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## Introduction

- HPV-related cancers pose serious **health risks**, potentially leading to long-term health issues and even death.
- The **HPV vaccine** was approved by the FDA in **2006**.



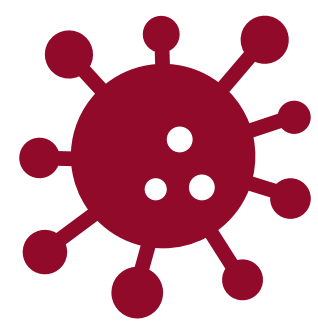
**~33700**

Cancer cases are caused by HPV infection in the US.



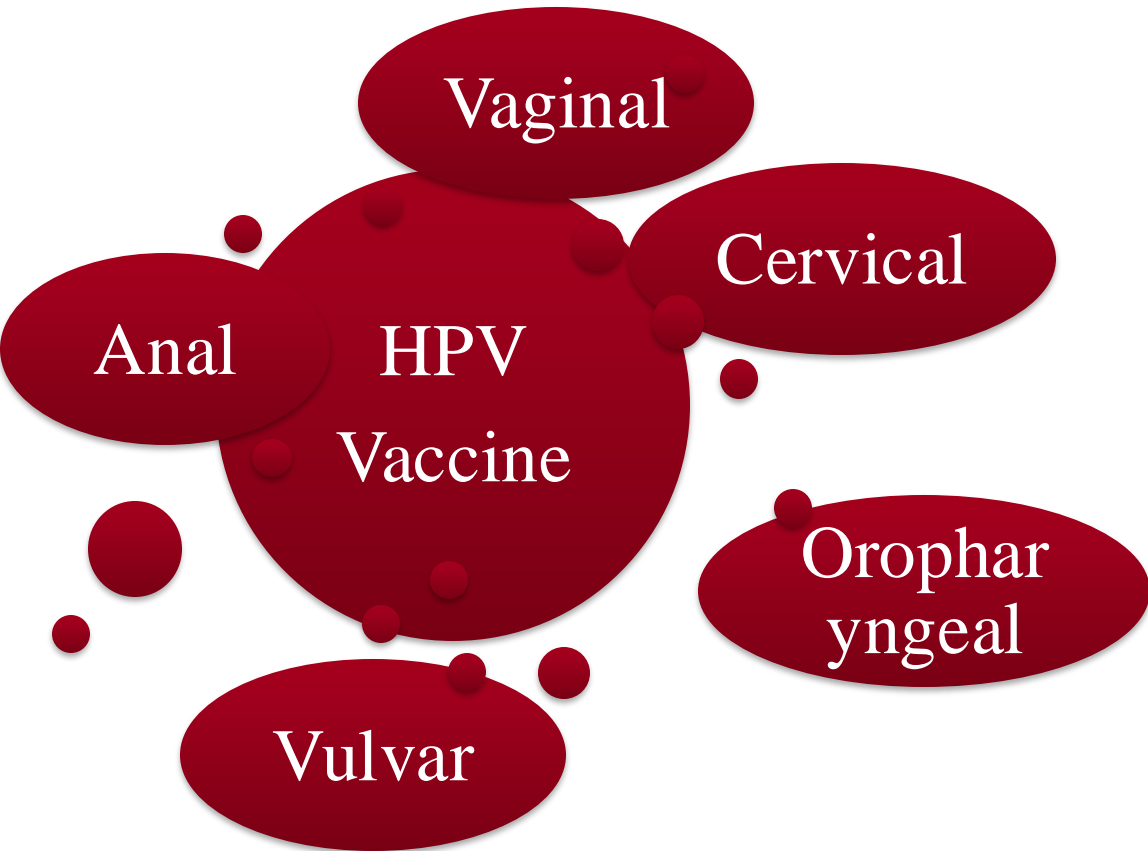
**~38.6%**

Of US children in the 9-17 age group received at least one dose of the HPV vaccine in 2022



**6 Types**

Of HPV-related cancer can be prevented by the vaccine.



## Motivation

- It is important to reduce HPV-related cancer through better vaccine uptake, we studied the **trends and patterns** of HPV vaccine uptake on Long Island.
- Our study aims to analyze **vaccine uptake disparities** among different population groups.
- A secondary aim is to identify **geographic patterns** to help address disparities in vaccination coverage.

## CDC HPV Vaccination Dose Schedule

- Initiate the 1<sup>st</sup> dose **before 15<sup>th</sup> birthday**.

<b>1<sup>st</sup> dose</b>	11–12 years old (can start at age 9)
<b>2<sup>nd</sup> dose</b>	6 – 12 months after the 1 <sup>st</sup> dose

- Initiate the 1<sup>st</sup> dose **after 15<sup>th</sup> birthday**.

<b>1<sup>st</sup> dose</b>	Started age.
<b>2<sup>nd</sup> dose</b>	1 - 2 months after the 1 <sup>st</sup> dose
<b>3<sup>rd</sup> dose</b>	6 - 12 months after the 1 <sup>st</sup> dose

## Data and Methods

### Dataset:

- New York State Immunization Information System (**NYSIIS**)
- Data collected starting from **2008 to 2023**.
- Including:
  - ~ 2 million** visits
  - ~ 1 million** unique subjects
  - ~ 500k** HPV vaccinated subjects

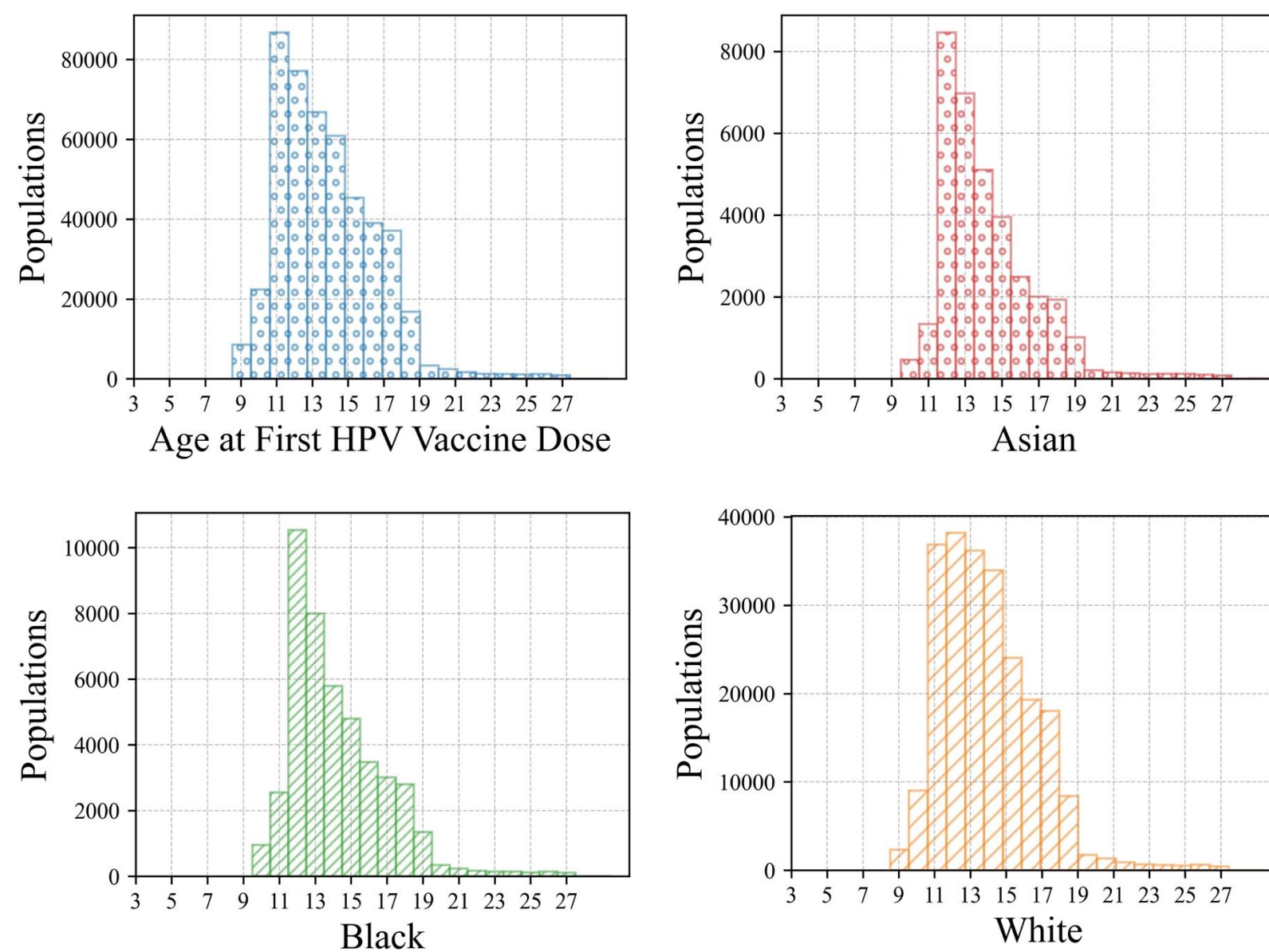
### Vaccination Rate Calculation:

- Since the Tdap Vaccine is **mandatory** for all the Daycare and Pre-K through 12<sup>th</sup> grade in NYS.
- $\frac{\# \text{ of HPV vaccinated children (aged 9-13)}}{\# \text{ of children who either received the HPV and/or Tdap vaccinations (aged 9-13)}}$

## Key Findings

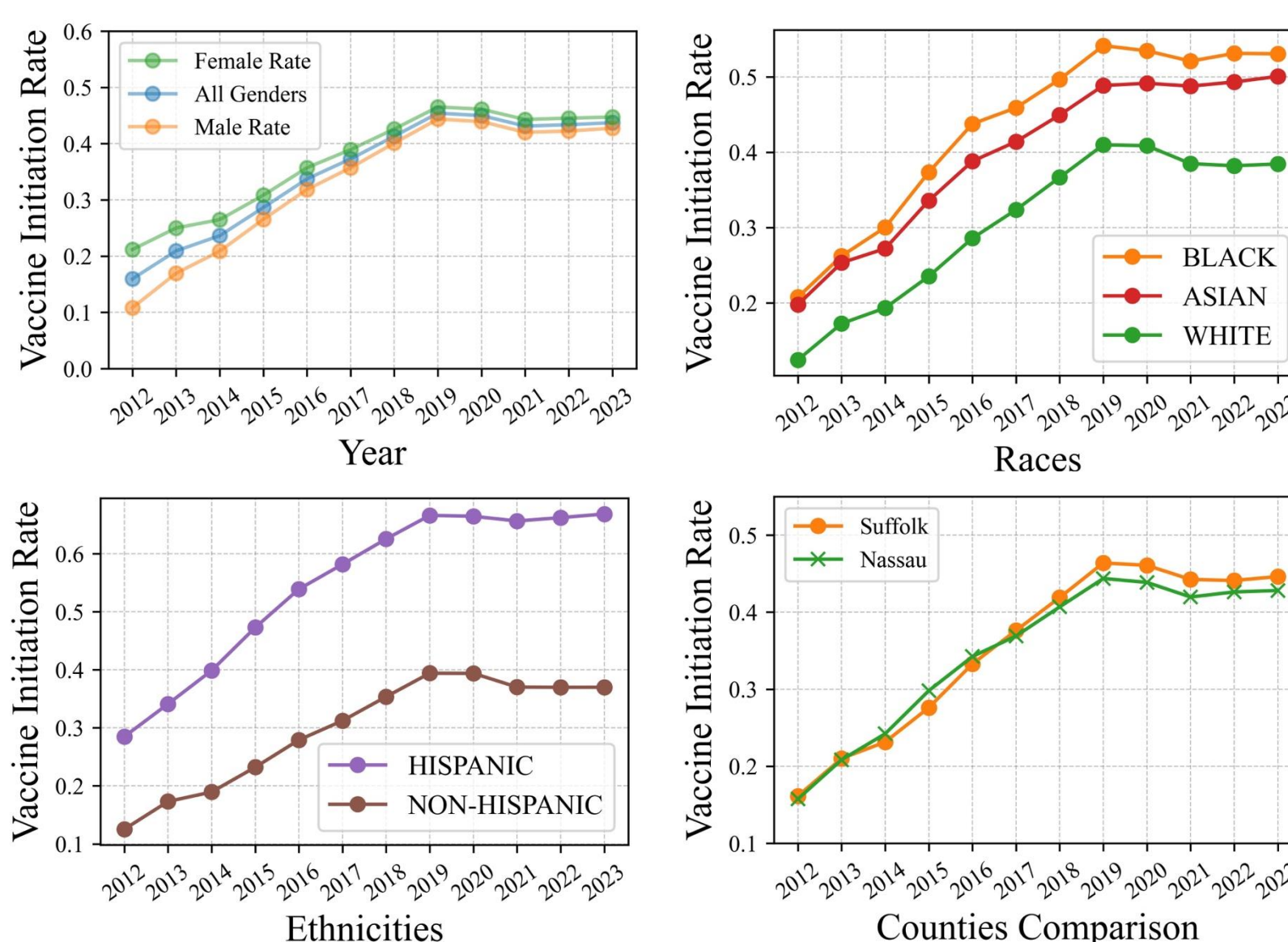
- Our study explored **Demographic Disparities, Temporal Trends, and Geographical Patterns** of the HPV vaccine on Long Island.

### Patient Initiation Age by Race



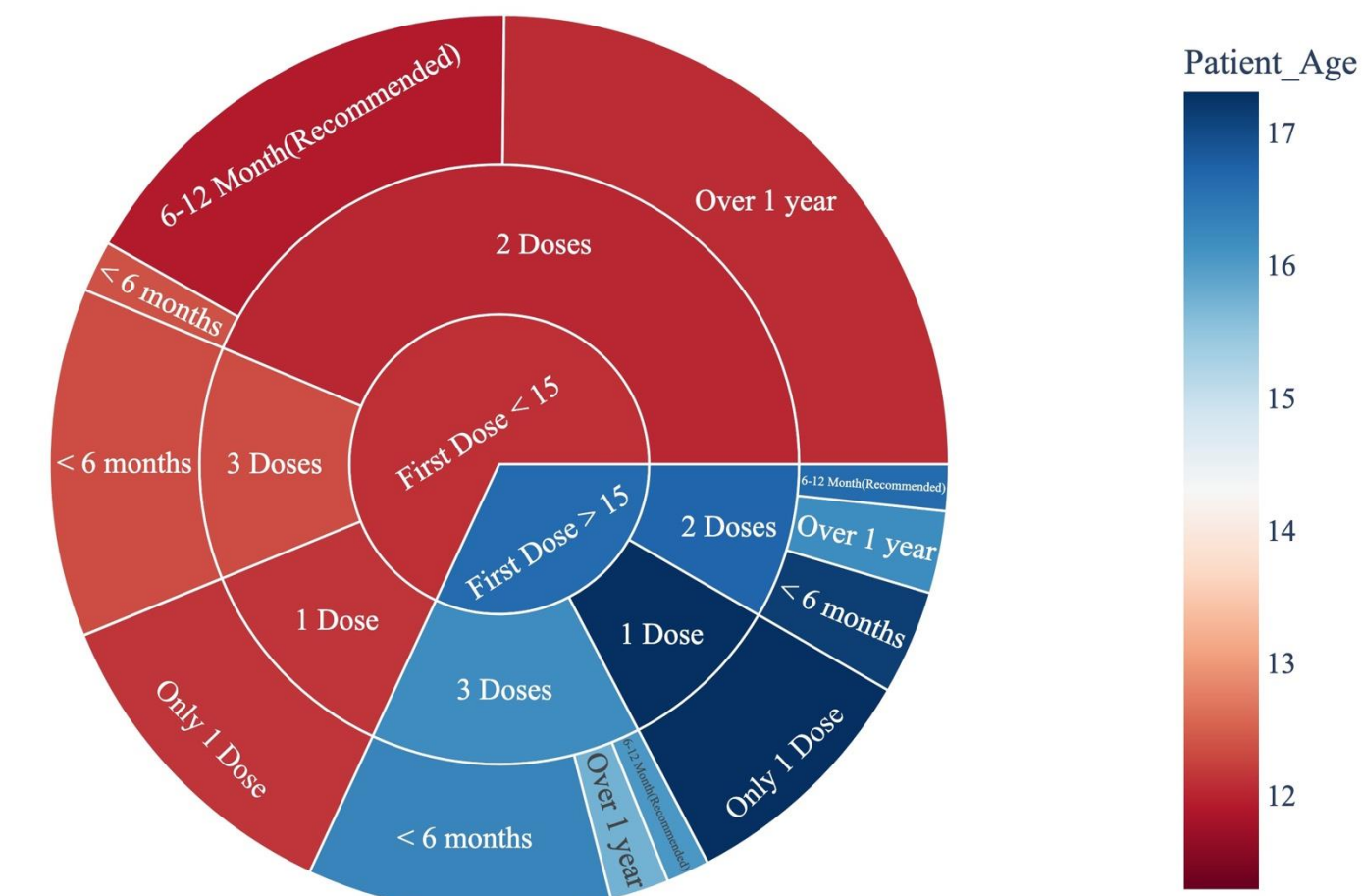
- For **girls**, vaccination was recommended in 2006, then recommended for **boys** starting from 2011.

### HPV Vaccination Rate



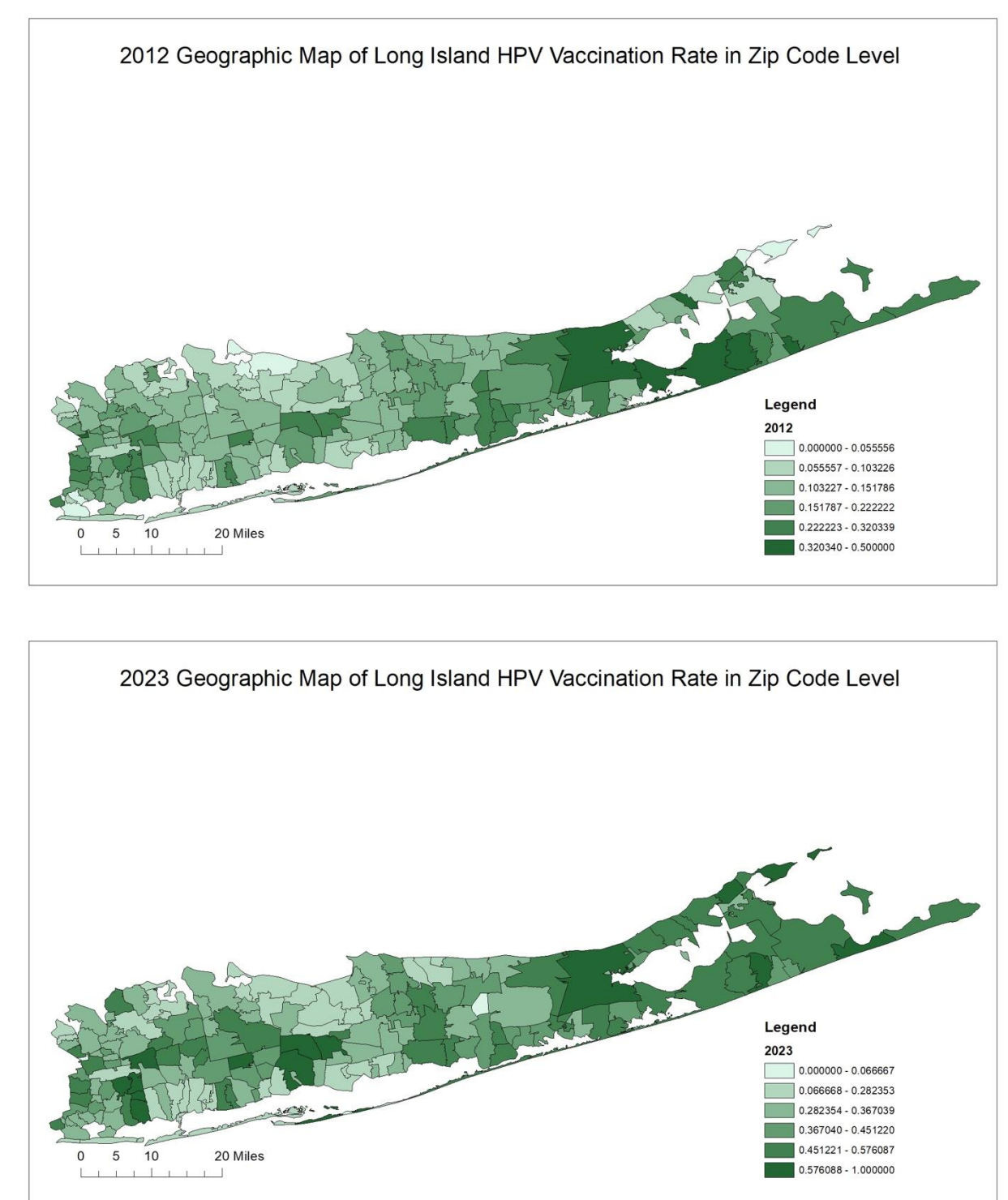
- The overall HPV Vaccination rate on Long Island **increased** by 284.43% from 2012 to 2019.
- A small **decrease** (5.04%) was noted in 2020 and 2021 during the COVID-19 pandemic time.

## HPV Vaccination Completeness



- ~45%** of the patients under 15 years of age completed two doses in 12 months
- The completeness rate for those younger than 15 years (**82.58%**) > those over- 15 years (**45.75%**)

## Geographical Patterns



- The rate for **eastern LI** consistently exceeded the rate in the west, especially near the northwest shore.
- Riverhead (zip code 11901)** had the highest HPV vaccination rate on LI.

## Discussion and Conclusion

- Our work provides an overview of HPV vaccine patterns and trends on Long Island.
- We evaluate the current practice and indicate targeted groups and regions that need more effort to improve the vaccine uptake.
- Additional geo-spatial and correlation analyses are ongoing

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