



HEALTH EQUITY IN MULTIPLE SCLEROSIS

BLACK AND HISPANIC PERSONS HAVE MS MORE THAN PREVIOUSLY RECOGNIZED

NAVIGATION

○ Prevalence

Unmet Need

Clinical Presentation

Disease Burden

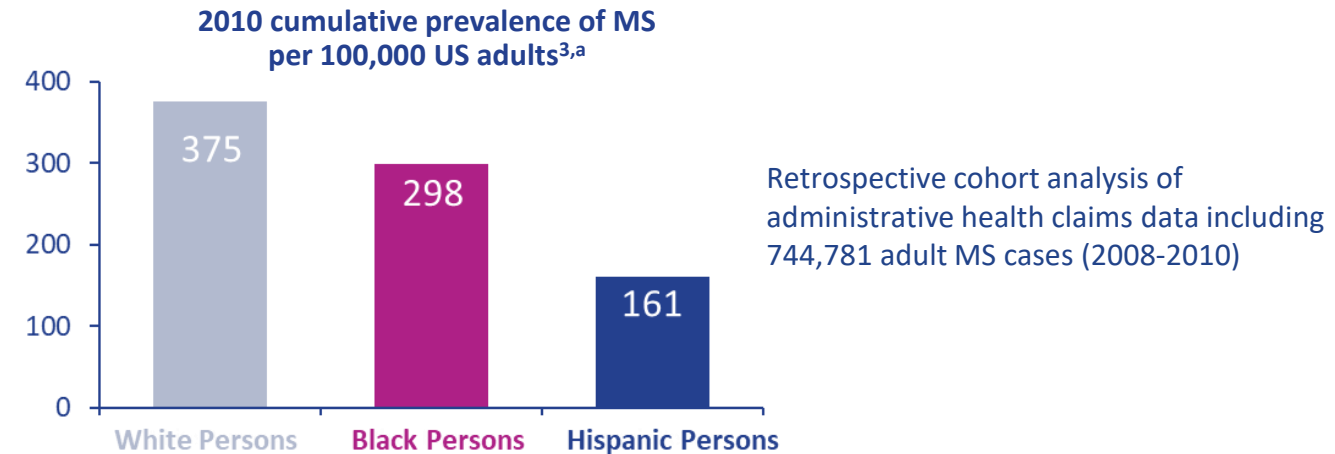
Imaging and Other Biomarkers

Potential Contributing Factors

Underrepresentation in Trials

Historically, MS was thought to primarily affect **White persons of Northern European ancestry**¹

Recent studies have shown that in the United States (US), **Black and Hispanic persons have MS more than previously recognized**²



^a95% CIs were 374 to 376 for White, 296 to 301 for Black, and 160 to 163 for Hispanic persons.

CI, confidence interval; MS, multiple sclerosis.

1. Khan O, et al. *Neurol Clin Pract*. 2015;5(2):132-142. 2. Amezcua L, McCauley JL. *Mult Scler*. 2020;26(5):561-567. 3. Hittle M, et al. *JAMA Neurol*. 2023;80(7):693-701.

THERE IS AN UNMET NEED TO UNDERSTAND MS IN BLACK AND HISPANIC POPULATIONS

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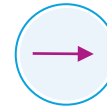
Potential Contributing
Factors

Underrepresentation in Trials

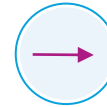


There are **limited data** on
Black and Hispanic patients
from clinical studies^{1,2}

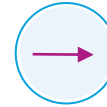
These limited data have suggested **differences** in:



Clinical Presentation^{1,3}



Disease Activity and Disability Outcomes⁴



Imaging and Other Biomarkers⁵⁻⁷

among MS patients of **different racial and ethnic groups**

MS, multiple sclerosis.

1. Telesford KM, et al. *Front Immunol.* 2023;14:1172993. 2. Williams MJ, et al. *Mult Scler Relat Disord.* 2023;76:104794. 3. Amezcua L, et al. *Mult Scler J Exp Transl Clin.* 2017;3(3):2055217317725103. 4. Ventura RE, et al. *Mult Scler.* 2017;23(11):1554-1557. 5. Rinker JR 2nd, et al. *Neurology.* 2007;69(1):68-72. 6. da Gama PD, et al. *Biomed Res Int.* 2015;2015:217961. 7. Weinstock-Guttman B, et al. *Neurology.* 2010;74(7):538-544.

BLACK AND HISPANIC PATIENTS CAN HAVE DIFFERENT CLINICAL PRESENTATIONS OF MS COMPARED WITH WHITE PATIENTS

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In a retrospective chart analysis (US),
Black patients (n=79)
presented with

**worse disability
scores at diagnosis**

~60% higher EDSS scores compared
with White patients (n=80)¹



In a retrospective cross-sectional study (US),
Hispanic patients (n=256)
showed an

**earlier age at
onset**

(31.4 ± 9.2 years) compared with
White patients (36.4 ± 10.8 years) (n=3113)²

EDSS, Expanded Disability Status Scale; MS, multiple sclerosis.

1. Naismith RT, et al. *Mult Scler*. 2006;12(6):775-781. 2. Briggs F, et al. Presented at CMSC; Aurora, CO, USA; May 31-June 3, 2023.

BLACK AND HISPANIC PATIENTS WITH MS MAY EXPERIENCE GREATER DISEASE BURDEN THAN WHITE PATIENTS

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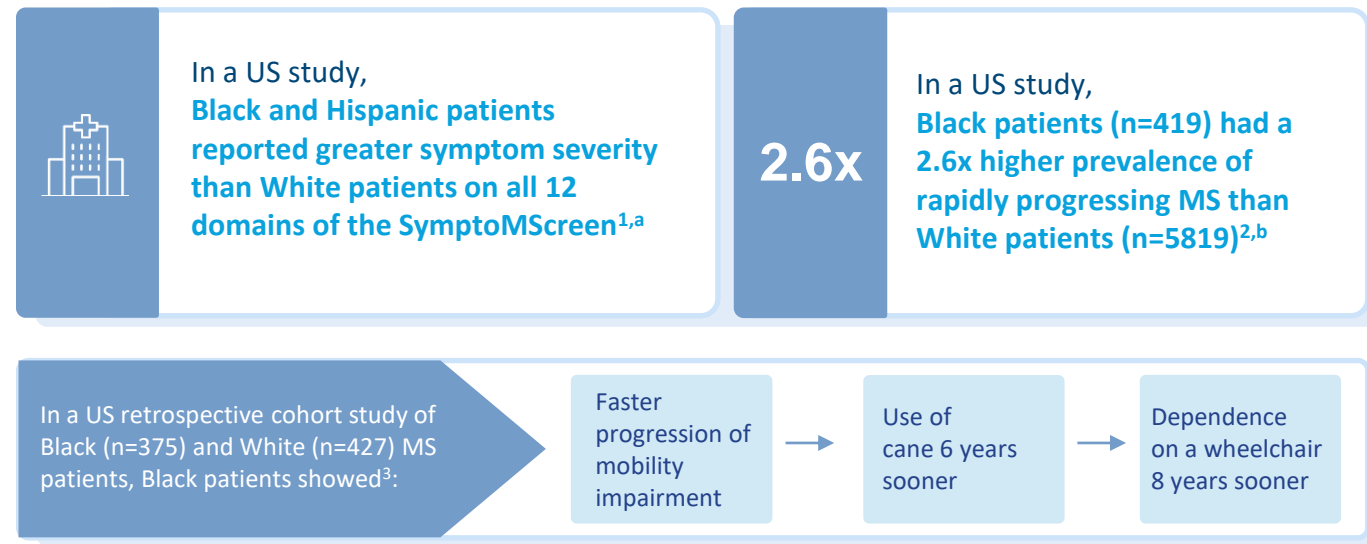
Clinical Presentation

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^aDomains of the SymptoMScreen include mobility, dexterity, vision, fatigue, cognition, bladder function, sensory function, spasticity, pain, dizziness, depression, and anxiety. ^bBased on MSSS scores ≥ 9.6 (7.3% vs 2.9% in Black and White patients, respectively; $p < 0.001$).

MS, multiple sclerosis; MSSS, Multiple Sclerosis Severity Scale.

1. Kister I, et al. *Neural Clin Pract.* 2021;11(4):335-341. 2. Kister I, et al. *Neurology.* 2010;75(3):217-223. 3. Cree BAC, et al. *Neurology.* 2004;63(11):2039-2045.

IMAGING AND OTHER BIOMARKERS VARY AMONG DIFFERENT POPULATIONS

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Compared with White patients with MS, Black patients exhibited:



Greater likelihood of CSF oligoclonal bands and higher CSF IgG index^{1,2}



Greater T1 and T2 lesion volumes on MRI^{3,4}



More rapid loss of brain and retinal tissue^{5,6}

CSF, cerebrospinal fluid; IgG, immunoglobulin G; MRI, magnetic resonance imaging; MS, multiple sclerosis.

1. Rinker JR 2nd, et al. *Neurology*. 2007;69(1):68-72. 2. da Gama PD, et al. *Biomed Res Int*. 2015;2015:217961. 3. Howard J, et al. *PLoS One*. 2012;7(8):e43061. 4. Weinstock-Guttman B, et al. *Neurology*. 2010;74(7):538-544. 5. Gray-Roncal K, et al. *Neurology*. 2021;97(9):e881-e889. 6. Caldito NG, et al. *Brain*. 2018;141(11):3115-3129.

BLACK AND HISPANIC PATIENTS WITH MS SHOW GREATER DISEASE SEVERITY AND FASTER DISEASE PROGRESSION



Greater disease severity and faster disease progression in these populations are likely driven by a combination of factors:



Genetic factors



Environmental factors



Behaviors



Other social determinants of health

MS, multiple sclerosis.
Telesford KM, et al. *Front Immunol.* 2023;14:1172993.

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BLACK AND HISPANIC PATIENTS ARE UNDERREPRESENTED IN CLINICAL TRIALS¹⁻³

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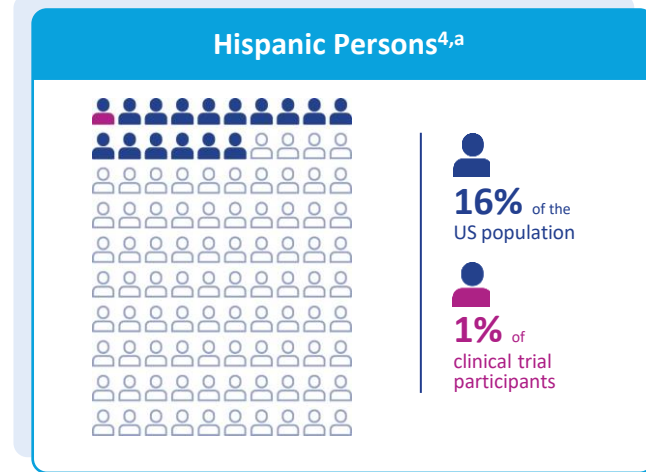
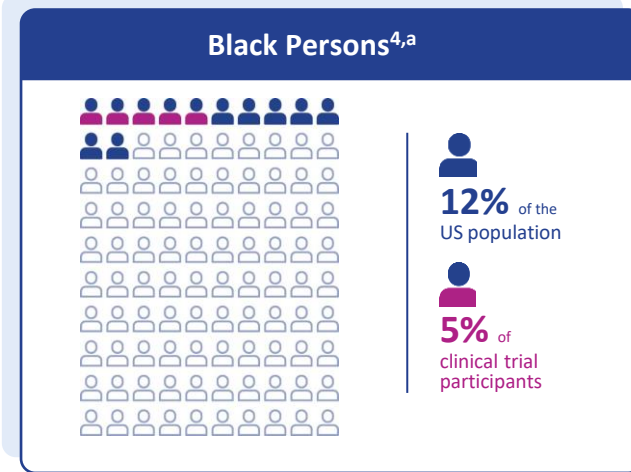
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Modest increases over time in the representation of racial and ethnic minorities in clinical trials have been reported⁵



- Out of **52,000** published articles on MS, only **113** focused on Black patients and **23** focused on Hispanic patients^{6,b}
- A review of phase 3 trials of MS DMTs from 1995-2020 demonstrated that the median percentage of White participants was **93.8%**⁷

^a2011 report from the Dialogues on Diversifying Clinical Trials conference sponsored by the FDA. ^bPubMed review conducted in 2014. DMT, disease-modifying therapy; FDA, Food and Drug Administration; MS, multiple sclerosis.

1. Okai AF, et al. *Neurology*. 2022;98(24):1015-1020. 2. Roberts MV, et al. *Practical Neurology*. 2020;49-54. Available at: <https://practicalneurology.com/articles/2020-feb/multiple-sclerosis-treatment-in-racial-and-ethnic-minorities>. Accessed September 6, 2023. 3. Avasarala J. *JAMA Neurol*. 2014;71(8):943-944. 4. FDA. Clinical Trials Shed Light on Minority Health. Available at: <https://wayback.archive-it.org/7993/20180908114418/https://www.fda.gov/ForConsumers/ConsumerUpdates/ucm349063.htm>. Accessed July 31, 2023. 5. Turner BE, et al. *Lancet Reg Health Am*. 2022;11:100252. 6. Khan O, et al. *Neurol Clin Pract*. 2015;5(2):132-142. 7. Onuorah HM, et al. *Neurology*. 2022;98(9):e880-e882.

LACK OF DIVERSITY IN CLINICAL TRIALS LIMITS KNOWLEDGE ON EFFICACY AND SAFETY OF THERAPIES FOR ALL MS PATIENT POPULATIONS

Barriers affecting participation in clinical trials include¹⁻⁴:



This lack of diversity limits our understanding of MS and the collection of accurate efficacy and safety data across all patient populations^{5,6}

MS, multiple sclerosis.

1. Rivas-Rodríguez E, Amezcua L. *Neurol Clin*. 2018;36(1):151-162. 2. Amezcua L, et al. Paper presented at CMSC Annual Meeting; National Harbor, MD, USA; June 1-4, 2022. 3. Khan O, et al. *Neurol Clin Pract*. 2015;5(2):132-142. 4. Garrick O, et al. *Ethn Dis*. 2022;32(1):61-68. 5. Telesford KM, et al. *Front Immunol*. 2023;14:1172993. 6. Williams MJ, et al. *Mult Scler Relat Disord*. 2023;76:104794.

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