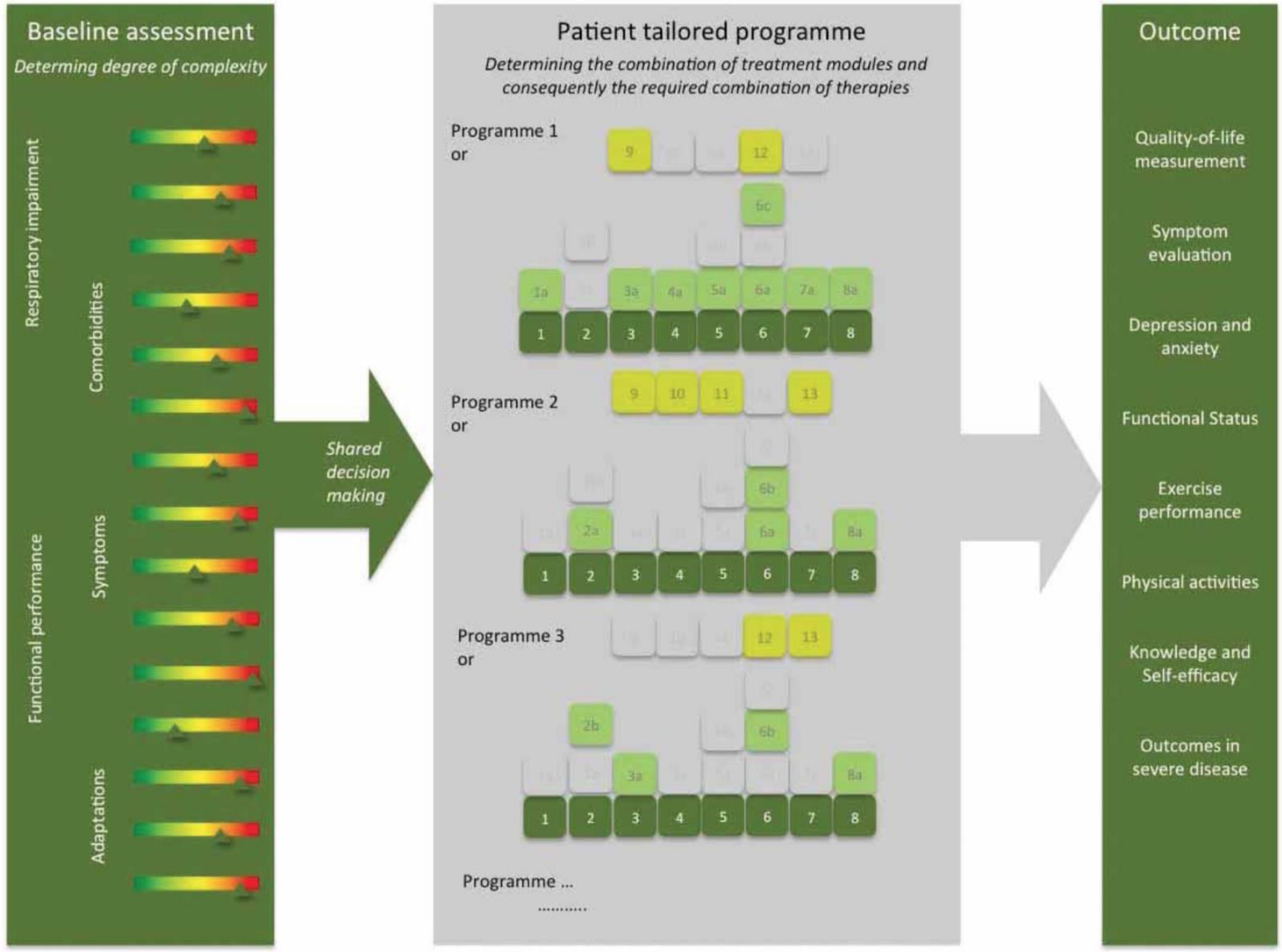


FIGURE 2 The process of a tailored programme including the three core processes (baseline assessment, tailored treatment and outcome assessment). Reproduced from [41] with permission.

Traits respiratoires traitables

Table 2 Extending the scope for pulmonary rehabilitation

Condition	Adaptation
Asthma	▶ To minimise risk of adverse events, patients should be medically optimised prior to PR referral.[75]
Bronchiectasis	▶ Optimisation of airway clearance technique is recommended before and during PR.[76] ▶ No data on risk of cross-infection of multiresistant organisms during PR,[77] but local infection control policies should be followed.
Interstitial lung disease	▶ Compared with COPD, profound exercise-induced desaturation is more common in idiopathic pulmonary fibrosis (IPF) and some subtypes of interstitial lung disease.[78]
Post-COVID-19	▶ Caution with unexplained chest pain. ▶ Consider patients with functional limitation and ongoing symptoms for post-COVID-19 rehabilitation. ▶ Individuals with postintensive care syndrome have multisystemic symptoms and deficits, which may require individualisation of exercise and education components. ▶ Fatigue and postexertional symptom exacerbation should be closely monitored through symptom, exertion, activity scores and diaries.
Lung cancer	▶ Due to time sensitivity for curative surgery, conventional PR programmes would require adaptation to be suitable for prehabilitation. ▶ Optimal timing, setting, nature and duration of PR for postlung cancer surgery or advanced lung cancer remains unknown. ▶ Advanced lung cancer not a contraindication to PR but flexibility required for pragmatic reasons (eg, timing of chemotherapy session).
Lung volume reduction	▶ All individuals should have completed PR prior to their assessment for lung volume reduction procedures. ▶ PR practitioners may have a role in identifying potential candidates at the post-PR assessment.
Lung transplantation	▶ All individuals should have completed PR prior to their assessment for lung transplantation.
Chronic heart failure	▶ Programme adaptations/considerations might include[107]: – Provision of disease-specific education. – Workforce training to understand signs of decompensated heart failure. – Inclusion of a heart failure nurse in the multi-disciplinary team.
Pulmonary hypertension	To be eligible for PR, people with pulmonary arterial hypertension (PAH) and chronic thromboembolic pulmonary hypertension (CTEPH) should have stable disease[109 112]: ▶ No change in drug therapy or dose in previous 2 months. ▶ No syncope or symptomatic arrhythmia in previous 2 months. ▶ International guidelines recommend that exercise is supervised by specialist exercise professionals.[112] ▶ Remote supervision of exercise training is not recommended in people with PAH or CTEPH.
Perihospitalised exacerbation of COPD	▶ PR should be outpatient, started after hospital admission and incorporate comprehensive exercise and education components. ▶ Reoffer PR to people who initially decline in the immediate posthospitalisation period.

COPD, chronic obstructive pulmonary disease; PR, pulmonary rehabilitation.

Effort : interval training

TABLE 3 Practical indications for considering the use of an interval training approach

Interval training may be more appropriate when the patient presents with:

- A severe airflow obstruction (FEV_1 <40% pred)
- A low exercise capacity (peak work rate <60% pred)
- A total time at a constant work rate test of <10 min
- A marked oxygen desaturation during exercise (S_{pO_2} <85%)
- An intolerable dyspnoea during continuous endurance training

FEV_1: forced expiratory volume in 1 s; % pred: % predicted; S_{pO_2}: arterial oxygen saturation measured by pulse oximetry.

Eur Respir Rev 2013; 22: 128, 178–186
DOI: 10.1183/09059180.00000513

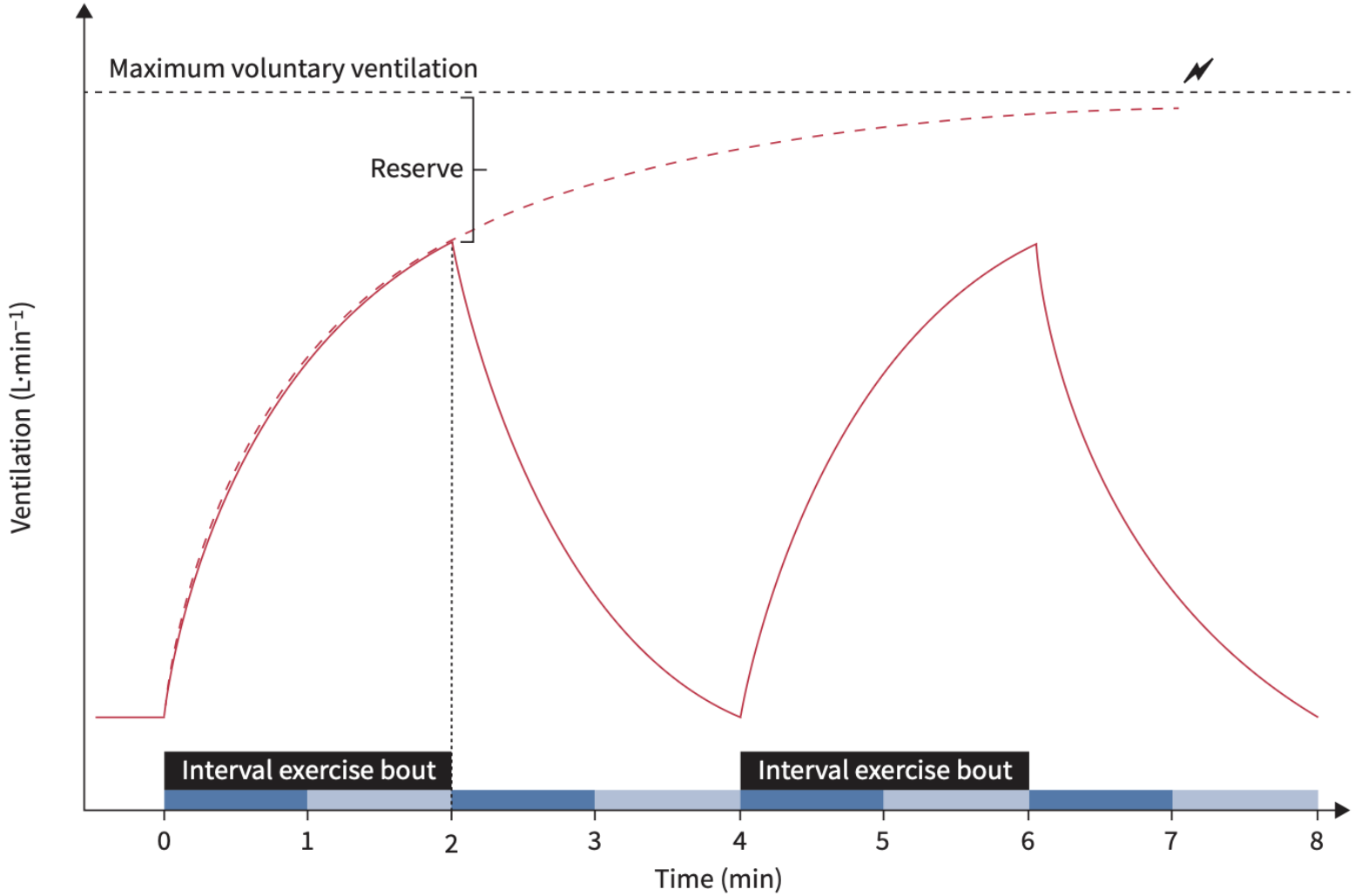


FIGURE 2 Change in pulmonary ventilation during constant high-intensity exercise (dashed red line) and interval training at the same work rate (red solid line) as a function of time of exercise. With constant exercise at high intensity, patients often reach maximum voluntary ventilation and have to stop the exercise. With shorter bouts of exercise, the pulmonary ventilation remains further from the maximum pulmonary ventilation and hence patients experience fewer symptoms during exercise.

Exercice et VNI

Annals of Physical and Rehabilitation Medicine 64 (2021) 101460

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Review

Non-invasive ventilation intervention during exercise training in individuals with chronic obstructive pulmonary disease: A systematic review and meta-analysis☆

Guiling Xiang, Qinhan Wu, Xu Wu, Shengyu Hao, Liang Xie, Shanqun Li *

Department of Pulmonary Medicine, Zhongshan Hospital, Fudan University, 180, Fenglin Road, 200032 Shanghai, China

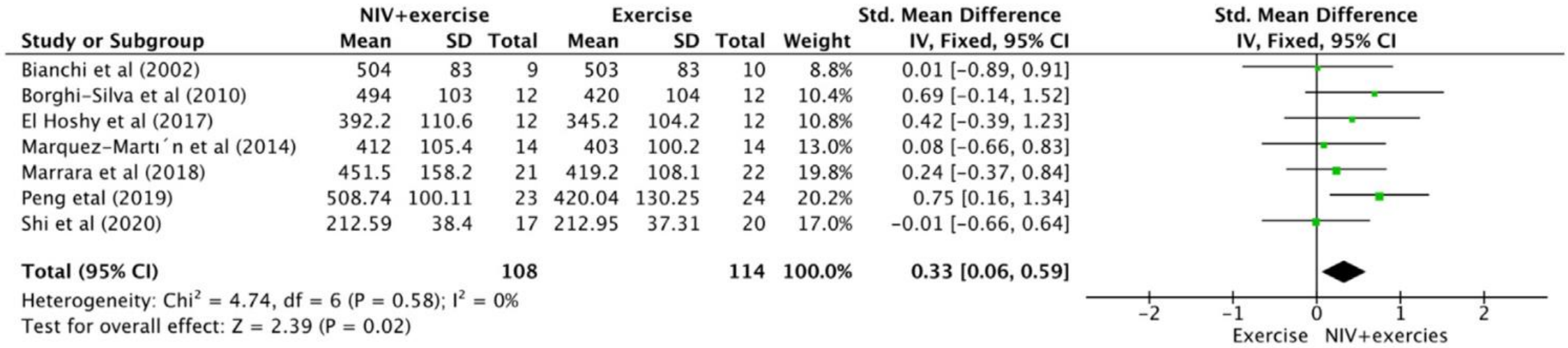


Fig. 2. Forest plot for analysis of 6-min walk distance. NIV: non-invasive ventilation.

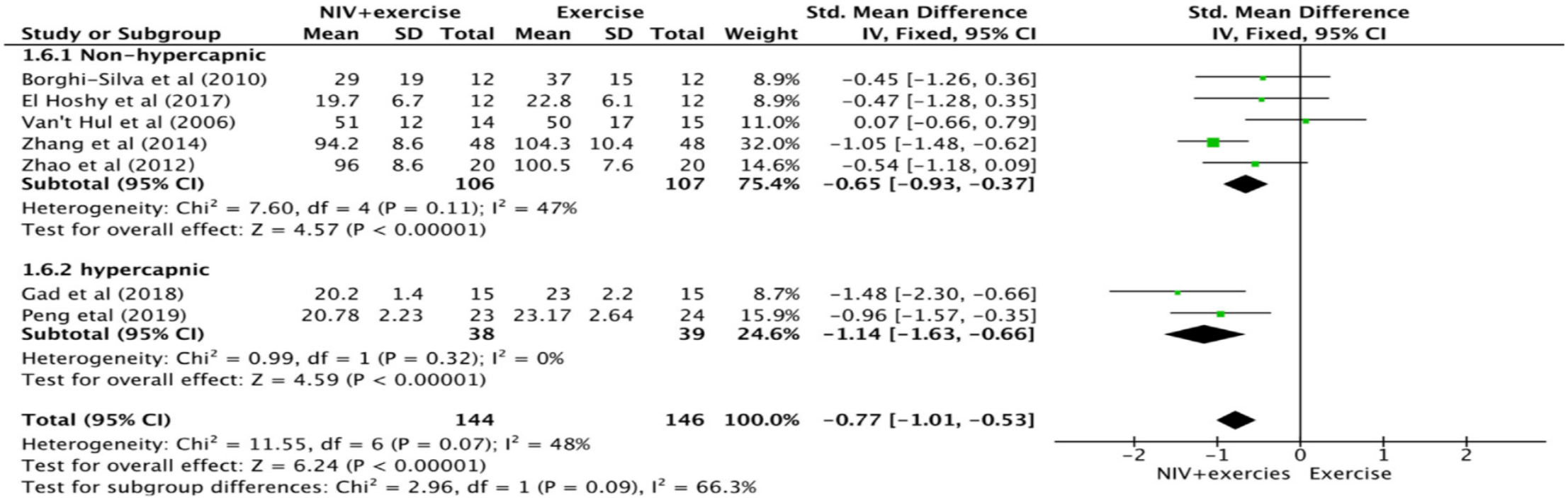


Fig. 3. Forest plot for analysis of health-related quality of life. NIV: non-invasive ventilation.

Traitements inhalés

Effects of pharmacological and non-pharmacological interventions on physical activity outcomes in COPD: a systematic review and meta-analysis

ERJ Open Res 2023; 9: 00409-2023

Dimitrios Megaritis [1], Emily Hume [1], Nikolaos Chynkiamis [2], Christopher Buckley [1], Ashley M. Polhemus [3], Henrik Watz [4], Thierry Troosters [5] and Ioannis Vogiatzis [1] on behalf of the Mobilise-D COPD Review group [6]

Study or subgroup	Pharmacological int Mean±SD	Total	Placebo Mean±SD	Total	Weight (%)	Mean difference IV, random, 95% CI
Beeh, 2014 (LAMA)	296±2062	85	−163±2059	83	15.8	459.00 (−164.19–1082.19)
Troosters, 2014 (LAMA)	103±2549	186	94±2639	167	19.8	9.00 (−533.58–551.58)
Watz, 2016 (LAMA/LABA)	31±1662	194	−321±1648	194	39.3	352.00 (22.65–681.35)
Watz, 2017 (LAMA/LABA)	621±1882	127	−110±1852	123	25.1	731.00 (268.12–1193.88)
Total (95% CI)		**592**		**567**	**100**	396.44 (124.80–668.08)

Heterogeneity: Tau^2=20613.56; Chi^2=4.07, df=3 (p=0.25); I^2=26%
Test for overall effect: z=2.86 (p=0.004)

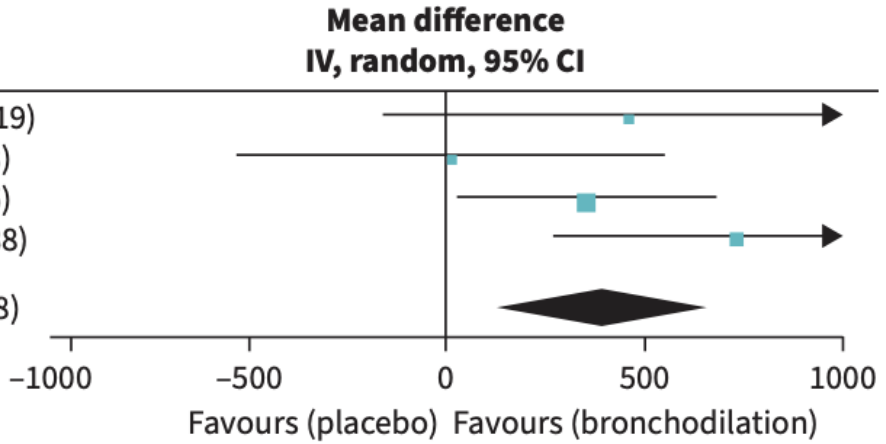


FIGURE 3 Effect size of pharmacological interventions *versus* placebo on steps/day. Long-acting bronchodilator type indicated next to the publication year. int: intervention; LAMA: long-acting muscarinic receptor antagonist; LABA: long-acting β-agonist.

Activité physique en +

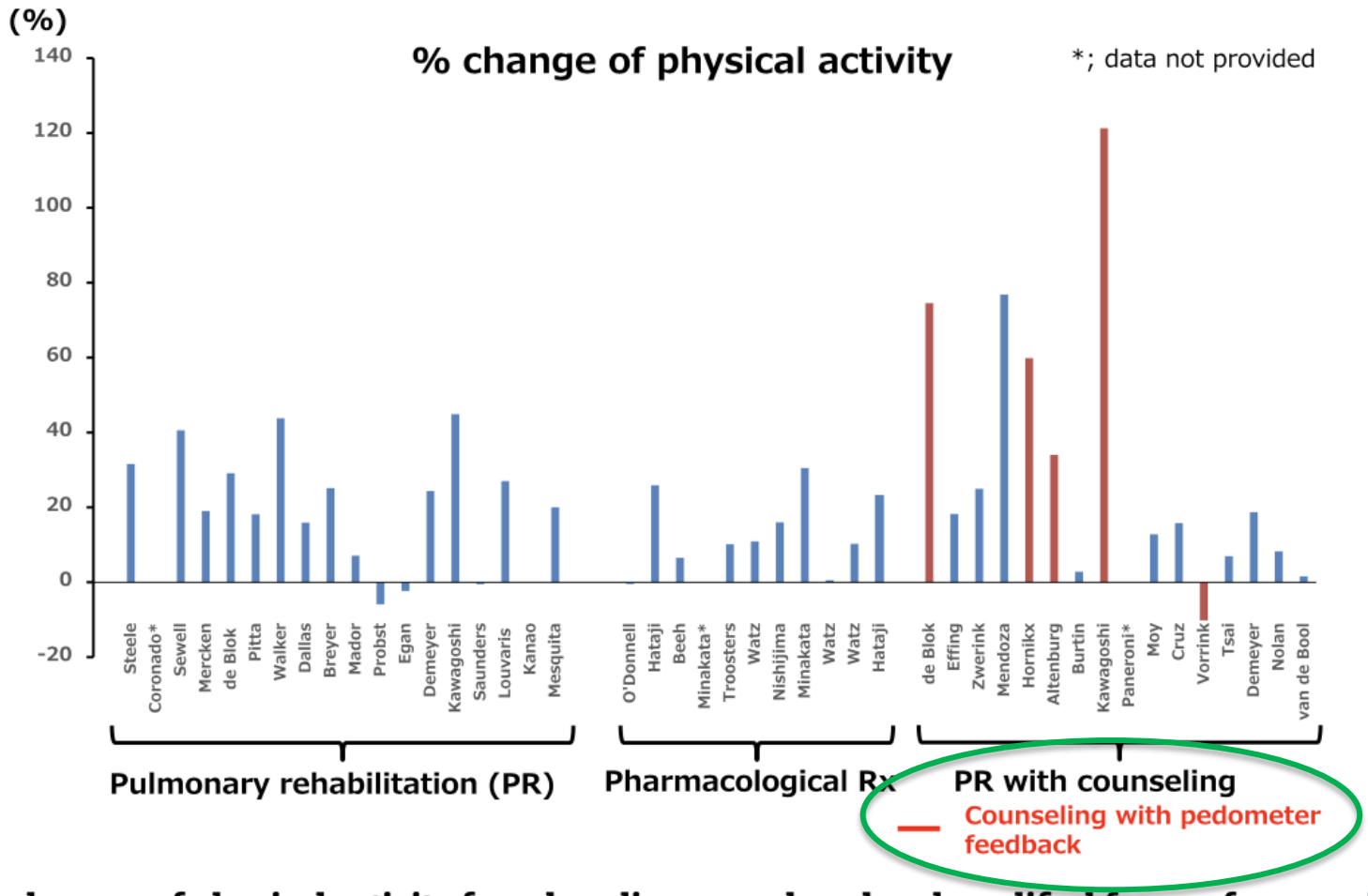


Figure 3 – Percentage changes of physical activity from baseline reproduced and modified from references [36–79]. The effects of PR alone, pharmacological treatment, and PR with counseling are shown in the left, middle, and right of the figure, respectively. The effect of PR and counseling with pedometer feedback are shown as red bars. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

2 TM6 ?

Intérêt de réaliser deux tests de marche de 6 minutes en fin de réadaptation respiratoire chez des patients atteints de broncho-pneumopathie chronique obstructive

Manon Pirou

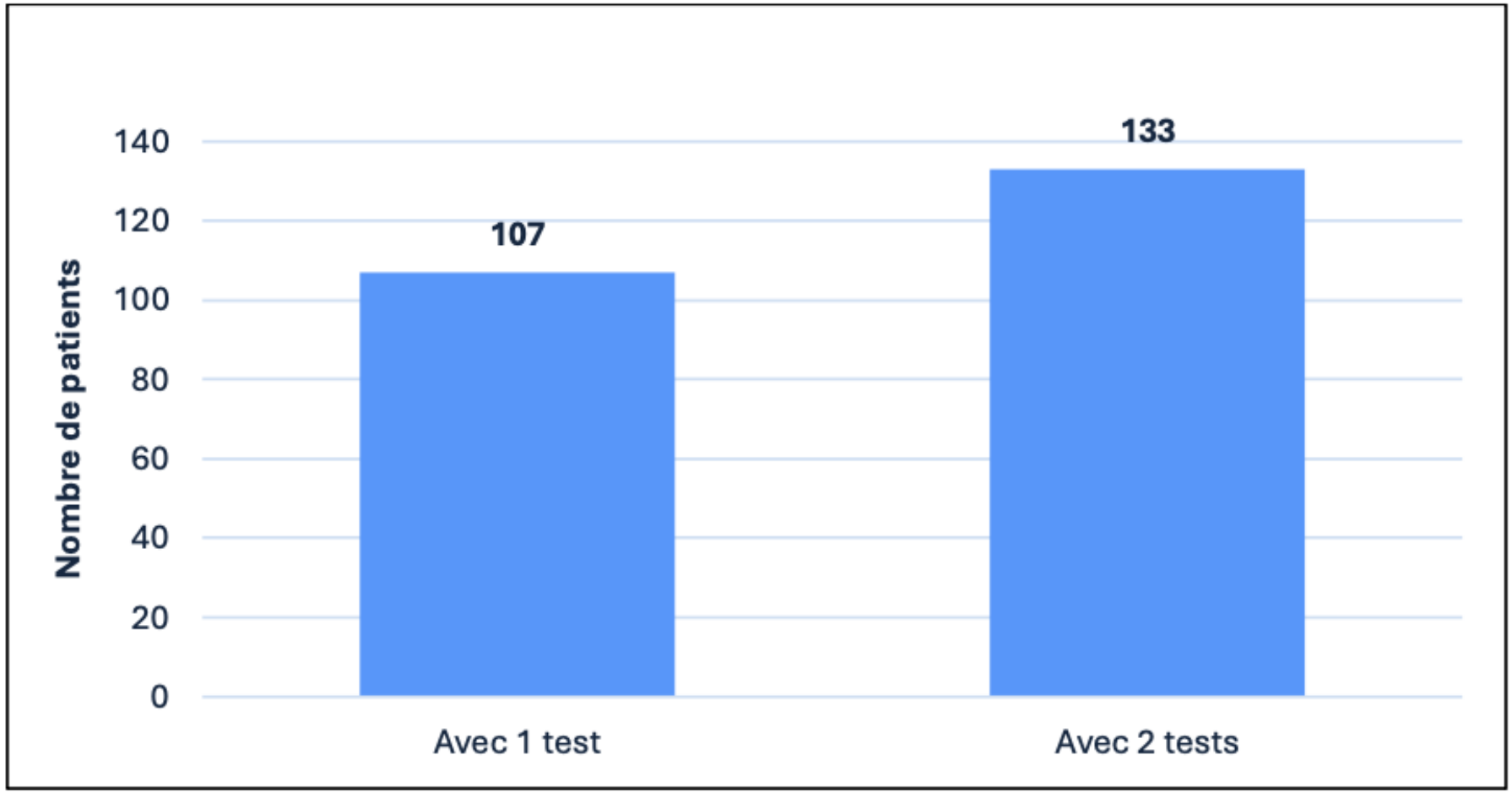
Tableau 5 : Comparaison des données des deux tests de marche de 6 minutes effectués en fin de réadaptation respiratoire

	Test de marche 1	Test de marche 2	*P* valeur
Distance parcourue	438 +/- 97	452 +/- 98	<0.0001
SpO_2 fin de test	87.301 +/- 5.170	86.988 +/- 5.433	0.227
FC fin de test	107.913 +/- 17.095	109.954 +/- 16.605	0.075
Dyspnée fin de test	3.806 +/- 1.570	3.913 +/- 1.564	0.160
Pénibilité musculaire fin de test	1.915 +/- 1.929	2.232 +/- 1.900	0.008

Les résultats sont exprimés en moyenne +/- l'écart type.
FC : Fréquence cardiaque ; SpO2 : Saturation Pulsée en Oxygène

HAL Id: dumas-05039899
https://dumas.ccsd.cnrs.fr/dumas-05039899v1
Submitted on 18 Apr 2025

Figure 5 : Nombre de patients répondeurs au programme de réadaptation respiratoire



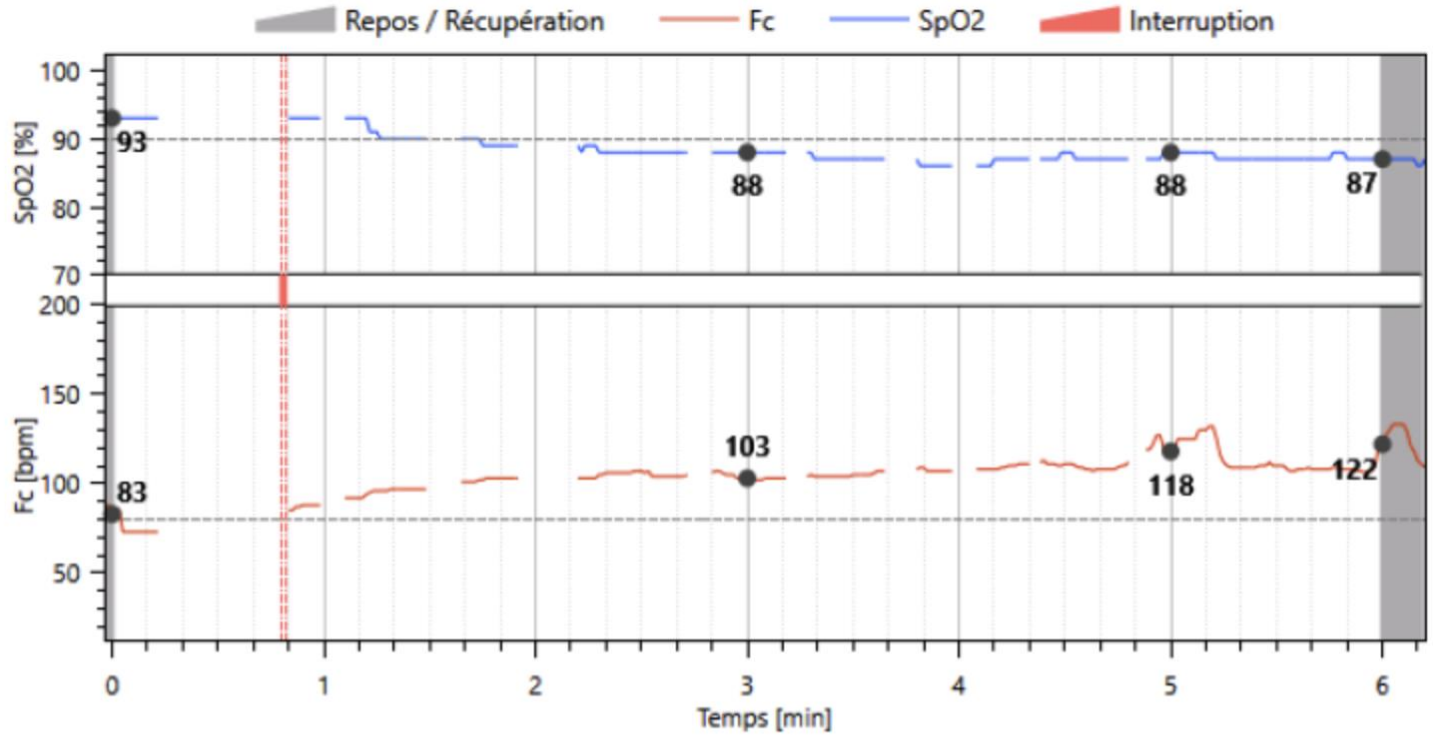
Cas 2

Patient 1964
BPCO 3E

Question en fin de RR = avez-vous profiter de la prise en charge ici ?

=> Absolument : plus sûr, plus de durée d'effort, meilleure récupération…

	18.11.2025 09:47	31.10.2025 11:54
Test de marche de 6min.		
Distance parcourue	400	396
Temps de marche	6	6
Utilisation d'un auxiliaire de m …	Non	Non
Administration d'oxygène	Non	Non
saturation initiale %	94	91
saturation minimale %	87	88
FC initiale (batt/min)	90	87
FC maximale (batt/min)	108	119
Echelle de dyspnée de Borg début	2 léger	0,5 très très léger
Echelle de Borg fin	4 assez fort	2 léger
Commentaires (Test de marche)	STST : 12	stst : 10
valeur prédite en %	78	77



Résultats

Oxygène	Non	Déambulateur	Non
Dyspnée (Borg)			
Repos	1	Récupération	2
Repos			
SpO2 moy.	93 %	Fc moy.	88 bpm
Effort			
SpO2 min.	86 %	Fc max.	132 bpm
SpO2 moy.	88,3 %	Fc moy.	105 bpm
Delta (récupération - repos)			
SpO2	-6 % = -6 % vr	Fc	23 bpm = 26 % vr
Distance			
Parcourue	430 m (84 % D.Th)	Vitesse moy.	1,19 m/s
Théorique (Enright)	512 m	Théorique min.	359 m

Composition de la présentation

- Introduction :
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  - caractéristiques – clusters à risque de non réponse
- Solutions
- Conclusions

Conclusions

- Bénéfice de la RR sur une population respiratoire
- Variabilités et différences cliniques minimales
- Variété des paramètres de mesure d'une réponse et intérêt du seul TM dans le cadre d'une réponse pluridimensionnelle
- Patients, traits et clusters à risque de réponse/non-réponse :

  NR TM : seul /♂/ âge ↑ / masse maigre ↓ / dyspnée ↑ / stade-BODE ↑ / O2 ↓
  NR multi-dimension : traits ↓ / RR moins structurée (out) / pas exa / ↑ TM / O2 ↑

- Pas de RR « one size fits all » mais du adapté au patient & traits
- Solutions respiratoires et générales… 2TM?

Finalement, une RR réussie n'est-elle pas une RR réalisée sans abandon et avec au moins un paramètre amélioré significativement sans aggravation des autres paramètres

...

et entendez vos patients

Merci