COVID-19: Vaccinations & Obesity Across Ethnic Groups

Mamba Mentality

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Intro

- COVID-19 Spread vs. Vaccination Hesitancy
- Analyzing Demographics in COVID-19 Vaccination
- Case Surge and Vaccination Disparity
- Targeted Health Campaigns for Low Uptake Demographics
- Correlation of Obesity Rates and Vaccine Rates

THE PROBLEM

VACCINATIONS

Countless across Chicago remain unvaccinated against COVID-19

MOTIVATIONS

Understanding and improving the health and wellness of our city

OBESITY

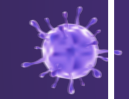
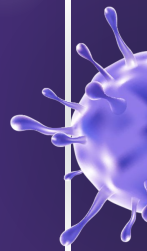
Obesity was already a prevalent issue prior to the COVID-19 pandemic

HYPOTHESES

Minority ethnic groups faced vaccination and obesity disparities

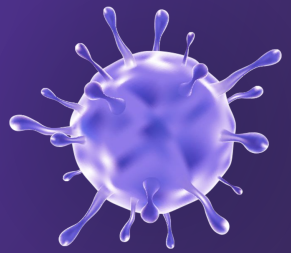
DATA

Respiratory	Ethnicity	Obesity
2010-2024 data showing respiratory diseases, total number of tests, the number of positive cases, and the percentage of positive cases on a weekly basis	2021-2024 data shows population size amount & percentage had first dose have completed their vaccine series are boosted who have bivalent	2011-2022 data shows Location of Patient Class of Patient Gender Race/Ethnicity Age Data Value

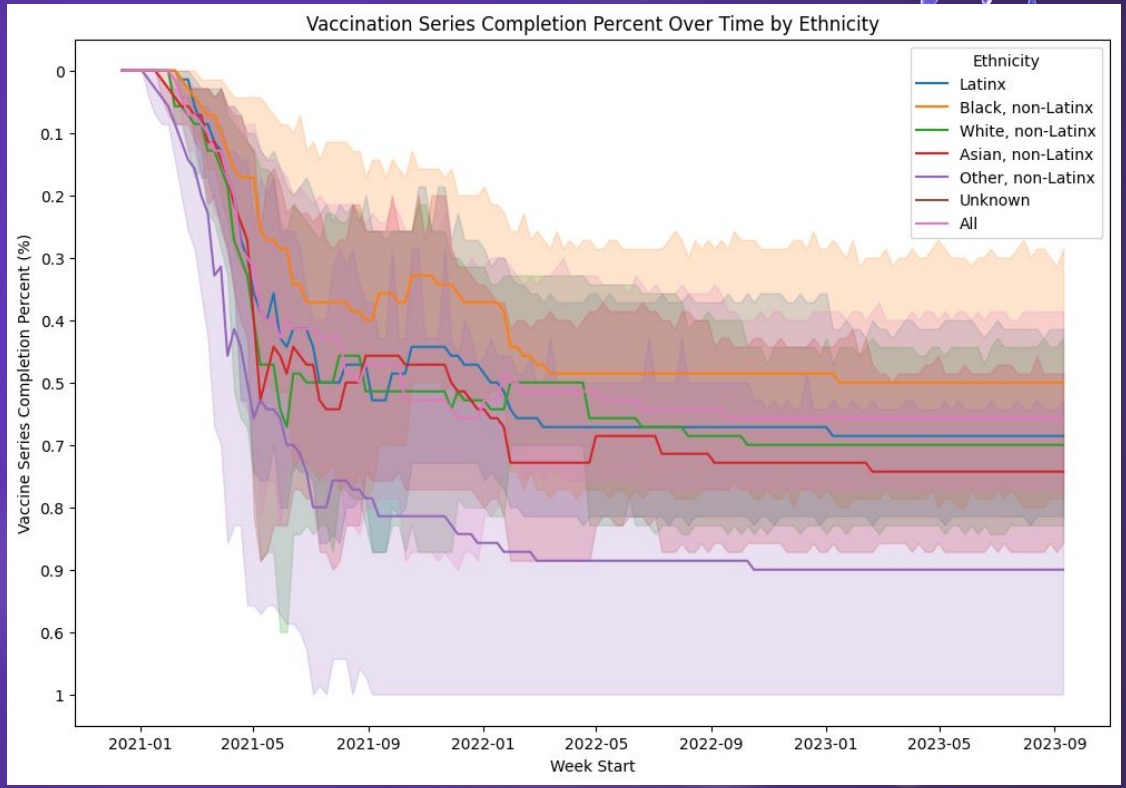

DATA CLEANING

- Influenza, COVID-19, RSV, and Other Respiratory Virus Laboratory Surveillance
  - 2276 rows ⟶ 1813 rows
- COVID-19 Vaccinations by Age and Race-Ethnicity - Historical
  - 7601 rows ⟶ 22 rows
- Nutrition Physical Activity and Obesity Behavioral Risk Factor Surveillance
  - 34842 rows ⟶ 8633 rows



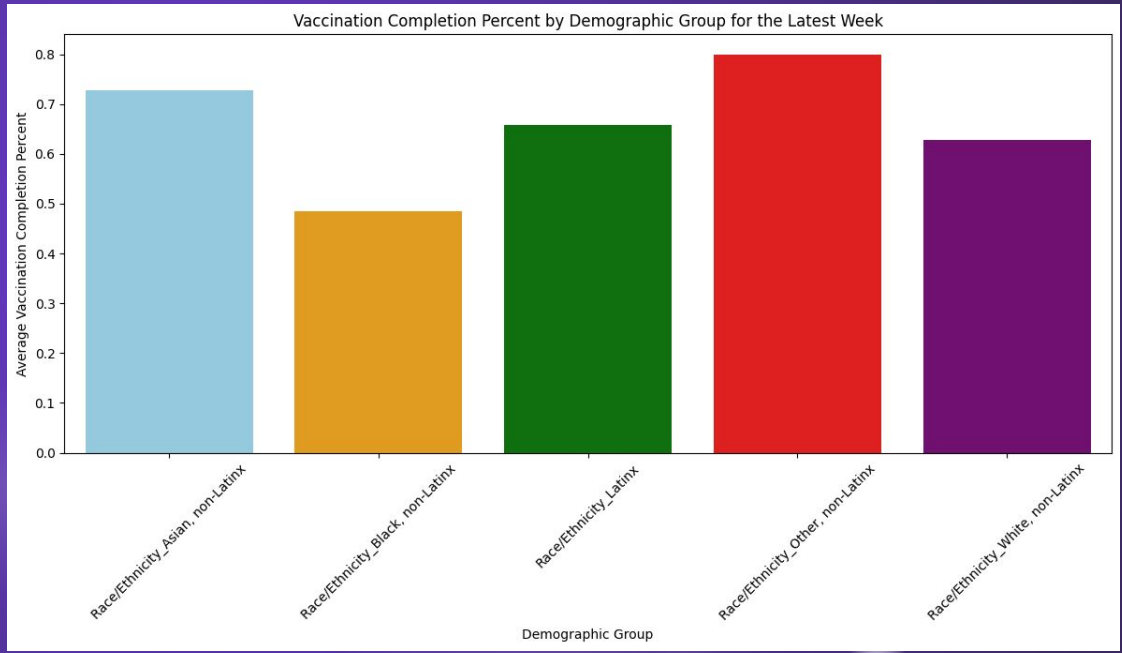
VISUALIZATION #1

This graph shows how vaccination was least completed over a period of time for the Black, non-latinx group and the most was by Other, non-Latinx followed by Asian, non-Latinx

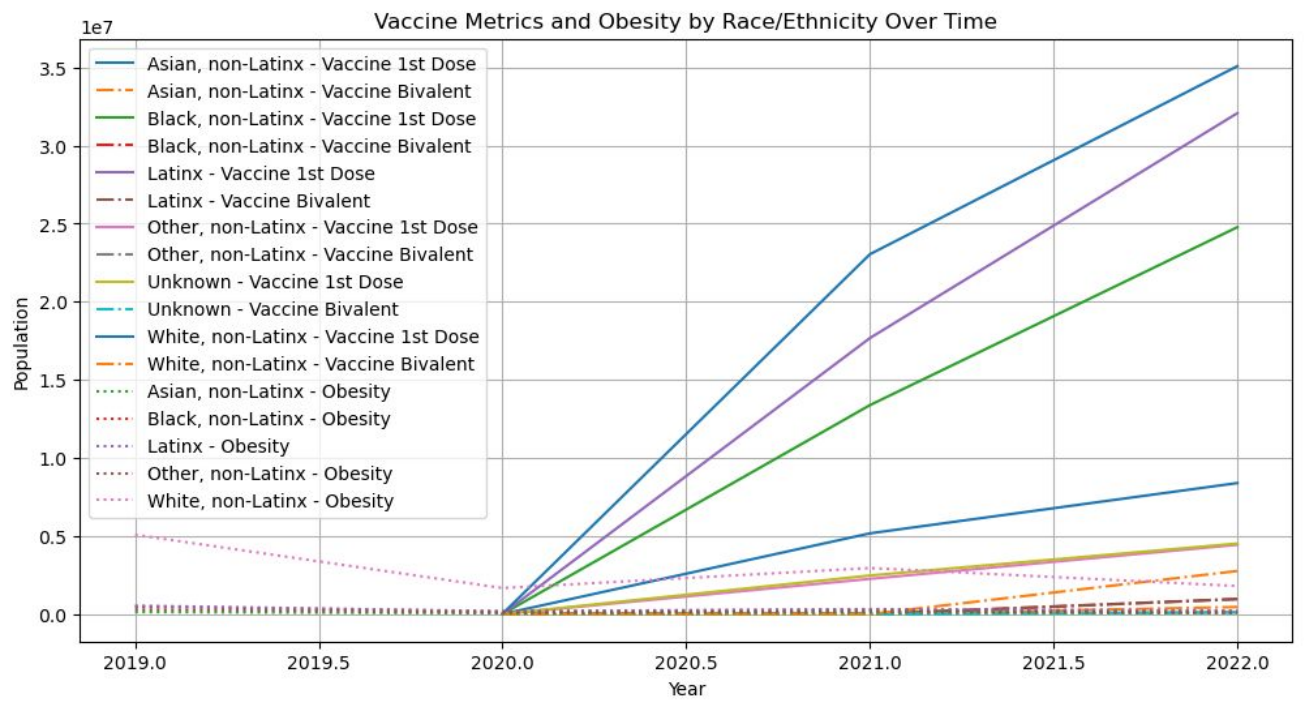


VISUALIZATION #2

- Black, non-Latinx are the least vaccinated
- Other, non-Latinx are the most vaccinated followed by Asian, non-Latinx
- White Latinx and Latinx are about the same



VISUALIZATION #3



Comparison of obesity population and vaccine acquisitions in relation to demographics.

ML/STAT #1

Analysis Overview

factors affecting vaccination rates over time.

Key Findings:

Completion differs across groups

Demographic Indicators:

Other non-Latinx = Positive coeff

Ethnicity Black = Negative coeff

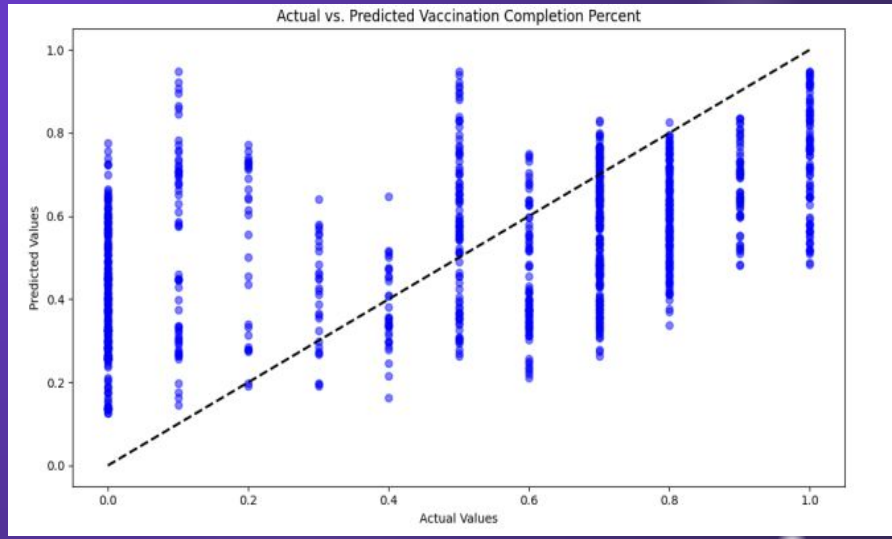
Temporal Features:

minimal increase in vaccination completion

Model Evaluation:

indicating model accuracy through proximity to the line.

	Feature	Coefficient
5	Race/Ethnicity_Other, non-Latinx	0.190503
3	Race/Ethnicity_Black, non-Latinx	-0.121842
2	Race/Ethnicity_Asian, non-Latinx	0.067921
4	Race/Ethnicity_Latinx	0.027071
0	days_since_start	0.000542
7	Race/Ethnicity_White, non-Latinx	0.000517
1	lab_tot_positive	0.000026
6	Race/Ethnicity_Unknown	0.000000



ML/STAT #2

- **Health Promotion Efforts:** By comparing the trends in vaccination rates and obesity rates over time, we can assess the effectiveness of health promotion efforts and interventions targeting specific racial/ethnic groups.
- **Socioeconomic Factors:** The intersectionality of race/ethnicity, socioeconomic status, and health outcomes plays a significant role. Analyzing the relationship between vaccination metrics, obesity rates, and socioeconomic factors within racial/ethnic communities can provide insights into the underlying determinants of health disparities.

EVALUATION

It is evident from the graphs that minority groups are potentially less inclined to seek vaccinations, perhaps due to being less informed or as a result of less accessibility to resources to that vaccinations.
This analysis demonstrates on temporal dynamics critically influences COVID-19 vaccination strategies, enabling stakeholders to create more effective and adaptive initiatives tailored to evolving community needs.

TAKEAWAYS

The ongoing analysis of vaccination trends and their correlation with COVID-19 case numbers can inform adaptive strategies that preemptively address potential surges in cases through increased vaccination efforts.

Furthermore the graph displaying obesity rates in relation to vaccinated populations could have been improved upon in terms of scaling alongside age and/or improving scalability of population sizes. Additionally, income could have been used to derive related information.

DATASET REFERENCES

- https://catalog.data.gov/dataset/influenza-covid-19-rsv-and-other-respiratory-virus-laboratory-surveillance
- https://catalog.data.gov/dataset/covid-19-vaccinations-by-age-and-race-ethnicity
- https://www.google.com/url?q=https://catalog.data.gov/dataset/nutrition-physical-activity-and-obesity-behavioral-risk-factor-surveillance-system&sa=D&source=editors&ust=1713751749948712&usg=AOvVaw1F4EJX0RQONM2kG5PAzawi

THANKS!

Does anyone have any questions?

THANKS FOR LISTENING!!!

1. Title
    a. Presentation title
        i. Not just project name
    b. Team Members
2. Problem
    a. Define problem/question
    b. Explain how problem was chosen
    c. Explain motivation
        i. Why should others care?
        ii. What are the implications of figuring this out?
        iii. Who should care about and can take an action based on findings?
    d. State hypotheses
3. Data
    a. Dataset
        i. Title
        ii. Source
    b. Accessibility of data
    c. Describe data
        i. Size
        ii. Type of data
        iii. Type of features
        iv. Granularity
        v. Anything else relevant
4. Solutions
    a. Plan to approach the problem
    b. Explain what we did
        i. Techniques used
    c. Explain why we did it
5. Evaluation of whether solution worked or not
6. Main takeaways

- Less text
    - No complete sentences
- At least size 20 font
- Incorporate visuals

Datasets Used

- Dataset: Influenza, COVID-19, RSV, and Other Respiratory Virus Laboratory Surveillance

https://catalog.data.gov/dataset/influenza-covid-19-rsv-and-other-respiratory-virus-laboratory-surveillance

- Dataset: COVID-19 Vaccinations by Age and Race-Ethnicity - Historical

https://catalog.data.gov/dataset/covid-19-vaccinations-by-age-and-race-ethnicity

- Dataset: Nutrition Physical Activity and Obesity Behavioral Risk Factor Surveillance

https://www.google.com/url?q=https://catalog.data.gov/dataset/nutrition-physical-activity-and-obesity-behavioral-risk-factor-surveillance-system&sa=D&source=editors&ust=1713751749948712&usg=AOvVaw1F4EJX0RQONM2kG5PAzawi

Data

RangeIndex: **93249 entries**, 0 to 93248
Data columns (total 33 columns):

#	Column	Non-Null Count	Dtype
0	YearStart	93249 non-null	int64
1	YearEnd	93249 non-null	int64
2	LocationAbbr	93249 non-null	object
3	LocationDesc	93249 non-null	object
4	Datasource	93249 non-null	object
5	Class	93249 non-null	object
6	Topic	93249 non-null	object
7	Question	93249 non-null	object
8	Data_Value_Unit	0 non-null	float64
9	Data_Value_Type	93249 non-null	object
10	Data_Value	84014 non-null	float64
11	Data_Value_Alt	84014 non-null	float64
12	Data_Value_Footnote_Symbol	9235 non-null	object
13	Data_Value_Footnote	9235 non-null	object
14	Low_Confidence_Limit	84014 non-null	float64
15	High_Confidence_Limit	84014 non-null	float64
16	**Sample_Size**	**84014 non-null**	**float64**
17	Total	3330 non-null	object
18	Age(years)	19980 non-null	object
19	Education	13320 non-null	object
20	Gender	6660 non-null	object
21	Income	23310 non-null	object
22	Race/Ethnicity	26640 non-null	object
23	GeoLocation	91513 non-null	object
24	ClassID	93249 non-null	object
25	TopicID	93249 non-null	object
26	QuestionID	93249 non-null	object
27	DataValueTypeID	93249 non-null	object
28	LocationID	93249 non-null	int64
29	StratificationCategory1	93240 non-null	object
30	Stratification1	93240 non-null	object
31	StratificationCategoryId1	93240 non-null	object
32	StratificationID1	93240 non-null	object

RangeIndex: **7600 entries**, 0 to 7599
Data columns (total 12 columns):

#	Column	Non-Null Count	Dtype
0	Week End	7061 non-null	object
1	Age Group	7061 non-null	object
2	Race/Ethnicity	7061 non-null	object
3	Population Size	6048 non-null	float64
4	1st Dose	7061 non-null	float64
5	1st Dose Percent	6048 non-null	float64
6	Vaccine Series Completed	7058 non-null	float64
7	Vaccine Series Completed Percent	6048 non-null	float64
8	Boosted	7056 non-null	float64
9	Boosted Percent	6048 non-null	float64
10	Bivalent	7056 non-null	float64
11	Bivalent Percent	6048 non-null	float64

RangeIndex: **2276 entries**, 0 to 2275
Data columns (total 14 columns):

#	Column	Non-Null Count	Dtype
0	mmwr_week	2276 non-null	int64
1	week	2276 non-null	int64
2	week_start	2276 non-null	object
3	week_end	2276 non-null	object
4	season	2276 non-null	object
5	pathogen	2276 non-null	object
6	lab_tot_tested	2276 non-null	int64
7	lab_tot_positive	2276 non-null	int64
8	lab_pct_positive	2257 non-null	float64
9	lab_tot_tested_cumulative	2276 non-null	int64
10	lab_tot_positive_cumulative	2276 non-null	int64
11	lab_pct_positive_cumulative	2259 non-null	float64
12	current_week_ending	2276 non-null	object
13	row_id	2276 non-null	object

ML/STAT #1

Impact of Demographics on Vaccination Rates: A Regression Analysis

Analysis Overview: Examined the influence of demographic factors, COVID-19 case trends and time on vaccination completion rates using regression coeffs.

Key Findings:

Other, non-Latinx: Positive coeffs indicate higher vaccination rates

African-American: Negative coeffs suggests lower vaccination rates.

Model Evaluation:

Plotted actual vs predicted values to gauge model fit. Dashed line represents perfect predictions; proximity to this line signifies accuracy, while distance indicated discrepancies.

	Feature	Coefficient
5	Race/Ethnicity_Other, non-Latinx	0.190503
3	Race/Ethnicity_Black, non-Latinx	-0.121842
2	Race/Ethnicity_Asian, non-Latinx	0.067921
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