

homes, while maintaining fidelity to the core components of conventional PR that are known to be efficacious (2–4).

Bhatt and colleagues speculate that PR's positive effects on “physical, psychological, and social resilience” increased the “symptomatic threshold” for an AE, and thus reduced readmission rates (1). The authors made great efforts to mirror conventional PR with 36 sessions of aerobic exercise, strength training, and education over the course of 12 weeks. Nevertheless, there are enough differences (the use of a portable foot pedaler rather than a treadmill, resistance bands instead of free weights, videoconferenced education rather than group education, and a single provider rather than a multidisciplinary team of PR professionals) that efficacy of the video intervention should be robustly assessed. Within the video PR group, at the very least, assessments of changes in exercise capacity, dyspnea, and health-related quality of life before and after the intervention should document that this new model of PR is efficacious before it is called PR and before its effects can be attributed to benefits of conventional PR. An alternative explanation of the observed results could be that these patients received individualized counseling and intensive monitoring after hospital discharge, which led to early detection of mild exacerbations treated as outpatients, thereby avoiding hospitalizations. Assessment of all AEs, including those that did not lead to hospital readmissions, is needed to support the observed results and conclusions.

If patients cannot access conventional in-center PR, the use of any intervention that can effectively promote physical activity and exercise is certainly better than nothing. Bhatt and colleagues' video-delivered intervention may have an important role in patients with COPD. Therefore, it is critical to understand details of patient selection criteria, the intervention itself, and implementation barriers/facilitators. It is unclear whether enrolled patients were initially referred to conventional PR but refused. Also, knowing how many patients refused the video program and how many were unable to complete the 36 sessions would help define the potential for large-scale uptake of and compliance with this delivery method. Understanding how many patients achieved 60–80% target heart rate and safely tolerated exercise progression would provide a sense of the intensity of exercise delivered and physiologic training effects. Details on whether patients were directly monitored during exercise sessions and by whom would help gauge the burden of personnel resources needed. Finally, understanding the Health Insurance Portability and Accountability Act compliant application used on the smartphone would help overcome current barriers of ensuring patient privacy and information security of home-recorded data.

The authors note that the results using an “active telehealth intervention” require confirmation with a randomized controlled trial. Three groups (video PR, conventional PR, and no PR) would need to be compared before the program can be called a “video telehealth PR intervention.” ■

Author disclosures are available with the text of this letter at www.atsjournals.org.

Marilyn L. Moy, M.D., M.Sc.*
VA Boston Healthcare System
Boston, Massachusetts
and

Harvard Medical School
Boston, Massachusetts

*Corresponding author (e-mail: marilyn.moy@va.gov).

References

1. Bhatt SP, Patel SB, Anderson EM, Baugh D, Givens T, Schumann C, et al. Video telehealth pulmonary rehabilitation intervention in chronic obstructive pulmonary disease reduces 30-day readmissions. *Am J Respir Crit Care Med* 2019;200:511–513.
2. Troosters T, Blondeel A, Janssens W, Demeyer H. The past, present and future of pulmonary rehabilitation. *Respirology* 2019;24:830–837.
3. Nici L, Singh SJ, Holland AE, ZuWallack RL. Opportunities and challenges in expanding pulmonary rehabilitation into the home and community. *Am J Respir Crit Care Med* 2019;200:822–827.
4. Casaburi R. Whither pulmonary rehabilitation? Will alternative modes help or hurt? *Eur Respir J* 2018;52:1801678.

Copyright © 2019 by the American Thoracic Society



Reply to Moy



From the Authors:

We thank Dr. Moy for her interest in our study and her thoughtful comments. The central premise of her letter is that home-based pulmonary rehabilitation (PR) programs are not equivalent to traditional center-based PR because of perceived differences in the level of exercise achieved and the professionals administering the intervention. We agree with Dr. Moy that there are many unanswered questions, for which we also support further study. Our team was indeed multidisciplinary and involved an exercise physiologist to administer live instructions and monitoring, a respiratory therapist to provide education on disease management and inhaler training, a psychologist to deal with anxiety and depression, and a pulmonologist to manage disease and comorbidities. Patients also received smoking cessation and dietary advice when applicable. We agree with her that although we mimicked the components of traditional PR, the intensity of exercise achieved was different, and in most cases lower. We also agree with her that the intensity of exercise is linearly associated with improvements in exercise endurance, but there is now ample evidence to suggest that home-based interventions that use minimal equipment and are less intense result in improvements in 6-minute-walk distance and quality of life that are similar to those achieved with traditional PR (1, 2). Although there were significant improvements in 6-minute-walk distance, muscle strength, and quality of life in the telehealth arm, our research letter did not describe these results because these measures were not acquired in control subjects. One also has to weigh the physiological benefits of a traditional PR intervention that has a 50% chance of completion against those of a less intense intervention that has a higher likelihood of completion (3). Our intervention was safe and none of the subjects reported any adverse events. We first approached potential patients to

Ⓒ This article is open access and distributed under the terms of the Creative Commons Attribution Non-Commercial No Derivatives License 4.0 (<http://creativecommons.org/licenses/by-nc-nd/4.0/>). For commercial usage and reprints, please contact Diane Gem (dgern@thoracic.org).

Supported by NIH grant K23HL133438 (S.P.B.).

Originally Published in Press as DOI: 10.1164/rccm.201907-1287LE on July 25, 2019

participate in the telehealth intervention, as our traditional PR participation rate after discharge has been approximately 5% (4), a number reflected in the data for control subjects in this study. The videoconferencing sessions were performed using a Health Insurance Portability and Accountability Act-compliant app, and no video data were recorded. Although there are privacy concerns with conducting live monitoring at a patient's home, we believe these are no greater than those possible in supervised home PR sessions and perhaps group activities in traditional PR.

Dr. Moy suggests that the observed benefits of our video intervention were possibly due to individual counseling and monitoring that could have led to earlier detection of exacerbations and outpatient therapy. Although this is possible, we believe this is unlikely to explain the benefits, as patients who were not exposed to the telehealth intervention also received daily phone calls for 2 weeks and then weekly phone calls for 3 months (4).

Dr. Moy also calls for a randomized controlled trial with three arms comparing video PR, traditional PR, and no PR before video PR attains PR status. An important distinction to make in comparing our video telehealth PR program with other center-based and home-based programs is the indication for receipt of telehealth PR in our study (5). Our patients were enrolled during hospitalization and had extremely poor functional capacity at discharge. Their ability to participate in an optimal-intensity PR program was thus limited. We also believe we should not be too dogmatic about the notion that PR interventions can be called PR only if they involve attending sessions at a center with access to expensive equipment and a team of experts. Although this is ideal, this approach has clearly failed in the real world (6), and efforts should be made to test and invest in new and alternative methods for delivering PR (7). These approaches include alternative exercise strategies such as tai chi and yoga (8), interactive web-based PR (9), home-based supervised PR, and video telehealth PR (5). ■

Author disclosures are available with the text of this letter at www.atsjournals.org.

Surya P. Bhatt, M.D., M.S.P.H.*
Mark T. Dransfield, M.D.
University of Alabama at Birmingham
Birmingham, Alabama

ORCID ID: 0000-0002-8418-4497 (S.P.B.).

*Corresponding author (e-mail: sbhatt@uabmc.edu).

References

1. Maltais F, Bourbeau J, Shapiro S, Lacasse Y, Perrault H, Baltzan M, *et al.*; Chronic Obstructive Pulmonary Disease Axis of Respiratory Health Network, Fonds de recherche en santé du Québec. Effects of home-based pulmonary rehabilitation in patients with chronic obstructive pulmonary disease: a randomized trial. *Ann Intern Med* 2008;149:869–878.
2. Holland AE, Mahal A, Hill CJ, Lee AL, Burge AT, Cox NS, *et al.* Home-based rehabilitation for COPD using minimal resources: a randomised, controlled equivalence trial. *Thorax* 2017;72:57–65.
3. Brown AT, Hitchcock J, Schumann C, Wells JM, Dransfield MT, Bhatt SP. Determinants of successful completion of pulmonary rehabilitation in COPD. *Int J Chron Obstruct Pulmon Dis* 2016;11:391–397.
4. Bhatt SP, Wells JM, Iyer AS, Kirkpatrick DP, Parekh TM, Leach LT, *et al.* Results of a Medicare bundled payments for care improvement initiative for chronic obstructive pulmonary disease readmissions. *Ann Am Thorac Soc* 2017;14:643–648.
5. Bhatt SP, Patel SB, Anderson EM, Baugh D, Givens T, Schumann C, *et al.* Video telehealth pulmonary rehabilitation intervention in COPD reduces 30-day readmissions. *Am J Respir Crit Care Med* 2019;200:511–513.
6. Spitzer KA, Stefan MS, Priya A, Pack QR, Pekow PS, Lagu T, *et al.* Participation in pulmonary rehabilitation after hospitalization for chronic obstructive pulmonary disease among Medicare beneficiaries. *Ann Am Thorac Soc* 2019;16:99–106.
7. Bhatt SP. It's time to rehabilitate pulmonary rehabilitation. *Ann Am Thorac Soc* 2019;16:55–57.
8. Polkey MI, Qiu ZH, Zhou L, Zhu MD, Wu YX, Chen YY, *et al.* Tai chi and pulmonary rehabilitation compared for treatment-naïve patients with COPD: a randomized controlled trial. *Chest* 2018;153:1116–1124.
9. Chaplin E, Hewitt S, Apps L, Bankart J, Pulikottil-Jacob R, Boyce S, *et al.* Interactive web-based pulmonary rehabilitation programme: a randomised controlled feasibility trial. *BMJ Open* 2017;7:e013682.

Copyright © 2019 by the American Thoracic Society



CD71⁺ Alveolar Macrophages in Idiopathic Pulmonary Fibrosis: A Look beyond the Borders of the Disease



To the Editor:

Idiopathic pulmonary fibrosis (IPF) is a chronic, progressive, fibrosing lung disorder characterized by an unavoidable decline in pulmonary function and poor clinical outcomes. Despite significant efforts in basic and translational research over the past two decades, many aspects of the pathobiology of IPF remain elusive. The recent introduction of two effective agents for the treatment of the disease has significantly changed the clinical management of patients with IPF; however, the behavior of the disease and response to therapy are highly variable among patients. The individuation of new therapeutic targets and the validation of diagnostic, prognostic, and therapeutic biomarkers are widely recognized as urgent clinical needs (1).

In a recent study published in the *Journal*, Allden and coworkers elegantly demonstrated by means of a modern flow-cytometry approach that in IPF airways there is a distinct subset of alveolar macrophages (AMs) that downregulate the expression of the surface transferrin receptor CD71 and are phenotypically distinct with regard to their expression of profibrotic genes and impaired ability to take up transferrin *in vitro* (2). This subset of AMs was not significantly present in any of the healthy subjects tested in the study as the control population, and interestingly, its presence was correlated with worse clinical outcomes for patients.

Ⓒ This article is open access and distributed under the terms of the Creative Commons Attribution Non-Commercial No Derivatives License 4.0 (<http://creativecommons.org/licenses/by-nc-nd/4.0/>). For commercial usage and reprints, please contact Diane Gern (dgern@thoracic.org).

Supported by institutional funds from the University of Rome Tor Vergata, Rome, Italy.

Originally Published in Press as DOI: 10.1164/rccm.201906-1159LE on July 26, 2019