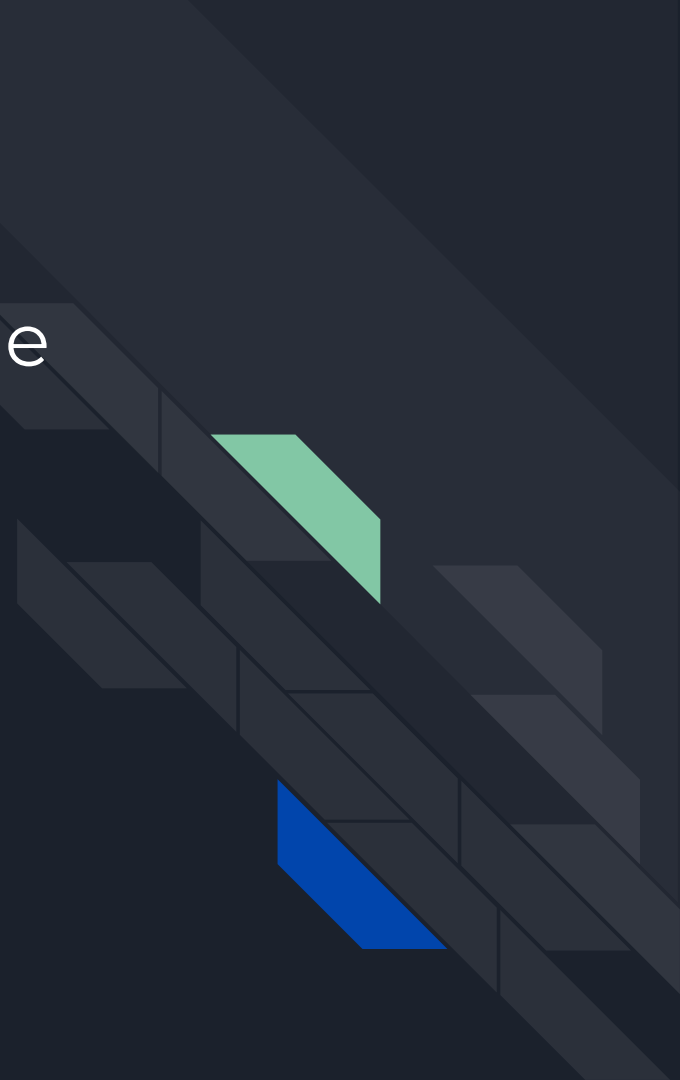


# Group 4 Maternal Health

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# Determining an Association between Family History of Cardiometabolic Disease and the Incidence of Preeclampsia amongst Pregnant Women across Different Racial and Age Groups using Artificial Intelligence and Machine Learning





# Main Factors

## Hypertension/Cholesterol:

High blood pressure (R03.0)

Hypertension (I10)

High cholesterol/Hypercholesterolemia (E78.0)

Hyperlipidemia (E78.5)

## Diabetes Conditions:

Diabetes/Diabetes Mellitus (E8-E13)

Diabetes Mellitus Type 1 (E10)

## Cardiovascular Diseases:

Heart Attack/Myocardial Infarction (I21.9)

Stroke/Cerebral Infarction (I63.9)

Heart Disease (I51.9)



## Hypothesis

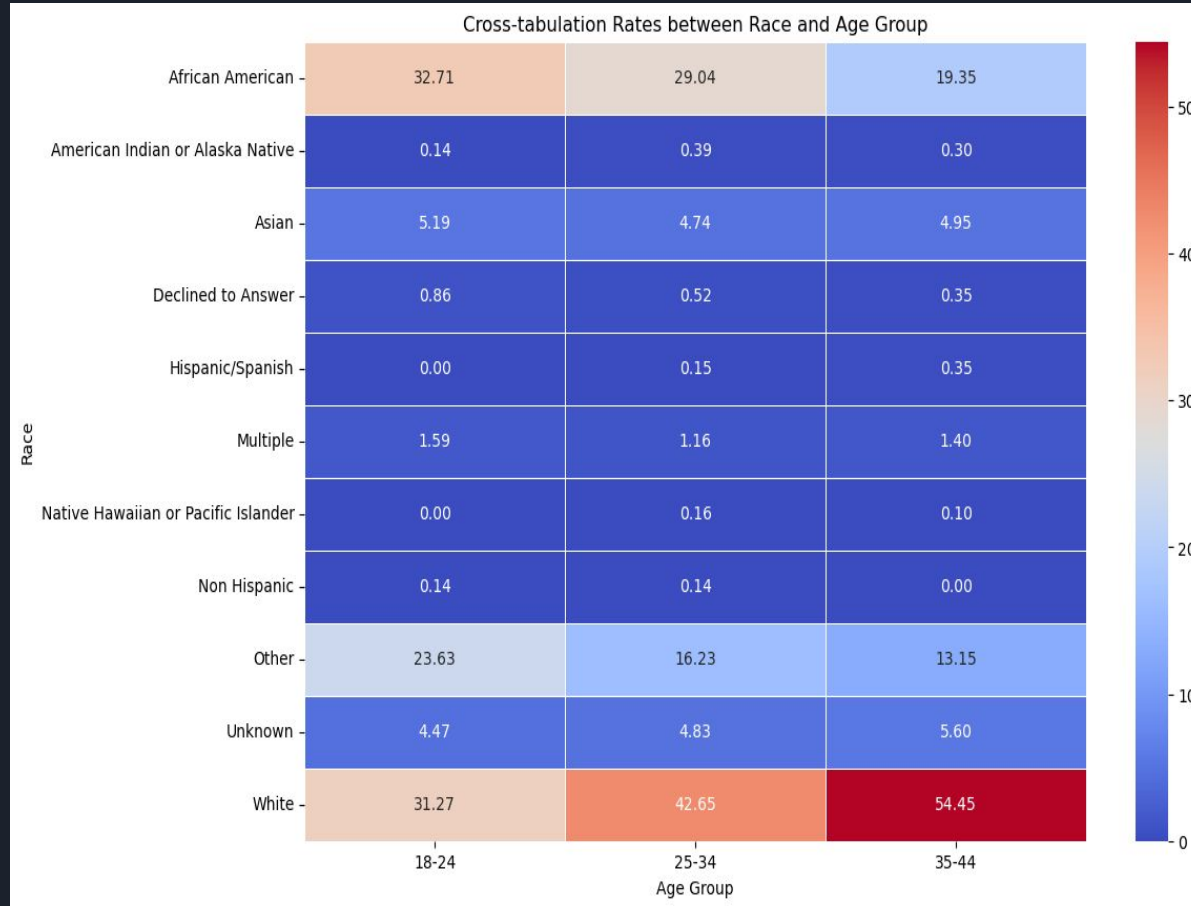
Minorities with family history in cardiovascular disease and aged 35 and older are more likely to develop preeclampsia during pregnancy.



## Results Found Before

- African Americans & Asians have a higher preeclampsia rate
- Other have moderate preeclampsia rate
- White and Unknown have lower preeclampsia rate
- Preeclampsia rate goes down by age
- African Americans are most prevalent in the 18-24 age group (32.71%) but decrease with age. Whites increase with age, peaking in the 35-44 group (54.45%).
- Younger groups (18-24) show higher diversity, with significant representation from categories like "Other" (23.63%) and Asian (5.19%).

# Cross-Tabulation Between Race and Age





White

RFV	Rate
ROB	9.13%
C-Section Delivery	3.12%
38 WKS 5 DYS CONTRACTIONS	2.96%

African American

RFV	Rate
ROB	10.33%
Rob 1hr glucose	3.69%
38 WKS 5 DYS CONTRACTIONS	2.89%

Asian

RFV	Rate
ROB	10.13%
38 WKS 5 DYS CONTRACTIONS	6.54%
ROB 36W 2D-Office	4.90%


Other

RFV	Rate
ROB	6.46%
C-Section Delivery	4.33%
RTN OB	2.42%

Unknown

RFV	Rate
ROB	12.11%
35 WKS Contractions	4.50%
OB	3.81%

## 18-24



RFV	Rate
ROB	5.10%
Rob 1hr glucose	4.61%
33 WKS HBP	4.13%

## 25-34

RFV	Rate
ROB	8.93%
Rob 1hr glucose	2.79%
C-SECTION DELIVERY	2.74%

## 35-44

RFV	Rate
ROB	10.90%
C-SECTION DELIVERY	4.42%
38 WKS 5 DYS CONTRACTIONS	3.06%





# Analysis

**African American:** The high concentration in the 18-24 and 25-34 age groups aligns with the higher counts of visits for "ROB" and associated high preeclampsia rates. This suggests that the younger African American population has higher healthcare utilization for conditions leading to preeclampsia.

**White:** The high concentration in the 35-44 age group aligns with the higher counts of visits for "ROB" and "C-SECTION DELIVERY" with associated preeclampsia rates. This suggests that older White women are more likely to visit for these reasons and have higher preeclampsia rates.

**Other and Unknown:** The varied rates across age groups for these races reflect the more dispersed visit reasons and lower visit counts, which are consistent with the cross-tabulation showing moderate rates in various age groups.

**Asian:** The lower to moderate rates across age groups in the cross-tabulation are consistent with the lower counts of visits for "ROB" and related reasons, reflecting a lower concentration of preeclampsia-related visits.



## Methodology

64%

Initial Logistic Model



71%

Split the family history into three groups

Hypertension/Cholesterol  
Diabetes Conditions  
Cardiovascular Diseases



72%

Reason for Visit



# Questions

Dr. Charles advised us to utilize GridSearch, what is your opinion?