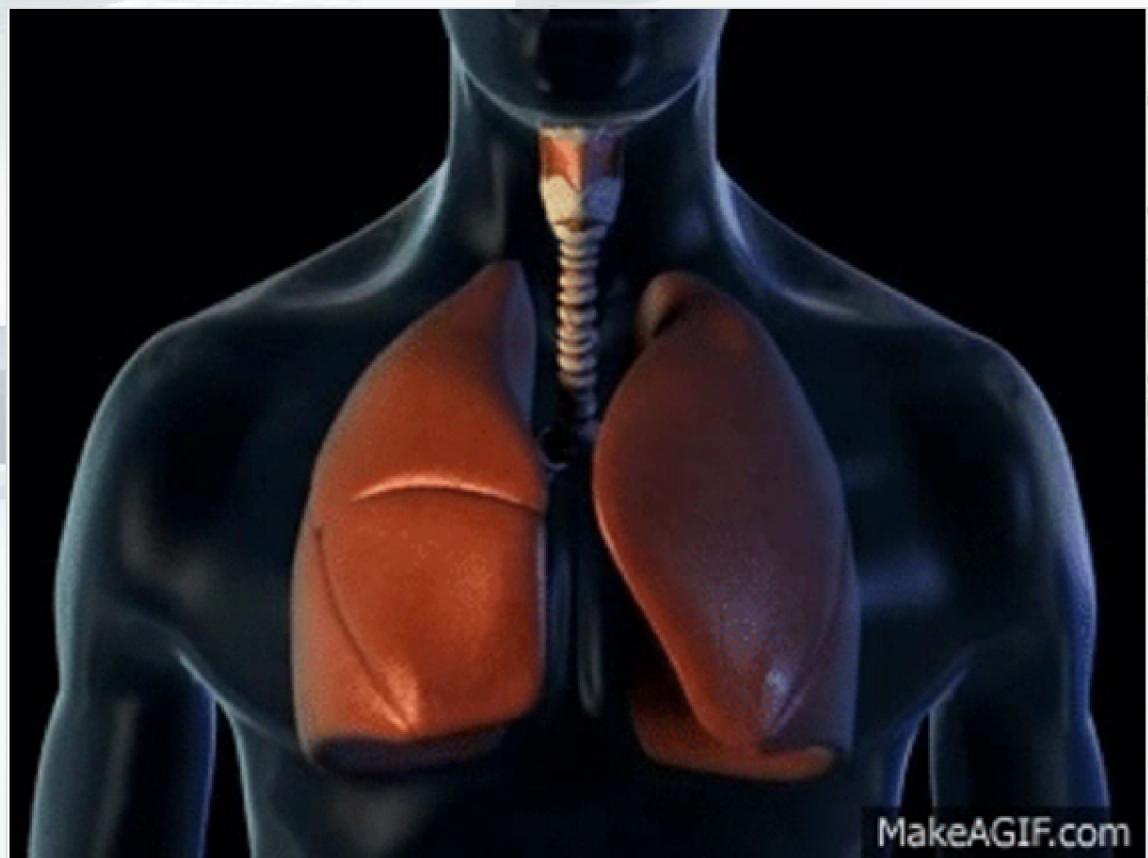


CLASSIFICATION PROJECT

DHHS Chronic Disease
Indicators: Chronic Obstructive
Pulmonary Disease Prevalance
Analysis



By: Annie Carter

AGENDA



01

Executive Summary

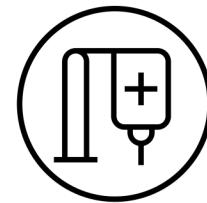
Approximately 13 million Americans diagnosed with COPD, and an additional 13 million unaware.



Goals

Develop a powerful predictive model using advanced ML classification techniques.

Analyze demographic and chronic disease indicators to understand COPD rate fluctuations.

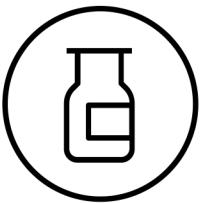


Findings

Gender and racial disparities in COPD prevalence.

COPD prevalence has remained stagnant despite lower reported numbers

Geographic location is related to COPD prevalence



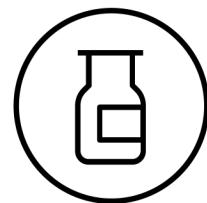
Recommendation

Address gender disparities in COPD diagnosis through targeted interventions and enhanced healthcare access.

Implement tailored initiatives to improve COPD diagnosis rates for racial minority groups.

Raise awareness among healthcare providers to differentiate COVID-19 symptoms from COPD exacerbation, facilitating timely and accurate diagnosis.

Conduct further research to understand factors contributing to the stagnation in COPD prevalence



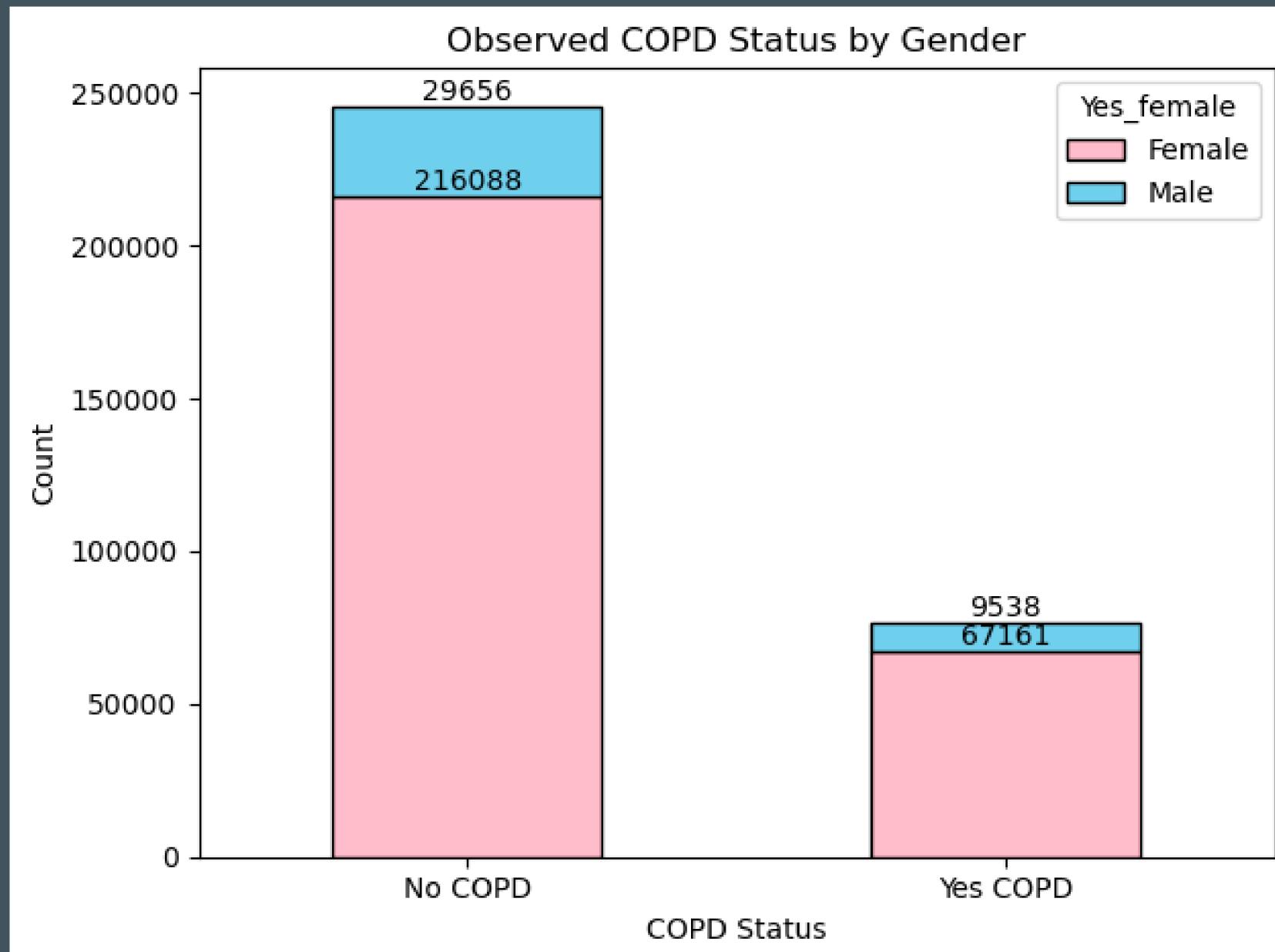
Conclusion

Significant relationships between gender, race/ethnicity, US locations, and COPD prevalence.

Decision Tree Test Model performed well with a marginal improvement over the baseline accuracy of 76.21% at 76.28%.

Findings emphasize need to tailored interventions for underserved populations, .

02 FINDINGS



Gender Disparity in COPD

Women had higher observations of COPD, potentially due to women smokers being about 50% more likely to develop COPD than men. Despite smoking less than men in general, women may be more susceptible to developing COPD, with females showing more severe COPD with early-onset disease and greater susceptibility to COPD with lower tobacco exposure (Barnes, 2016).

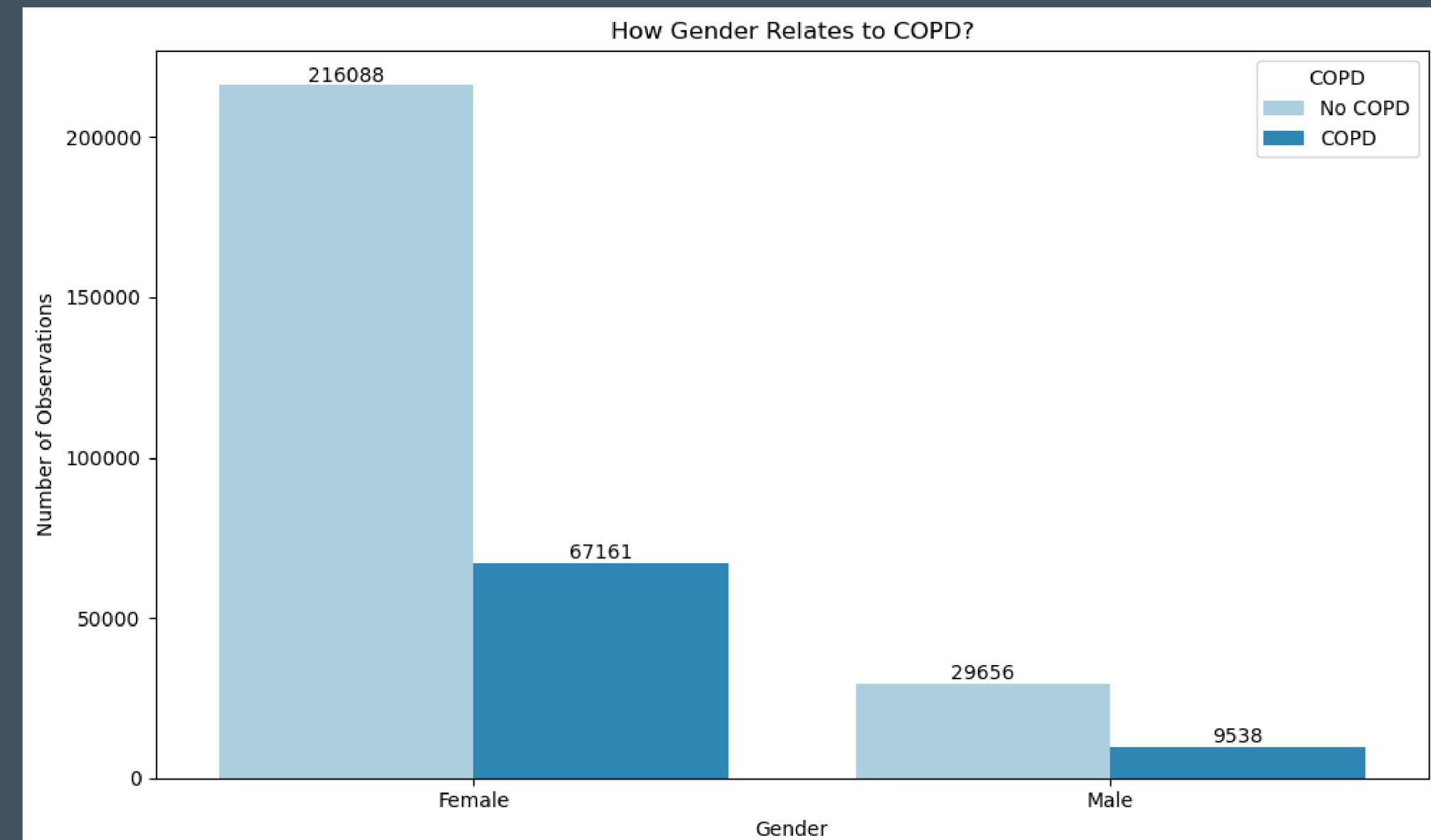


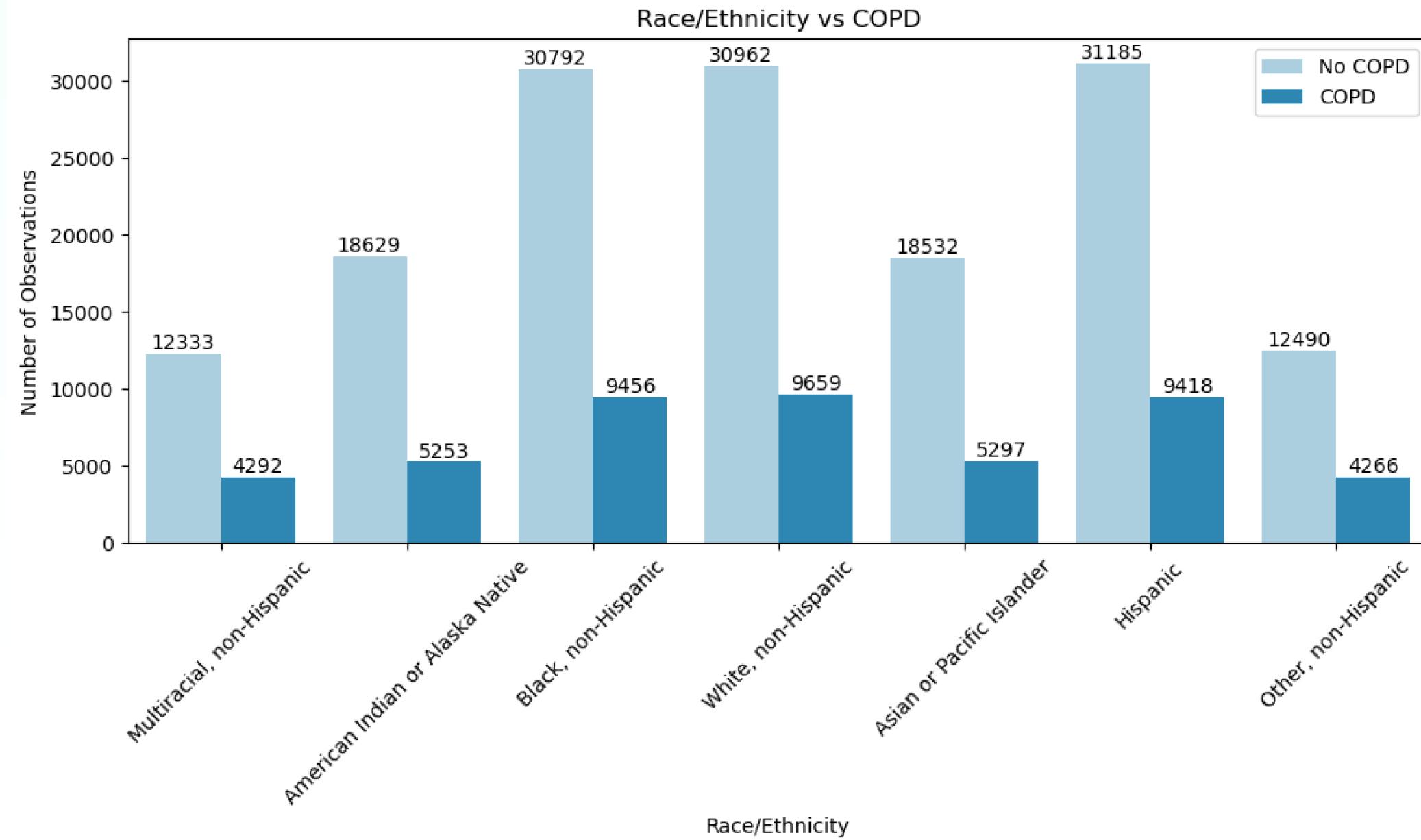
02

FINDINGS

Gender Disparity in COPD

Data showed significant gender disparity in COPD diagnosis. Women had higher observations of COPD than men. A study showed men having higher rates of undiagnosed COPD, regardless of race. This suggests that men are less likely to receive timely COPD diagnoses compared to women. (Mamary et al., 2018).





Race Relationship to COPD Prevalence

The data highlights racial disparities in COPD diagnosis, with African American (AA) and Hispanic populations showing similar COPD prevalence as White populations despite having smaller numbers in the overall population. This indicates a need for tailored interventions and targeted healthcare initiatives to address and mitigate these disparities, especially as COPD is increasingly prevalent among AA men and women (Mamary et al., 2018).

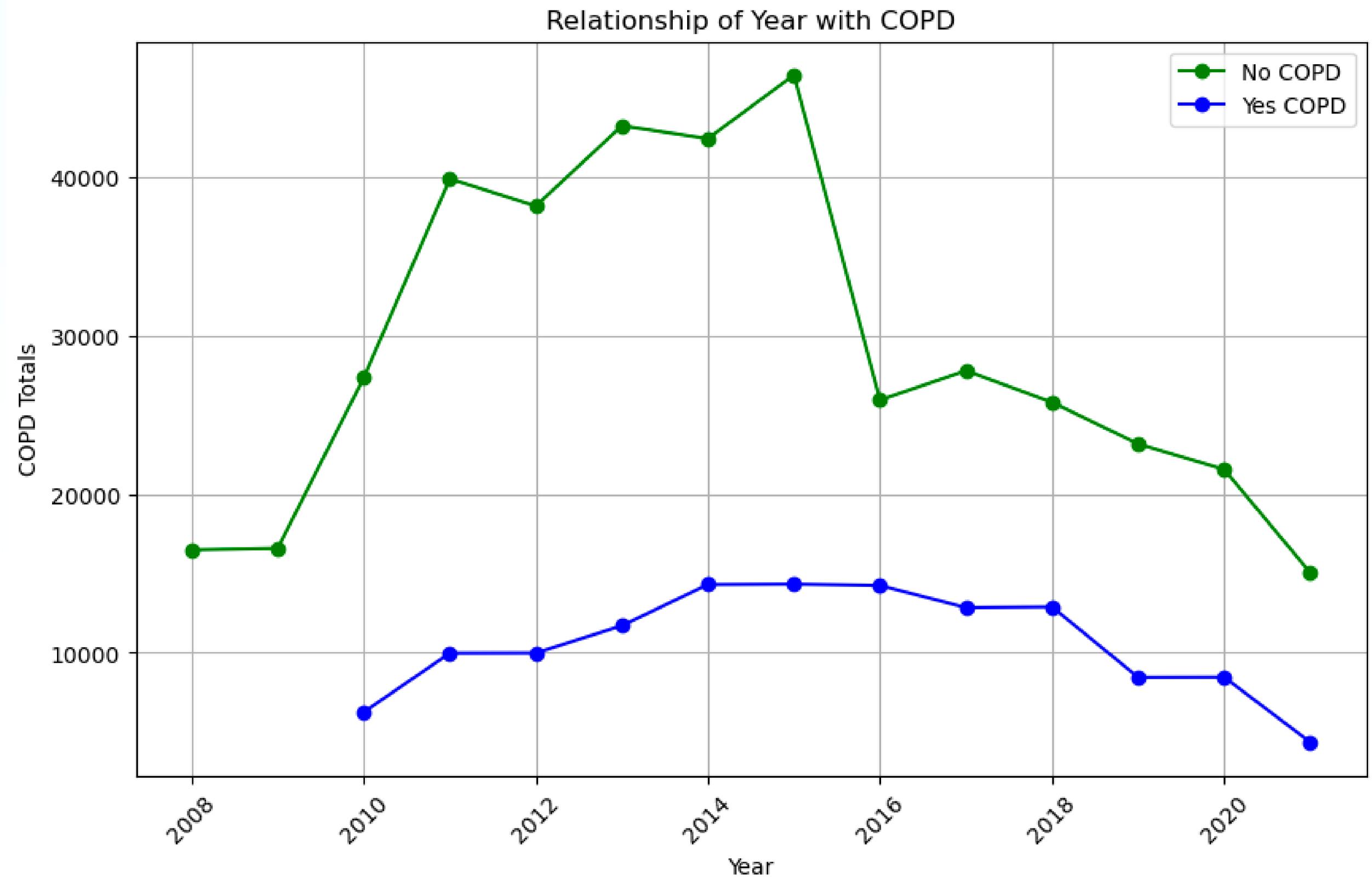


02 FINDINGS

Year Relationship to COPD Prevalence

Overall COPD rates have been stagnant with a drop between 2015 to 2020.

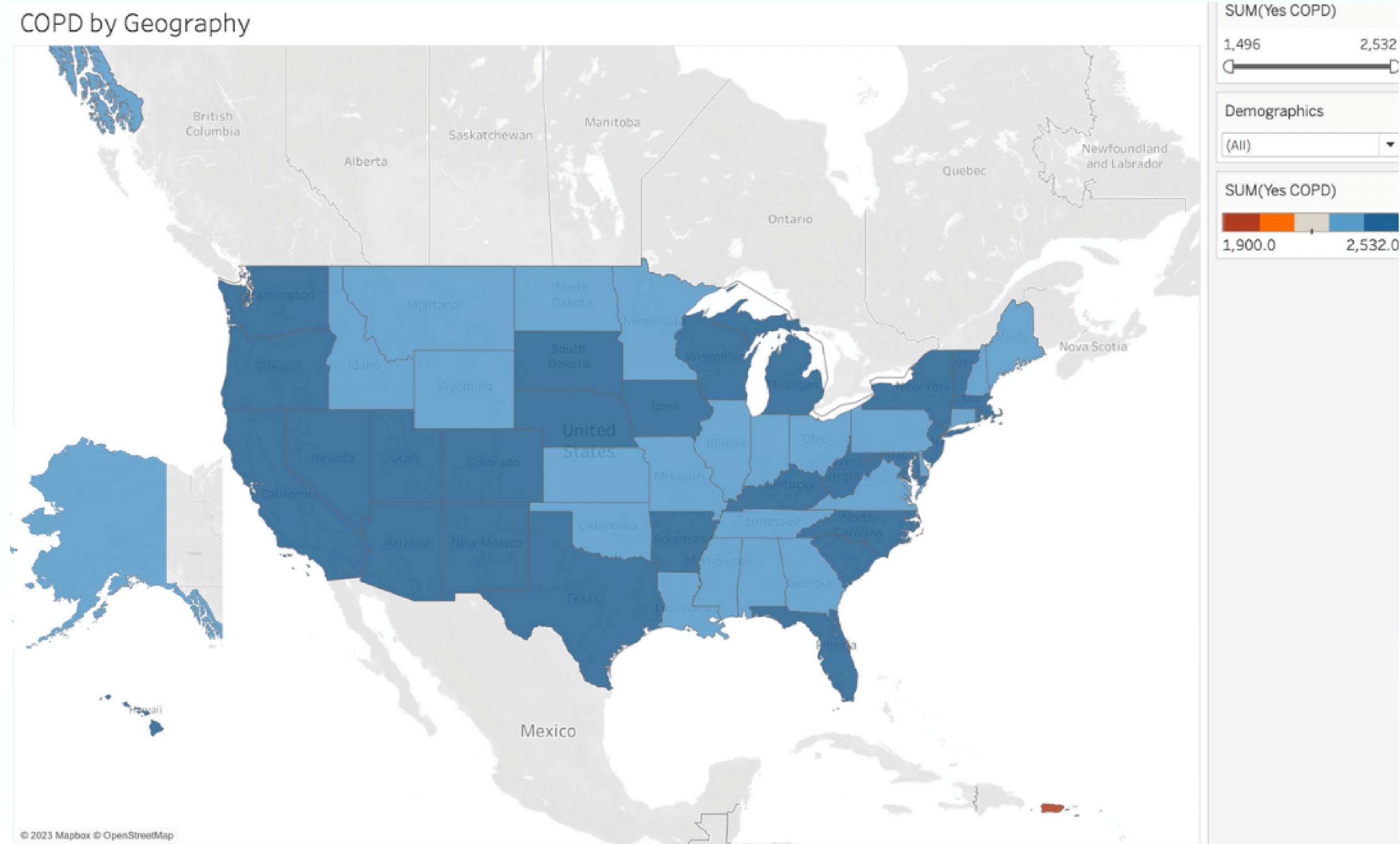
Due to changes in reporting, the impact of COVID-19 on COPD led to delayed diagnosis for some patients, with misdiagnosis as a COPD exacerbation potentially contributing to the reported decline (ALA, 2023; USCB, 2021; Awatade, 2023)



02 FINDINGS

State Relationship to COPD Prevalence

The prevalence of COPD showed significant variation among different states. The graph shows more prevalence in the west coast.*



*This was a sample size that conflicts with existing data.ranging from less than 4.5% in states like California, Colorado, Hawaii, Massachusetts, Minnesota, and Utah, to over 9% in states such as Alabama, Arkansas, Kentucky, and West Virginia. Puerto Rico had the lowest reported. Notably, states with the highest COPD prevalence tended to be concentrated along the Ohio and lower Mississippi Rivers region.(CDC, 2021)



02

FINDINGS

Classification Model

Decision Tree Test Model, exhibited similar performance and closely aligned with the baseline accuracy of 76.21%. The Decision Tree Test Model showed a marginal improvement at 76.28%.



03

RECOMMENDATIONS: NEXT STEPS



Time-Series Analysis

Conduct time-series analysis to explore COPD prevalence trends, focusing on the significant decline observed between 2016 and 2019. Identify underlying factors or interventions that contributed to this change.



Melt Observation Data

Utilize the 'melt' operation to reshape data and reveal meaningful relationships between different variables and COPD prevalence. Transforming data to a long format enhances analysis and visualization.



Feature Engineering: Age

Enhance predictions and insights by incorporating targeted feature engineering for different COPD types and age groups. Capture unique characteristics and risk factors to improve accuracy in prevalence predictions.

03

RECOMMENDATIONS



Targeted Awareness Campaigns

Implement interventions to address gender and racial disparities in COPD diagnosis, enhancing healthcare access and early reporting of symptoms. Raise awareness among healthcare providers to differentiate COVID-19 symptoms from COPD for prompt and accurate diagnoses during pandemics.

Further Research

Investigate reasons for the lack of improvement in COPD prevalence, considering changes in smoking habits, including vaping. Identify factors contributing to the stagnation in COPD rates to inform targeted prevention and management strategies.

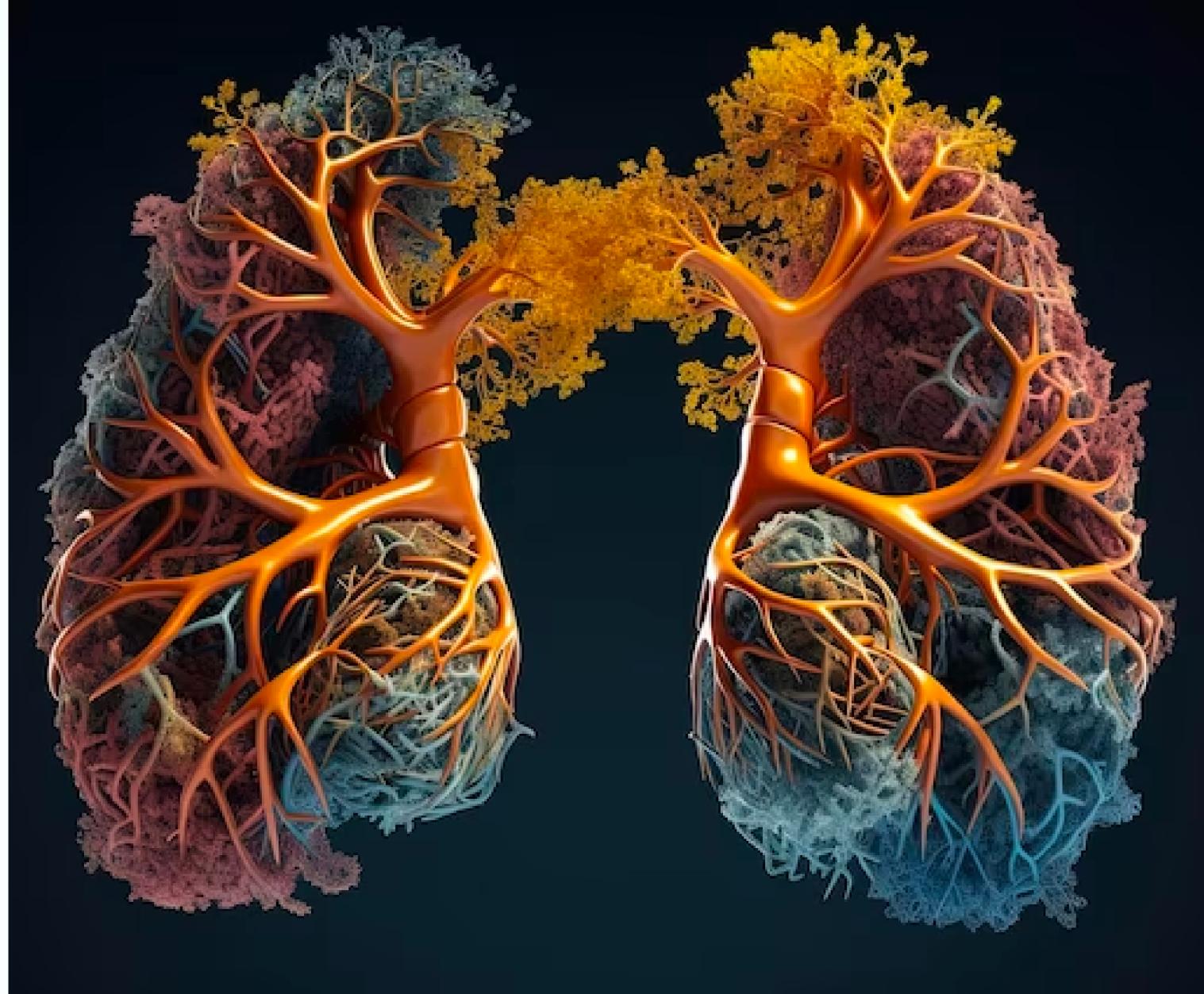


04 CONCLUSION

DHHS Chronic Disease Indicators analysis shows significant relationships between gender, race/ethnicity, US locations, and COPD prevalence.

Predictive models, especially the Decision Tree Test Model, perform well with 76.28% accuracy, emphasizing gender and racial disparities, and highlighting the need for tailored interventions and continuous monitoring.

COVID-19 impact on COPD reinforces considering comorbidities and prompt diagnoses during pandemics, guiding effective public health strategies to mitigate COPD's impact in the US.



05 CONTACT



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https://github.com/annie-carter/COPD_Prevalence_Analysis

THANK YOU



06

AWARENESS

