QUALITY STANDARDS

Asthma

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

Ontario Health

In October 2024, evidence for Ontario Health's *Asthma in Children and Adolescents: Care in the Community for People Under 16 Years of Age* and *Asthma in Adults: Care in the Community for People 16 Years of Age and Older* quality standards (originally released in September 2020) was reviewed as part of a 5-year update. The *Asthma in Children and Adolescents* quality standard addresses the diagnosis and management of asthma in children and adolescents under 16 years of age, and the *Asthma in Adults* quality standard addresses the diagnosis and management of asthma in adults 16 years of age and older. Both quality standards address referral to specialized asthma care for people who have indications characterizing severe asthma, but they do not address the management of severe asthma in specialized care, acute asthma exacerbations, or care provided during emergency department visits or hospitalizations.

This document provides information for clinicians about content in the Ontario Health asthma quality standards on the use of race-neutral equations to interpret and report spirometry. The asthma quality standards were developed using the best available evidence in collaboration with experts in respirology and primary care and people with lived experience of asthma. Ontario Health has also produced companion documents for children and adolescents with asthma and adults with asthma and their families and care partners 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 chronic obstructive pulmonary disease (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]

When race-specific adjustments in reference equations are used, if a racialized person and a White person have the same absolute measure of lung function, the racialized person will have a higher relative value (percent predicted) than the White person.[2] With a higher percent predicted value, the racialized person will be assessed as having better lung function than the White person without that truly being the case, thus delaying the detection of reduced lung function and impairing the correct diagnosis or assessment of the severity of their illness. This can in turn delay or restrict

their access to appropriate care, benefits, and treatment and enable further progression of their underlying condition.

What has changed in the 2025 Ontario Health asthma quality standard updates to promote health equity?

The definition of *spirometry* in quality statement 1 has 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 definition in the updated *Asthma in Children and Adolescents* and *Asthma in Adults* quality standards is as follows.

Quality Statement 1: Diagnosis

Spirometry: Reference values to interpret the test are generally based on age, sex, and height.

Traditionally, race has also been factored into the determination of spirometry reference values on the theoretical basis that biological differences between races influence expected lung function. However, race is a dynamic social construct that encompasses values, structures, and practices, rather than a well-defined biological construct. Furthermore, recent data show that social determinants such as socioeconomic status and education are more strongly correlated with lung function than race.[6] Accordingly, the use of race to set reference values inadvertently normalizes historical socioeconomic and other disadvantages suffered by people from racialized groups, which can perpetuate and amplify race-based inequities and structural racism.

To address this issue, the American Thoracic Society (ATS) has developed a consensus statement, endorsed by the European Respiratory Society, that concludes that race and ethnicity should no longer be considered factors in interpreting the results of spirometry. Rather, 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 minimizes negative impacts on people from racialized groups.[5,7] The Canadian Thoracic Society (CTS), the ATS, and other respiratory care societies have collaboratively conducted a comprehensive evidence review, explored the clinical implications of using race and ethnicity in the interpretation of pulmonary function testing, and identified a number of research gaps in this area, suggesting that ongoing research is needed to mature our understanding of the implications of this change in reference values for people from racialized groups.[36]

What evidence supports this update?

To address the inappropriate use of race in clinical algorithms, the removal of race correction in PFTs is a priority in Canada and the United States. As noted, the ATS recently released a consensus statement on race, ethnicity, and the interpretation of PFTs, endorsed by the European Respiratory Society.[5]

Other peer-reviewed publications have also concluded that race correction in PFTs is a standard clinical practice that lacks a biological basis.[2,7,8] 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.[8,9] Specifically in Black children, the use of race-neutral equations led to a significantly lower

percent predicted forced expiratory volume in 1 second (FEV_1) and forced vital capacity (FVC) in comparison with race-specific equations, thus identifying more children with symptoms of asthma as having reduced lung function and changing their treatment needs and options.[10,11]

Although the CTS has not released a consensus statement, it has recently collaborated with the ATS on a comprehensive evidence review and the development of research recommendations on the effect of race and ethnicity on the interpretation of pulmonary function testing.[12] These recommendations highlight the need for research to address the fact that past perceptions and practices of interpreting PFT results were supported by limited scientific evidence and measures lacking reliability.

What implications does this update have for people with asthma in Ontario?

The adoption of a race- and ethnicity-neutral approach to interpreting spirometry will promote health equity and minimize negative impacts on patients from racialized groups. It will also promote more accurate and timely detection of reduced lung function in racialized people in Ontario and increase the likelihood of further testing being done to detect asthma and assign the appropriate illness severity, ensuring that patients from racialized groups have equitable and appropriate access to care, benefits, and treatments (e.g., appropriate medications, referral to specialized respiratory care, 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 testing laboratories in Ontario. Ontario Health's *Asthma in Children and Adolescents* and *Asthma in Adults* quality standards establish a goal for improvement for organizations and health services planners, clinicians, and laboratory technicians, focusing on high-quality care for people with asthma. In alignment with the recent statement from the ATS,[5] pulmonary function testing laboratories and clinicians' offices should update the software in new and existing spirometry machines to reflect race-neutral equations such as the GLI Global reference equations.[6,13] In cases where race- and ethnicity-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. For example, to measure kidney function, serum creatinine level is used to determine the

estimated glomerular filtration rate (eGFR). For anyone identified as Black, race-specific eGFR algorithms have traditionally provided higher eGFR values, suggesting better kidney function.[4] Such race-based correction was justified by algorithm developers on the basis of 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 were purported to be more muscular. However, such adjustments that yield higher estimates of kidney function in Black patients were shown to inappropriately 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.[14-16] 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.[17] The Ontario Renal Network has developed a clinician resource and a patient resource explaining these changes.

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