



Data Glacier

Your Deep Learning Partner

Exploratory Data Analysis

Data Science Persistency of a Drug Project

Data Force

9/26/22

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EDA

EDA Summary

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Team Information

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Background/Information

In medical terms, the persistency of a drug refers to the extent while the patient acts accordingly to the effects of a drug. Patients lose persistency when the drug no longer has an affect on them.

ABC Pharma is a pharmaceutical company who aims to automate identification of the persistency of a drug.

In this data analysis, the various factors of a patient are evaluated to determine if they have an affect on the persistency.

At the end of this project, we will suggest a model to follow for deployment.

Approach

Given: 1 dataset with information about each patient and whether they had persistency with a drug.

Method of Approach:

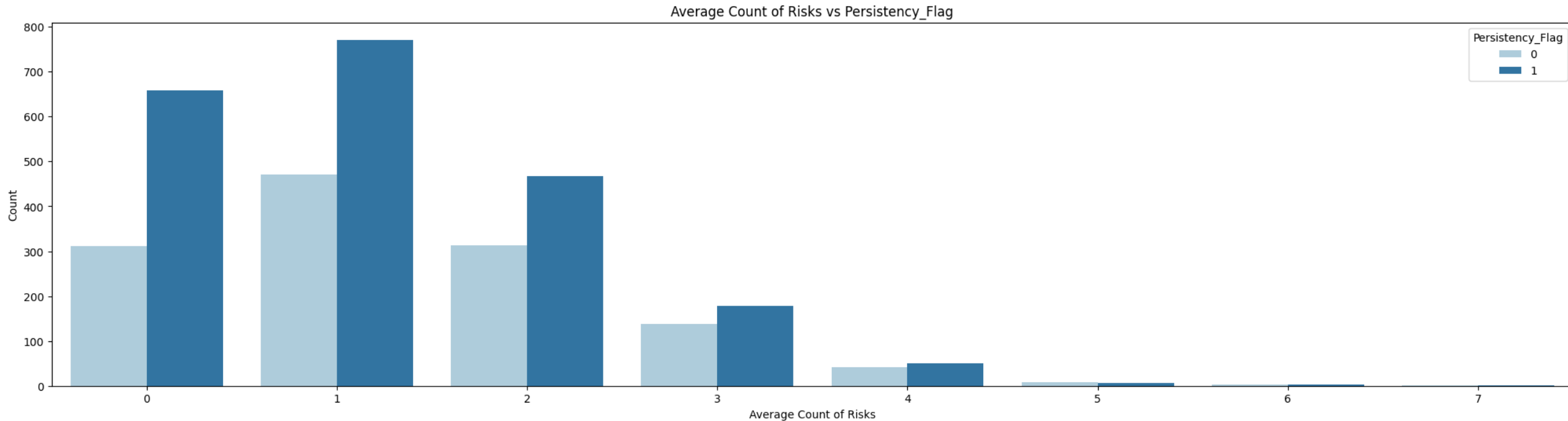
1. Look for null or missing values.
2. Identify values that are improbable.
3. Create visualizations of the data.

Assumptions:

1. Each patient adheres to a specific ID and do not have multiple.
2. Data was selected at random from a population and not targeted specifically based on a patient's previous persistency.

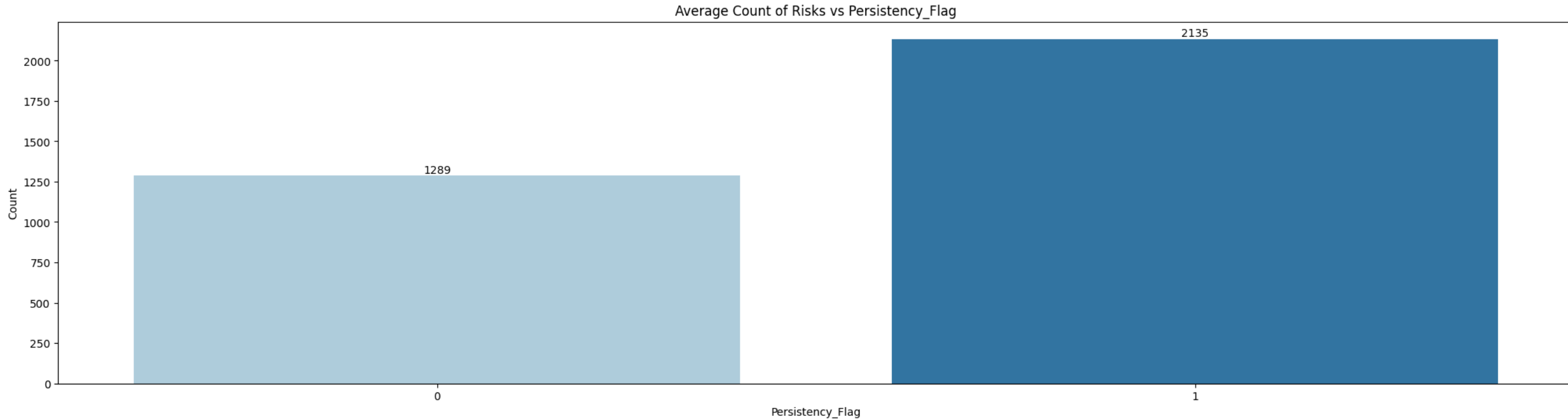
EDA

Risks vs. Persistency Flag



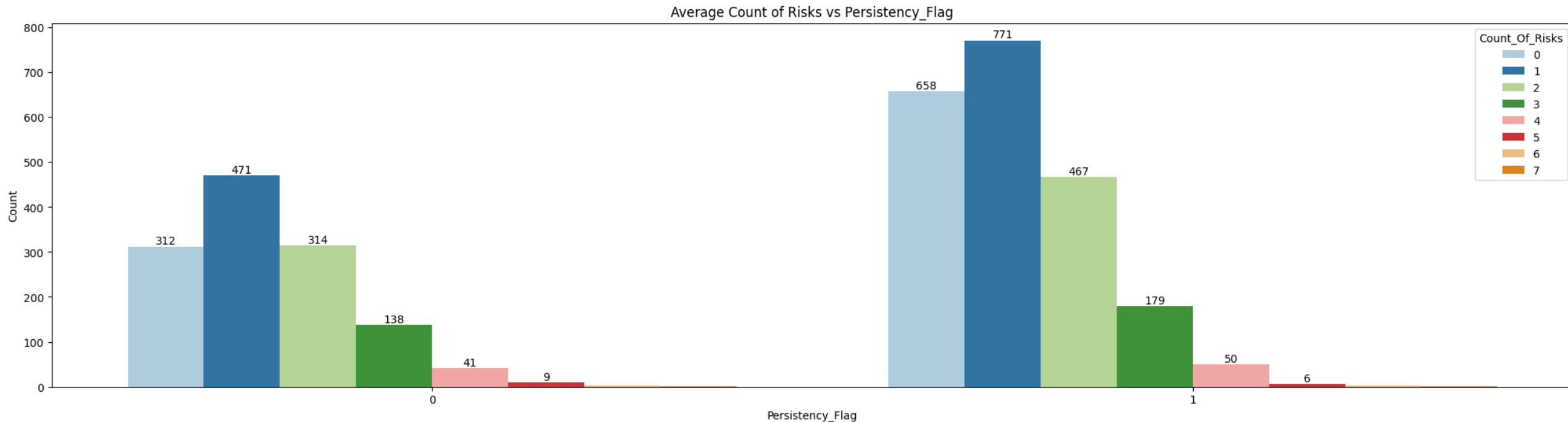
Using this graph, it is clear to see that more people were persistent when they had 0-1 risks. The greatest amount of non-persistent patients were at 1 risk, and as the risks increased, the gap between the two groups decreased.

Risks vs. Persistency Flag



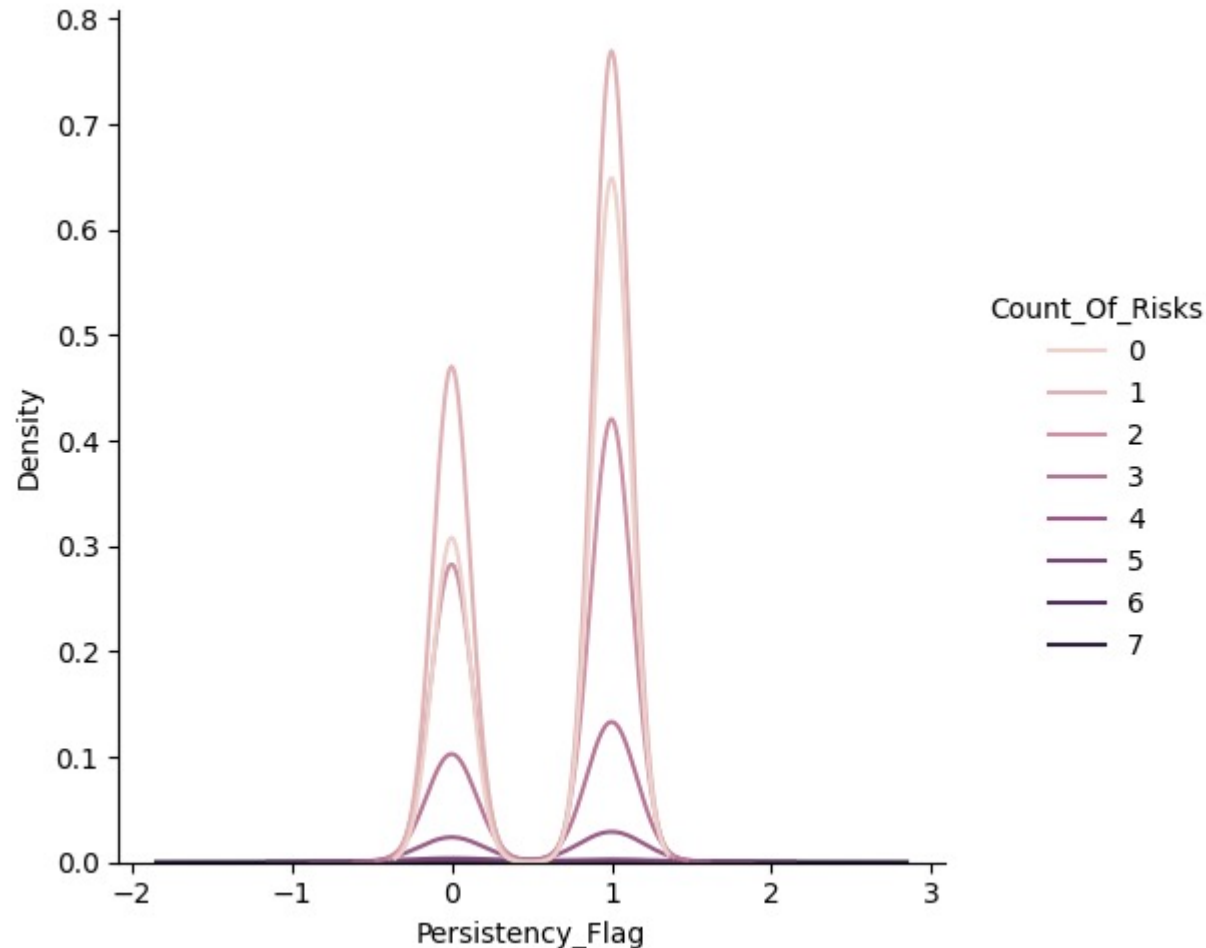
With this data table, it is clear that the data collected has more information about the people that were persistent than the people that were not. Therefore, the data itself may seem to favor the persistent group of people but in reality that is due to the collection of data.

Risks vs. Persistency Flag



Overall, both the non-persistent and the persistent group of people follow a relatively similar distribution. Overall, in the non-persistent group side, more people have 2 risks than no risks, which indicates that risks of diseases may negatively impact the persistency of a drug. For the persistent group, both 0 and 1 risks dominate over the other counts of risks.

Risks vs. Persistency Flag

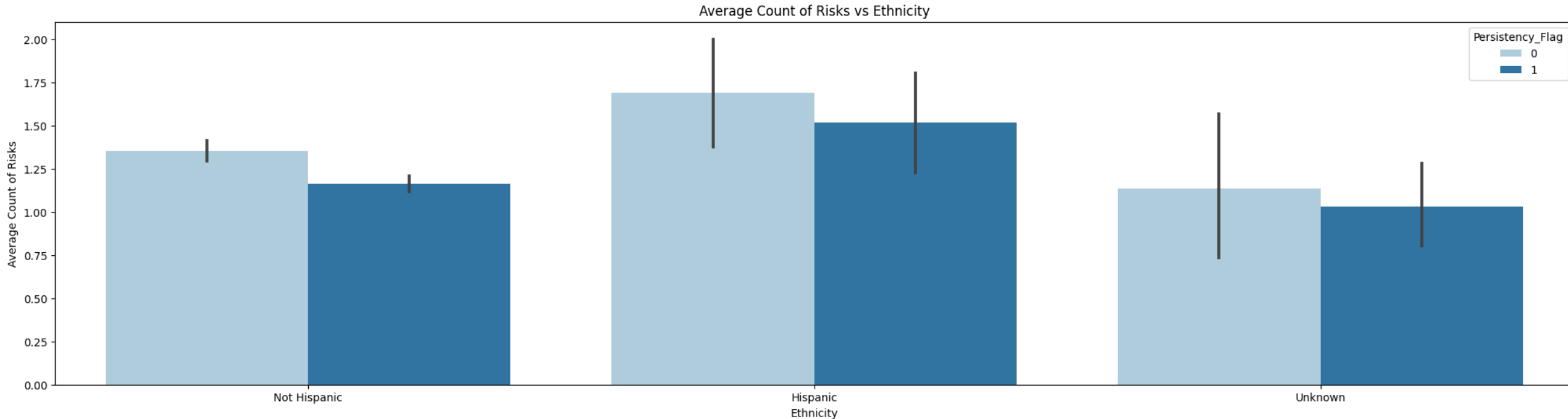


Using this data, it is clear to see that there is a greater amount of people with no risks who have experienced persistency compared to the amount who have not.

This suggests that in order for a drug to be persistent on a patient, the patient must have little to no risks.

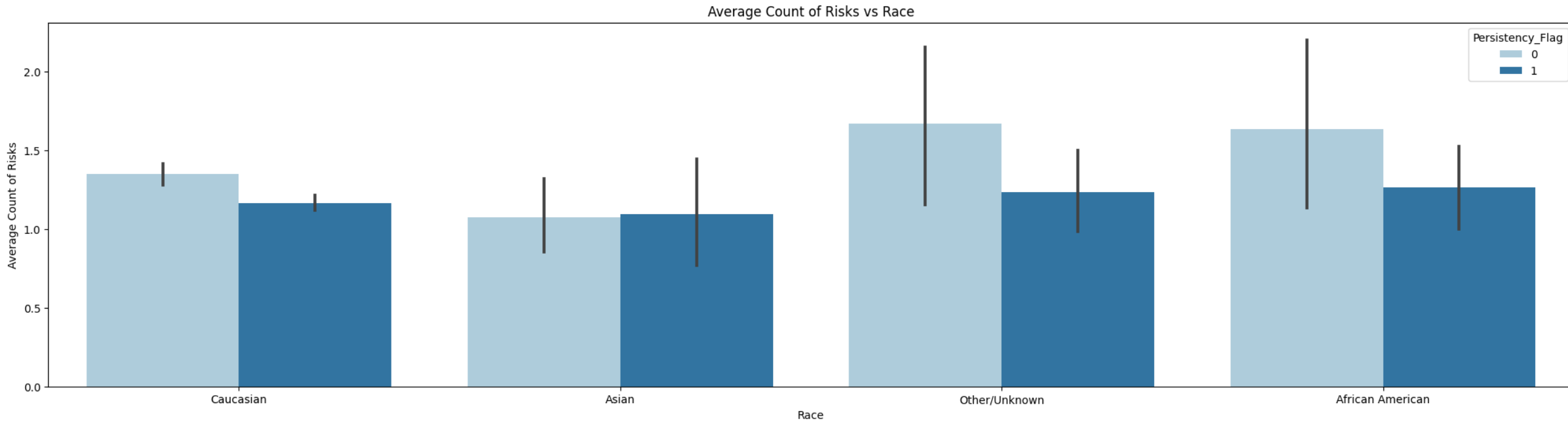
Overall, risks pose a significant impact on the persistency of a drug on a patient.

Risks vs. Ethnicity



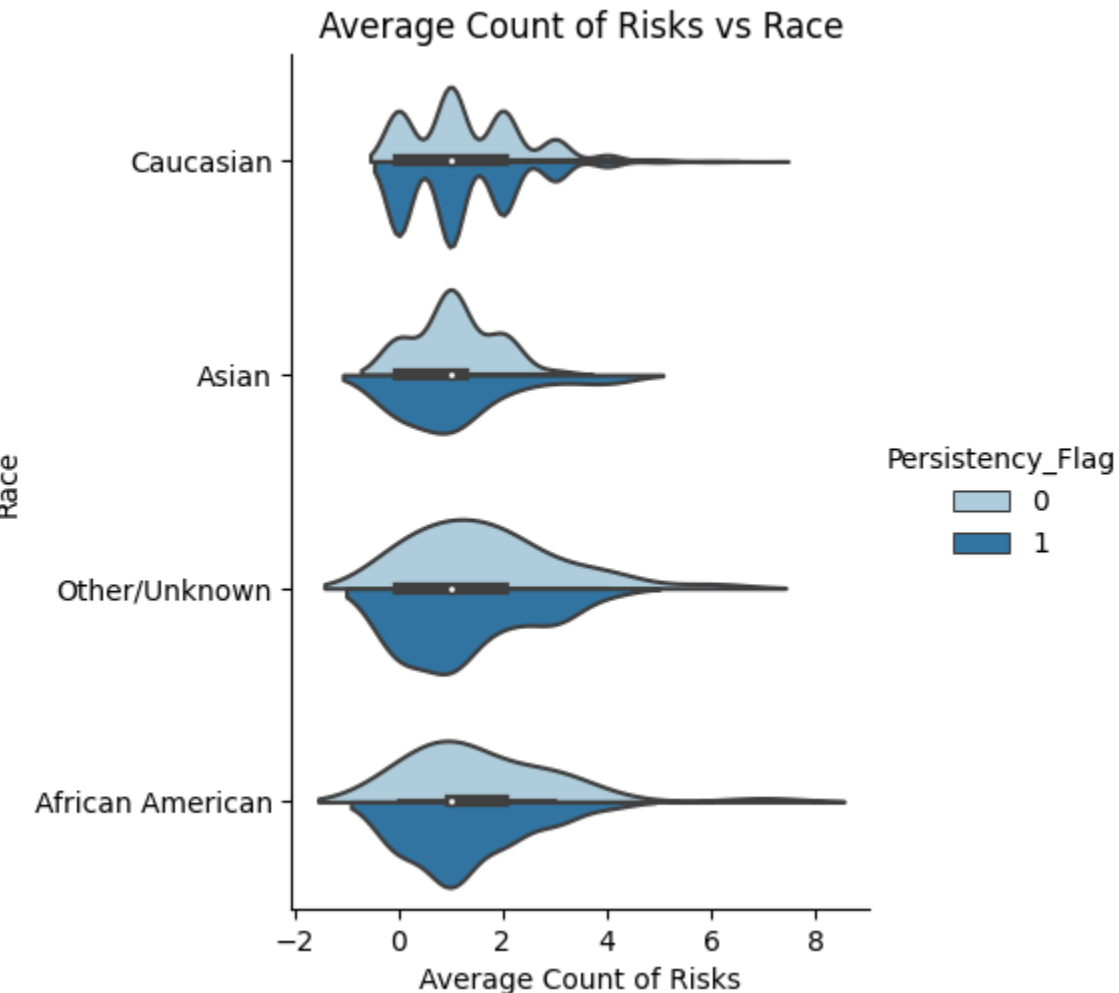
Overall, on average the Hispanic community faces a greater number of risks and a greater chance of not being persistent to a drug. In the graph above, the Hispanic group who does not experience persistency is the greatest column, indicating that the Hispanic community may find it difficult to increase their persistency with drugs.

Risks vs. Race



Overall, the Asian race seems to have a strong balance between people who have and have not experienced persistency. For the other races, however, people who don't have persistency with drugs dominate. This is especially emphasized for the Other category and the African American category. On average, the African American community has a greater number of risks, which leads them to face a greater challenge in finding the persistency of a drug.

Risks vs. Race

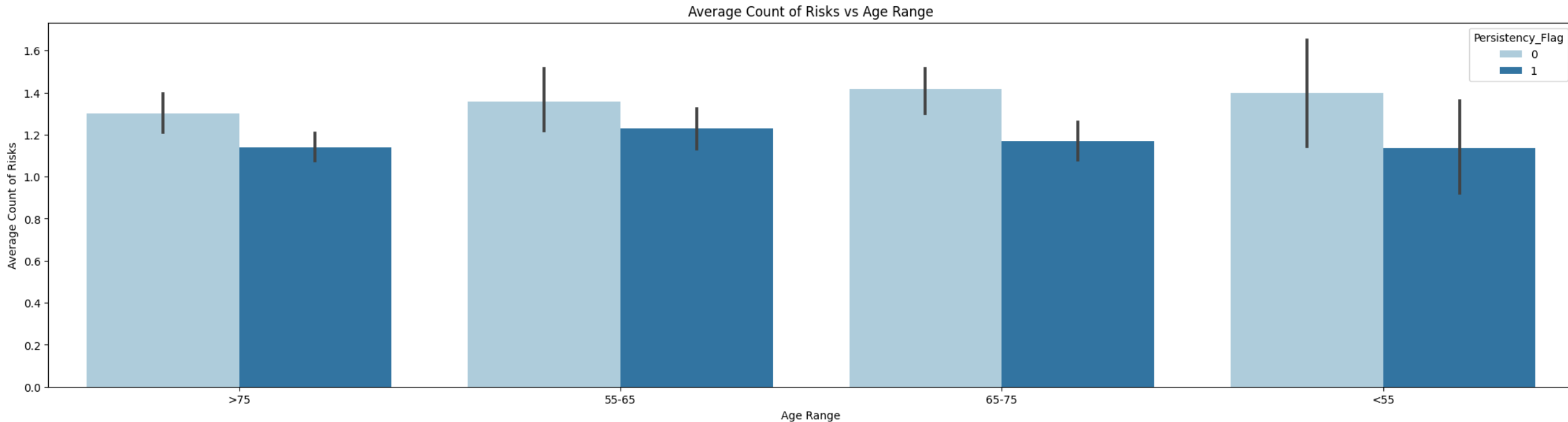


This chart on the left is another graphical representation of the average count of risks and the race of a patient.

It is clear that on average, the Caucasian race faces more variability for persistency within their group.

For the African American group, as the risks increase, the non-persistent group grows slightly larger than the persistent group, suggesting that they face less persistency as a whole.

Risks vs. Age



The groups of ages <55 and 65-75 seem to have a greater disparity between persistent and non-persistent patients. Group 55-65 has a reduced distance between the two groups. Using this data, it is clear that younger patients may not have persistency towards a drug and older people as well.

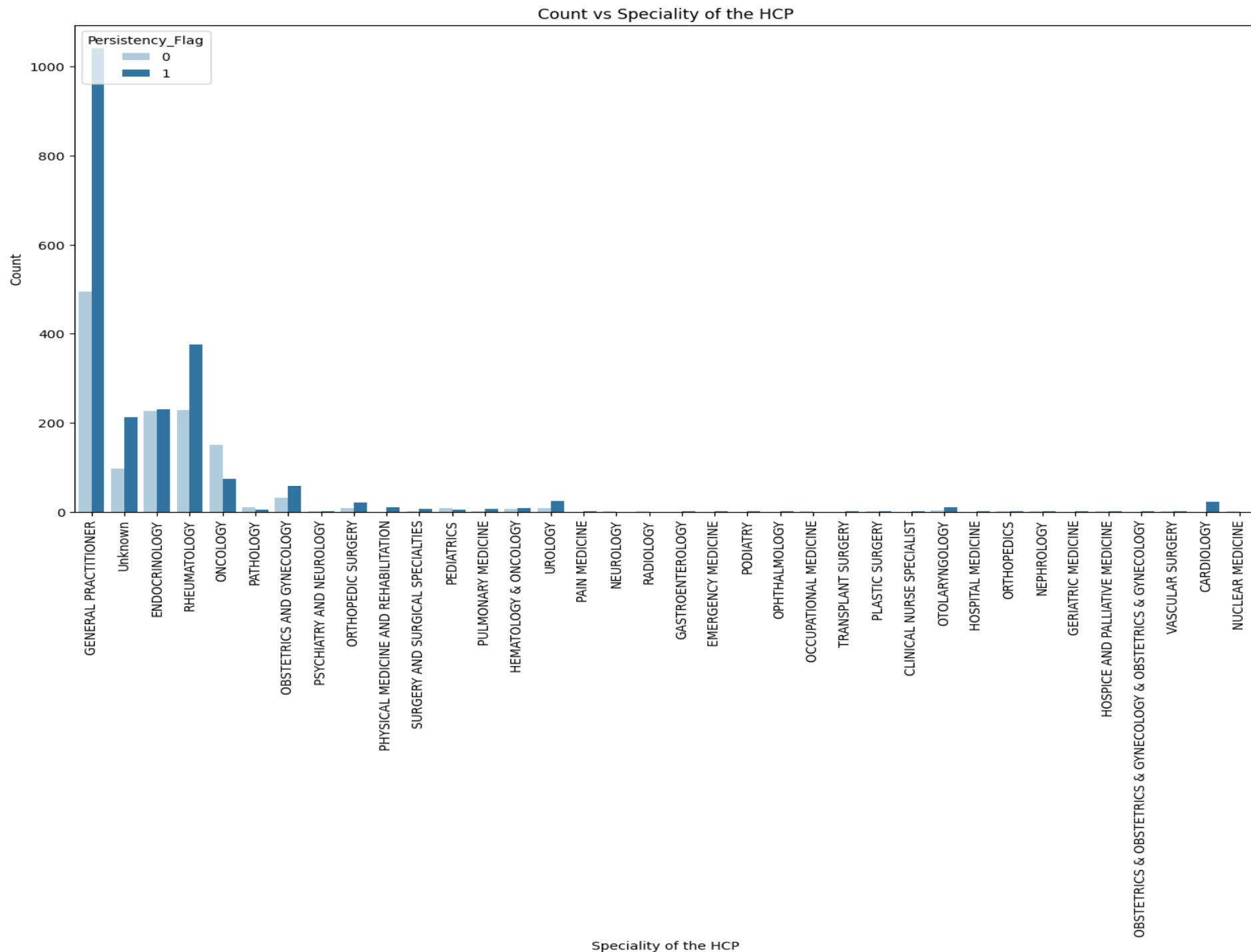
Specialty vs Count

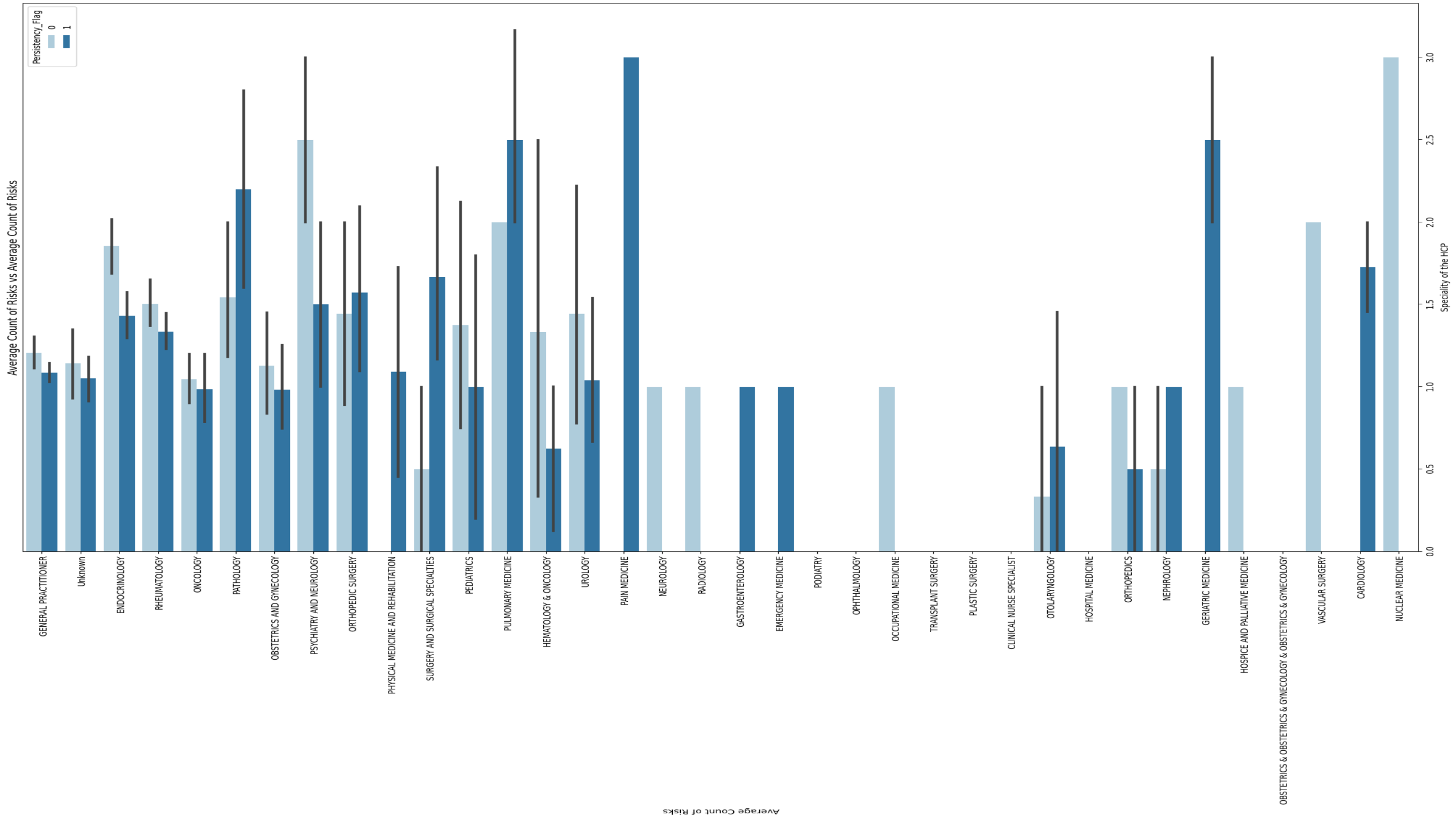
The data from this graph represents the specialty of the HCP that prescribed the drug.

Clearly, the general practitioner prescribed the most medicines.

The endocrinologist has about 49% of their drugs not be persistent.

Oncology also has a minimal number of drugs being persistent. This could also be due to cancer not having a specific cure.





Specialty vs Count

The previous slide uses another graphical representation of a HCP's specialty and the average count of risks.

Some of these specialties are rare to identify, which may affect the data analysis. With more data on less popular specialties, we may be able to draw conclusions based on the HCP's specialty.

Overall, the specialty of a person's HCP has the potential to have an affect on the persistency of a drug for a patient.



Conclusion

Out of the many factors that may affect a patient's persistency to a drug, having risks, being of a certain race, ethnicity, age group, and the specialty of the HCP have the strongest affect on a patient's persistency towards a drug.

Now that the factors have been identified, we will be able to use a model to create an automated process of which can predict if a drug would be persistent on a patient or not.

For a technical user:

Out of the many models of machine learning algorithms, the random forest classifier model would be the best one to use in this scenario. With additional testing, the random forest classifier model was the most effective and accurate for predicting whether or not a patient would have persistency with a drug.

Thank You