


# Inequality in Pulmonary Rehabilitation – The challenges magnified by the COVID-19 pandemic

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## Abstract

The COVID-19 pandemic has served to expose and amplify existing inequalities in chronic respiratory disease and the social determinants of health. In this article, we summarise evidence of existing disparities associated with chronic obstructive pulmonary disease and pulmonary rehabilitation; highlighting limitations of existing data. To reduce health inequalities in pulmonary rehabilitation, there is a need to identify and target factors influencing fair access and personal agency to engage. With consideration of the influence of culture on beliefs, expectations and health behaviours, we propose a renewed approach toward progressively achieving health equity in pulmonary rehabilitation based on principles of cultural safety and adaptation. This is a key priority in improving the quality of life of people living with chronic respiratory disease. Building comprehensive pulmonary rehabilitation service delivery models based on an understanding of the holistic needs of the local population should be a priority for service providers and researchers.

## Keywords

Pulmonary rehabilitation, health inequalities, chronic obstructive pulmonary disease, COVID-19, cultural adaptation

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Evidence consistently highlights lasting socio-economic inequalities in the prevalence and impact of chronic obstructive pulmonary disease (COPD); with increased risk of morbidity and mortality.<sup>1,2</sup> Ethnic and indigenous health disparities have been observed in high-income countries in prevalence, severity, hospital admissions and mortality associated with COPD.<sup>3–5</sup> These observed health inequalities may be attributable to: shared behavioural risk factors (e.g., smoking, unhealthy diet, physical inactivity), environmental factors (e.g., exposure to air pollution and biomass smoke), cultural differences in perceptions of health and healthcare, differences in education level and health literacy, motivation to engage in self-care interventions and self-efficacy.<sup>1–5</sup>

Pulmonary rehabilitation (PR) data demonstrate that people living with COPD in more socioeconomically deprived areas are less likely to complete PR than their counterparts living in the least deprived areas<sup>6–8</sup>; although clinical outcomes of those who do complete are comparable

to those from less deprived areas.<sup>6</sup> The ethnicity of PR attendees in the UK remains predominantly White-British<sup>7</sup> and significantly lower completion rates have been reported in Māori and Pacific Islanders in comparison to Europeans in a New Zealand cohort.<sup>9</sup> A large retrospective evaluation of participation in PR following COPD-related hospitalisation in the US demonstrated significant racial disparities

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that were not fully accounted for by geographical variation in service provision.<sup>10</sup> However reporting of ethnicity and other characteristics that may be associated with health-related disparities (e.g. sexual orientation, gender identity and intersex status) is limited.<sup>11</sup> Comprehensive data is needed to understand more about supporting PR access in diverse communities; with recognition of the multiple, interacting spheres of influence on health equity.<sup>12</sup>

The COVID-19 pandemic has served to expose and amplify existing inequalities in chronic respiratory diseases (CRD) and the social determinants of health.<sup>13,14</sup> Bambra and colleagues<sup>14</sup> characterise COVID-19 as a concurrent, synergistic pandemic for disadvantaged communities; with interaction and exacerbation of existing chronic disease and social conditions. People living with chronic disease in the most deprived areas, from ethnic minority backgrounds and/or of older age are at increased risk COVID-19 related morbidity and mortality.<sup>14</sup>

The rapid transition to remotely delivered models of PR (often reliant on digital access and literacy), has magnified existing digital inequalities which must be considered as the longer-term role of telerehabilitation in meeting the global demand for PR continues to evolve.<sup>15-17</sup> Though digital interventions have the potential to improve accessibility for some, those who are least likely to be online are indeed those who experience the greatest burden of ill health.<sup>15,16</sup> Further, it has been observed in a UK-based cohort of PR service-users that improved digital literacy does not necessarily translate to acceptability of web-based interventions.<sup>18</sup>

Uptake, attendance, and completion of PR are greatly influenced by individuals' beliefs and expectations.<sup>19</sup> There is an inherent association with defining components of

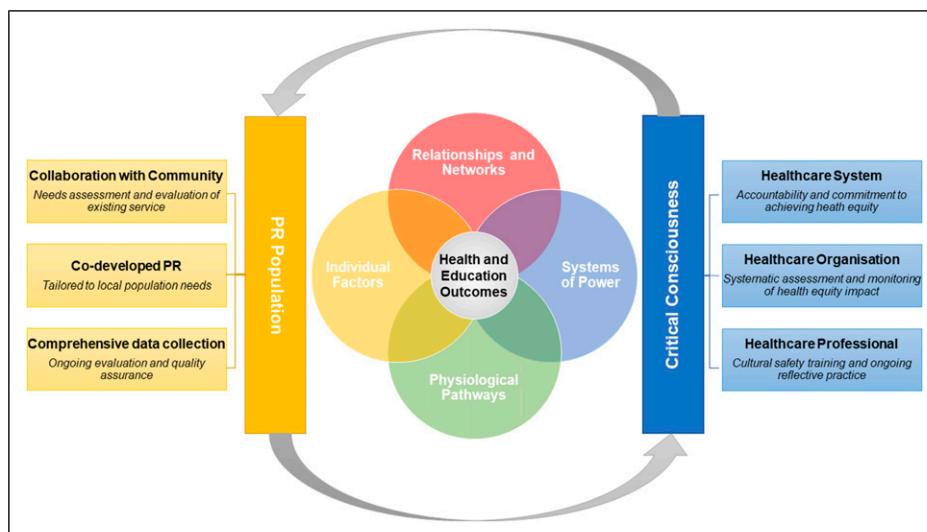
culture (knowledge, values, beliefs, and practices) which are influenced by multi-faceted and intersecting factors associated with identity, including socio-economic status and ethnicity. Culture can helpfully be conceptualised as a lens through which people define health and illness, and further how they perceive and respond behaviourally.<sup>20</sup> There is a need to target factors that influence both fair access and personal agency to engage in PR in order to reduce health inequalities.<sup>12</sup>

The work of the National Institute for Health Research Global Health Research Group on Respiratory Rehabilitation (RECHARGE)<sup>21,22</sup> seeks to determine how a western PR service should be adapted to local cultures in low- and middle-income countries. But given the vast multi-faceted diversity in high-income countries such as the US, Australia and UK, shouldn't we all be considering the cultural needs of our populations in the pursuit of health equity? **Figure 1** summarises principles of cultural safety and adaptation required in the pursuit of health equity in PR.

### Where do we go from here?

The Rehabilitation 2030 Initiative<sup>25</sup> highlights the growing global rehabilitation needs and calls for action to progressively achieve equitable access to quality services for all the population. The COVID-19 pandemic has served to magnify health inequalities and unmet needs.

Whilst the issue of uptake and adherence in PR is certainly not new, a renewed approach is required to both meet demand and effectively tackle health inequalities in PR.



**Figure 1.** Toward health equity in PR (developed using the 'Health Equity Framework'<sup>12</sup> and principles of 'cultural safety'<sup>23</sup> and cultural adaptation <sup>24</sup>

### Knowing our population

It is essential for us to understand the needs of our CRD population in order to effectively address them, including understanding culture as part of an intersectionality-informed approach. With consideration of cultural safety; how and where can we involve local people living with CRD in our PR service planning and delivery? How can we work collaboratively to co-produce service initiatives, ensuring that minority voices are engaged and heard? Though the efficacy of the lay health worker (LHW) in promoting uptake and adherence to PR is yet to be robustly explored, the positive influence of the LHW-patient relationship has great potential.<sup>26</sup> Alongside understanding and tailoring PR to our local population's needs, we must ensure to maintain our focus on individual patient needs and person-centred experience of care.

### Comprehensive, good-quality data

This is key in enabling and empowering policy-makers and healthcare professionals to identify the specific needs of different communities, respond with tailored strategies for addressing inequalities, and track the impact of these strategies. We must ensure that data reflects diversity in our PR populations with consideration of cultural factors. Robust quality assurance processes must be implemented locally and nationally to ensure delivery of optimal outcomes for our population and continue to evaluate cost-effectiveness.<sup>27</sup>

### Individual and organisational reflexivity

'Critical consciousness' can facilitate cultural humility and identification of structural blind spots; leading to transformative learning and enabling positive innovation.<sup>23</sup> To achieve the ambition of optimising rehabilitation for all, workforce training needs to consider cultural competence as well as skills necessary for the delivery of emerging models of PR.<sup>27</sup>

Building comprehensive PR service delivery models to progressively achieve equitable access to quality multi-disciplinary services fit for all is a key priority in improving the quality of life of people living with CRD.<sup>25</sup> Understanding our population's holistic needs inclusive of multifaceted cultural factors is essential in the pursuit of accomplishing this and should be a priority for service providers and researchers.

### Declaration of conflicting interests

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### References

1. Gershon AS, Dolmage TE, Stephenson A, et al. Chronic obstructive pulmonary disease and socioeconomic status: a systematic review. *COPD: J Chronic Obstructive Pulm Dis* 2012; 9(3): 216–226.
2. Collins PF, Stratton RJ, Kurukulaaratchy RJ, et al. Influence of deprivation on health care use, health care costs, and mortality in COPD. *Int J Chronic Obstructive Pulm Dis* 2018; 13: 1289–1296.
3. Martin A, Badrick E, Mathur R, et al. Effect of ethnicity on the prevalence, severity, and management of COPD in general practice. *Br J Gen Pract* 2012; 62(595): e76–81.
4. Nastars DR, Rojas JD, Ottenbacher KJ, et al. Race/ethnicity and 30-day readmission rates in medicare beneficiaries with COPD. *Respir Care* 2019; 64(8): 931–936.
5. Meharg DP, Gwynne K, Gilroy J, et al. Exercise-based interventions for Indigenous adults with chronic lung disease in Australia, Canada, New Zealand, and USA: a systematic review. *J Thorac Dis* 2020; 12(12): 7442–7453.
6. Steiner MC, Lowe D, Beckford K, et al. Socioeconomic deprivation and the outcome of pulmonary rehabilitation in England and Wales. *Thorax* 2017; 72(6): 530–537.
7. Royal College of Physicians. *National Asthma and Chronic Obstructive Pulmonary Disease Audit Programme (NACAP): Pulmonary rehabilitation clinical and organisational audit 2019*. [online], 2020. Available from: <https://www.nacap.org.uk/nacap/welcome.nsf/reportsPR.html> (Accessed 14 April 2022).
8. Stone PW, Hickman K, Steiner MC, et al. Predictors of pulmonary rehabilitation completion in the UK. *ERJ Open Res* 2021; 7(1): 00509–02020.
9. Candy S, Jepsen N, Coomarasamy C, et al. Patient characteristics and predictors of completion of a pulmonary rehabilitation programme in Auckland, New Zealand. *The New Zealand Med J (Online)* 2020; 133(1522): 30–41.
10. Spitzer KA, Stefan MS, Priya A, et al. A geographic analysis of racial disparities in use of pulmonary rehabilitation after hospitalization for COPD exacerbation. *Chest* 2020; 157(5): 1130–1137.
11. Baker KE, Streed CG Jr and Durso LE. Ensuring that LGBTQI+ people count—collecting data on sexual orientation, gender identity, and intersex status. *New Engl J Med* 2021; 384(13): 1184–1186.
12. Peterson A, Charles V, Yeung D, et al. The health equity framework: a science-and justice-based model for public

- health researchers and practitioners. *Health Promot Pract* 2021; 22(6): 741–746.
13. Marmot M, Allen J, Goldblatt P, et al. *Build back fairer: the COVID-19 Marmot review the pandemic, socioeconomic and health inequalities in England*.
  14. Bambra C, Riordan R, Ford J, et al. The COVID-19 pandemic and health inequalities. *J Epidemiol Community Health* 2020; 74(11): 964–968.
  15. Cox NS, Dal Corso S, Hansen H, et al. Telerehabilitation for chronic respiratory disease. *Cochrane Database Syst Rev* 2021; 1: CD013040.
  16. Gann B. Combating digital health inequality in the time of coronavirus. *J Consumer Health Internet* 2020; 24(3): 278–284.
  17. Watson A and Wilkinson TM. Digital healthcare in COPD management: a narrative review on the advantages, pitfalls, and need for further research. *Ther Adv Respir Dis* 2022; 16: 17534666221075493.
  18. Polgar O, Patel S, Walsh JA, et al. Digital habits of pulmonary rehabilitation service-users following the COVID-19 pandemic. *Chron Respir Dis* 2022; 19: 14799731221075647.
  19. Cox NS, Oliveira CC, Lahham A, et al. Pulmonary rehabilitation referral and participation are commonly influenced by environment, knowledge, and beliefs about consequences: a systematic review using the theoretical domains framework. *J Physiotherap* 2017; 63(2): 84–93.
  20. Nasir NI and Hand VM. Exploring sociocultural perspectives on race, culture, and learning. *Rev Educat Res* 2006; 76(4): 449–475.
  21. Orme MW, Free RC, Manise A, et al. Global RECHARGE: establishing a standard international data set for pulmonary rehabilitation in low-and middle-income countries. *J Glob Health* 2020; 10(2): 020316.
  22. Jayamaha AR, Perera CH, Orme MW, et al. Protocol for the cultural adaptation of pulmonary rehabilitation and subsequent testing in a randomised controlled feasibility trial for adults with chronic obstructive pulmonary disease in Sri Lanka. *BMJ Open* 2020; 10(11): e041677.
  23. Curtis E, Jones R, Tipene-Leach D, et al. Why cultural safety rather than cultural competency is required to achieve health equity: a literature review and recommended definition. *Int J Equity Health* 2019; 18(1): 1–7.
  24. Bernal G, Jiménez-Chafey MI and Domenech Rodríguez MM. Cultural adaptation of treatments: a resource for considering culture in evidence-based practice. *Prof Psychol Res Pract* 2009; 40(4): 361–368.
  25. World Health Organisation. Rehabilitation 2030 Initiative. [online], 2017. Available from: <https://www.who.int/initiatives/rehabilitation-2030> (Accessed 14 April 2022).
  26. Gilworth G, Lewin S, Wright AJ, et al. The lay health worker–patient relationship in promoting pulmonary rehabilitation (PR) in COPD: what makes it work? *Chron Respir Dis*. 2019; 16:1479973119869329.
  27. Holland AE, Cox NS, Houchen-Wolloff L, et al. Defining modern pulmonary rehabilitation. An official American thoracic Society workshop report. *Ann Am Thorac Soc* 2021; 18(5): e12–29.