QUALITY STANDARDS

Chronic Obstructive Pulmonary Disease

Using Race-Neutral Equations to Interpret Spirometry: Information for Clinicians

Ontario Health

In January 2023, evidence for Ontario Health's *Chronic Obstructive Pulmonary Disease: Care in the Community for Adults* quality standard (originally released in December 2018) was reviewed as part of a quality standard 5-year update. This quality standard addresses care for people with chronic obstructive pulmonary disease (COPD), including the assessment of people who may have COPD. It provides guidance on the diagnosis, management, and treatment of COPD in community-based settings. The scope of this quality standard applies to primary care, specialist care, and in long-term care and other home and community care settings. It does not address care provided in an emergency department or hospital inpatient setting for the management of acute exacerbations of COPD.

This document provides information for clinicians about content in the Ontario Health COPD quality standard on the use of race-neutral equations to interpret and report spirometry. The COPD quality standard was developed using the best available evidence, in collaboration with experts in respirology and primary care, and people with lived experience of COPD. Ontario Health has also produced a companion document for patients that clinicians can use to facilitate discussions about race-neutral equations for spirometry and what those equations mean for their care.

What is the historical background of the use of "race correction" in pulmonary function testing?

Since the late 1700s, differences and deficiencies in the "pulmonary apparatus" or vital capacity of the lungs have been highlighted to justify slavery and structural racism in the United States.[1,2] Race correction or ethnic adjustment in clinical algorithms, including pulmonary function tests (PFTs), is an approach through which race, a social construct, is inappropriately conflated with biological differences.[3] It is a practice rooted in racist beliefs about the supposed structural and biological differences of the lungs for some racial or ethnic groups, particularly Black people.[1,4]

Spirometry is the most common PFT, representing the cornerstone diagnostic and management tool for people with chronic respiratory diseases such as asthma and COPD. Spirometers have traditionally "corrected" or "adjusted" for race by using a scaling factor for racialized populations, or by applying race- or ethnicity-specific reference equations. This practice requires that to be interpreted as abnormal, PFT measurements must be up to 15% lower for Black people and up to 6% lower for Asian people compared to White people of the same sex, height, and age.[1,5] Research suggesting that lung function is lower in racialized populations has often neglected to examine the effects of structural or social determinants of health, or environmental exposures.[2]

Based on this lower observed lung function among racialized groups, reference equations yield lower predicted forced expiratory volume (FEV_1) values for those groups. Therefore, for 2 people with the same absolute measure of lung function, a racialized person will have a higher relative value (percent predicted) than a White person.[2] With a higher percent predicted value, the racialized person will be assessed as having a lower severity of COPD, thus delaying the diagnosis of the severity of their illness and restricting their access to appropriate care, benefits, and treatment.

What has changed in the 2023 Ontario Health COPD quality standard update to promote health equity?

The definitions of *spirometry* in quality statement 1 and *airflow limitation* in quality statement 2 have been updated to align with recommendations from the recent American Thoracic Society statement on race and ethnicity in the interpretation of PFTs.[5] The content added to the definitions in the updated COPD quality standard is as follows.

Quality Statement 1: Diagnosis Confirmed With Spirometry

Spirometry: Reference values to interpret the test are based on factors such as age, height, and sex. The American Thoracic Society has developed a consensus statement, endorsed by the European Respiratory Society, that highlights why race and ethnicity should no longer be considered factors in interpreting the results of spirometry.[5] In addition, the Canadian Thoracic Society, the American Thoracic Society, and other respiratory care societies have collaboratively conducted a comprehensive evidence review and developed a statement with recommendations to address research questions on the effect of race and ethnicity on pulmonary function testing interpretation.[6]

Traditionally, race and ethnicity have been factored into the determination of reference values for interpreting spirometry. However, lung function has recently been associated with factors beyond the complex combination of social, cultural, and genetic factors ascribed to race and ethnicity – such as socioeconomic status and education.[7] A race- and ethnicity-neutral approach to interpreting spirometry, using average reference equations (e.g., the Global Lung Function Initiative [GLI] average equation) promotes health equity and ensures that patients from racialized groups are not negatively affected.[5,8]

Quality Statement 2: Comprehensive Assessment

Airflow limitation: When interpreting and reporting spirometry results, it is best to adopt an approach that is race- and ethnicity-neutral, such as average reference equations (e.g., the GLI average equation). Race- and ethnicity-based equations and adjustments assume differences in lung function between populations and racial or ethnic groups without adequately considering the influence of social determinants on lung health.[5,8] Implementing a race- and ethnicity-neutral approach also requires health care professionals to acknowledge the biological variability in lung function measurements, as well as the uncertainty of fixed cut-offs for decision-making. The continued use of reference questions derived from only White European populations, along with race- and ethnicity-based equations, contributes to biased medical care. It perpetuates health disparities and structural racism, and it negatively affects patients from racialized groups by delaying or missing diagnoses on the severity of airflow limitation or hindering access to treatment (e.g., pharmacological management, referral to specialized respiratory care, or access to pulmonary rehabilitation).[2,5]

What evidence supports this update?

The removal of race correction in PFTs is a priority in Canada and the United States, to address the inappropriate use of race in clinical algorithms. Recently, the American Thoracic Society released a consensus statement on race, ethnicity, and the interpretation of PFTs, endorsed by the European Respiratory Society.[5] In alignment with this consensus statement, the Global Initiative for Chronic Obstructive Lung Disease (GOLD) updated its Global Strategy for Prevention, Diagnosis and Management of COPD report in 2024 emphasizing the recommended replacement of race and ethnicity equations with race-neutral average reference equations in pulmonary function testing.[9]

Other peer-reviewed publications have concluded that race correction in PFTs is a standard clinical practice that lacks a biological basis.[2,8,10] In recent studies conducted in the United States, removing race correction in PFTs led to a significant increase in the diagnosed prevalence and severity of pulmonary disease among Black patients.[10,11] Although the Canadian Thoracic Society has not released a consensus statement, it has recently collaborated with the American Thoracic Society on a comprehensive evidence review, and it has developed research recommendations on the effect of race and ethnicity on the interpretation of pulmonary function testing.[6] These recommendations highlight the need for research to address the fact that past perceptions and practices around the interpretation of PFT results are supported by limited scientific evidence and measures that lack reliability.

What implications does this update have for people in Ontario with suspected or confirmed COPD?

The adoption of a race- and ethnicity-neutral approach for interpreting spirometry will promote health equity and ensure that patients from racialized groups are not negatively affected. This will promote more accurate and timely diagnosis of the severity of airflow limitation (FEV_1), ensuring that patients from racialized groups have equitable and appropriate access to care, benefits, and treatments (such as the appropriate medications, referral to specialized respiratory care, pulmonary rehabilitation, disability benefits, organ transplants, and other surgeries).

What implications does this update have for clinicians and pulmonary function testing laboratories in Ontario?

Currently, there is variation in how spirometry is interpreted across pulmonary function laboratories in Ontario. Ontario Health's COPD quality standard establishes a goal for improvement for organizations and health services planners, clinicians, and laboratory technicians, focusing on high-quality care for people with COPD. In alignment with the recent statement from the American Thoracic Society,[5] pulmonary function laboratories and clinician offices could ensure that they update the software in new and existing spirometry machines to reflect race-neutral equations such as the GLI-Global equations.[14] In cases where the race-ethnic specific equations such as the GLI-2012 reference equations are still being used, patients should not be asked to

identify their race or ethnicity and "other" should be selected in the race or ethnicity field.

How has race correction been handled for other medical conditions?

Race correction is a practice applied to clinical algorithms used in medical specialties beyond respiratory care, such as cardiology, nephrology, obstetrics, and urology.[4] This practice raises concerns, because it is not grounded in scientific evidence, it is often embedded silently in clinical guidelines, and it is based on false and racist myths that are harmful to patients from racialized groups. To measure kidney function, serum creatinine level is used to determine estimated glomerular filtration rate (eGFR). For anyone identified as Black, eGFR algorithms have resulted in higher values, suggesting better kidney function.[4] Such race-based correction was justified by algorithm developers using evidence of higher average serum creatinine concentrations among Black people compared to White people, suggesting that Black people release more creatinine into their blood at baseline, partly because they are reportedly more muscular. However, such adjustments that yield higher estimates of kidney function in Black patients could delay referrals for specialist care or transplantation and lead to worse outcomes in Black people, who are already known to have a higher risk of end-stage kidney disease than most other racial or ethnic groups. Recently, the Ontario Renal Network and the Trillium Gift of Life Network discontinued the practice of adjusting eGFR for race to increase Black people's access to care for chronic kidney disease in Ontario.[15] They have developed a clinician resource and a patient resource explaining these changes.

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Ontario Health
500–525 University Avenue
Toronto, Ontario
M5G 2L3

Toll Free: 1-877-280-8538
TTY: 1-800-855-0511
Email: QualityStandards@OntarioHealth.ca
Website: hqontario.ca

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ISBN 978-1-4868-7765-2 (PDF)