

Historical roots of race-based pulmonary function testing (PFT)



Background

- The practice of adjusting pulmonary function test (PFT) results based on race [has roots in inaccurate, harmful historical beliefs](#) of innate biological differences between races, dating back to the era of slavery in the United States.
- These false beliefs led to the idea that Black individuals have inherently lower lung capacity than White individuals. Despite the lack of biological basis, [race correction is a common practice](#), with spirometers programmed with equations like those from the Global Lung Function Initiative (GLI) or the National Health and Nutrition Examination Survey (NHANES III) to adjust results based on a patient's self-identified or perceived race.
- These equations [provide separate values for different racial and ethnic groups](#), or apply correction factors. For example:
 - NHANES III equations provide separate values for white, African American, and Mexican-Americans.
 - GLI equations include coefficients for white, African American, Northeast Asian, and Southeast Asian groups.
- This practice [lowers the predicted "normal" values and leads to underdiagnosis and delayed or withheld treatment](#), worsening health outcomes for non-white individuals.



Findings

- Progress began by [questioning the current practice of using race-specific equations in spirometry](#), moving away from the idea of innate differences in lung capacity and towards an understanding of how social, environmental, and economic factors affect lung health. This requires acknowledging the historical misuse of lung function data to justify racial inequities.
- Studies such as [this one from the University of Pennsylvania Perelman School of Medicine](#) were conducted to compare the interpretation of PFT results with and without race correction to evaluate the impact of this adjustment on diagnosis and treatment. This includes [using a composite set of reference equations](#) derived from a diverse population. For example:
 - Using equations like the GLI "Other" category, which averages across multiple racial groups, instead of race-specific calculations.



Lessons learned

- ✓ Removing race correction leads to a [significant increase in the diagnosis](#) of obstructive and restrictive lung diseases, revealing that more patients may be affected than previously identified.
 - In the [University of Pennsylvania study](#), the removal of Black race correction in PFTs led to a 20.8% increase in the percentage of patients with any pulmonary defect.
 - In this [Cincinnati Children's Hospital Medical Center study](#), use of the 2022 GLI race-neutral equation labeled 2.5- to 4-fold more Black children with asthma symptoms as having reduced lung function.
- ✓ Among patients with diagnosed pulmonary issues, [removal of race correction often results in a higher classification of disease severity](#). This suggests that the race adjustment can underestimate the seriousness of a patient's condition.
 - In the [University of Pennsylvania study](#), the removal of race correction led to an increase in the severity of disease for 48.6% of patients.
- ✓ The removal of race correction addresses concerns that using race in PFT interpretation contributes to health disparities and the masking of health issues for non-white populations. This is an [opportunity to improve healthcare equity](#), promote more accurate diagnosis, and lead to more appropriate and timely treatment for all patients.
- ✓ Another opportunity includes the [development of multivariate clinical prediction models](#), creating a more holistic assessment and reduced reliance on any single variable, incorporating demographics, symptoms, medical history, and other test results into the lung function assessment.

Citations

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4. Removal of "Race Correction" in Pulmonary Function Tests Shows More Prevalent and Severe Lung Disease Among Black Patients. *American Thoracic Society*. 2021
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