



October 24<sup>th</sup>, 2025

West Lakes Regional Conference

Milwaukee, Wisconsin

# THE UNEVEN GEOGRAPHY OF OUTDOOR DINING: IMPLICATIONS FOR PEDESTRIAN SPACES

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**SPaRlab**  
spatial pattern analysis and research

# WHY OUTDOOR DINING MATTERS

- 📍 Pandemic Origins → Double-edge sword (Brody et al., 2025)
- 📍 Links to vitality: “positive interaction between people and space” (Chen, 2022).
- 📍 Gap: equity of distribution largely unstudied



# RELATED WORK

📍 Temporary urban structures  
→ increase pedestrian activity (Paukaeva et al., 2021; Batista & Friedrich, 2022).

📍 Sidewalk planimetric data as new resource (Hosseini et al., 2021; Lieu & Guhathakurta, 2025).



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# RESEARCH GOALS

- 📍 How are outdoor dining spaces distributed across neighborhoods of differing income and racial composition, and what does this reveal about equity in the public realm?
- 📍 First to combine outdoor dining and sidewalk planimetrics and sociodemographic data

# DATA OVERVIEW

Data Name	Data Description	Data Type	Data Date	Data Source	Link to Source
Open Dining Locations	Open Dining Locations in NYC	Points	2025	Department of Transportation	<a href="https://services.arcgis.com/wmZOI9vyUBq1zTzX/arcgis/rest/services/NYC_Open_Restaurants_Application_v3_Dashboard_Only/FeatureServer">https://services.arcgis.com/wmZOI9vyUBq1zTzX/arcgis/rest/services/NYC_Open_Restaurants_Application_v3_Dashboard_Only/FeatureServer</a>
Planimetric Sidewalks	Sidewalk Widths	Polygons	2024	NYC Open Data (Amelia Harvey)	<a href="https://opendata.cityofnewyork.us/projects/sidewalk-widths-nyc/">https://opendata.cityofnewyork.us/projects/sidewalk-widths-nyc/</a>
NYC Blocks	B19013_001: Median Income B02001_002: Percentage Population White B01003_001: Total Population	Polygons	2024	US Census Bureau	Downloaded using R package: "tidycensus"

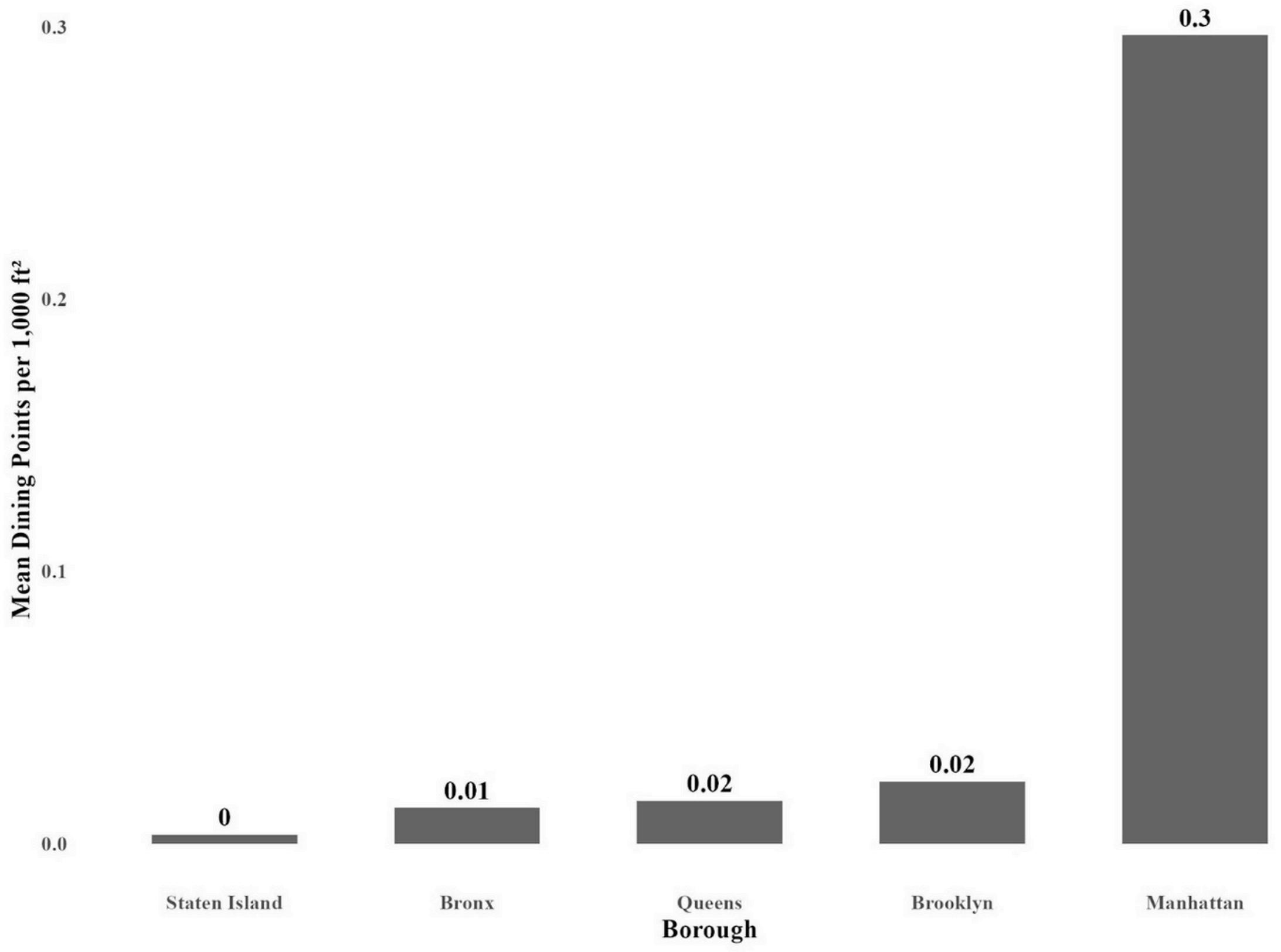
- 📍 Filter → sidewalk/both locations only.
- 📍 Density = dining points per 1000 square feet of sidewalk
- 📍 Stratification: by borough, income quartiles, percent white quartiles

# MEASURING OUTDOOR DINING DENSITY

- 📍 Equity gap measure:  
Symmetric Relative Gap.
- 📍 Spatial autocorrelation:  
Moran's I.
- 📍 Local clustering: Getis-  
Ord Gi\*, composite, and  
3-way hotspot maps

# SPATIAL ANALYSIS

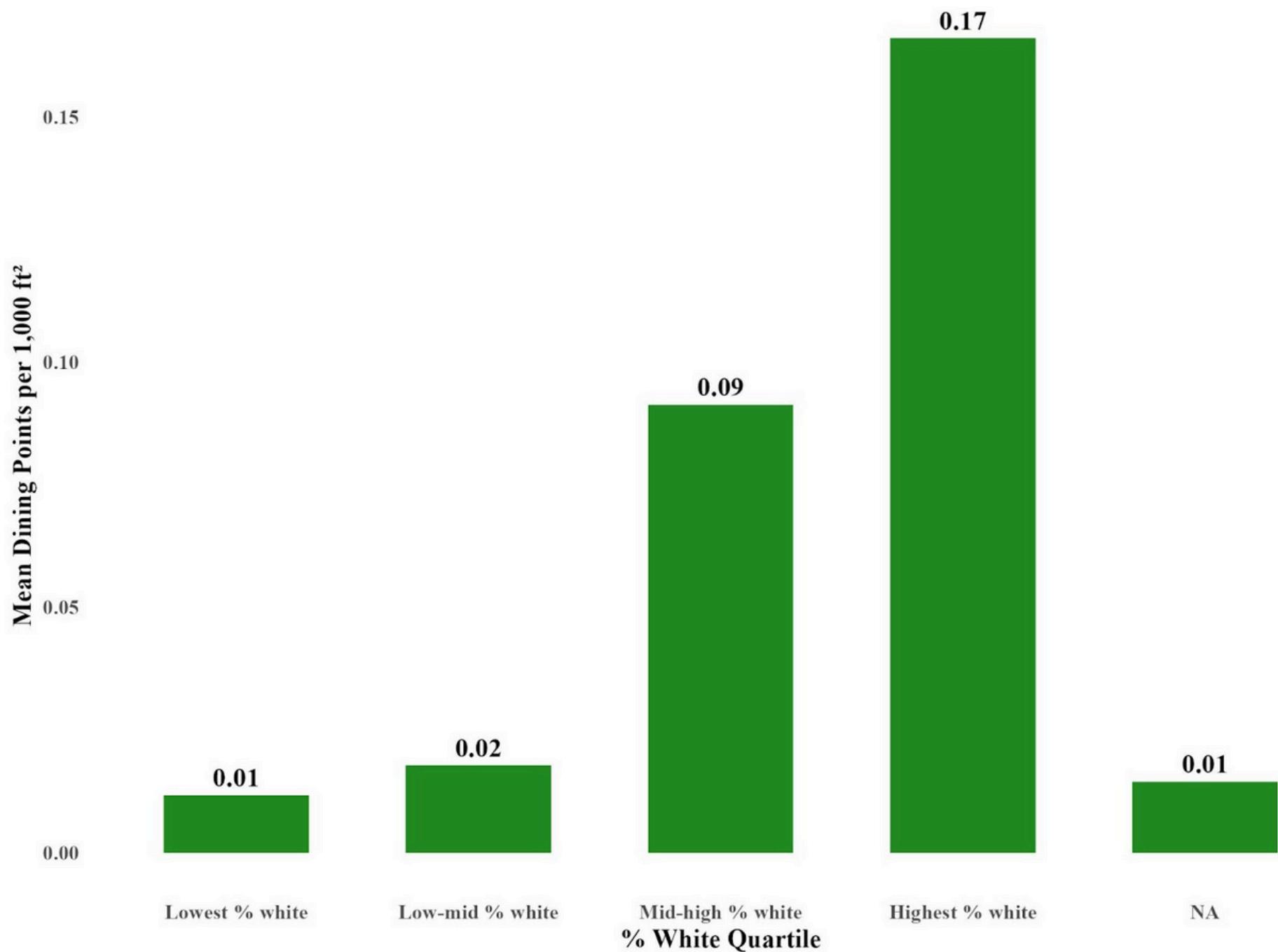
Average Dining Density by Borough



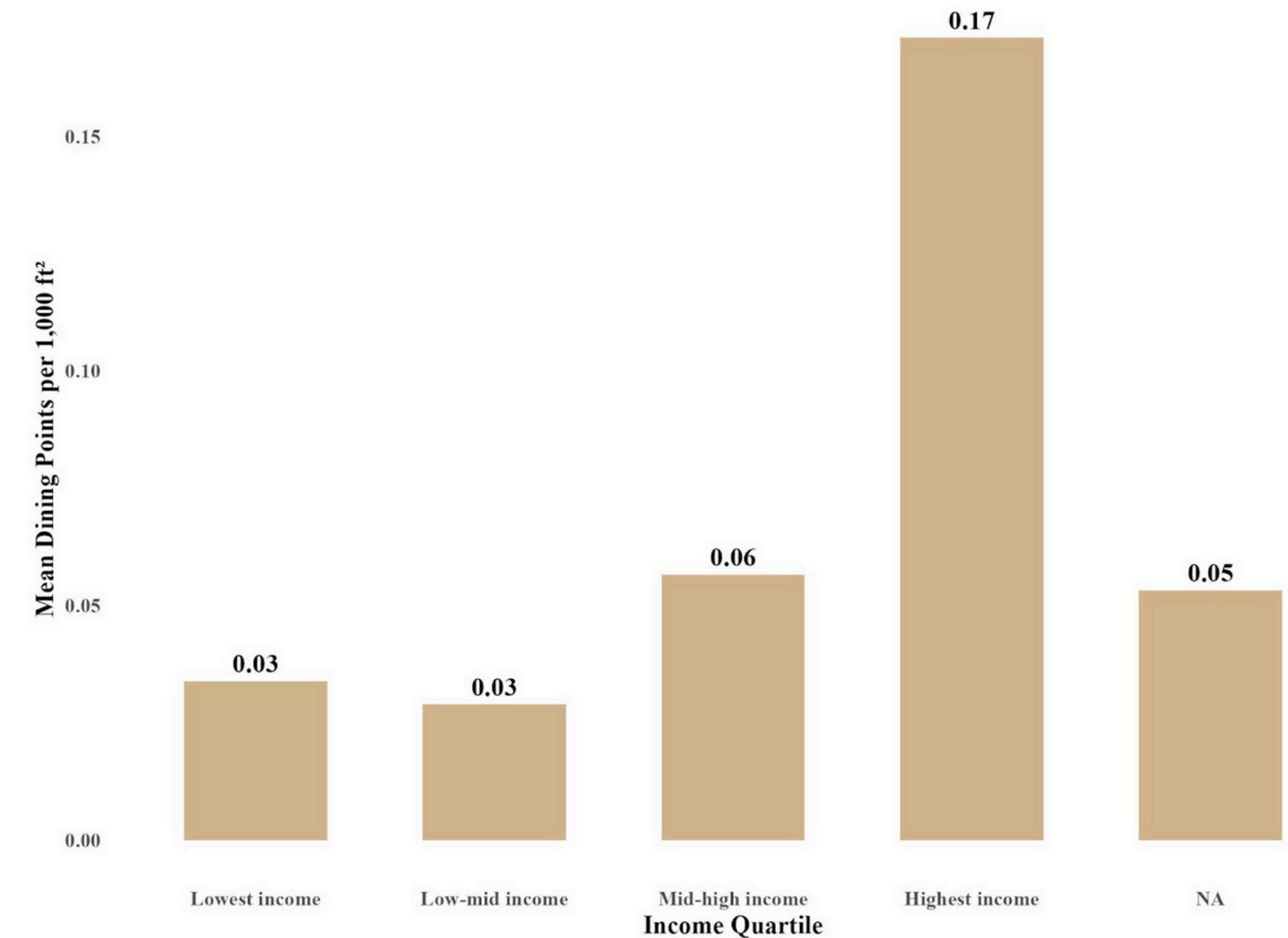
# BOROUGH PATTERNS

# SOCIODEMOGRAPHIC TRENDS

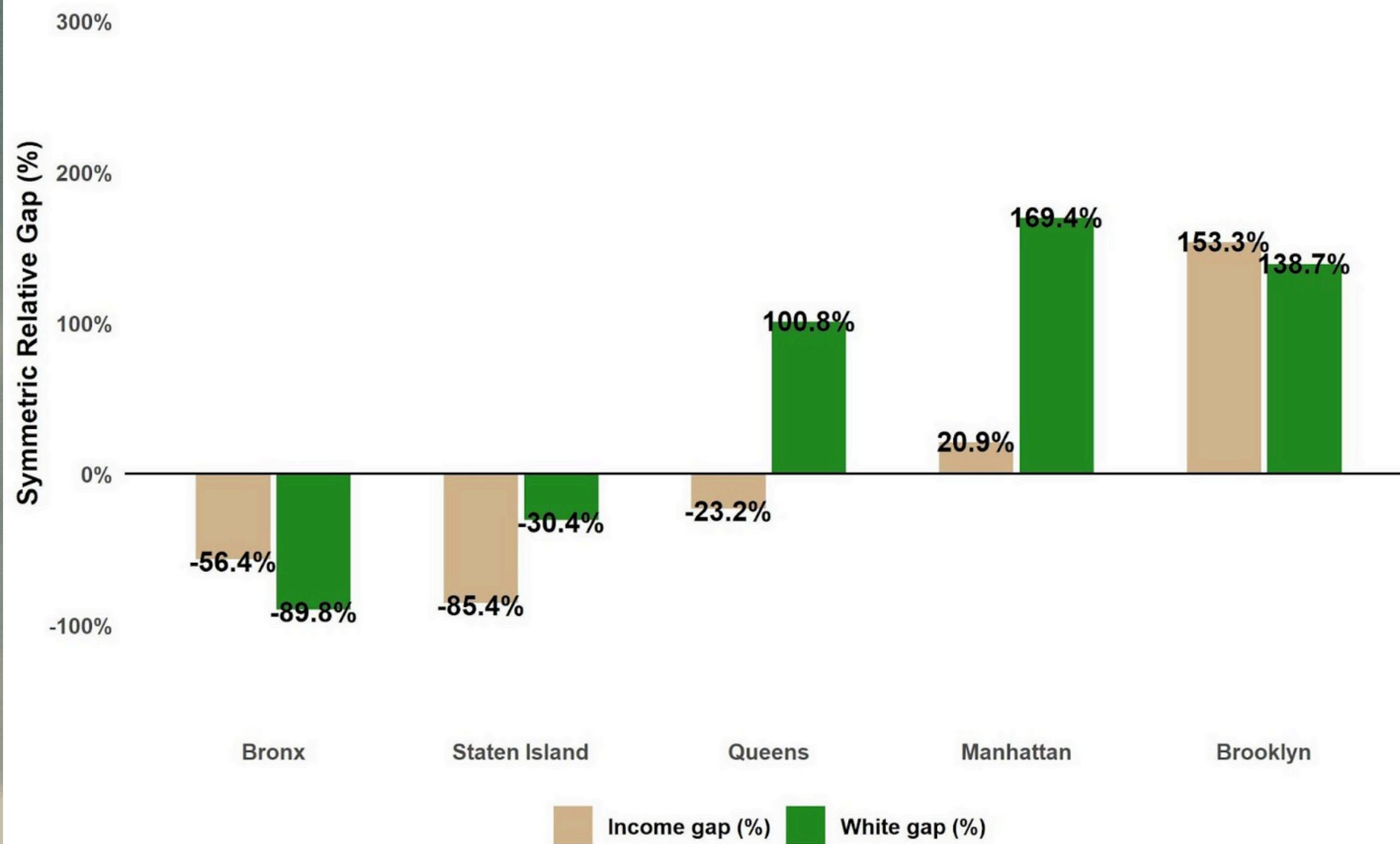
Mean Dining Density by % White Quartile



Mean Dining Density by Income Quartile



**Stable (Symmetric) Relative Gap in Dining Density by Borough**  
**Q4 vs Q1 within-borough income and % white quartiles**



**Composite Hotspots: Privileged Outdoor Dining  
(z of Density, Income, % White)**

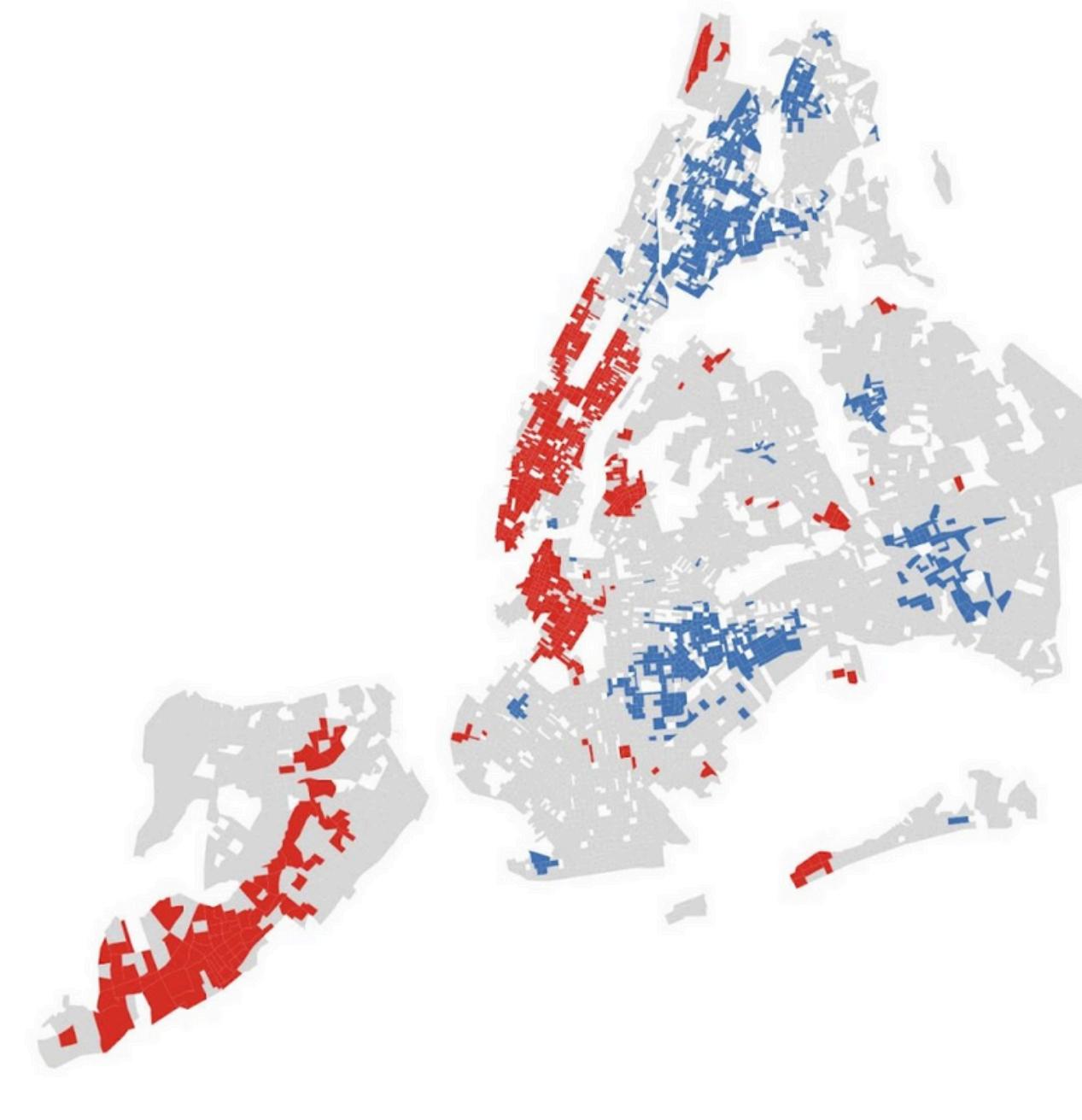
40.9°N

40.8°N

40.7°N

40.6°N

40.5°N



Composite Gi\*



Coldspot ( $p < 0.05$ )



Not sig



Hotspot ( $p < 0.05$ )

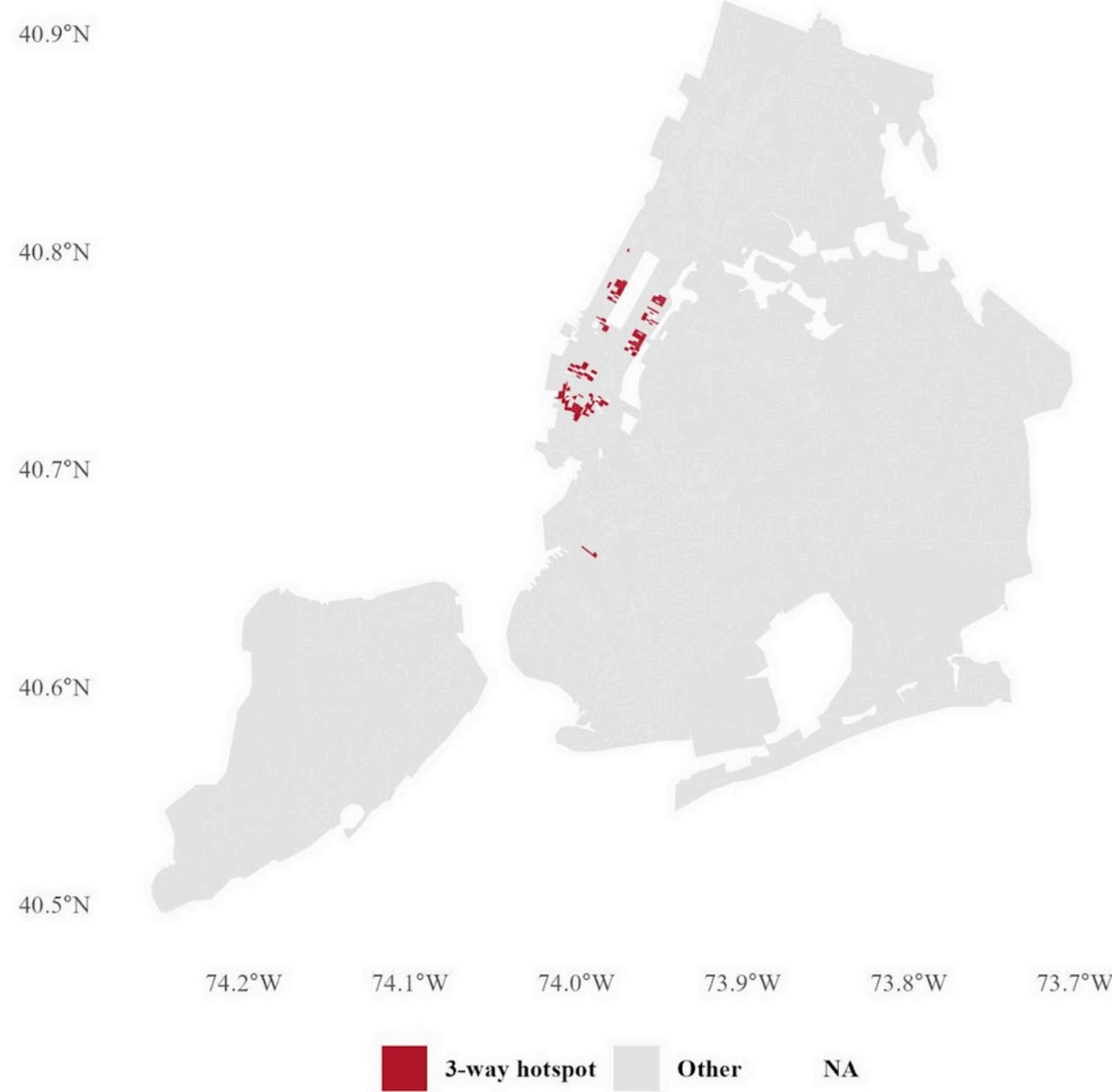


NA

# HOTSPOT ANALYSES

Composite hotspots:  
Manhattan and  
waterfronts

**3-Way Hotspots: High Dining + High Income + High % White (Gi\* intersections)**



# HOTSPOT ANALYSES

Compact midtown-  
to-lower  
Manhattan

📍 Outdoor dining increases pedestrian vitality but unevenly distributed.

📍 Spatial lines of advantage → wealthier, whiter areas coincide with higher concentrations

## KEY INSIGHTS

- 📍 Not casual but associations highlight program design issues.
- 📍 Sidewalks are contested spaces: conflicts with accessibility, delivery robots, competing uses.



# EQUITY IMPLICATIONS

# DISCUSSION

- 📍 Outdoor dining is now a permanent feature of NYC's pedestrian realm
- 📍 Distribution is uneven across boroughs and demographics.
- 📍 Open data and spatial analysis reveal clear inequities.
- 📍 Equity lens is critical: ensure benefits reach all communities



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BUT...  
QUANTITY DOES NOT  
EQUAL QUALITY

- 📍 But does ALL outdoor dining contribute equally?
- 📍 Next phase: Systematically measure quality differences across outdoor dining infrastructure
- 📍 Goal: Move from quantity-based policies to quality-based frameworks

# CURRENT RESEARCH

• Train team of 3-5 researchers to conduct systematic audits via Google Street View

• Stratified sampling: Restaurants across all 5 boroughs by:

- Income quartile
- Racial demographics (% white quartile)
- Geographic distribution

# SCALING OBSERVATIONS THROUGH AUDITS

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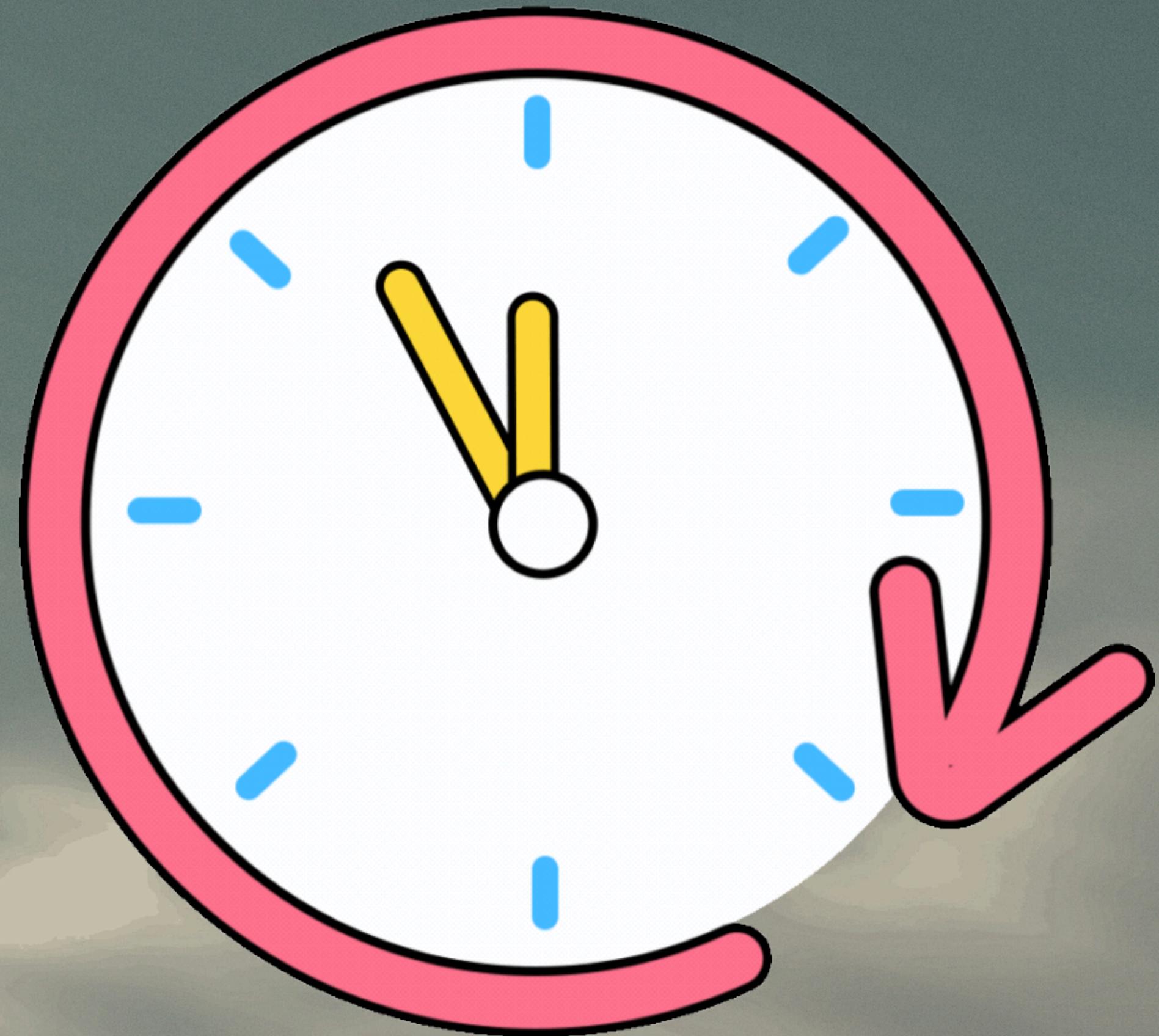
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FROM PRESENCE TO  
QUALITY. . .

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WE ALL WERE  
HIRED AS  
MILWAUKEE  
URBAN  
PLANNERS



May 24<sup>th</sup>, 2027

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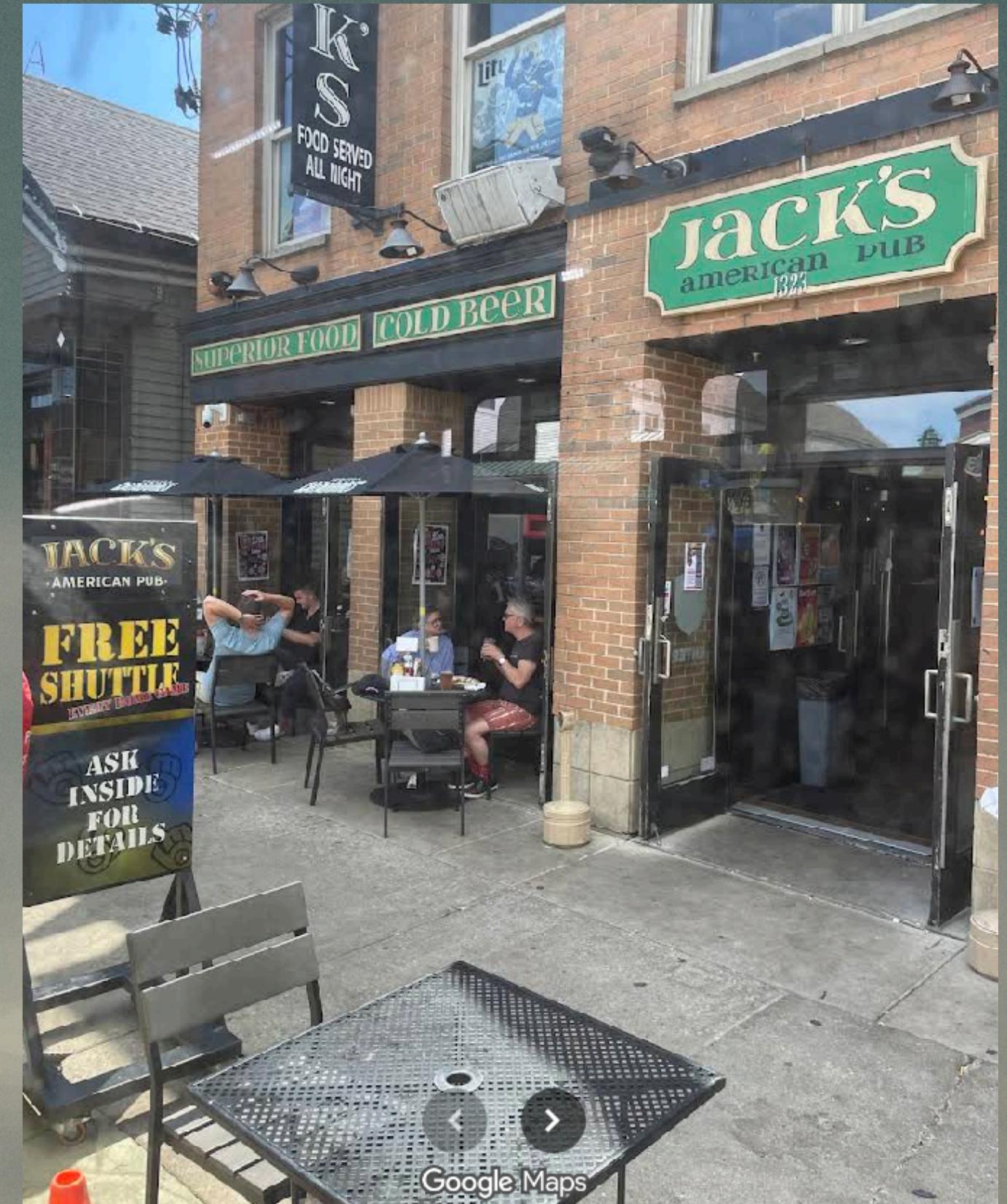
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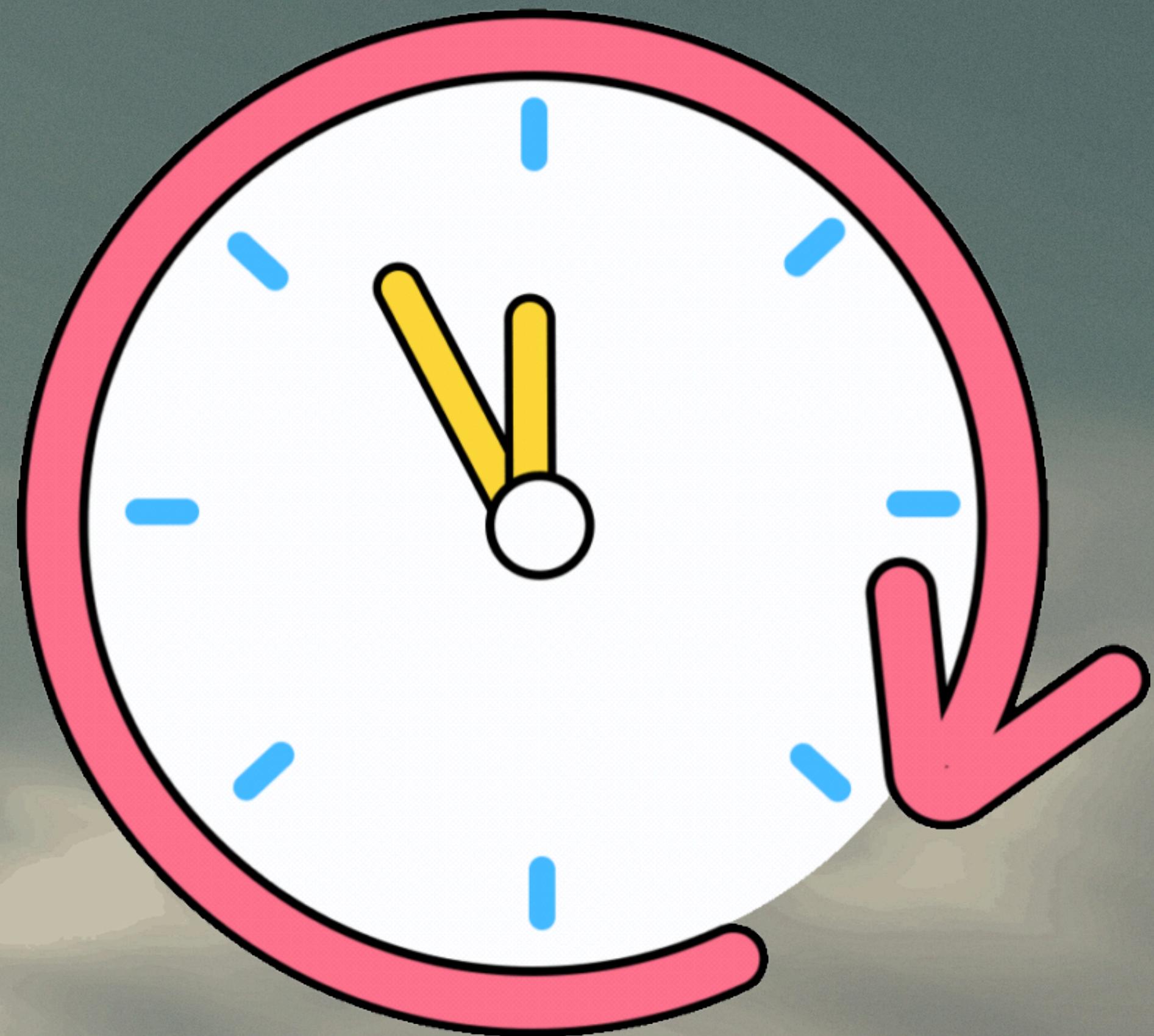
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THANK YOU  
AND  
QUESTIONS

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