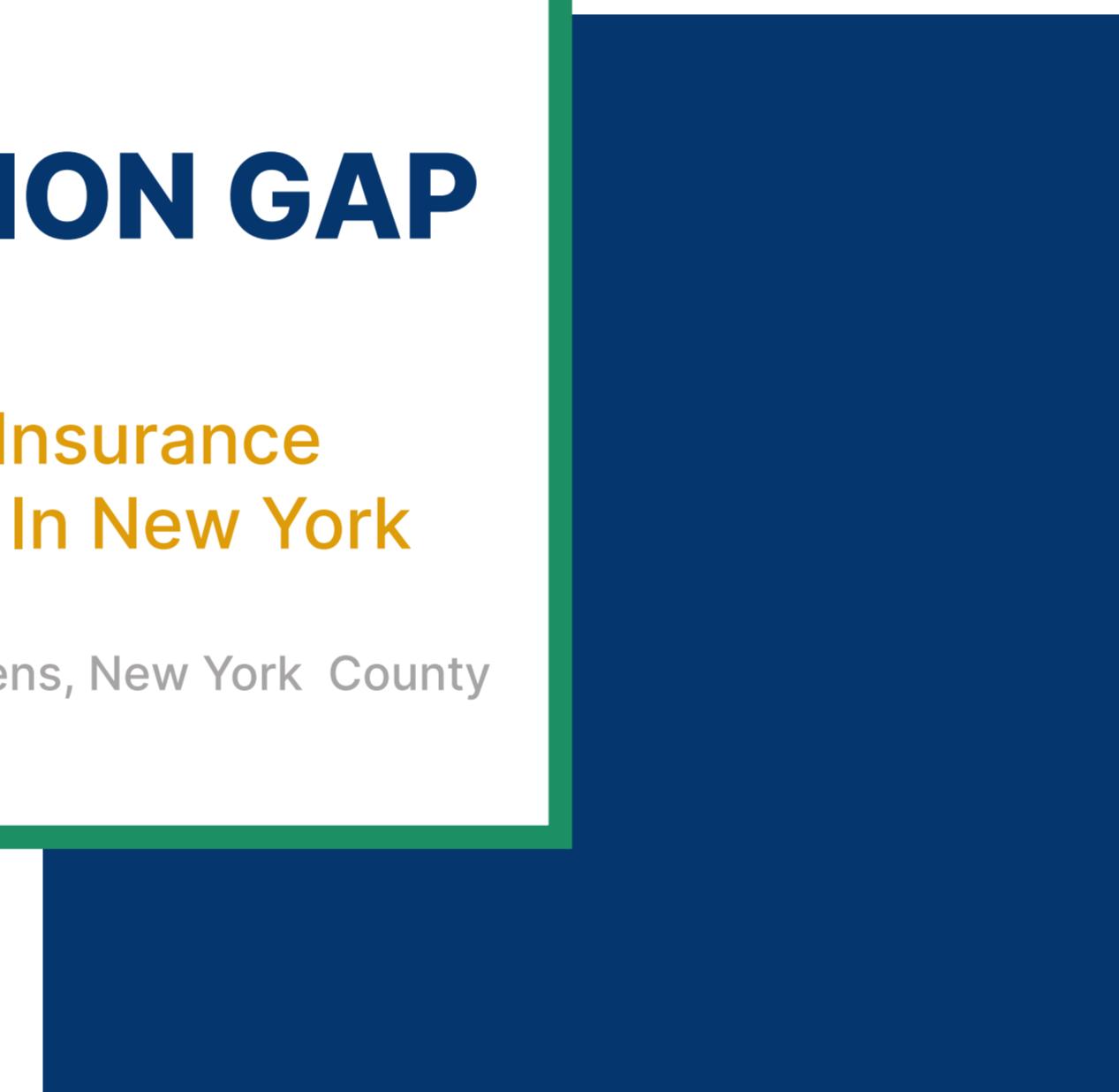




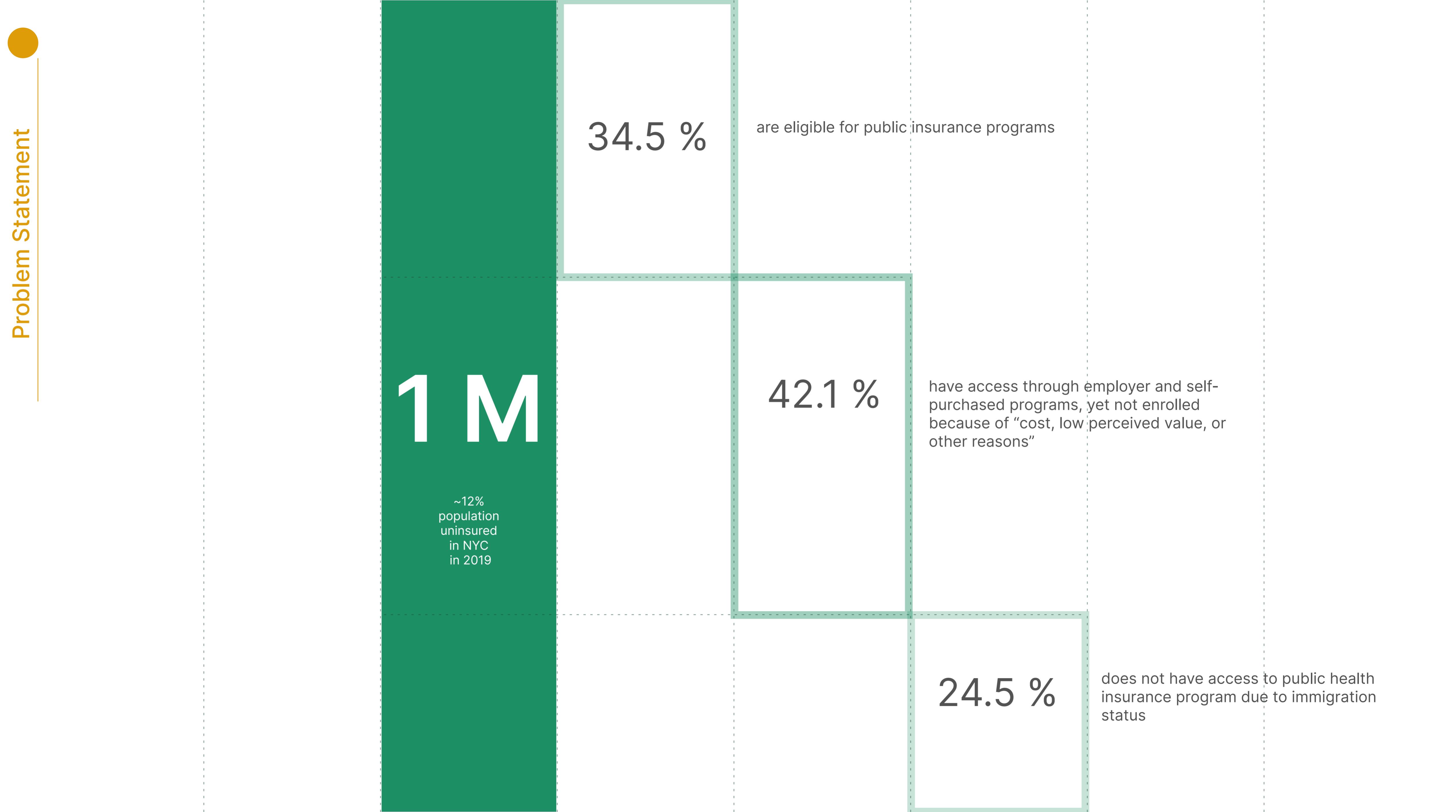
# 1 MILLION GAP

Health Insurance  
Inequality In New York

Bronx, Kings, Queens, New York County



Code: [https://rpubs.com/beckyxu\\_code/974106](https://rpubs.com/beckyxu_code/974106)



In Bronx, Queens, Manhattan, King county...

01

**Which independent variables correlate with population (all ages) health insurance (& public health insurance) enrollment rate?**

Independent variables: race, median household income, employment sectors, education attainment, foreign origin/citizenship, poverty.

02

**Which independent variables correlate with children's (under 18) health insurance (& public health insurance) enrollment rate ?**

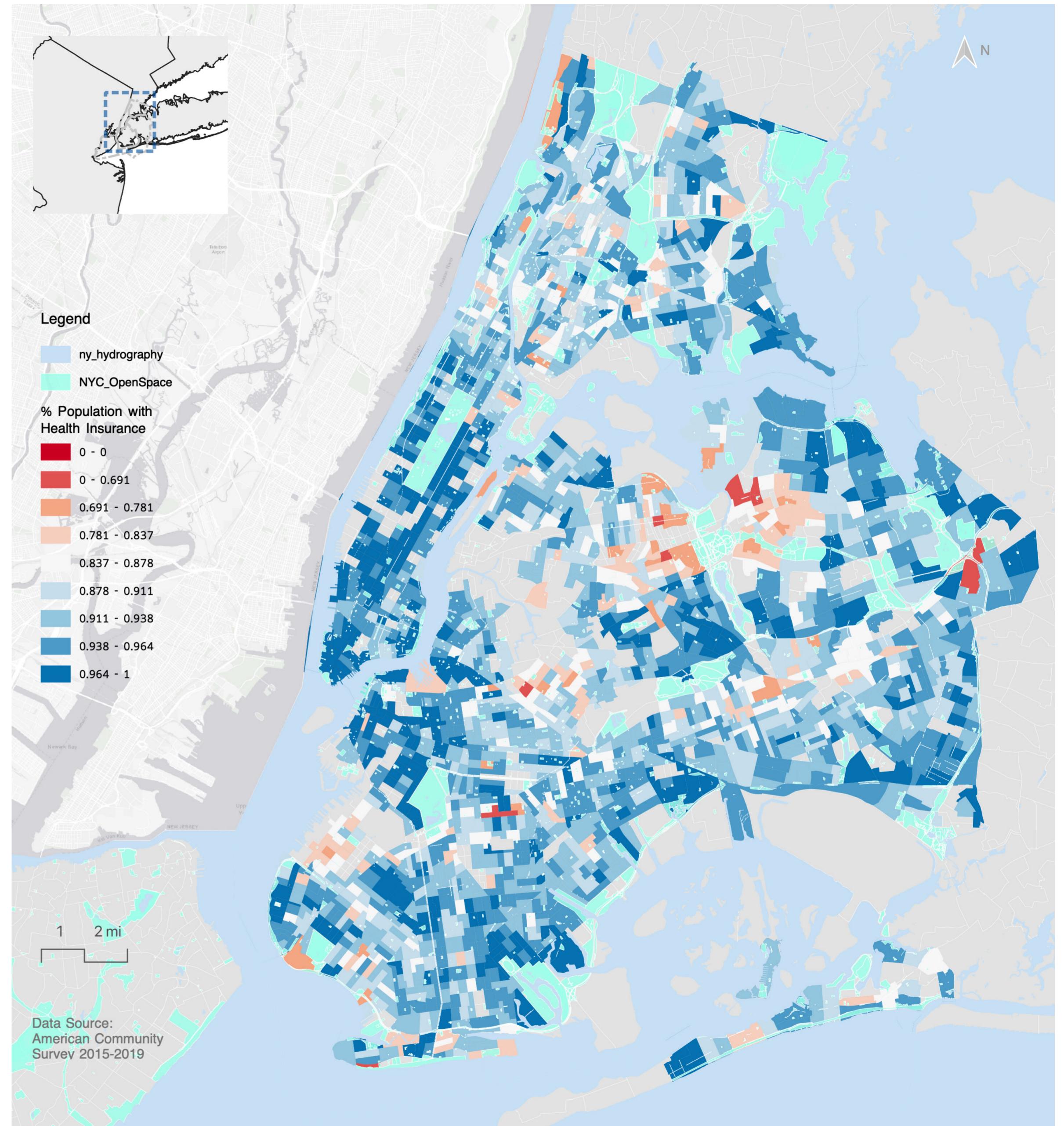
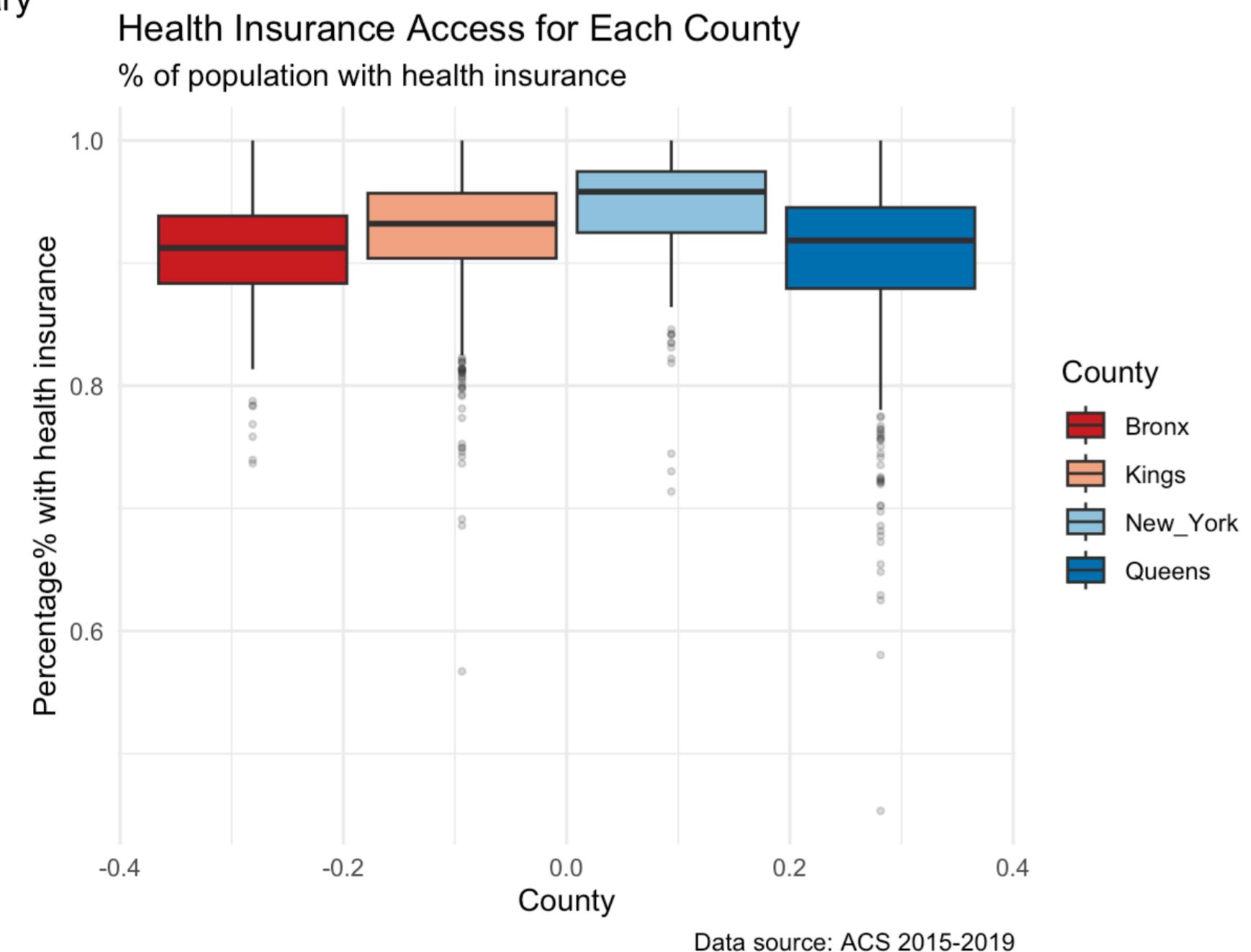
Independent variables: race, median household income, employment sectors, education attainment, foreign origin/citizenship, poverty.

**Data Source:** American Community Survey 2015 - 2019  
**Data converted to % of population from 0 to 1**  
**95% Confidence Level**

# % POPULATION WITH HEALTH INSURANCE

## Overview

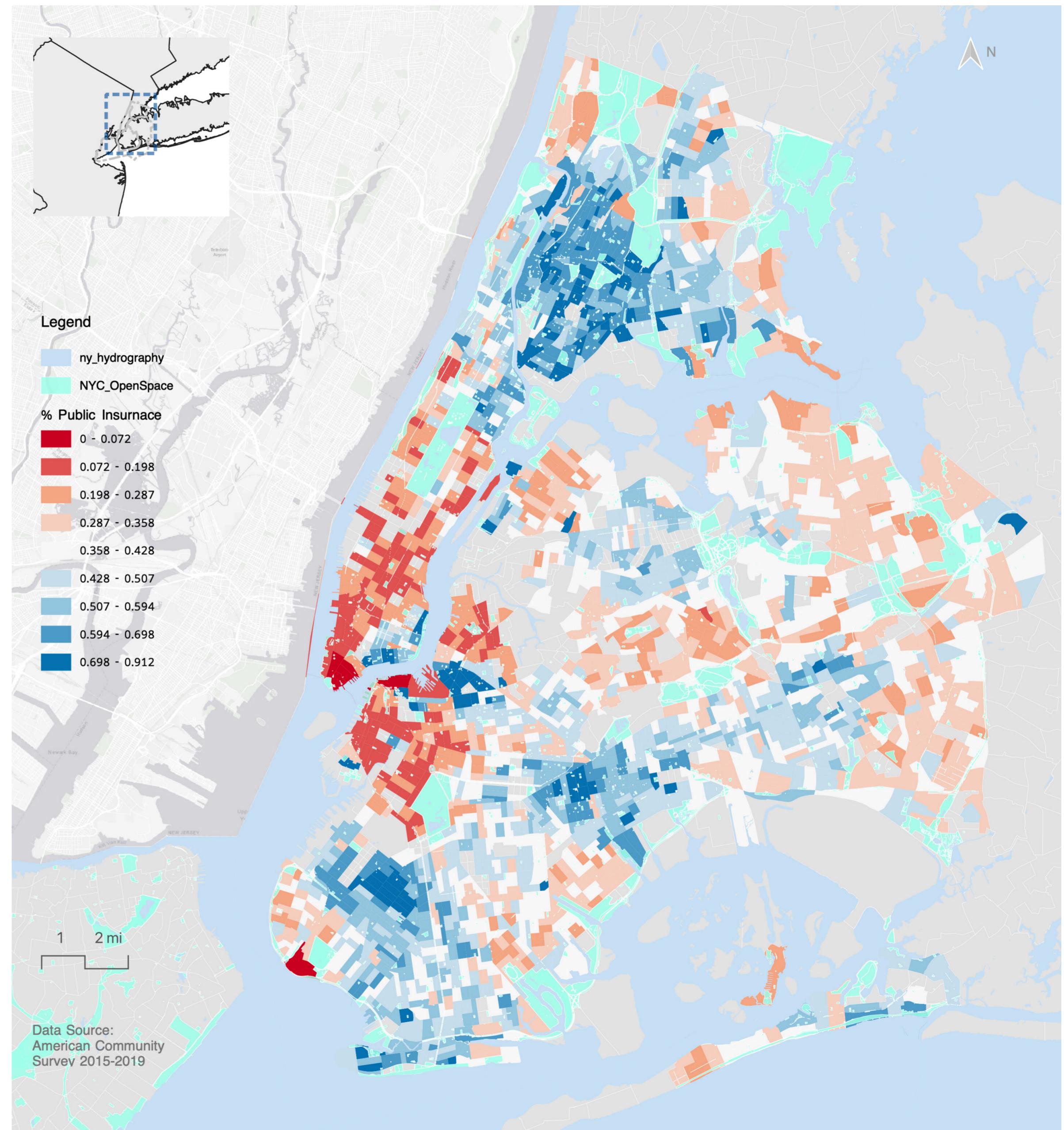
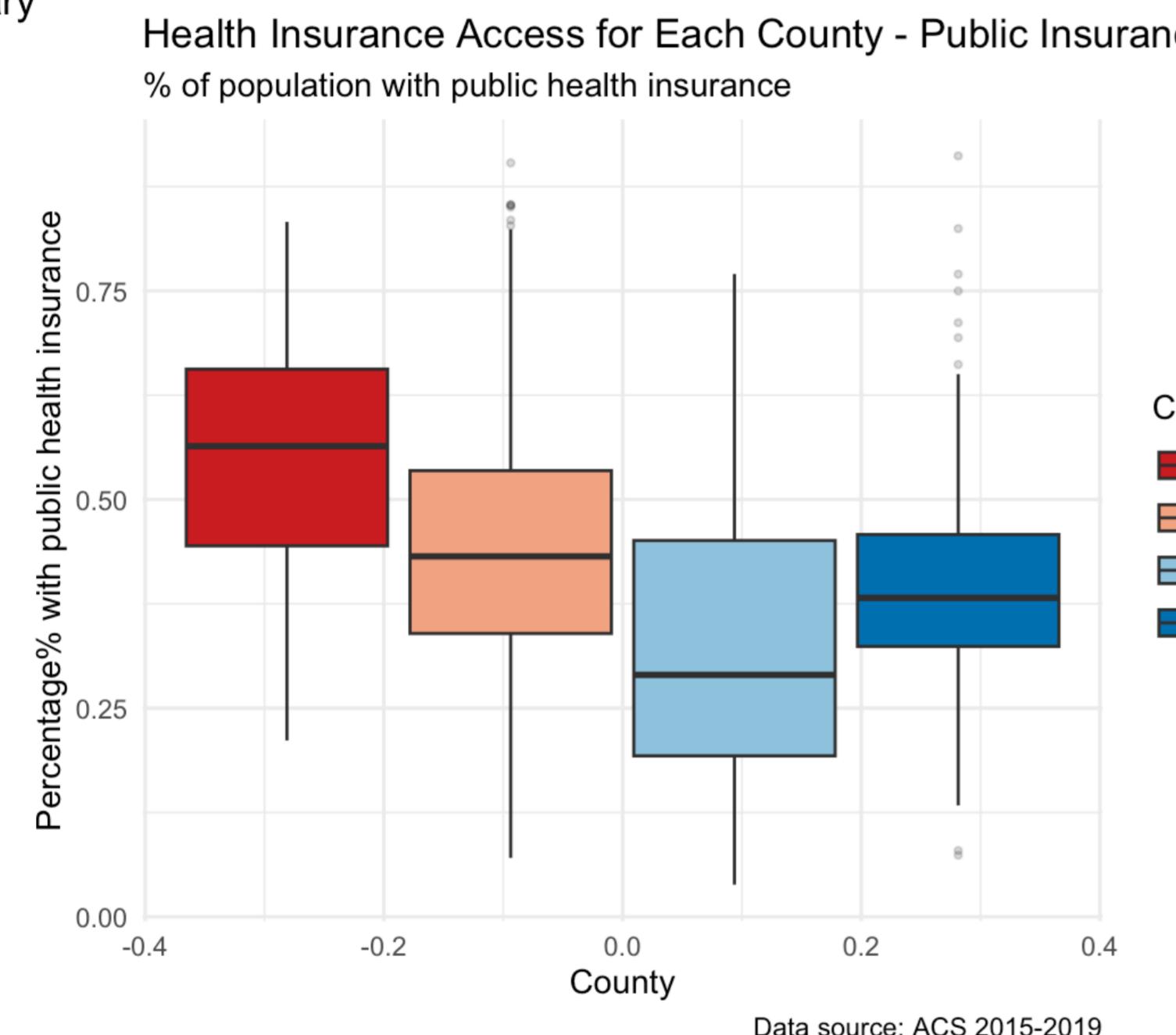
### Summary



# % POPULATION WITH PUBLIC HEALTH INSURANCE

Overview

Summary



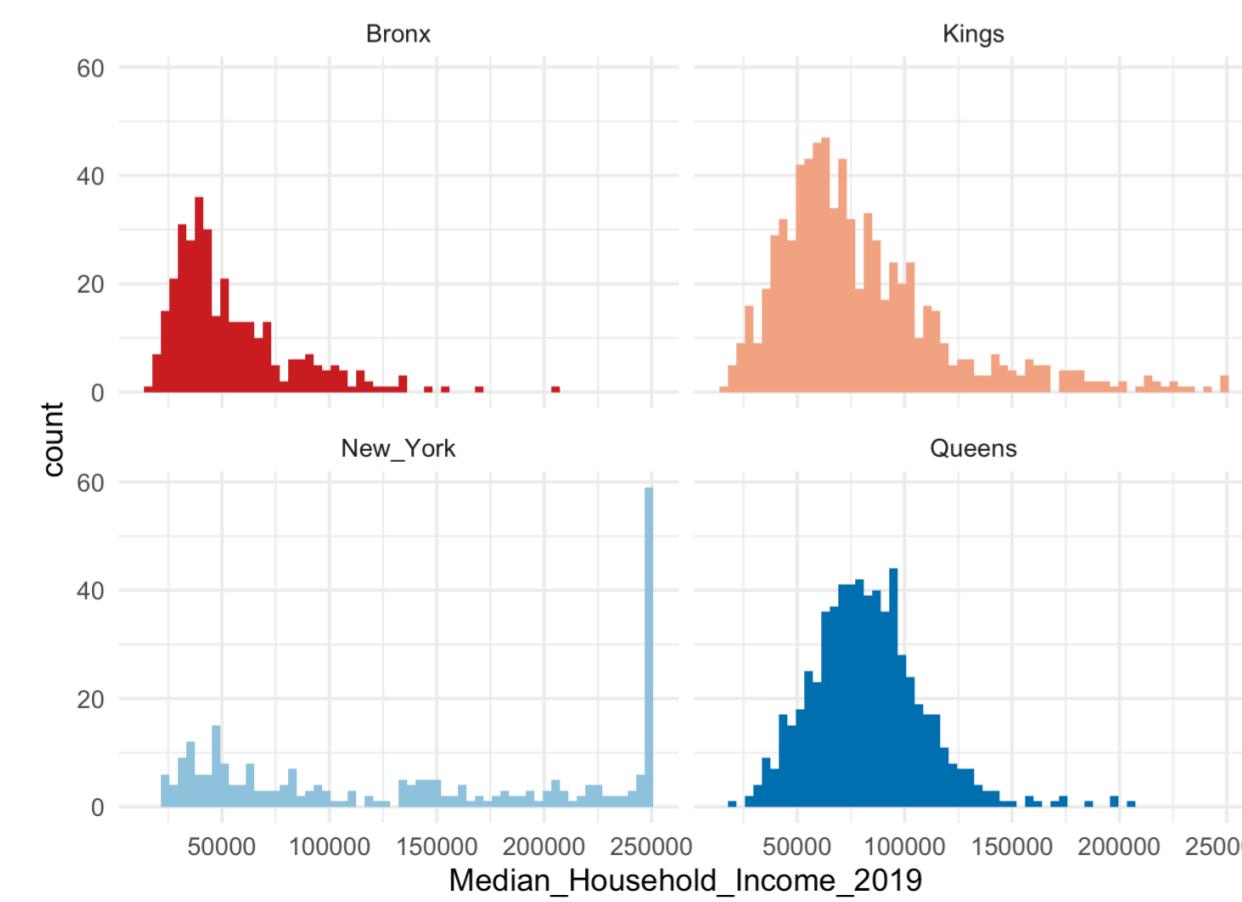
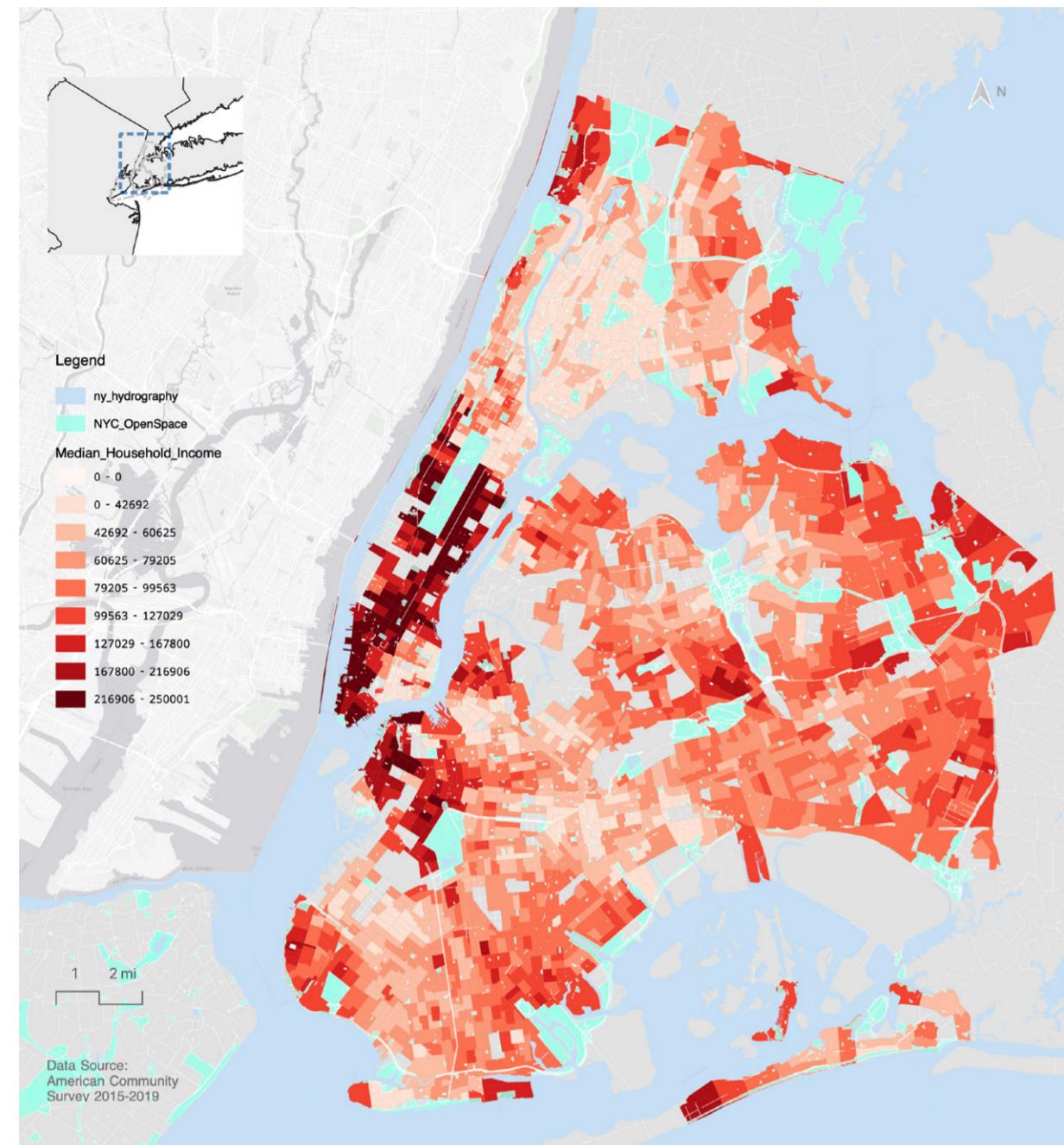
In Bronx, Queens, Manhattan, King county...

# 01

Which independent variables correlate with population  
(all ages) health insurance enrollment rate?

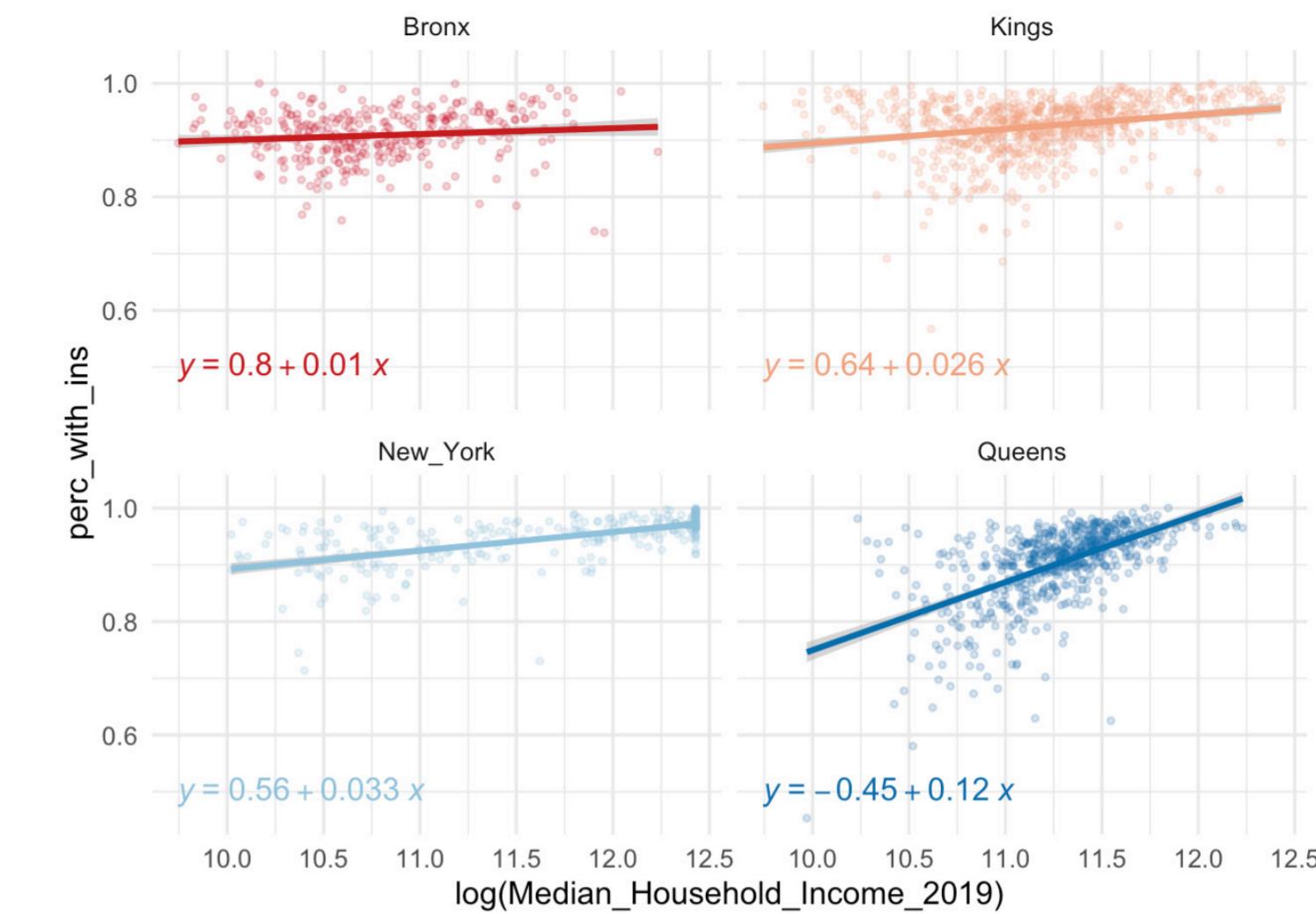
$$\begin{aligned} \text{\%Pop with Health Insurance} &= \boxed{\text{Race}} + \boxed{\text{Household Income}} + \boxed{\text{Education Attainment}} + \boxed{\text{Citizenship}} + \boxed{\text{Employment Sector}} + \boxed{\text{Poverty}} + e \\ \text{\%Pop with Public Health Insurance} &= \boxed{\text{Race}} + \boxed{\text{Household Income}} + \boxed{\text{Education Attainment}} + \boxed{\text{Citizenship}} + \boxed{\text{Employment Sector}} + \boxed{\text{Poverty}} + e \end{aligned}$$

# X = MEDIAN HOUSEHOLD INCOME

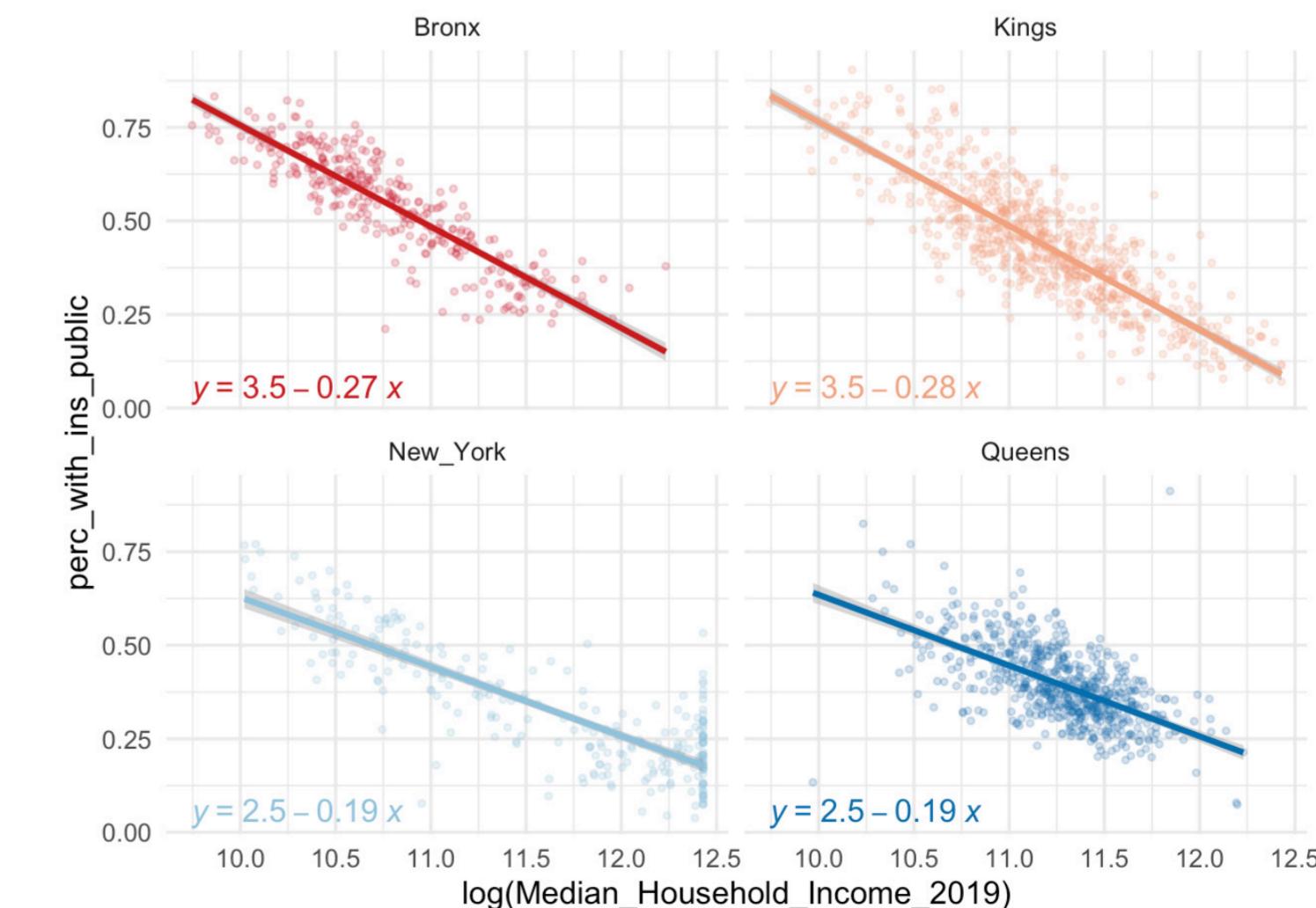


Geo\_County

Bronx
Kings
New_York
Queens



$$\% \text{ population with health insurance} = a * \text{median\_household\_income} + b$$

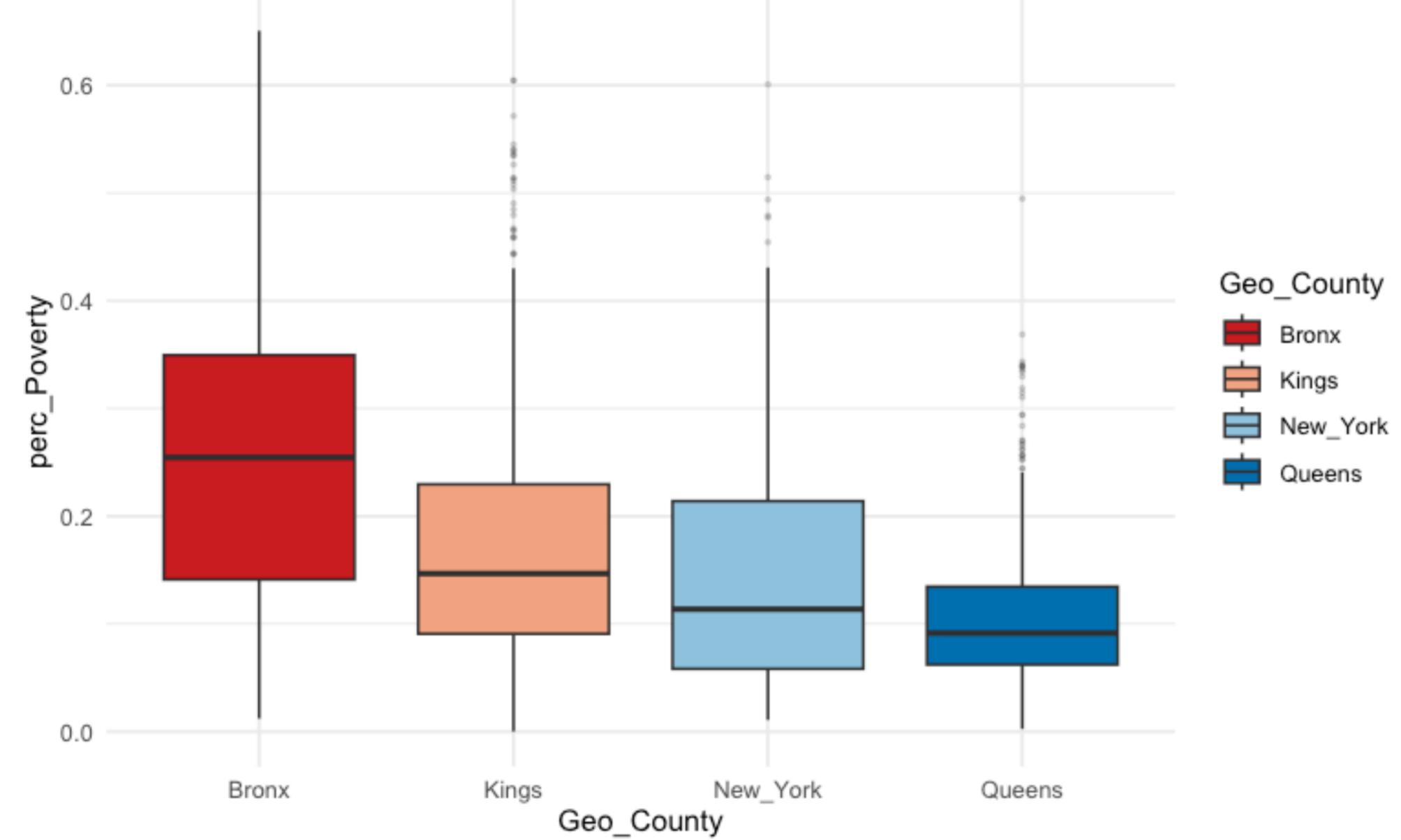


$$\% \text{ population with public health insurance} = a * \text{median\_household\_income} + b$$

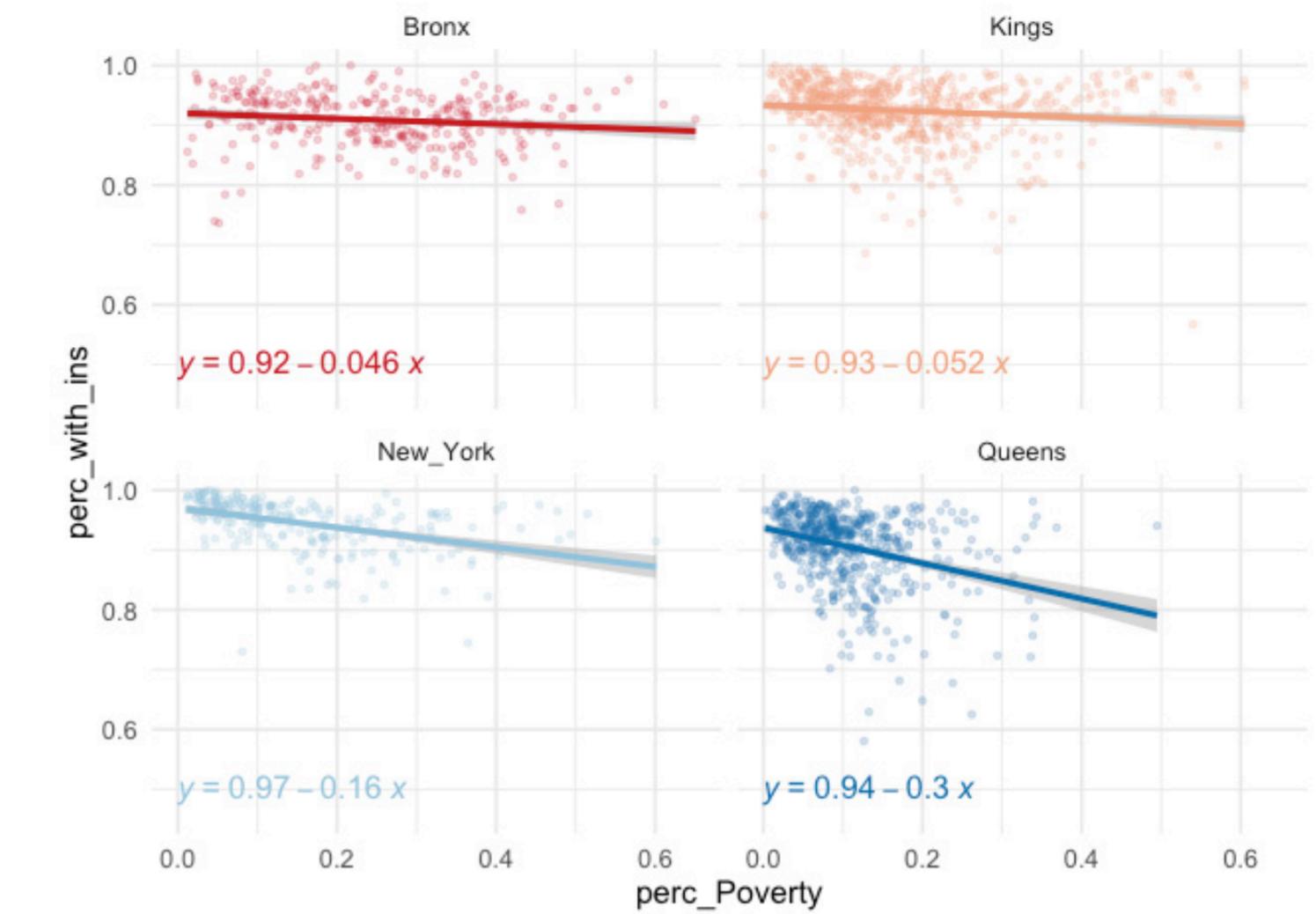
Bronx	Kings
New_York	Queens

# X = POVERTY

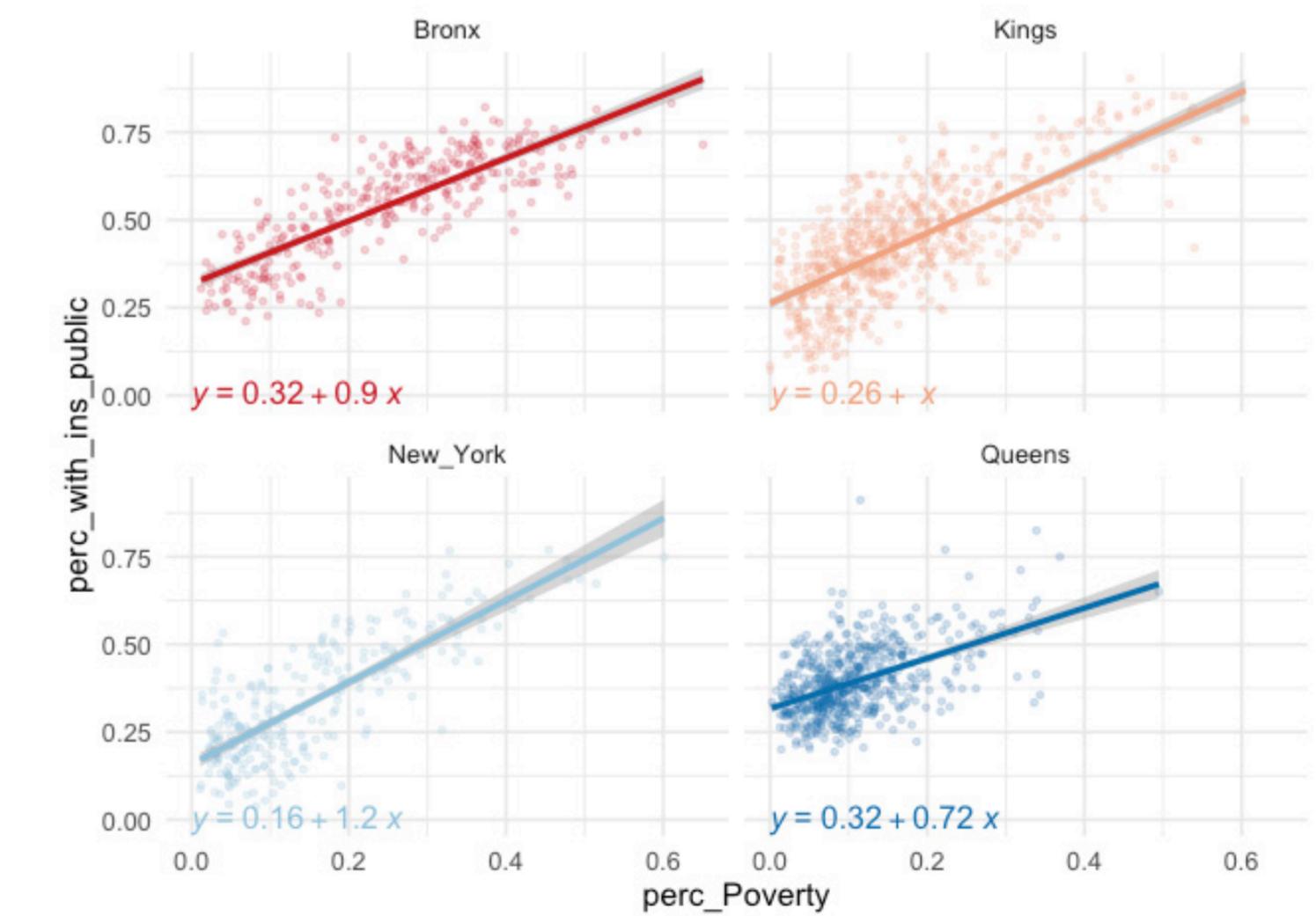
Variable: Poverty



Geo\_County  
Bronx  
Kings  
New\_York  
Queens



% population with health insurance =  
 $a \cdot \text{poverty} + b$

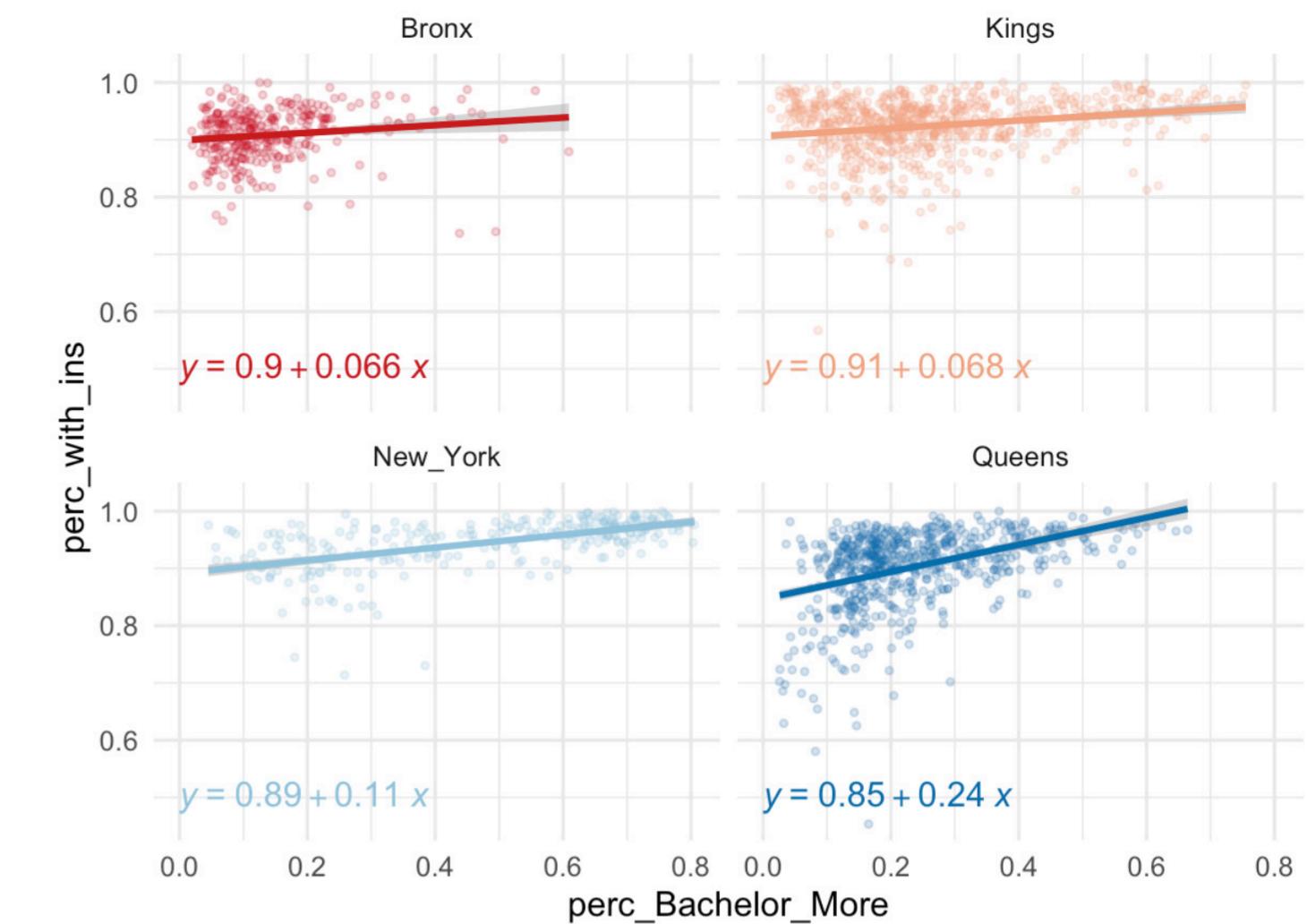
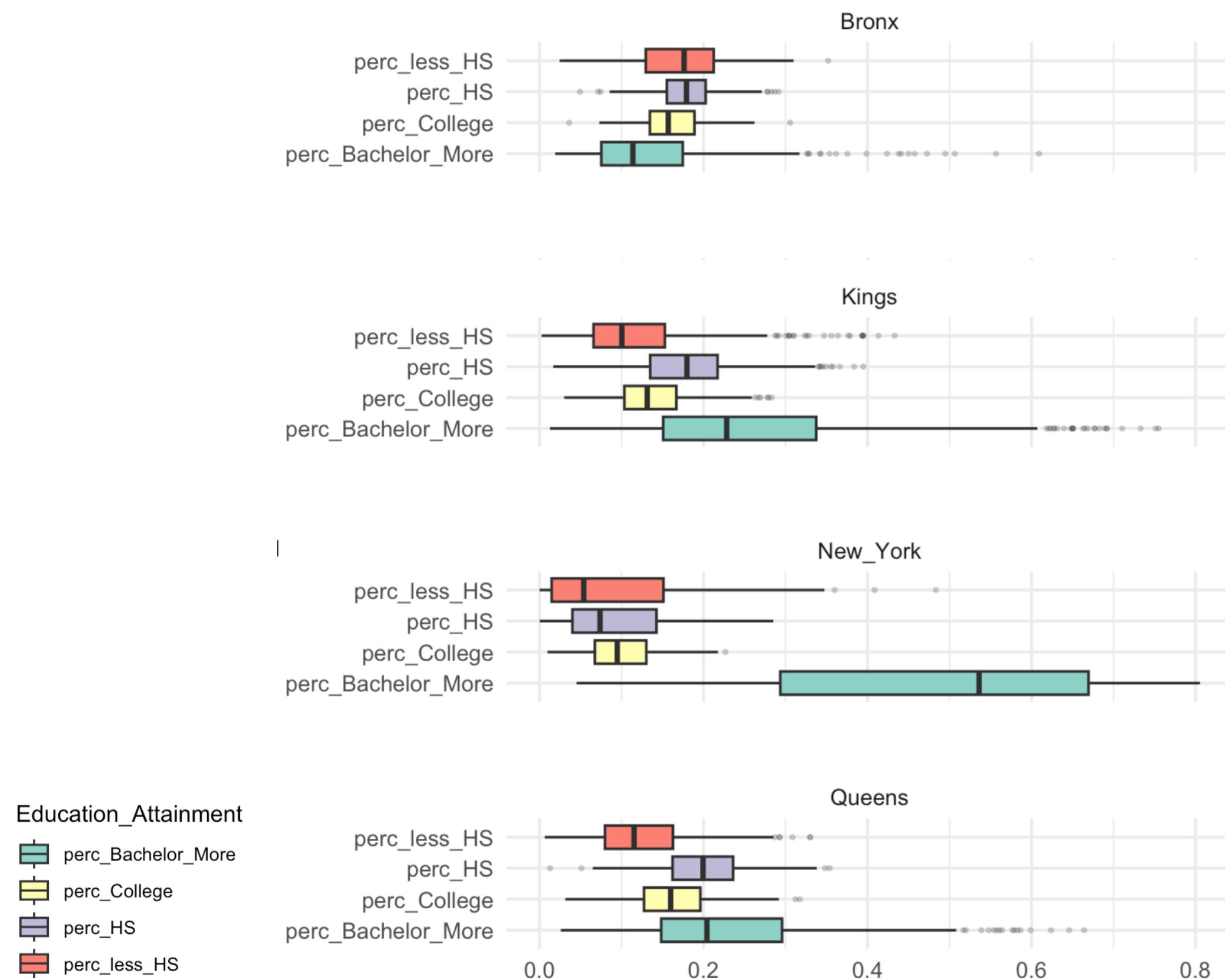


% population with public health insurance =  
 $a \cdot \text{poverty} + b$

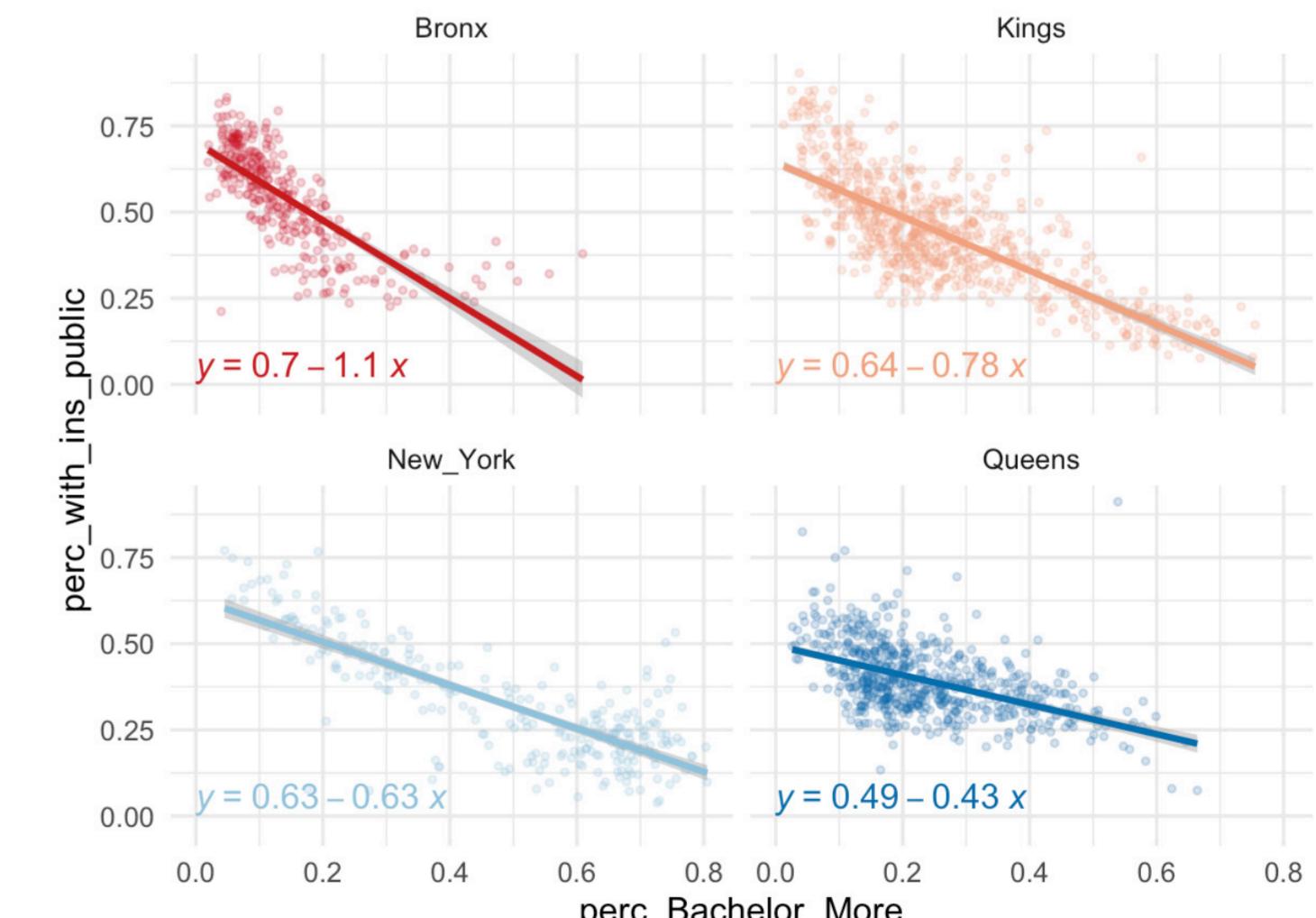
Bronx	Kings
New_York	Queens

# X = EDUCATION ATTAINMENT

Distribution of Education Attainment as % of Population in Each County



$$\% \text{ population with health insurance} = a * \text{bachelor\_degree\_or\_more} + b$$



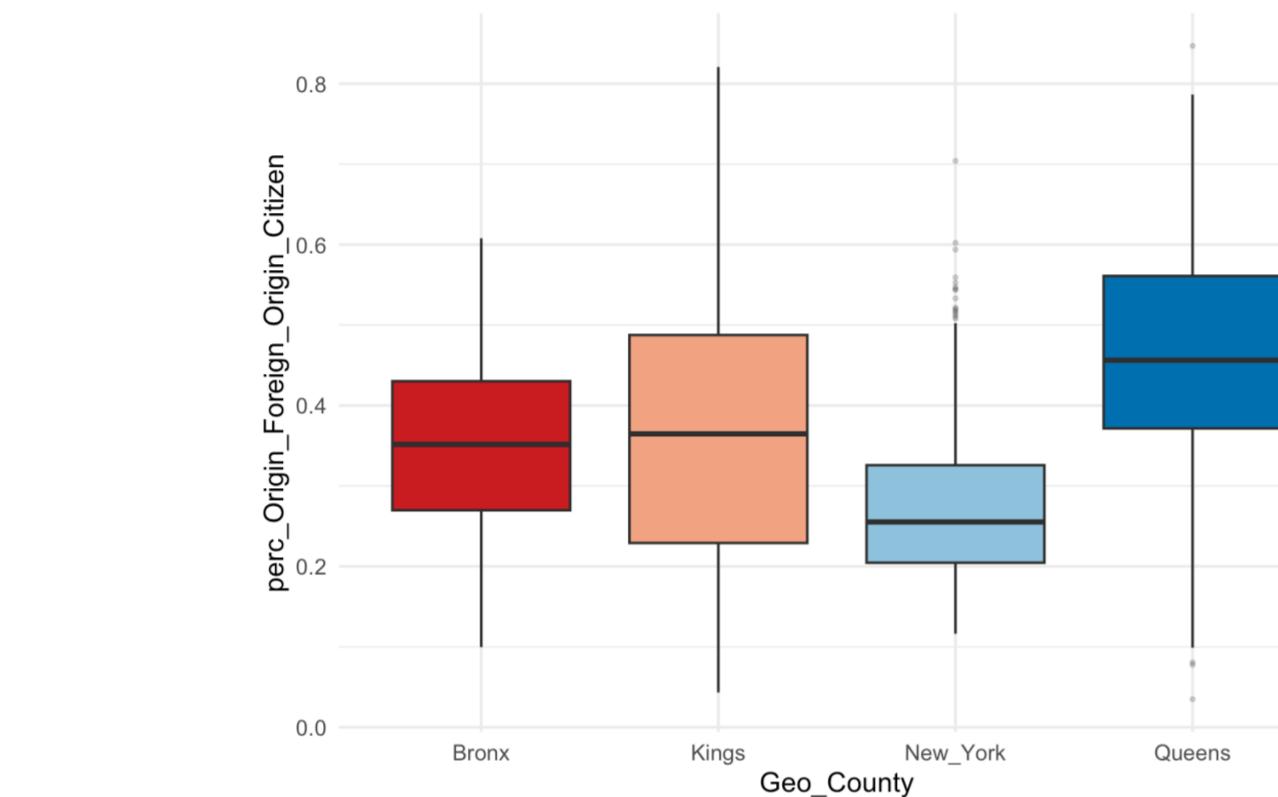
$$\% \text{ population with public health insurance} = a * \text{bachelor\_degree\_or\_more} + b$$

Bronx	Kings
New_York	Queens

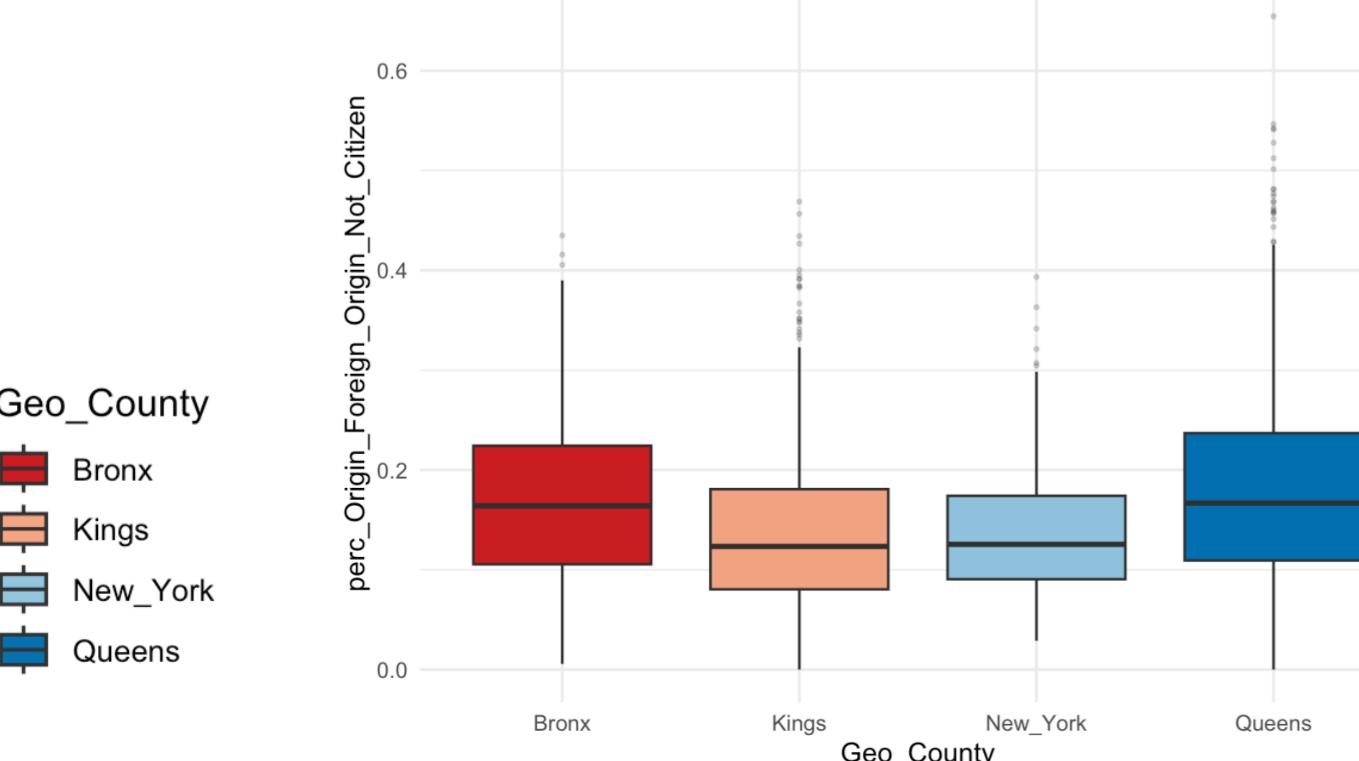
# X = FOREIGN ORIGIN: US CITIZEN & NON-CITIZEN

Bronx	Kings
New York	Queens

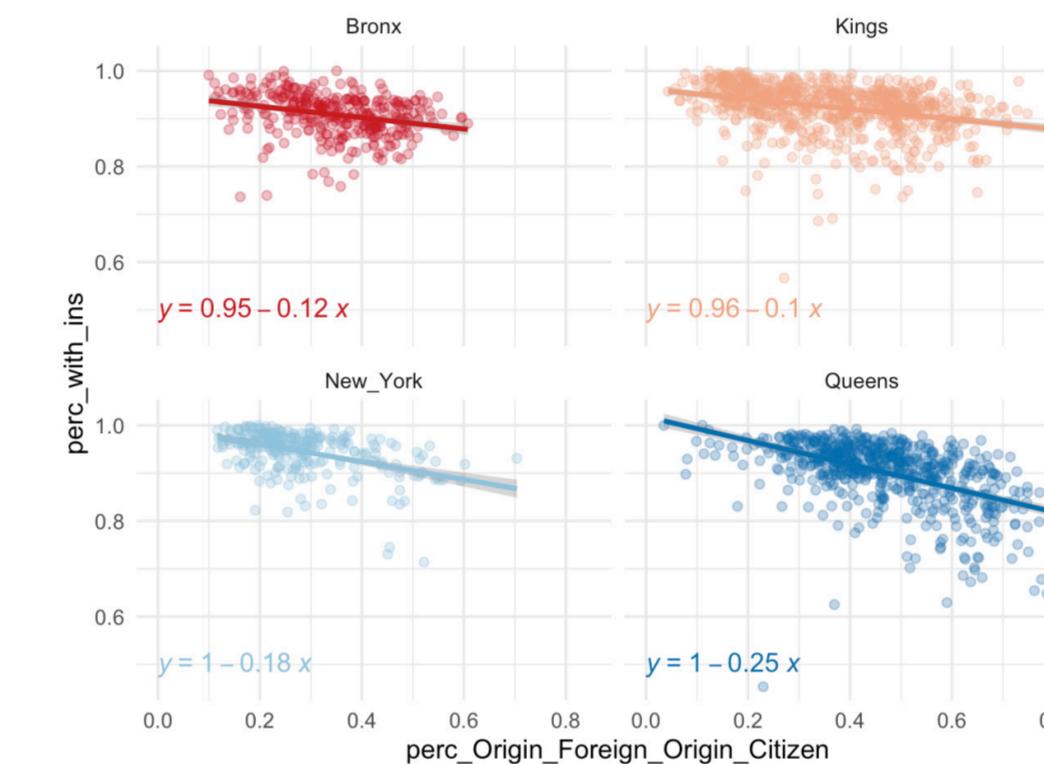
Distribution of Foreign Origin Citizen Population % in Each County



Distribution of Foreign Origin Not Citizen Population % in Each County

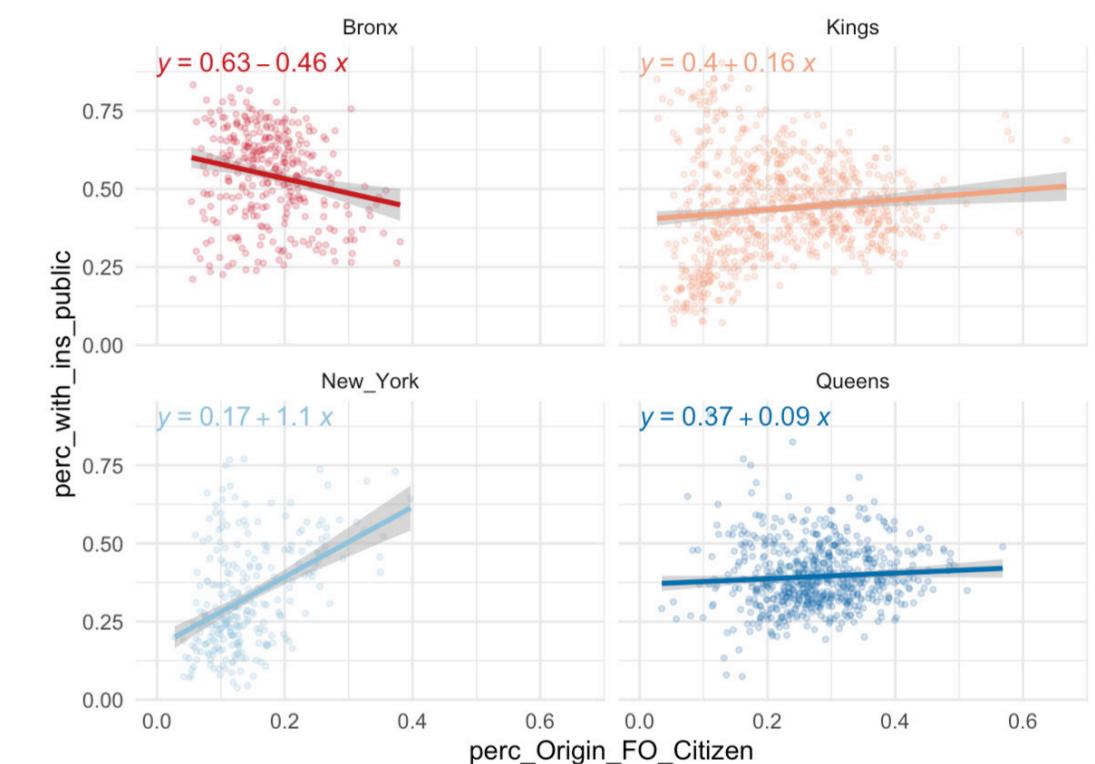


Foreign Origin US Citizen

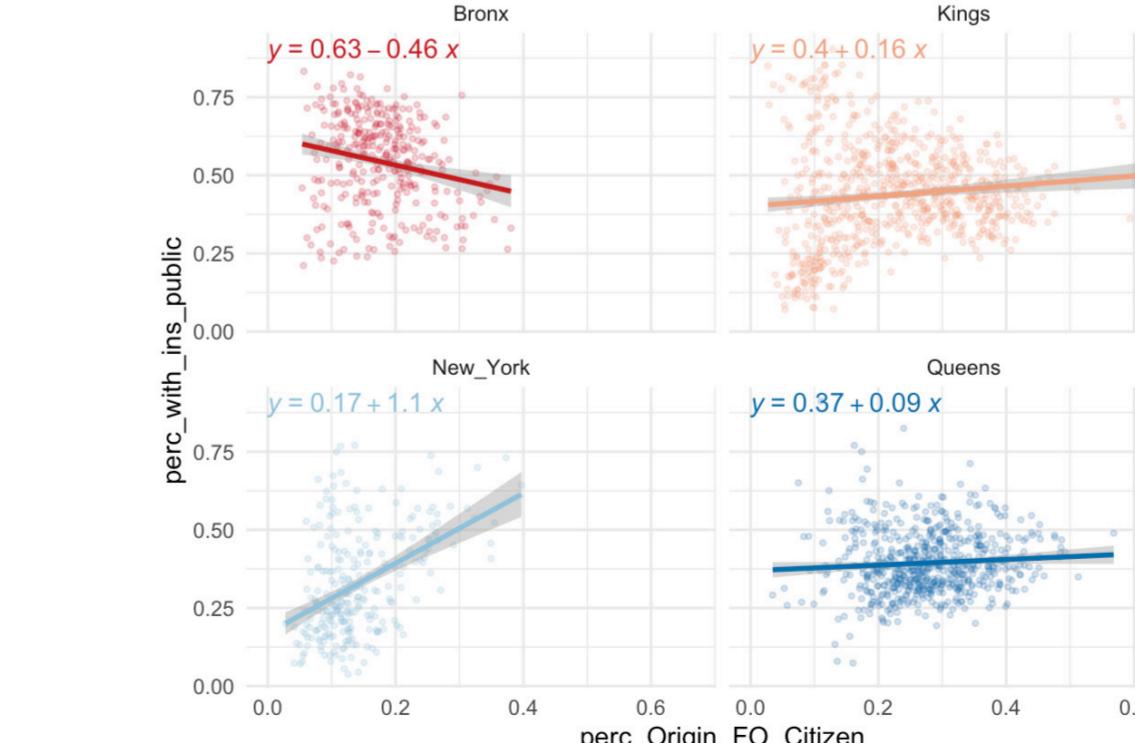


$$\% \text{ population with health insurance} = a * \text{foreign origin citizen} + b$$

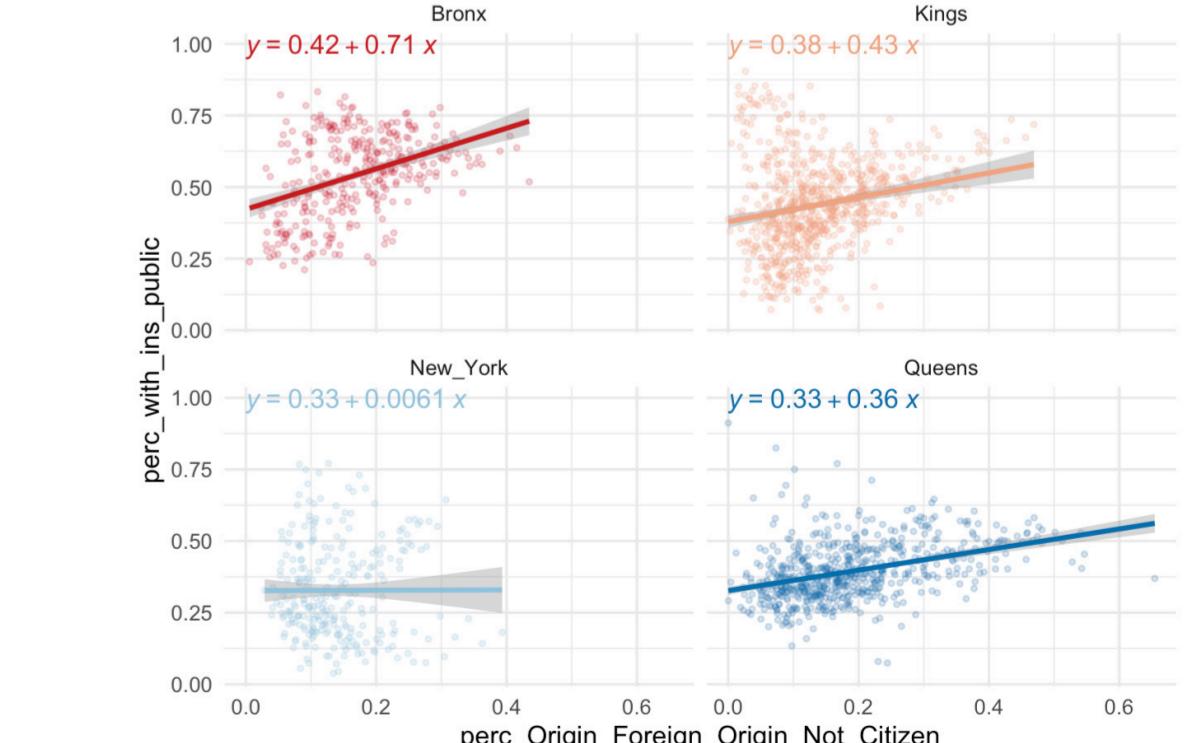
Foreign Origin NOT US Citizen



$$\% \text{ population with health insurance} = a * \text{foreign origin not citizen} + b$$



$$\% \text{ population with public health insurance} = a * \text{foreign origin citizen} + b$$



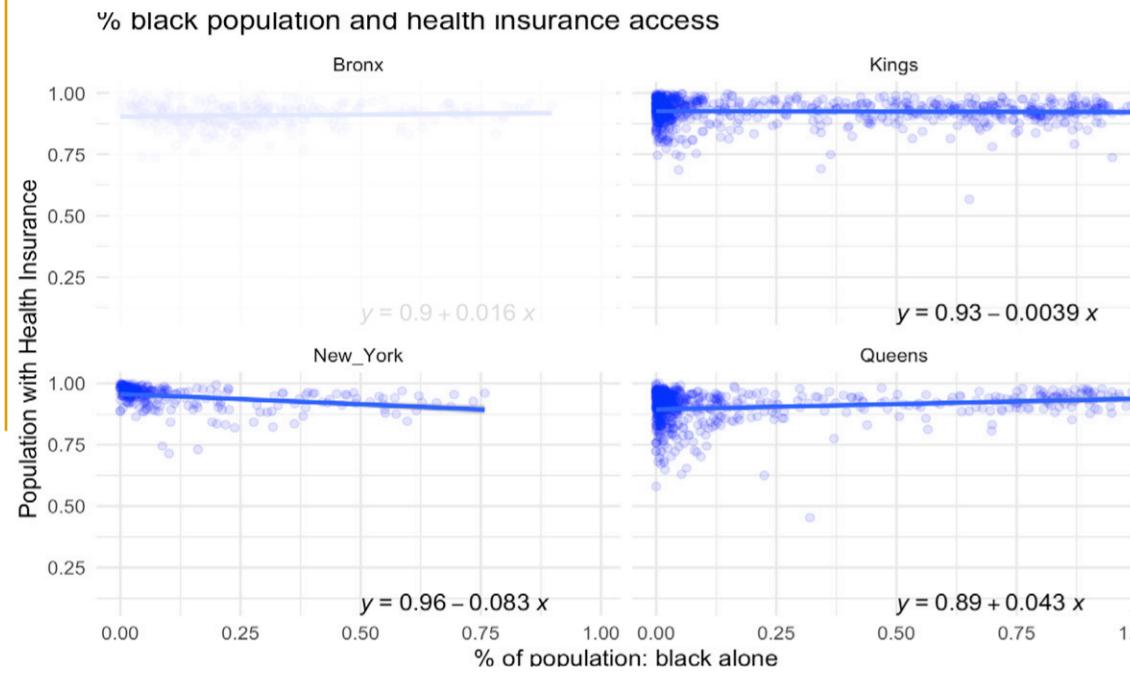
$$\% \text{ population with public health insurance} = a * \text{foreign origin not citizen} + b$$

# X = % POPULATION: RACE

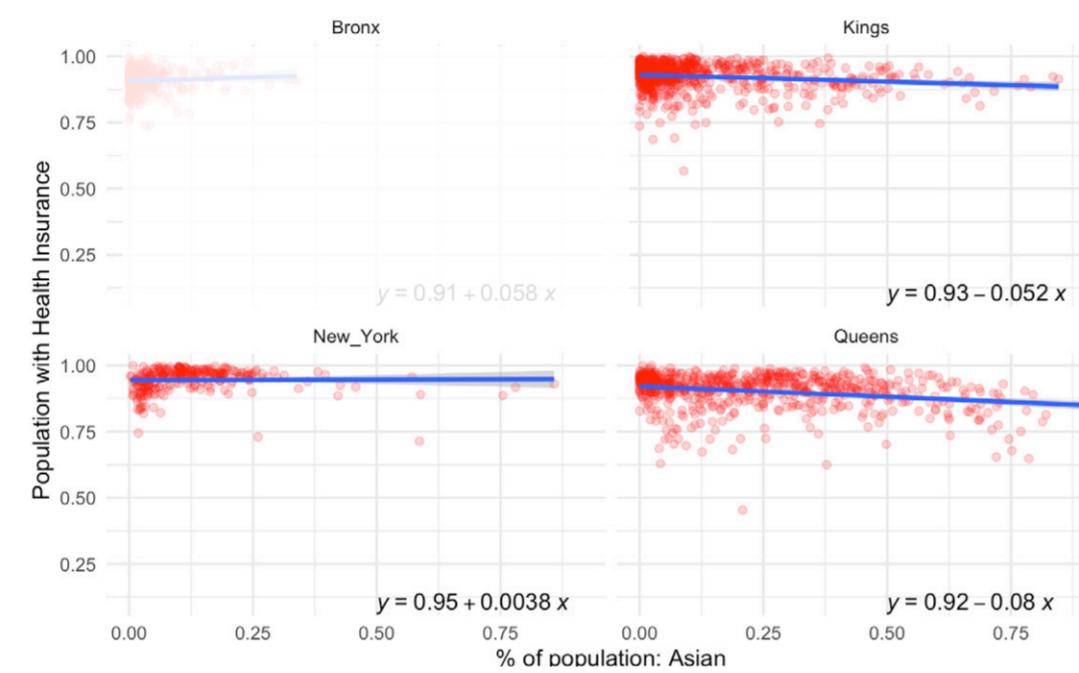
Bronx	Kings
New York	Queens

Variable: Race

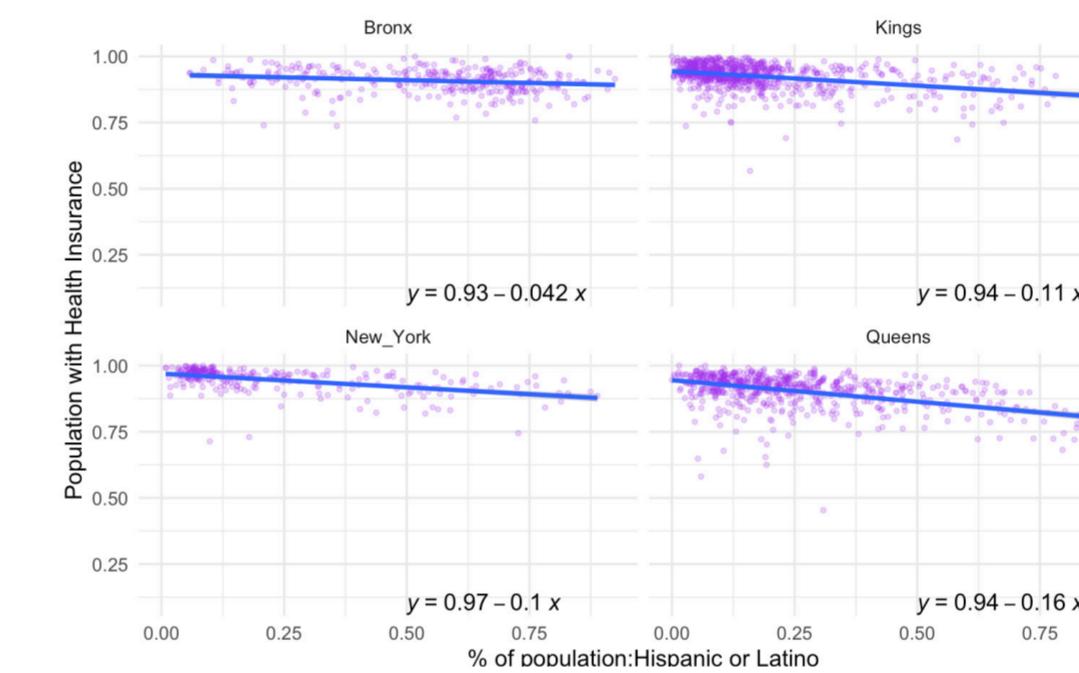
Black



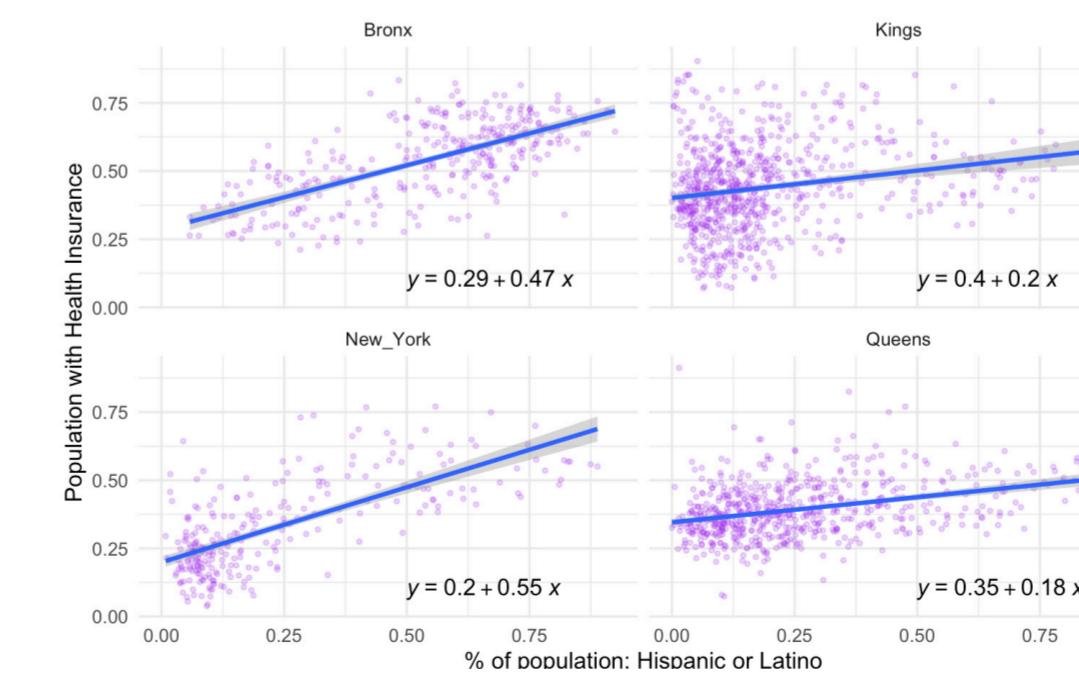
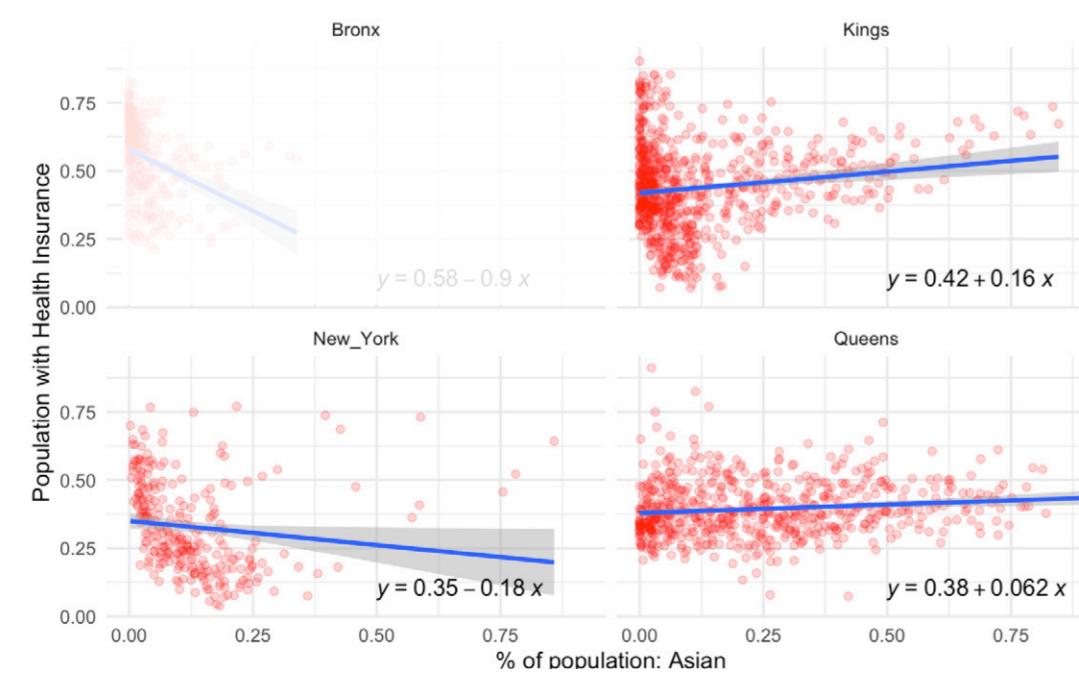
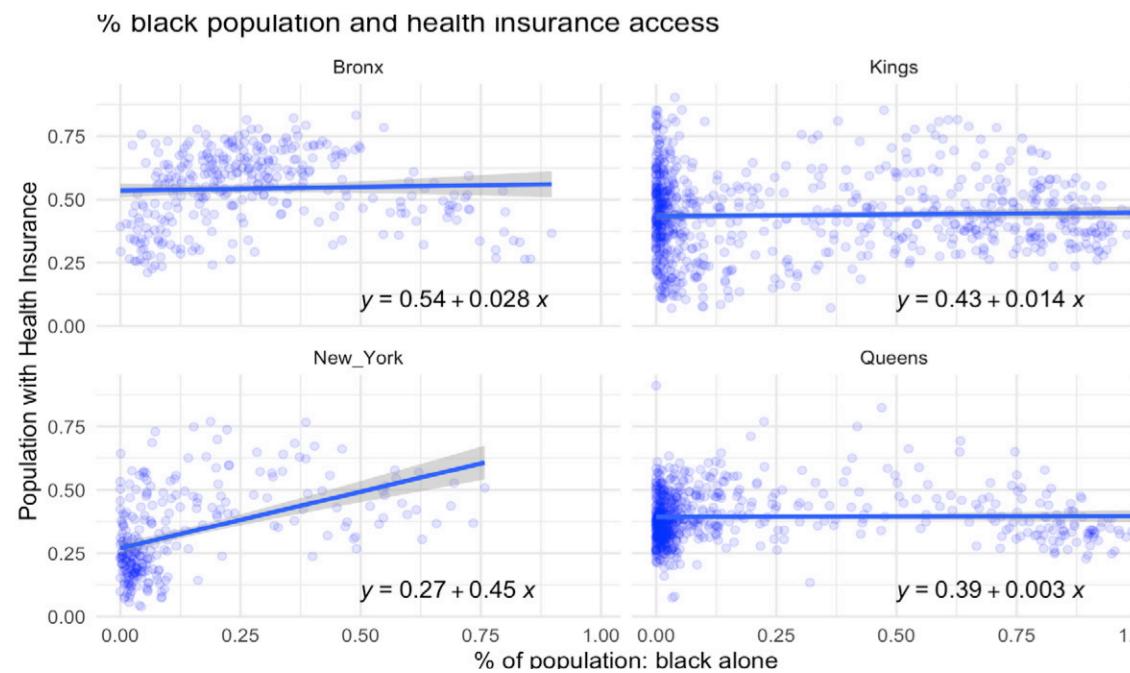
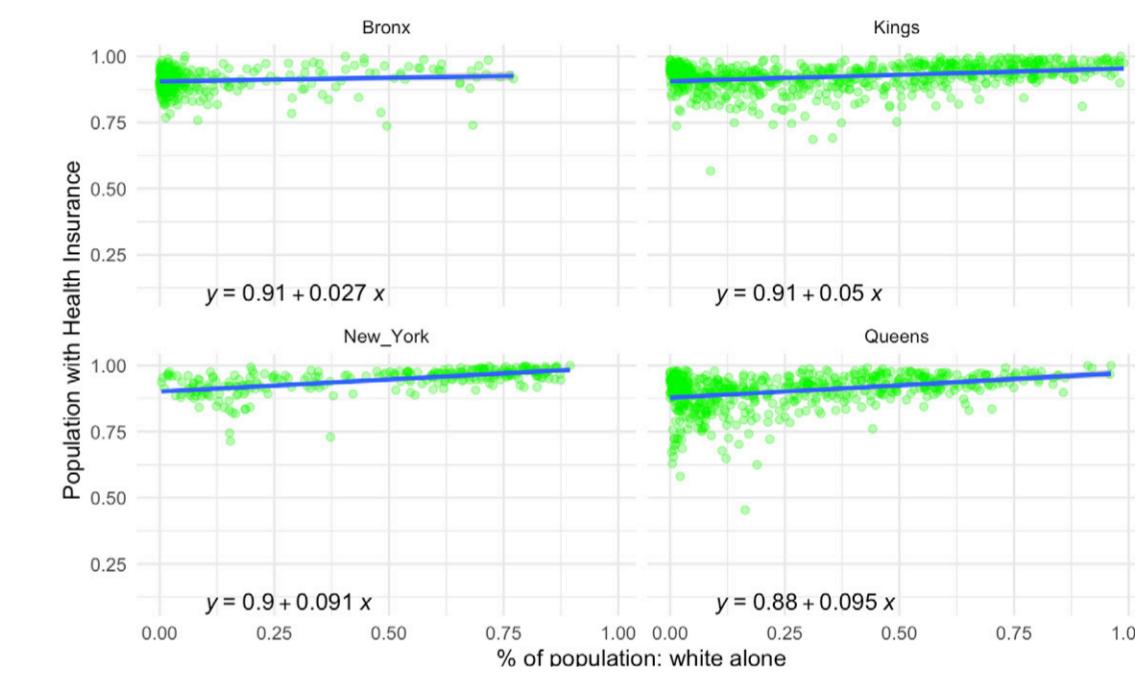
Asian



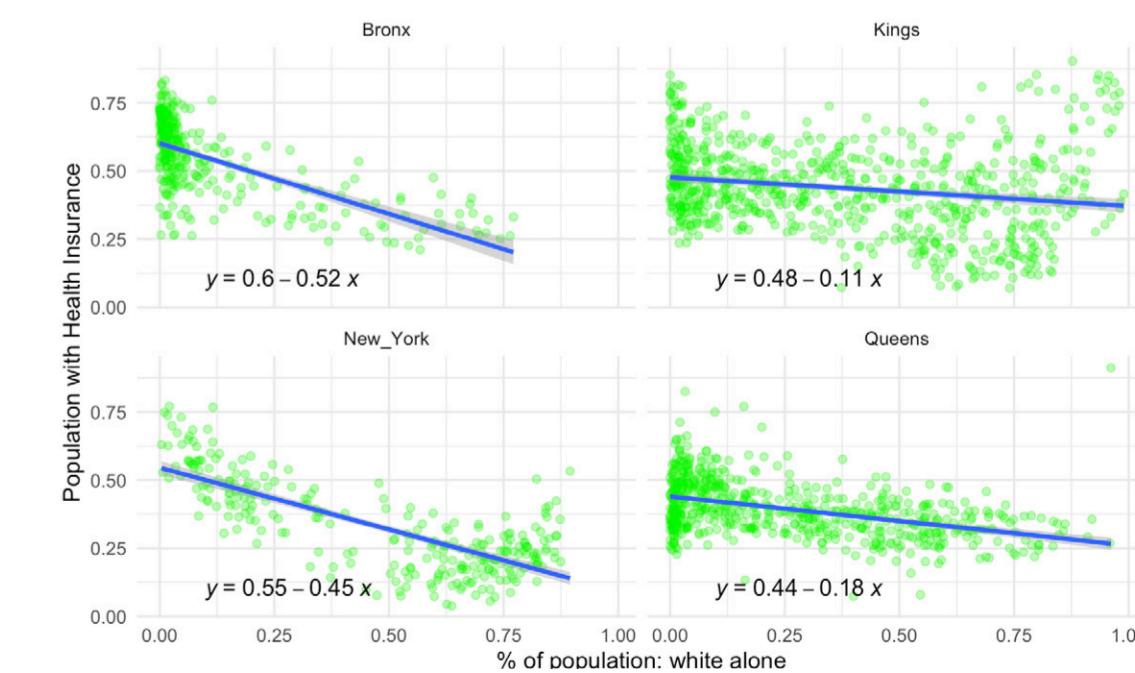
Hispanic/Latino



White



$$\% \text{ population with health insurance} = a * \text{race} + b$$



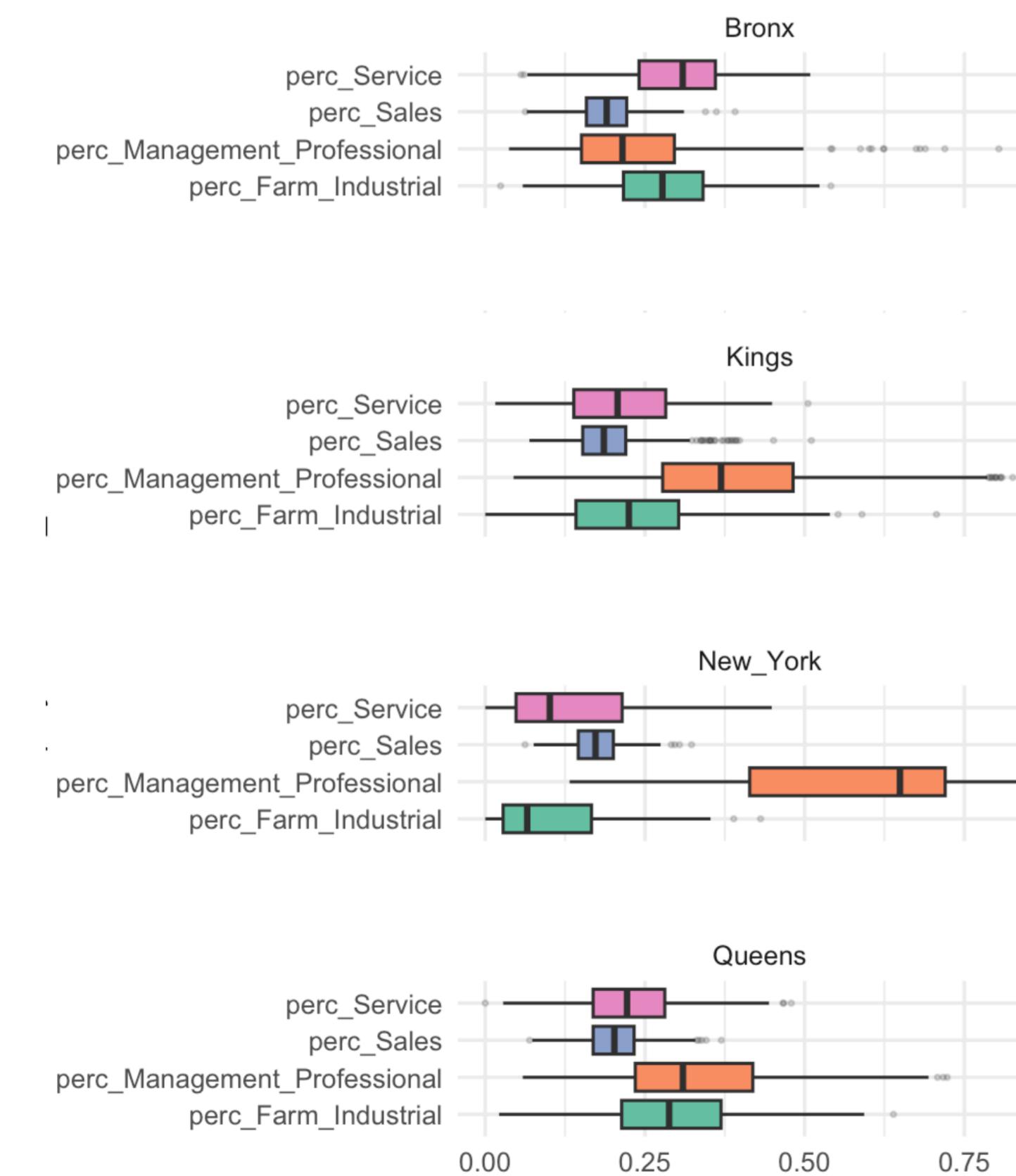
$$\% \text{ population with public health insurance} = a * \text{race} + b$$

# X = EMPLOYMENT SECTOR

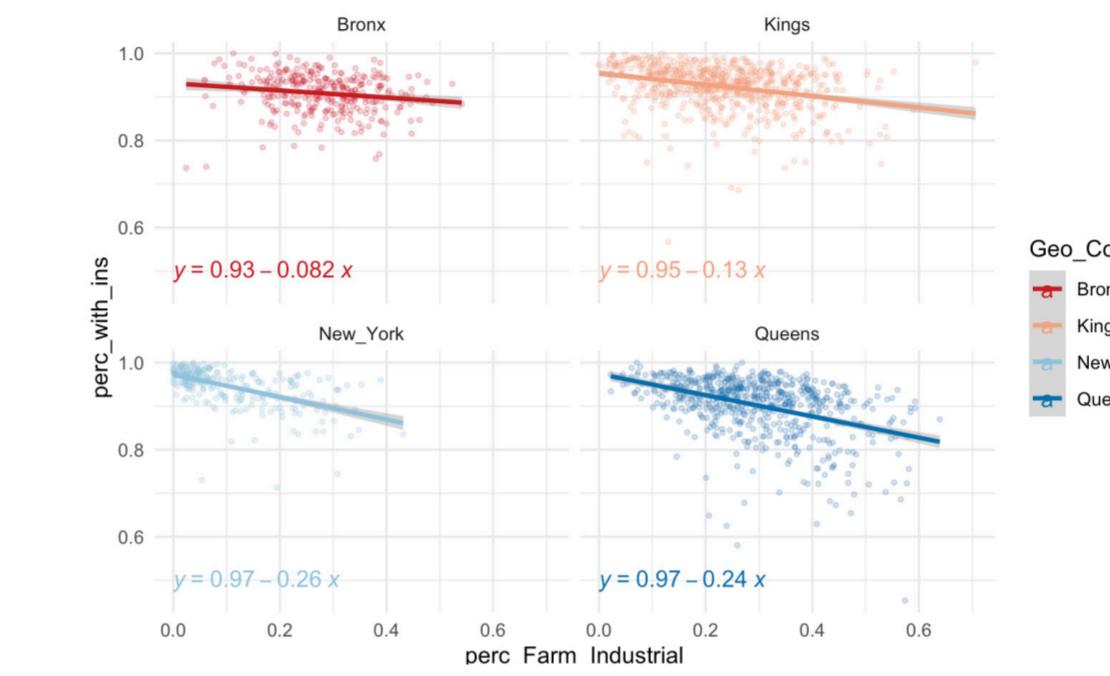
Bronx	Kings
New York	Queens

Variable: Employment

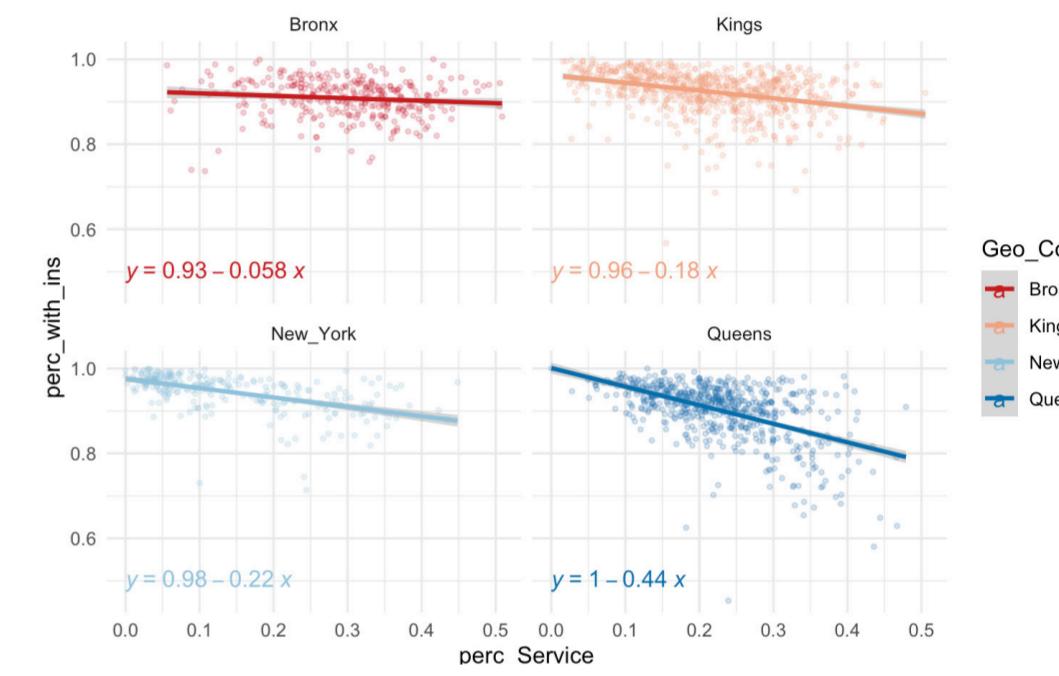
## Distribution of Employment Sectors as % of Population in Each County



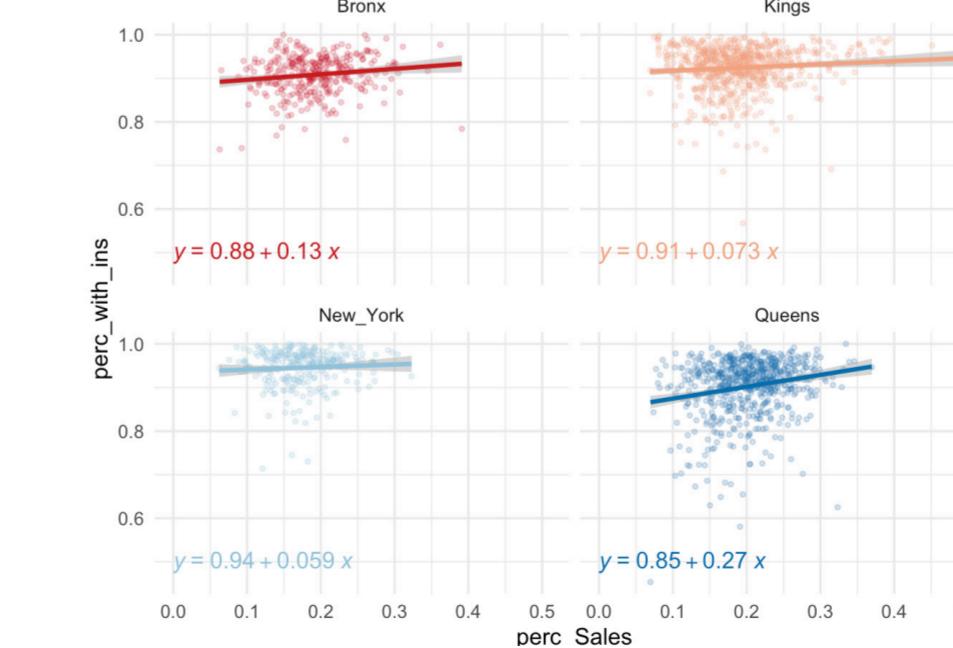
## Farm & Industrial



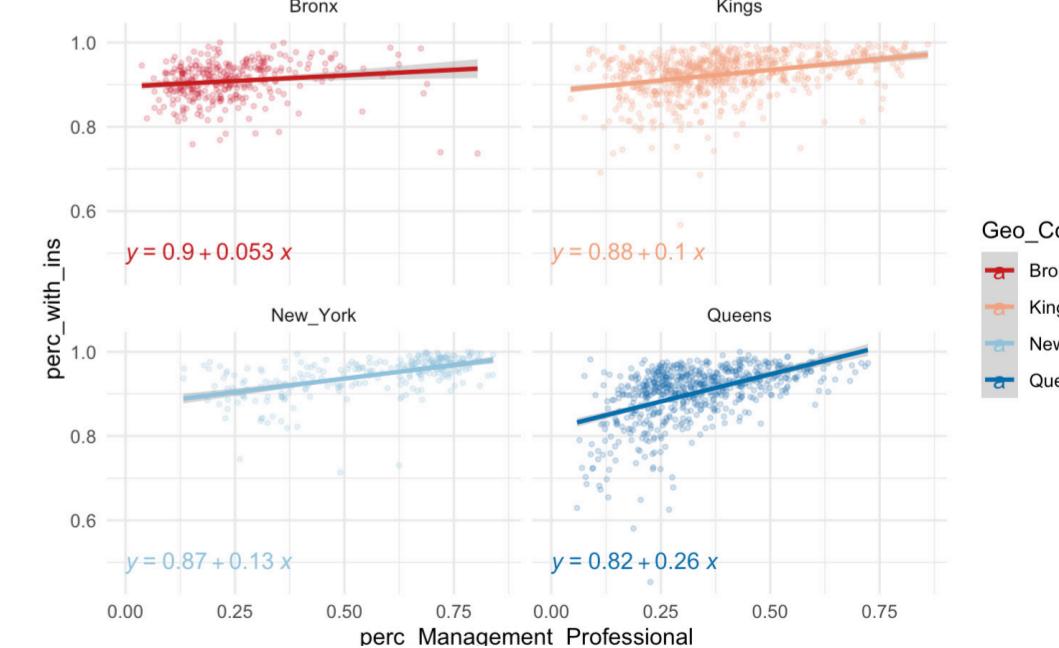
## Service



## Sales



## Management



$$\% \text{ population with public health insurance} = a * \text{employment\_sector} + b$$

# MULTIVARIATE LINEAR MODEL

Insurance (all)

Y = % population with health insurance  
-public and private

	(1)	(2)	(3)	(4)
perc_Pop_Black	-0.042*** (0.005)	-0.032*** (0.005)	-0.025*** (0.005)	-0.008 (0.005)
perc_Pop_Asian	-0.128*** (0.007)	-0.117*** (0.008)	-0.111*** (0.008)	-0.035*** (0.010)
perc_Pop_Hispanic_Latino	-0.120*** (0.005)	-0.100*** (0.007)	-0.094*** (0.007)	-0.073*** (0.007)
perc_Pop_More_Races	0.070 (0.056)	0.051 (0.056)	0.019 (0.057)	0.052 (0.054)
perc_Pop_Other_Races	-0.023 (0.038)	-0.030 (0.038)	0.004 (0.039)	0.055 (0.038)
log(Median_Household_Income_2019)		0.013*** (0.003)	0.005 (0.004)	0.008** (0.003)
perc_Bachelor_More			0.040*** (0.012)	0.016 (0.012)
perc-Origin_Native_Born				0.122*** (0.010)
Constant	0.978*** (0.003)	0.827*** (0.033)	0.903*** (0.040)	0.774*** (0.039)
Observations	1,976	1,976	1,976	1,976
R2	0.258	0.266	0.270	0.324
Adjusted R2	0.256	0.264	0.268	0.322
Residual Std. Error	0.048 (df = 1970)	0.048 (df = 1969)	0.048 (df = 1968)	0.046 (df = 1967)
F Statistic	137.008*** (df = 5; 1970)	118.882*** (df = 6; 1969)	104.085*** (df = 7; 1968)	118.102*** (df = 8; 1967)

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

# MULTIVARIATE LINEAR MODEL

Y = % population with  
public health insurance

	(1)	(2)	(3)	(4)
perc_Pop_Black	0.156*** (0.012)	-0.039*** (0.009)	-0.075*** (0.009)	-0.072*** (0.010)
perc_Pop_Asian	0.167*** (0.020)	-0.048*** (0.014)	-0.078*** (0.014)	-0.068*** (0.018)
perc_Pop_Hispanic_Latino	0.364*** (0.014)	-0.031** (0.012)	-0.061*** (0.012)	-0.059*** (0.013)
perc_Pop_More_Races	-0.821*** (0.150)	-0.450*** (0.099)	-0.296*** (0.098)	-0.292*** (0.098)
perc_Pop_Other_Races	0.127 (0.101)	0.252*** (0.067)	0.086 (0.068)	0.092 (0.068)
log(Median_Household_Income_2019)		-0.246*** (0.005)	-0.207*** (0.006)	-0.206*** (0.006)
perc_Bachelor_More			-0.196*** (0.021)	-0.199*** (0.021)
perc_Origin_Native_Born				0.015 (0.018)
Constant	0.279*** (0.009)	3.213*** (0.058)	2.846*** (0.069)	2.829*** (0.071)
Observations	1,976	1,976	1,976	1,976
R2	0.304	0.698	0.711	0.711
Adjusted R2	0.303	0.697	0.710	0.710
Residual Std. Error	0.129 (df = 1970)	0.085 (df = 1969)	0.083 (df = 1968)	0.083 (df = 1967)
F Statistic	172.424*** (df = 5; 1970)	757.295*** (df = 6; 1969)	691.492*** (df = 7; 1968)	605.083*** (df = 8; 1967)

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

In Bronx, Queens, Manhattan, King county...

# 02

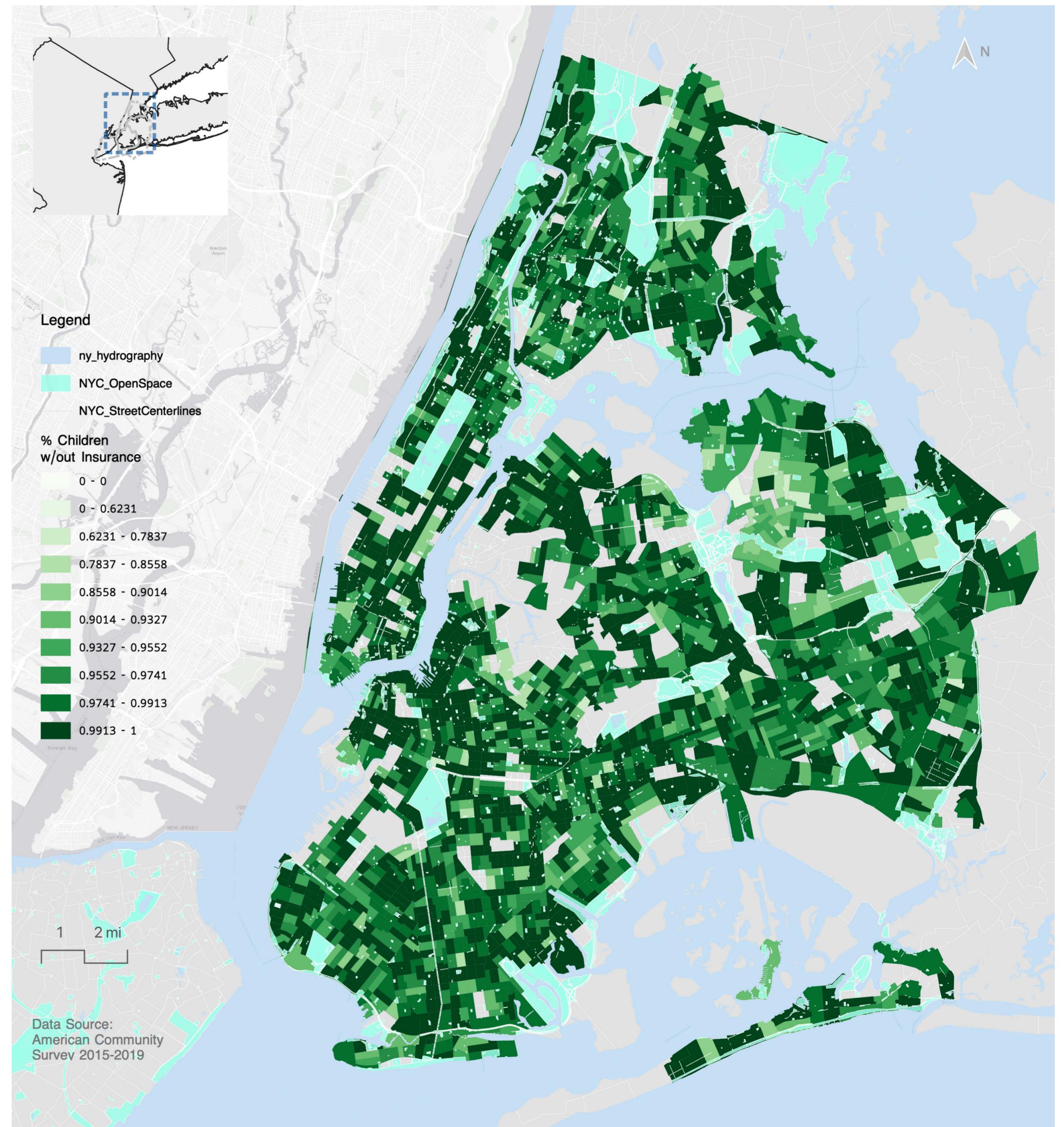
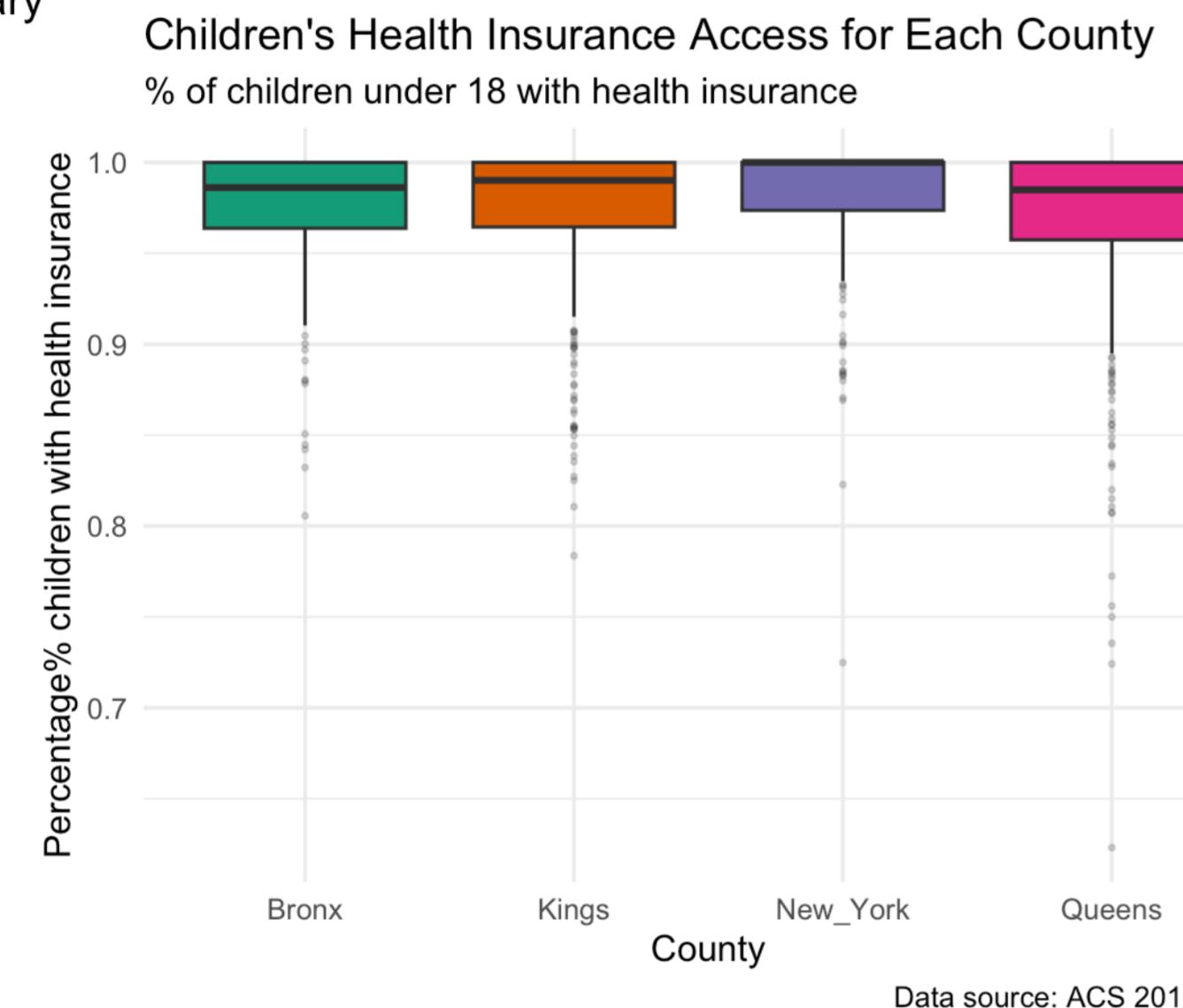
Which independent variables correlate to children's (under 18) health insurance (& public health insurance) enrollment rate ?

$$\begin{aligned} \text{\%Children with Health Insurance} &= \boxed{\text{Race}} + \boxed{\text{Household Income}} + \boxed{\text{Enrolled in School}} + \boxed{\text{Citizenship}} + \boxed{\text{Unemployed (over 16 yo)}} + \boxed{\text{Poverty}} + e \\ \text{\%Children with Public Health Insurance} &= \boxed{\text{Race}} + \boxed{\text{Household Income}} + \boxed{\text{Enrolled in School}} + \boxed{\text{Citizenship}} + \boxed{\text{Unemployed (over 16 yo)}} + \boxed{\text{Poverty}} + e \end{aligned}$$

# % CHILDREN WITH HEALTH INSURANCE

## Overview

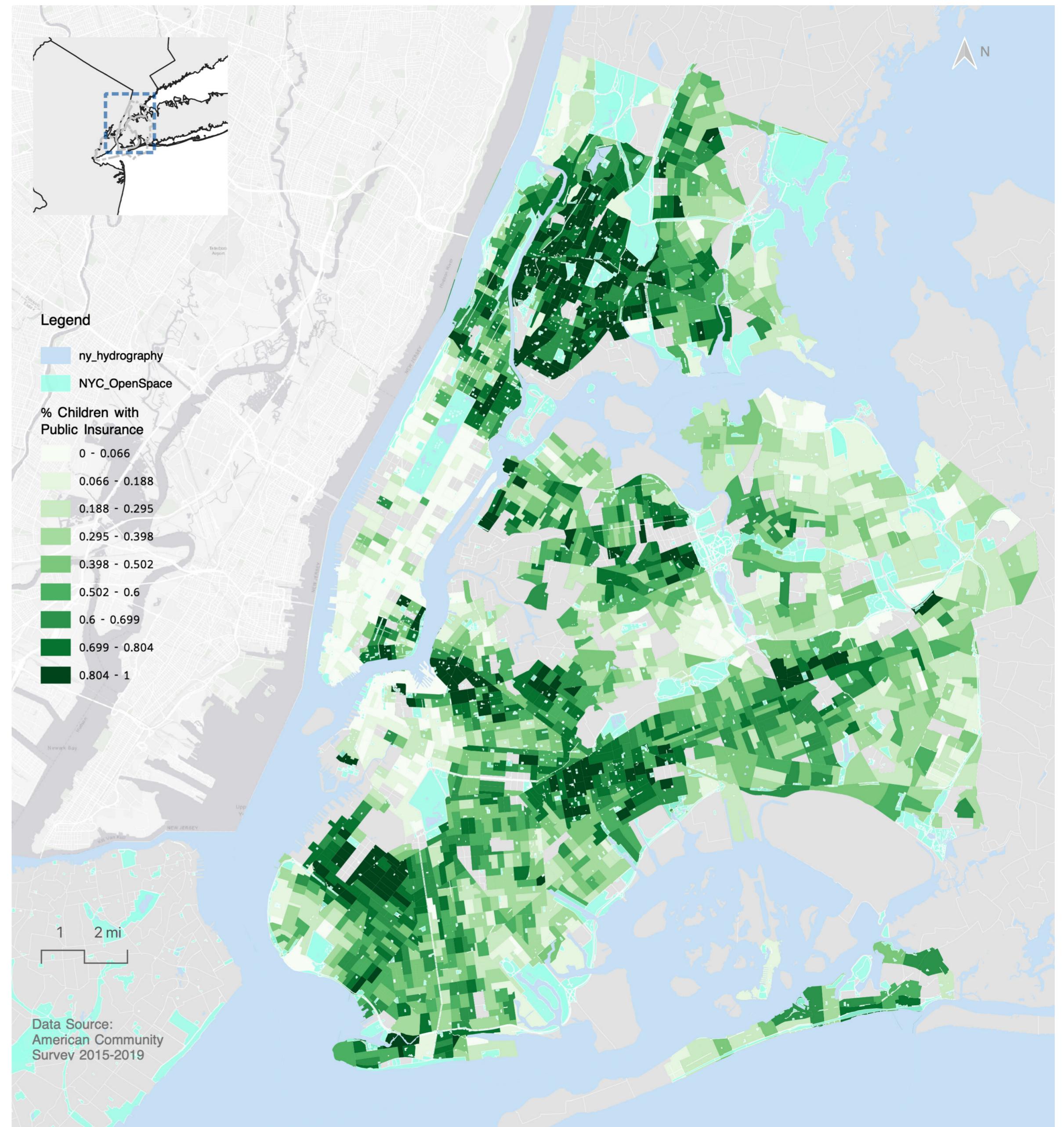
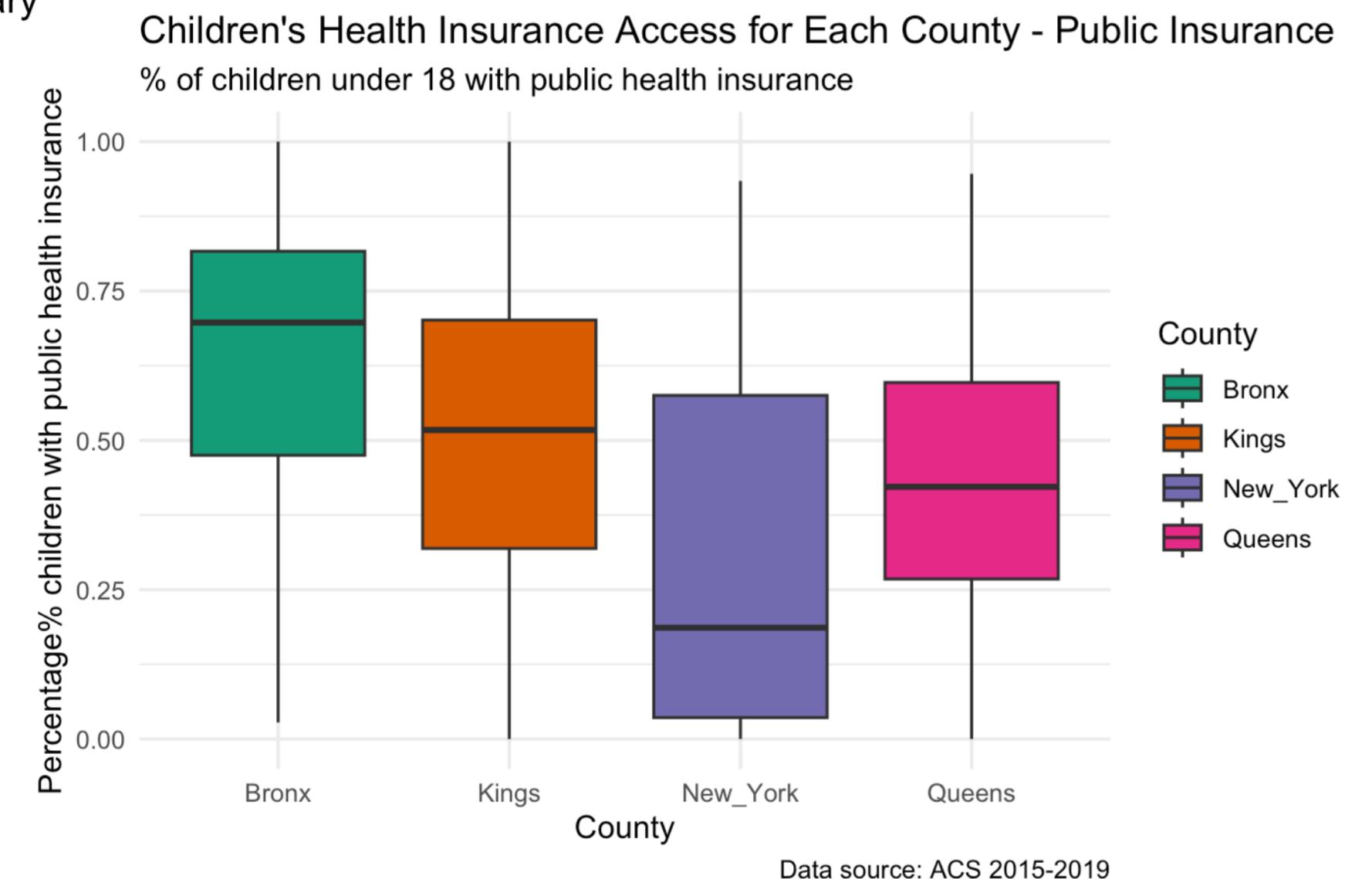
### Summary



# % CHILDREN WITH PUBLIC HEALTH INSURANCE

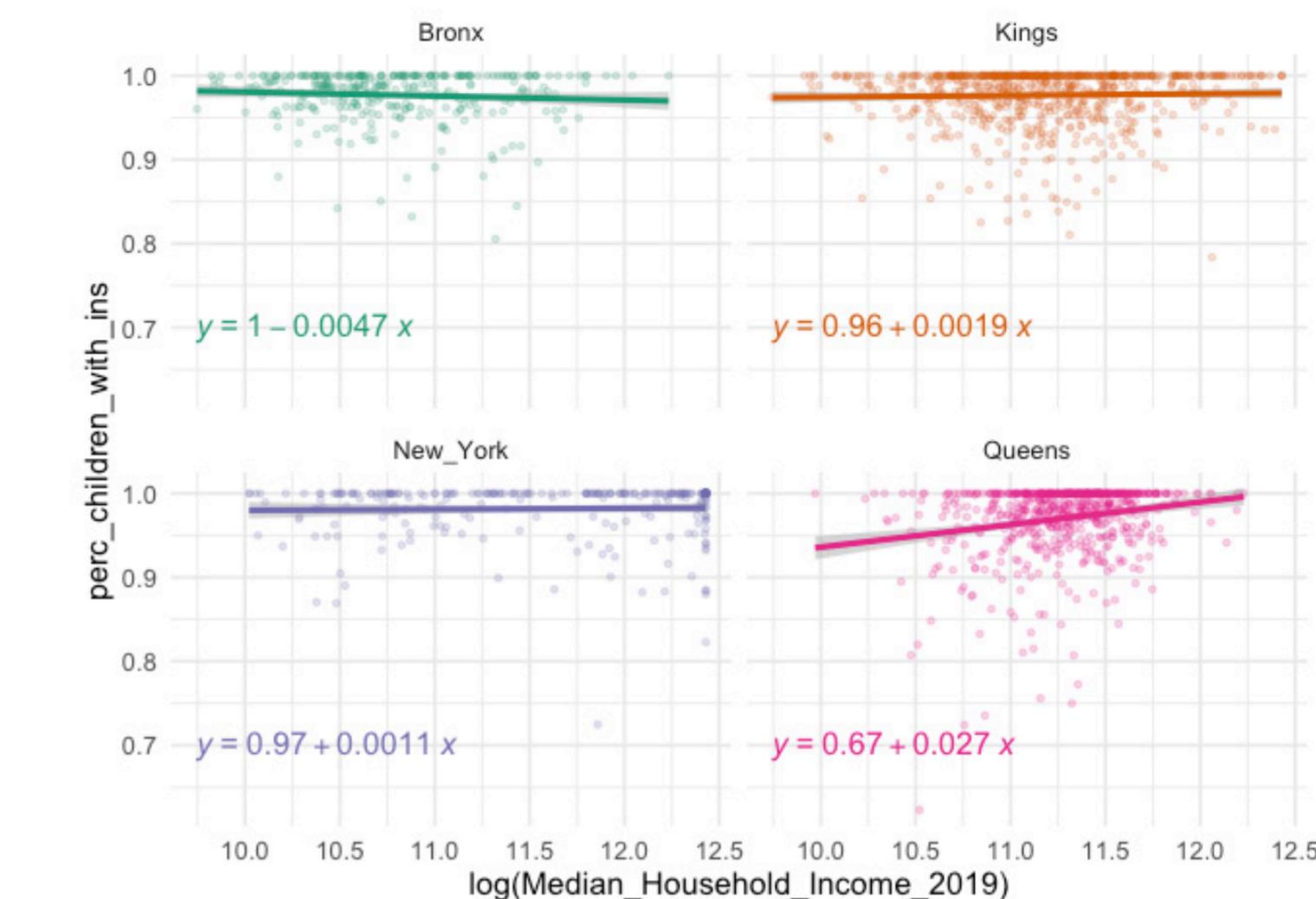
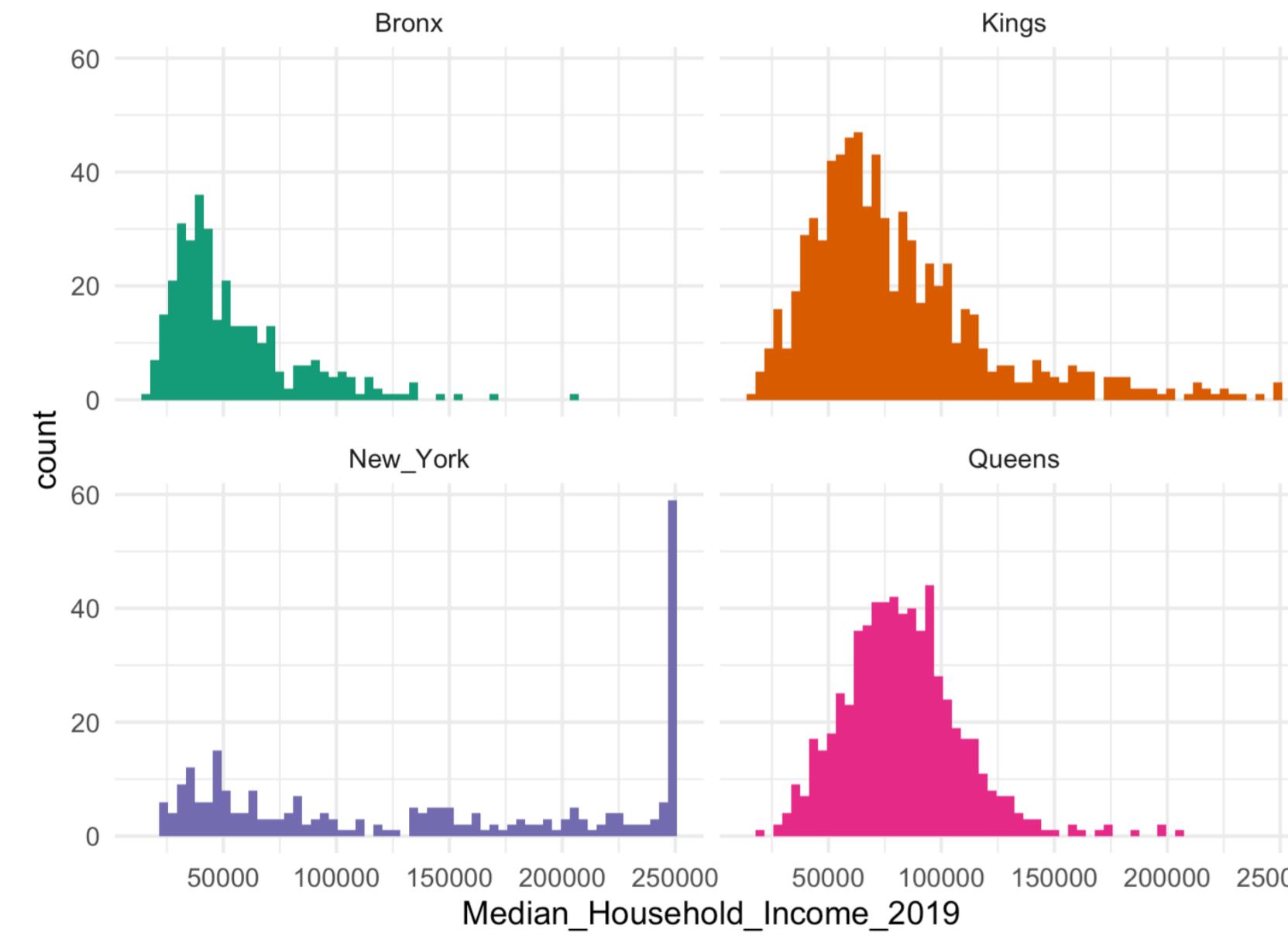
## Overview

### Summary

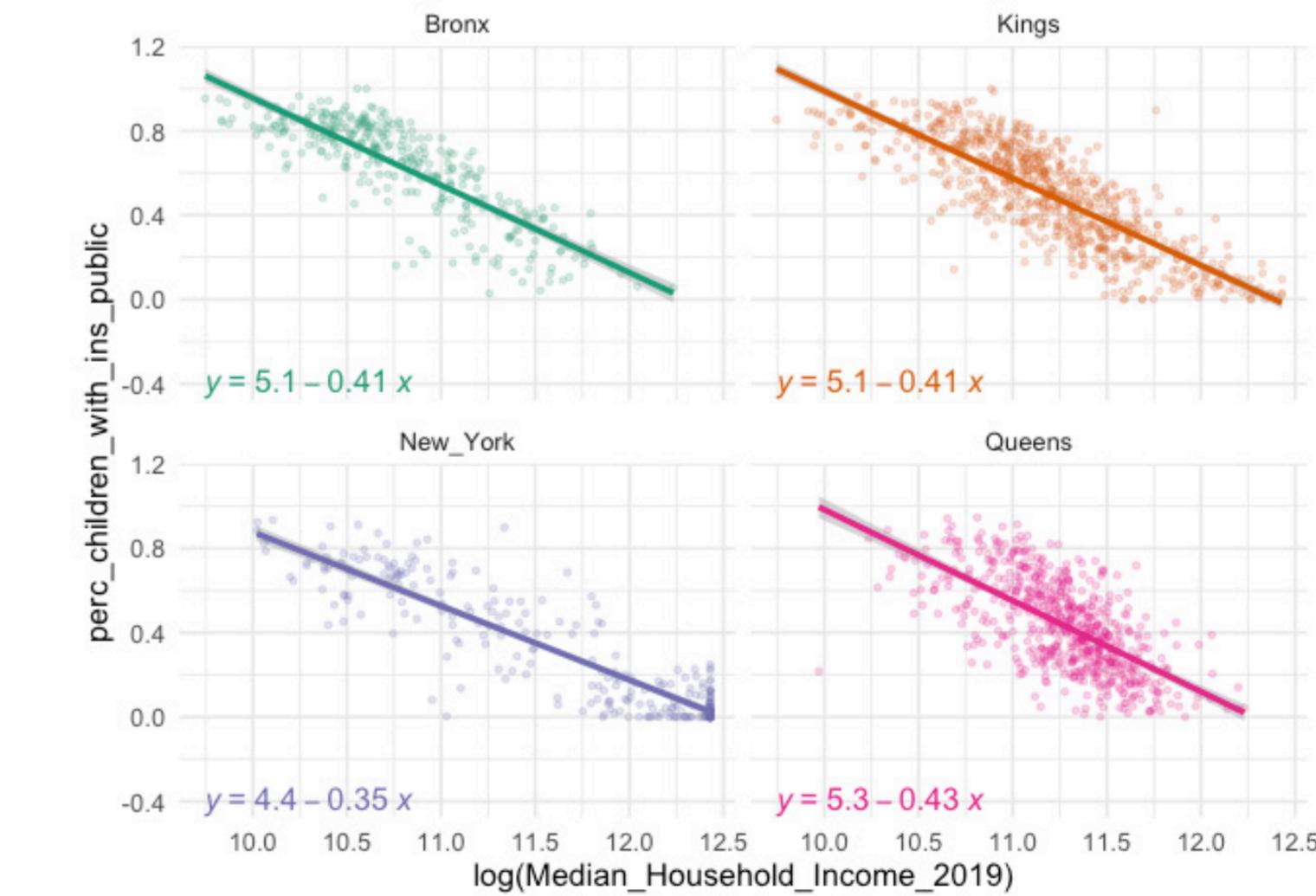


## X = MEDIAN HOUSEHOLD INCOME

Distribution of Median Household Income as % of Population in Each County



$$\% \text{ children with health insurance} = a * \text{median\_household\_income} + b$$

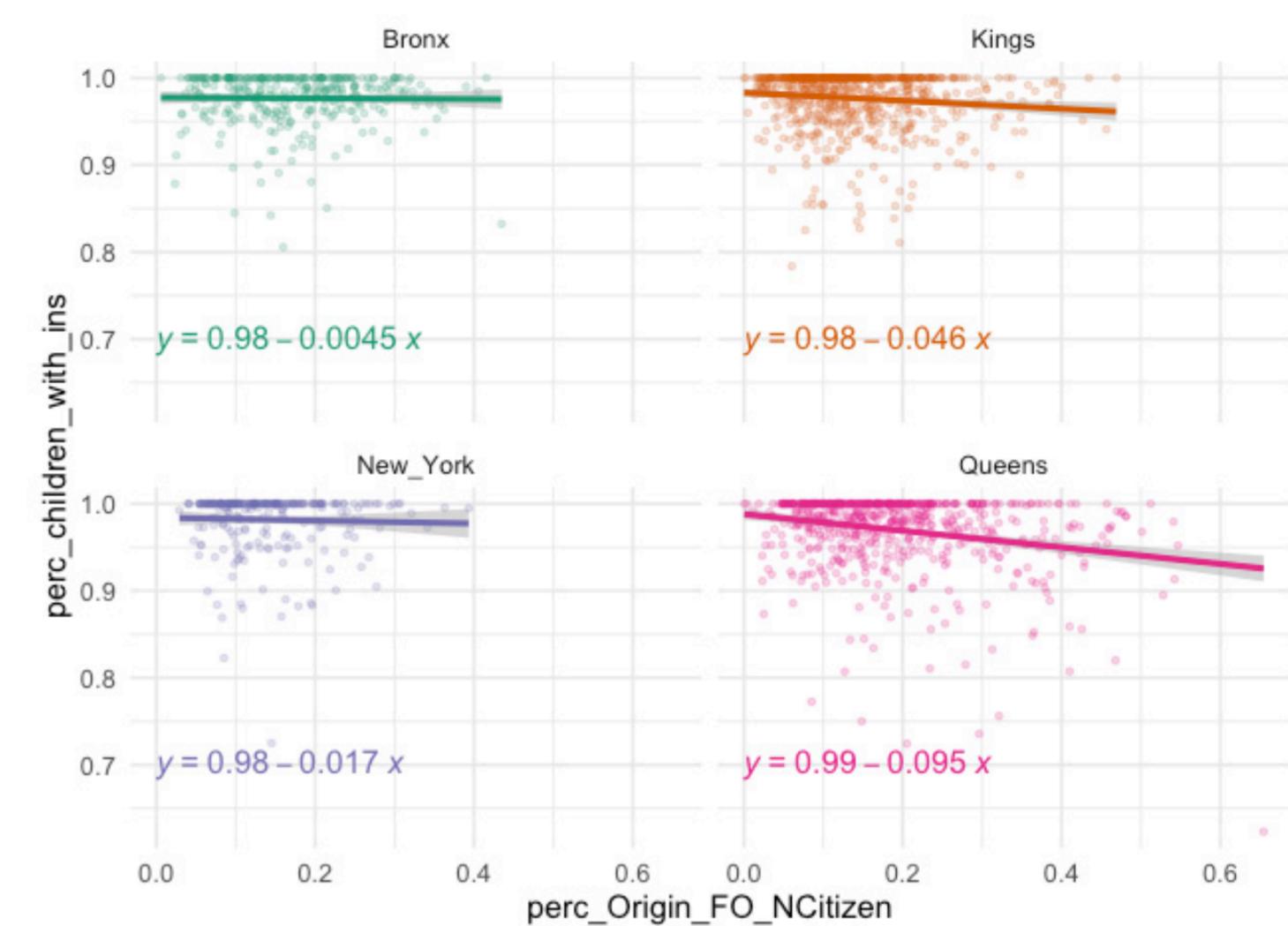
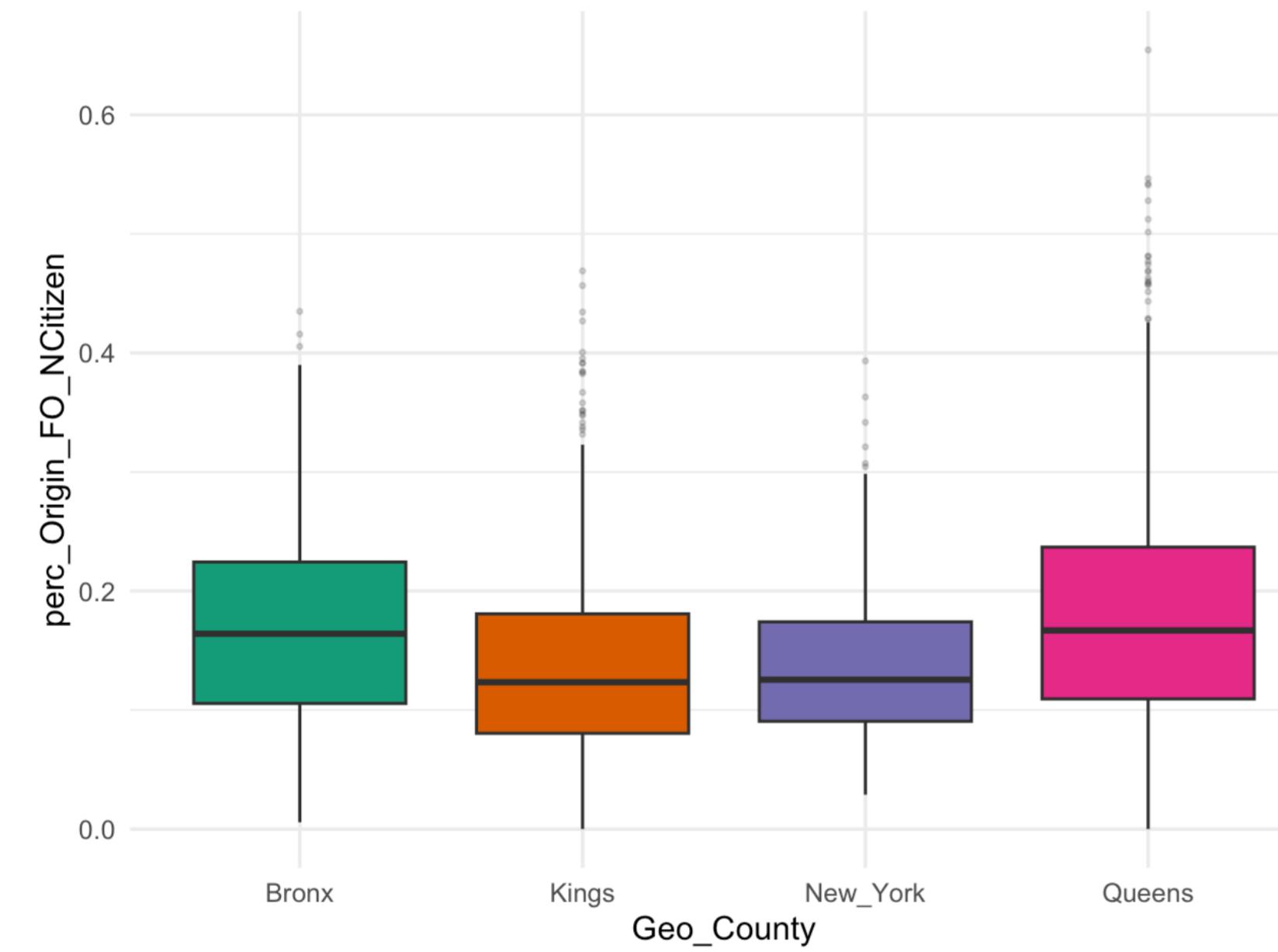


$$\% \text{ population with public health insurance} = a * \text{median\_household\_income} + b$$

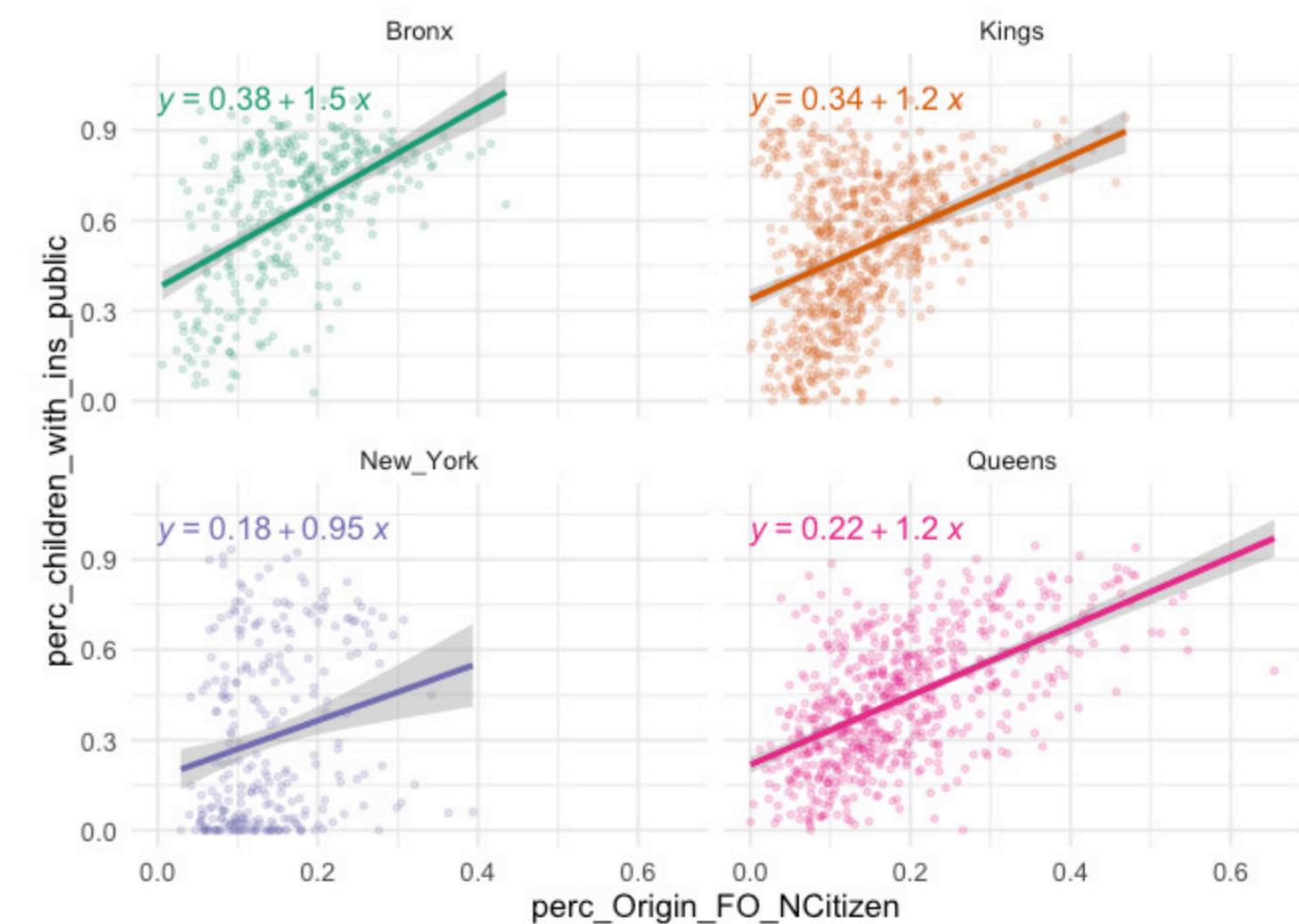
Bronx	Kings
New York	Queens

## X = % FOREIGN ORIGIN: NON-CITIZEN

Distribution of Foreign Origin Non-Citizen  
as % of Population in Each County



% children with health insurance = a\*foreign origin + b

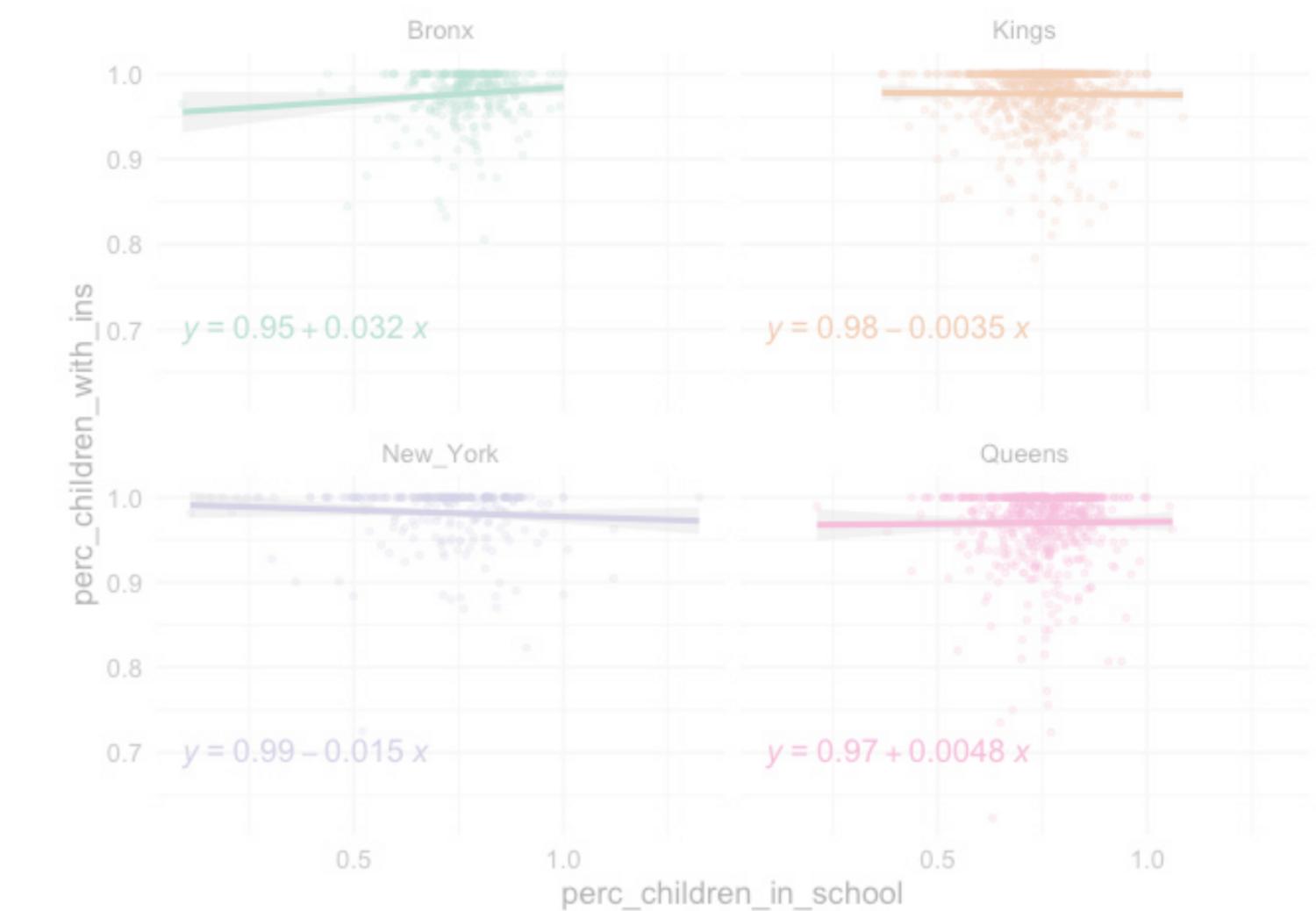
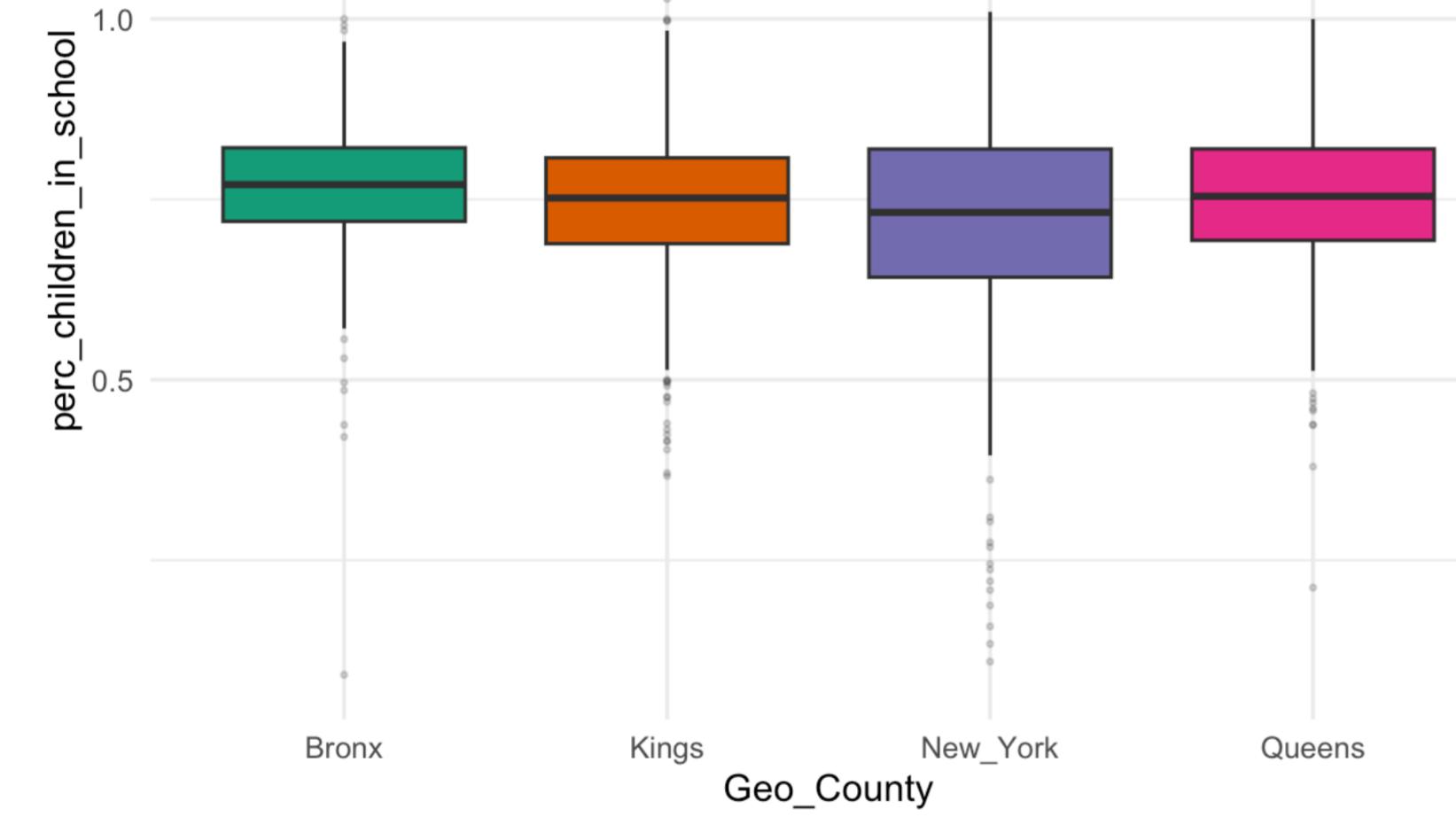


% children with public health insurance = a\*foreign origin + b

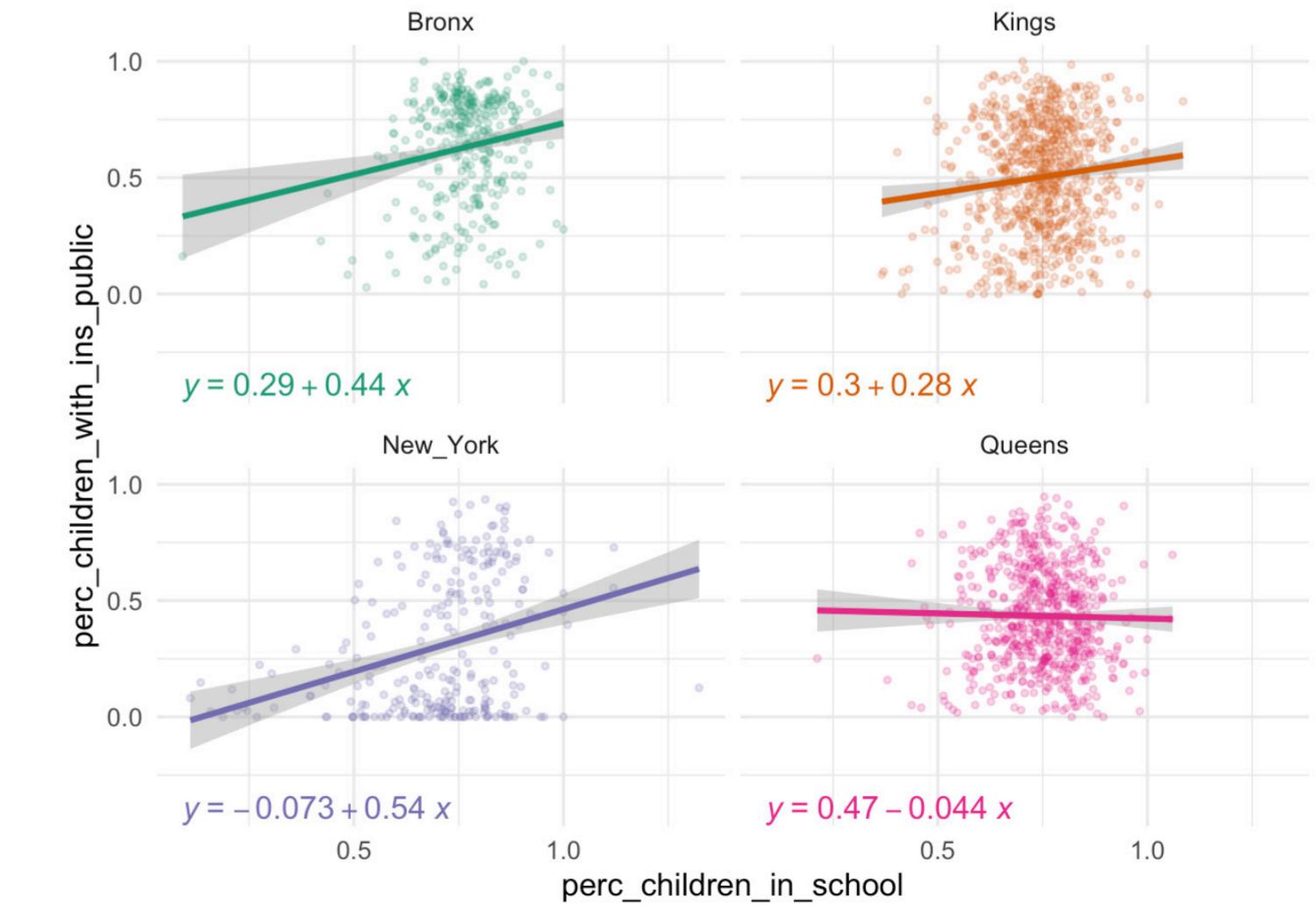
Bronx	Kings
New York	Queens

## X = % CHILDREN IN SCHOOL (UNDER 18YO)

Distribution of Children in School as % of Population under 18yo in Each County



NO SIGNIFICANT : % population with health insurance =  
*a\*children in school+ b*

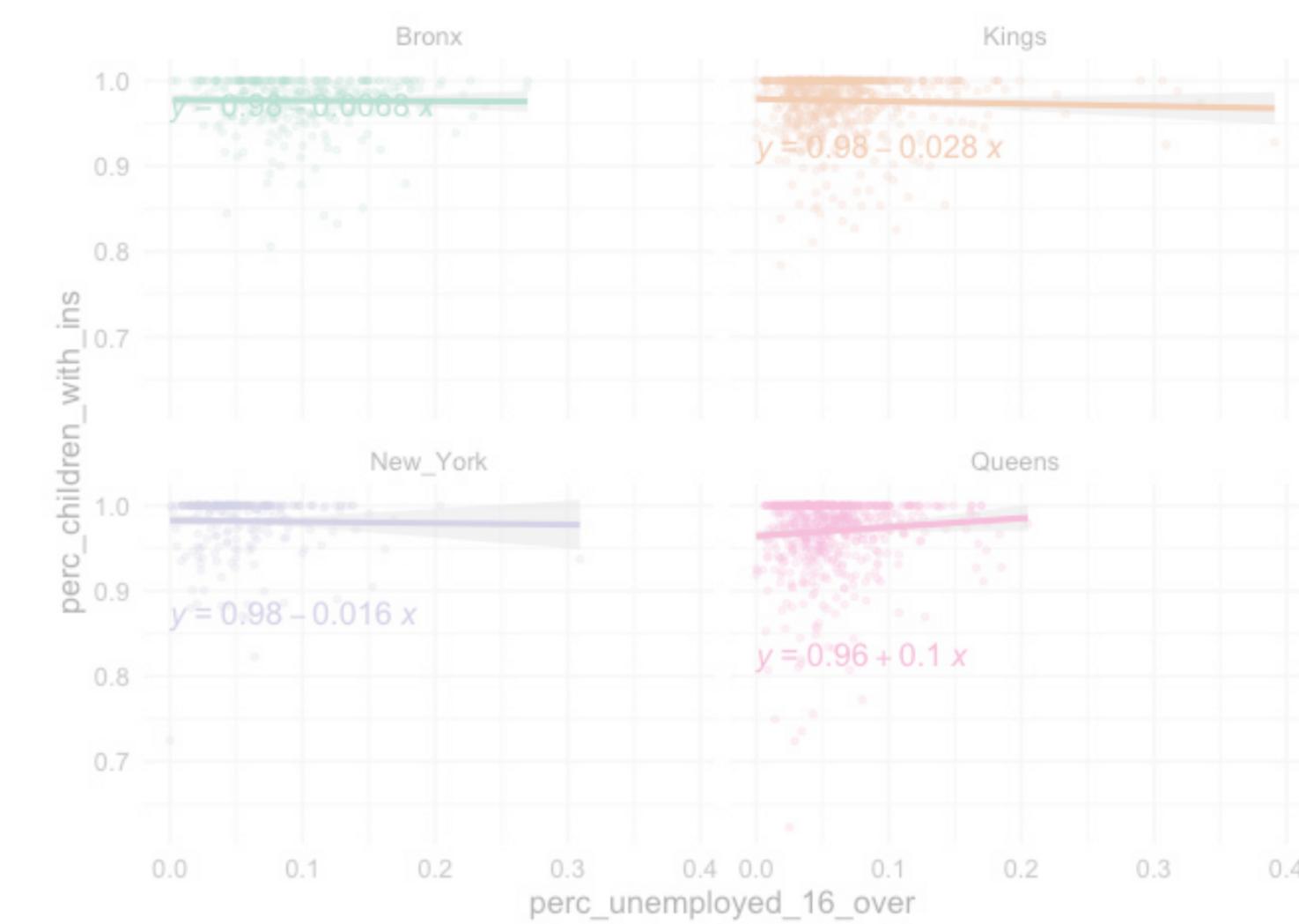
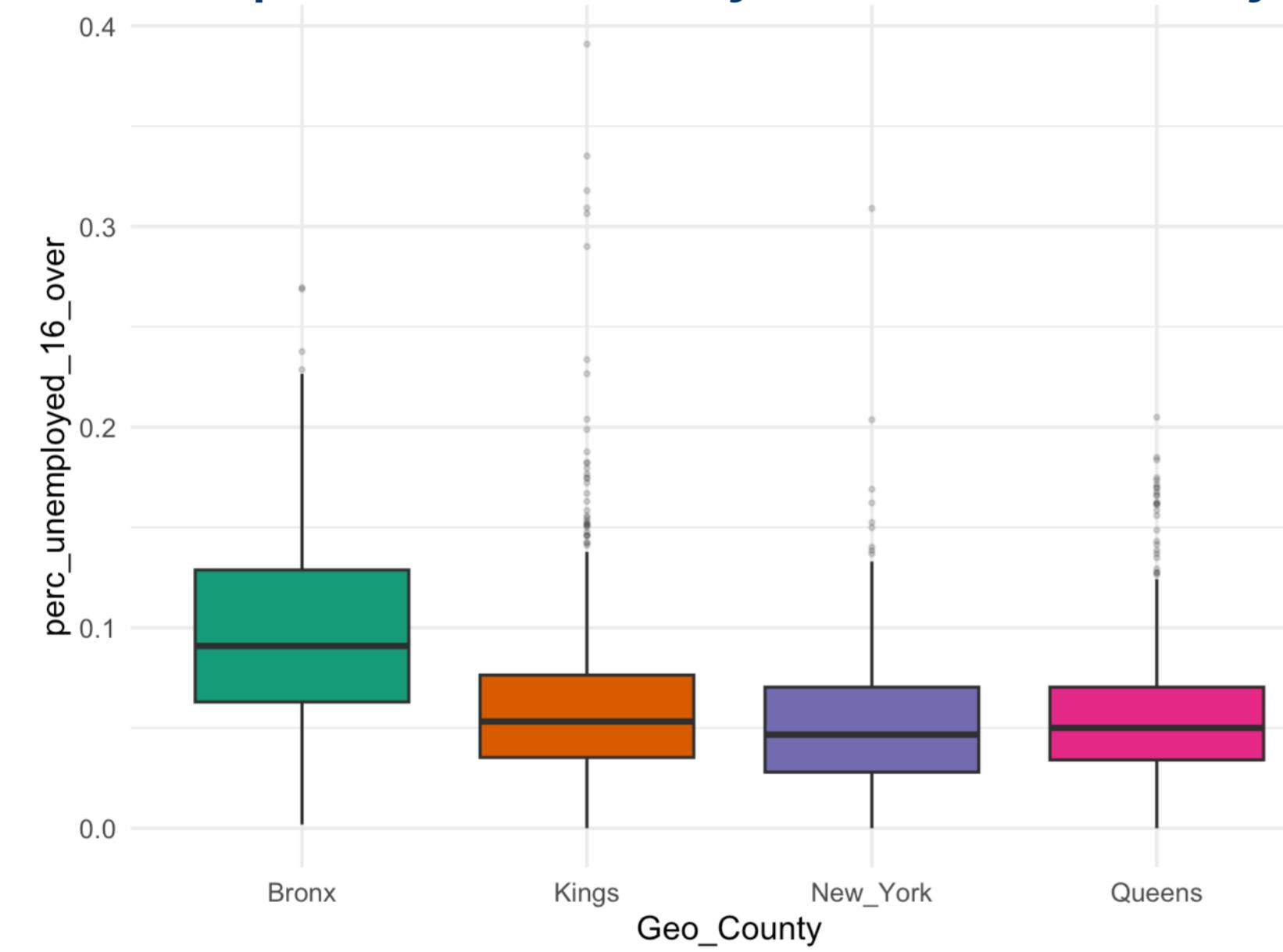


% population with public health insurance =  
*a\*children in school + b*

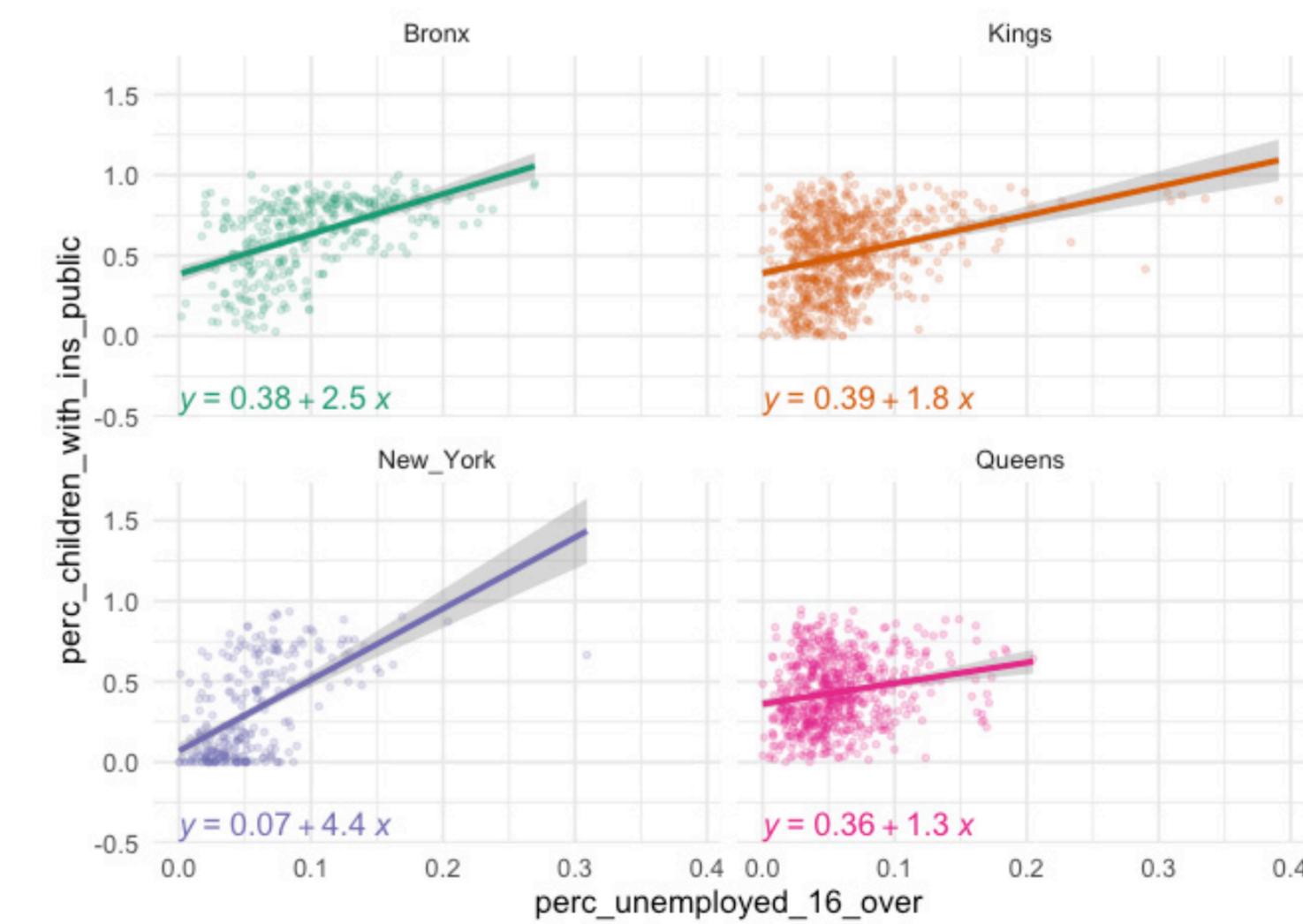
Bronx	Kings
New_York	Queens

## X = % UNEMPLOYED OF POPULATION OVER 16

Distribution of Unemployment as % of Population over 16yo in Each County



**NOT SIGNIFICANT: % children with health insurance = a\*unemployment+ b**



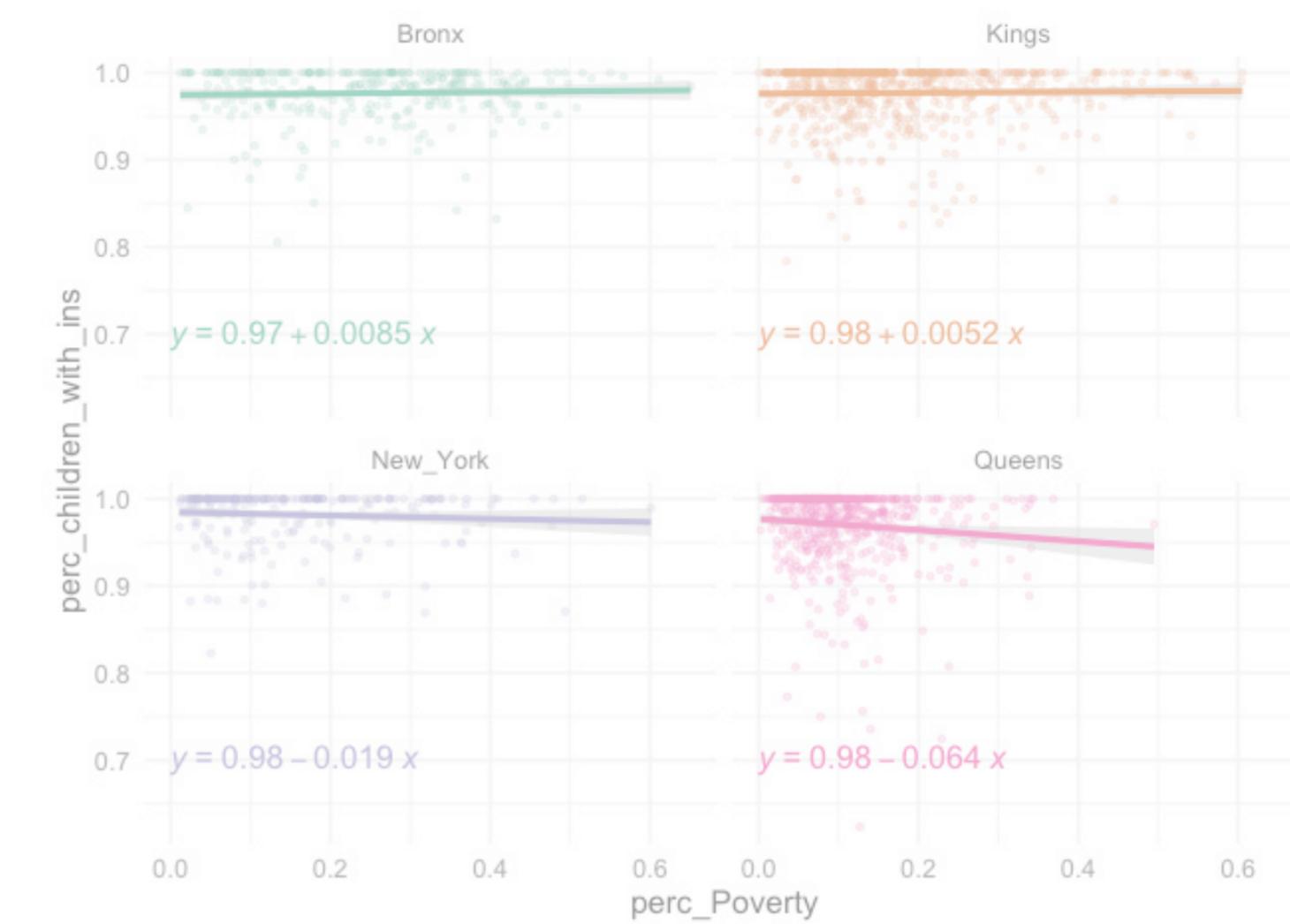
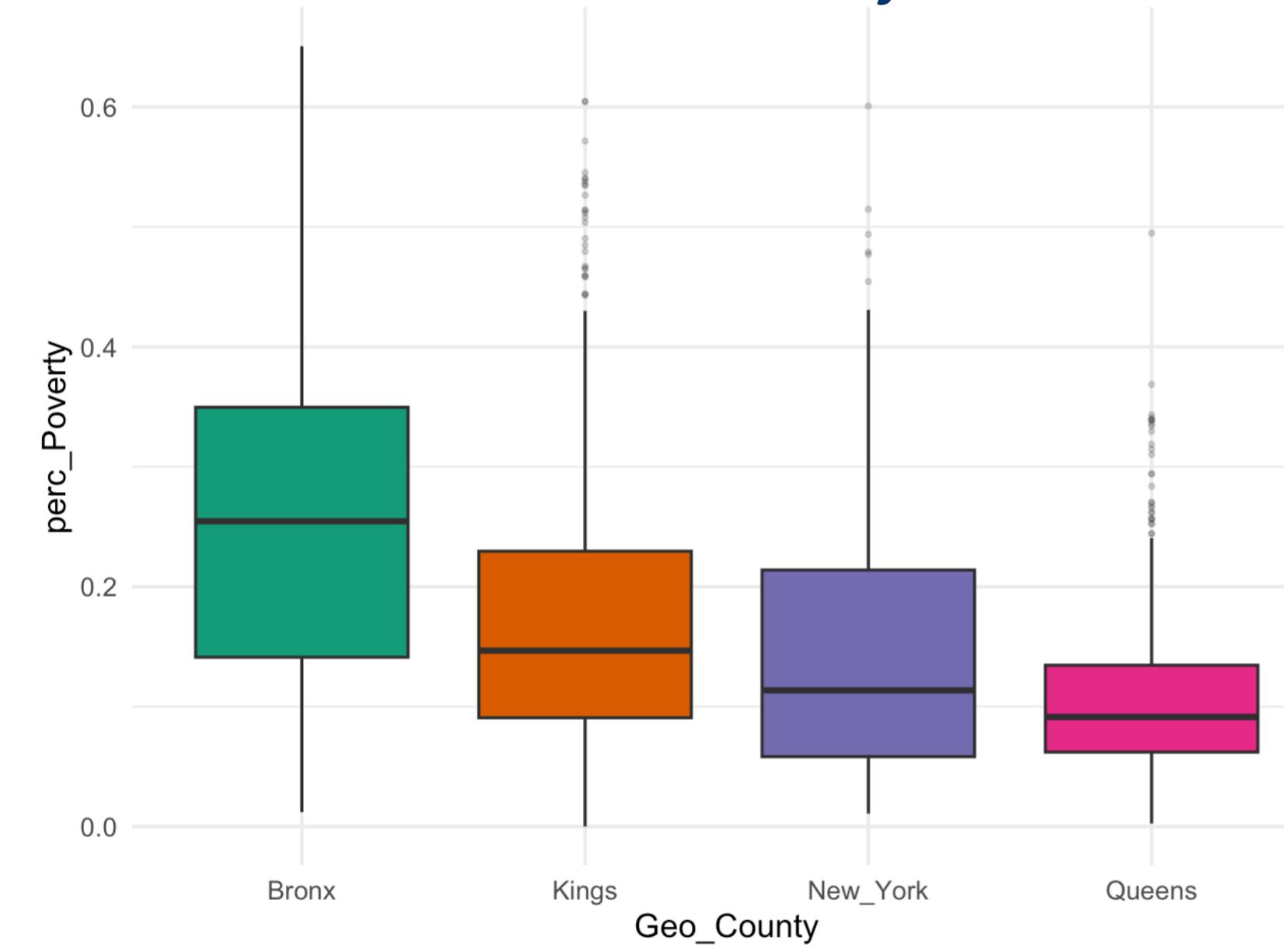
**% children with public health insurance = a\*unemployment + b**

Bronx	Kings
New_York	Queens

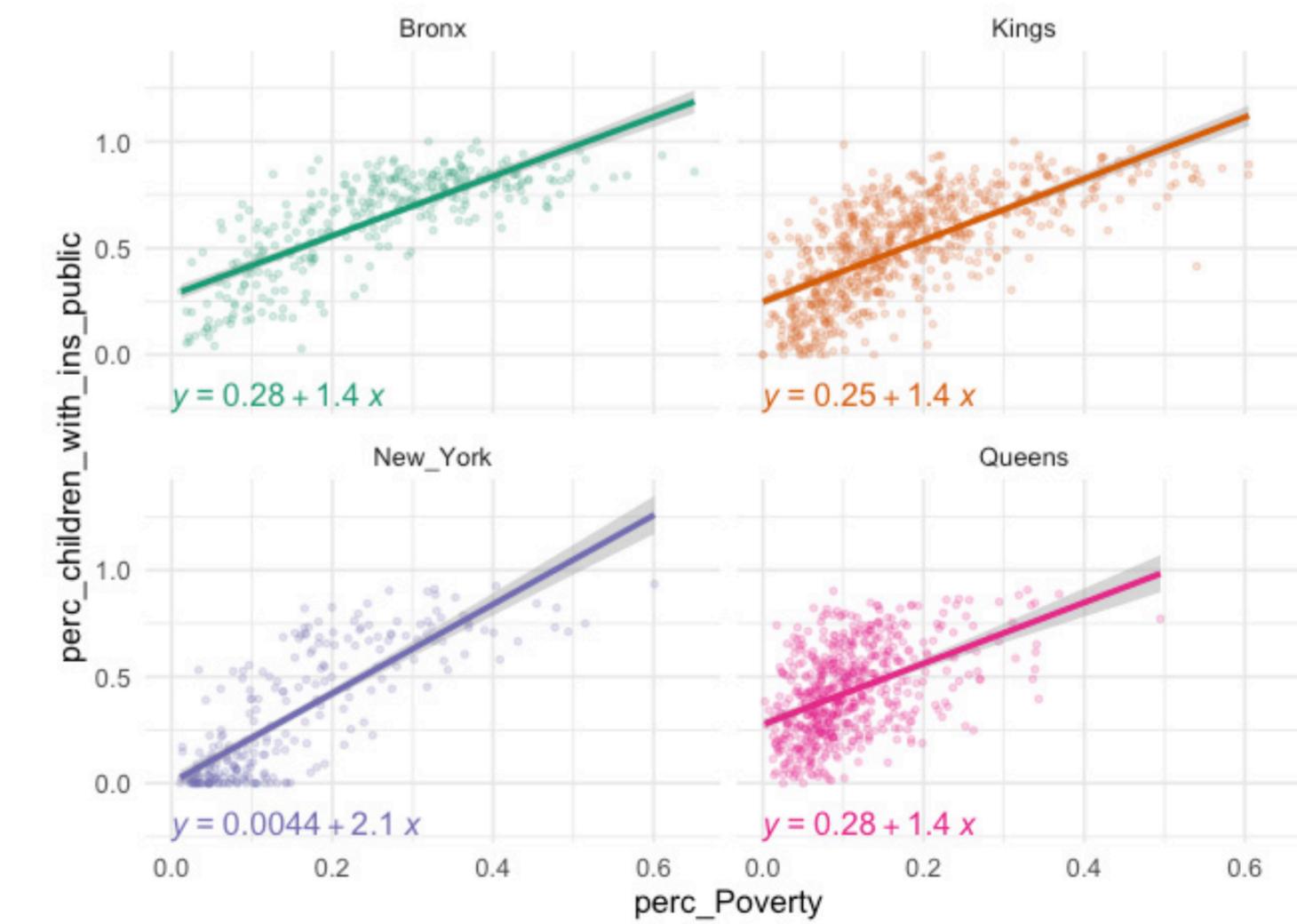
## X = % POPULATION IN POVERTY

Variable: Poverty

Distribution of Poverty as % of Population in Each County



NOT SIGNIFICANT: % children with health insurance =  
a\*poverty+ b



% children with public health insurance = a\*poverty + b

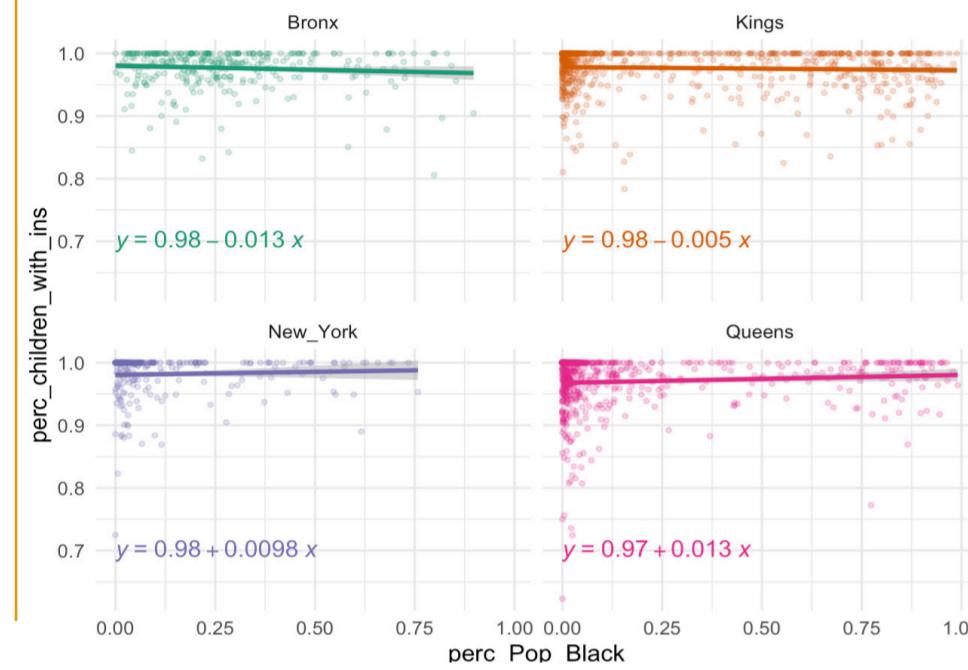
Bronx	Kings
New York	Queens

# X = % POPULATION: RACE

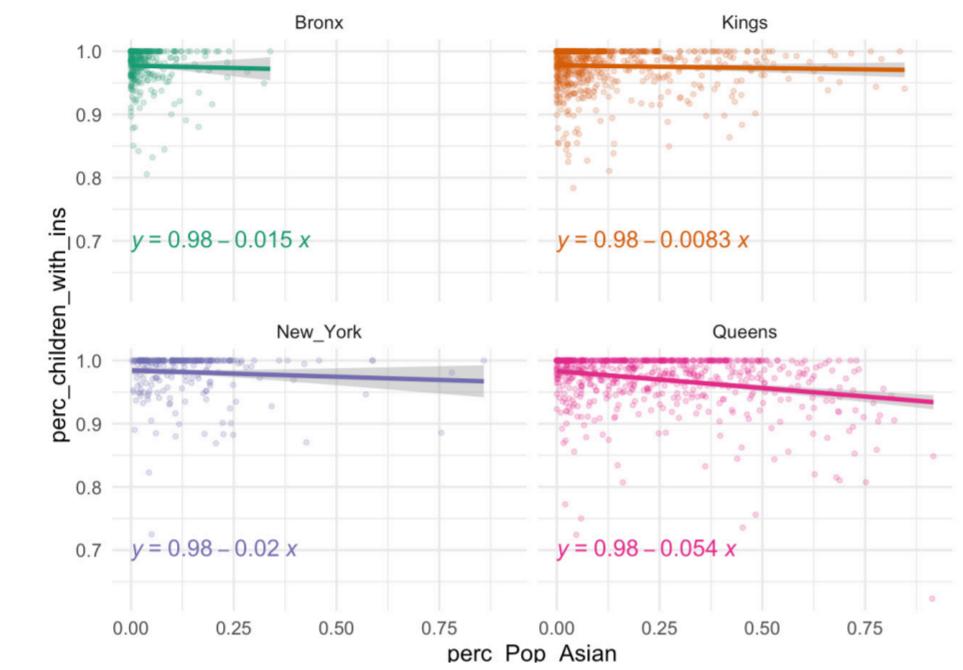
Bronx	Kings
New York	Queens

Variable: Race

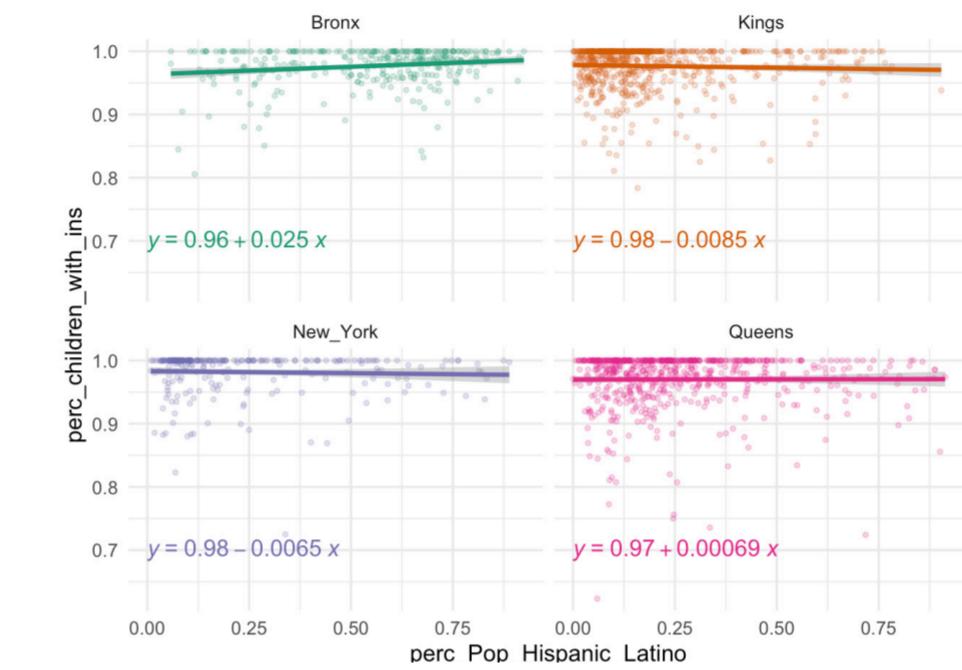
Black



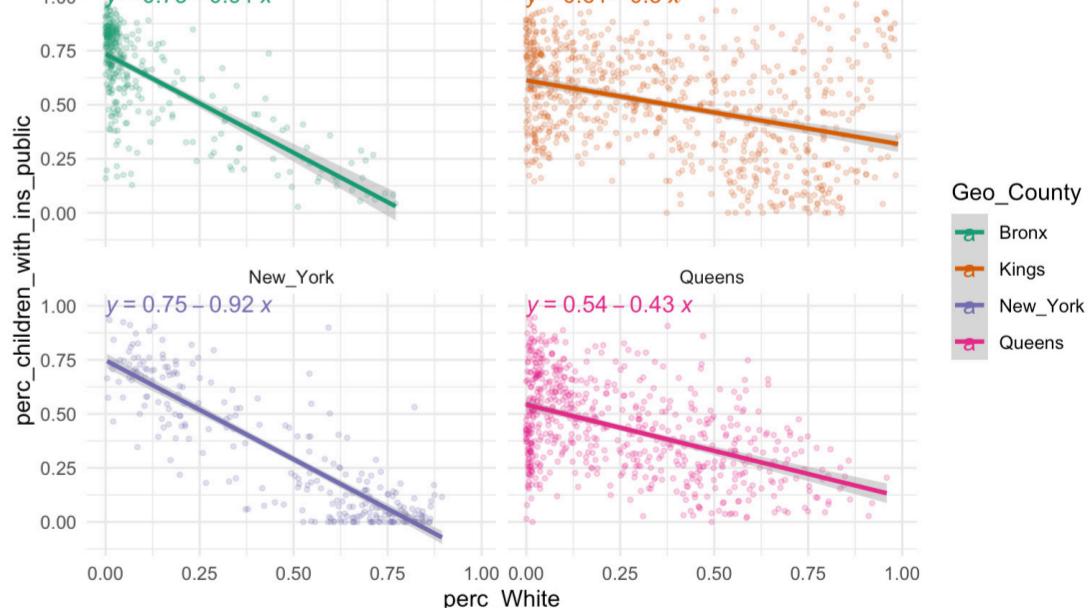
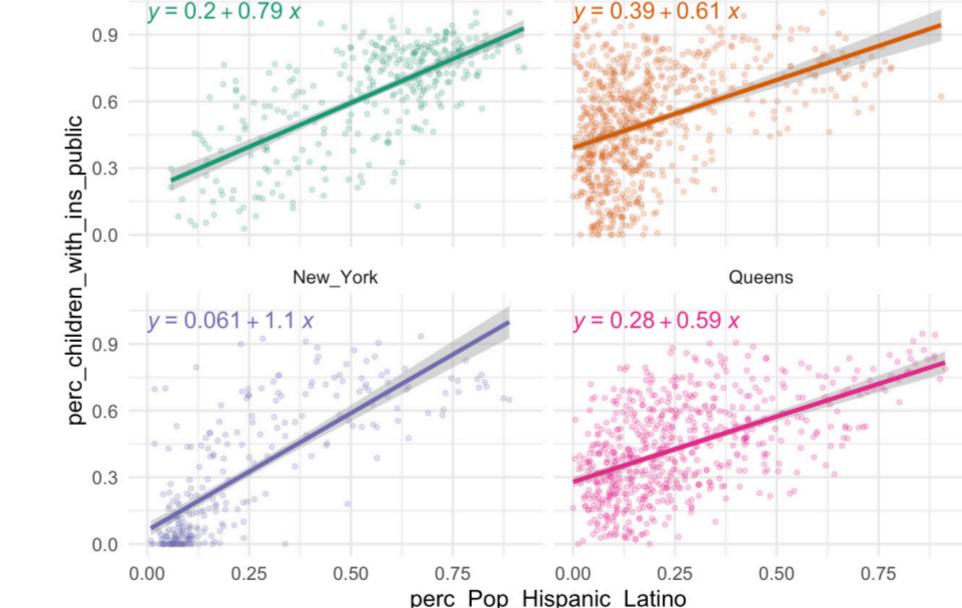
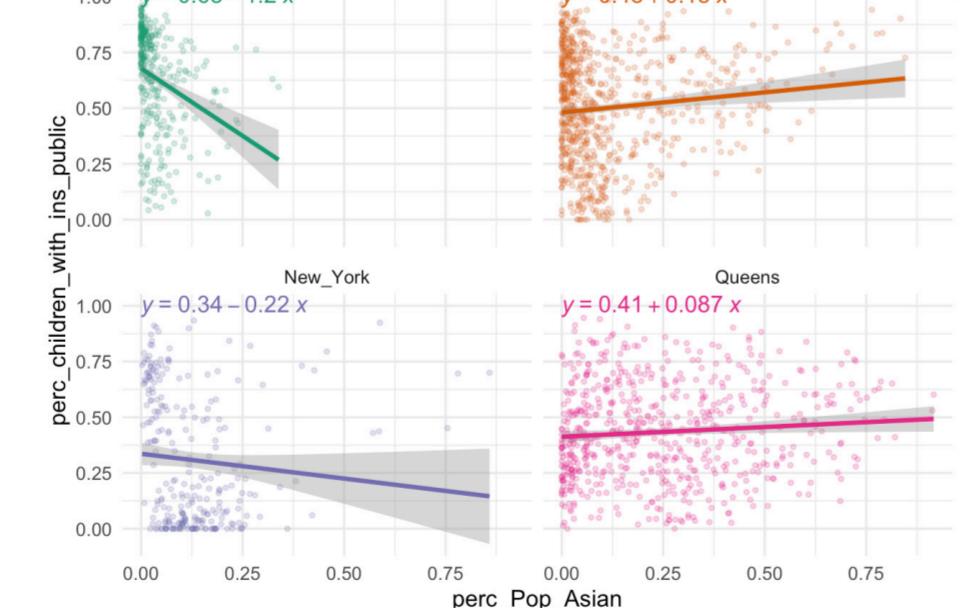
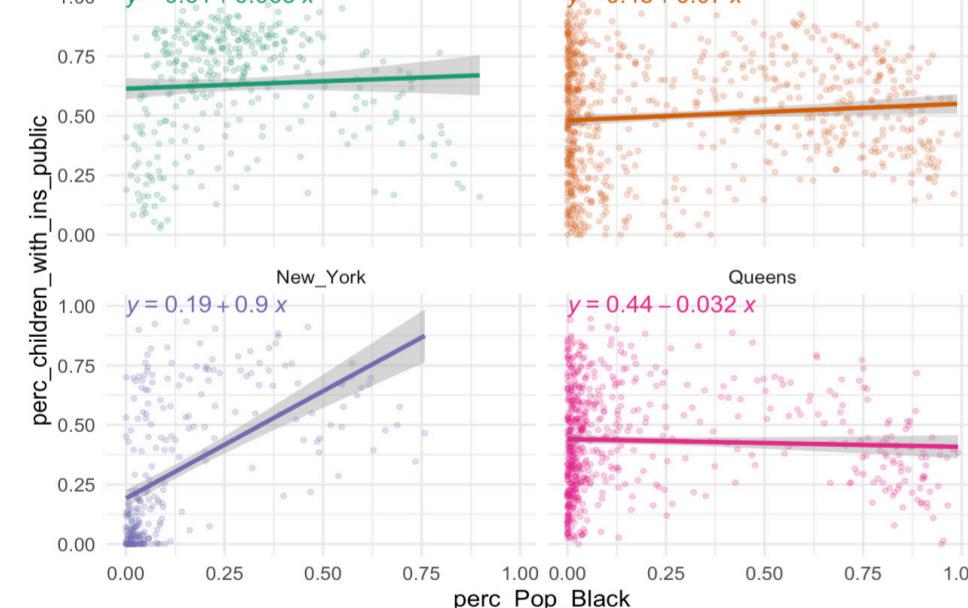
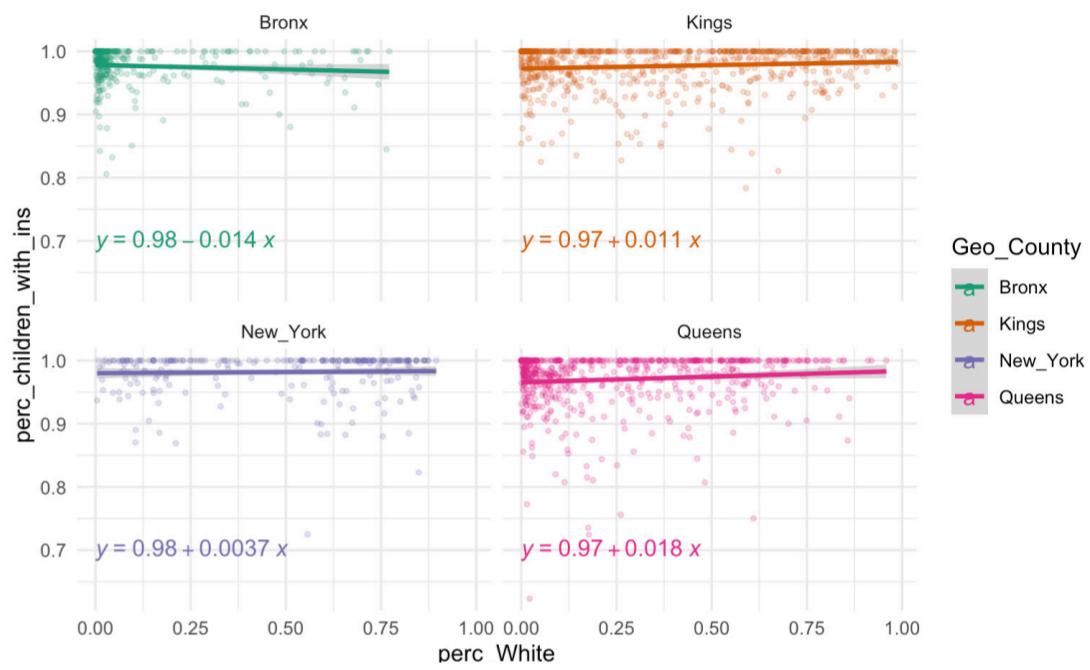
Asian



Hispanic/Latino



White



% children with health insurance = a\*race + b

% children with public health insurance = a\*race + b

# MULTIVARIATE LINEAR MODEL

## All Four Counties Together

**Y = % children with health insurance**

```
lm(formula = perc_children_with_ins ~ perc_Pop_Black + perc_Pop_Hispanic_Latino +
  perc_Pop_Asian + perc_Pop_More_Races + perc_Pop_Other_Races +
  perc_Poverty + perc_unemployed_16_over + log(Median_Household_Income_2019) +
  perc_Origin_FO_NCitizen + perc_Origin_FO_Citizen + perc_children_in_school,
  data = data)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.29720	-0.01129	0.01291	0.02184	0.05539

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	0.9228962	0.0387034	23.845	< 2e-16 ***
perc_Pop_Black	-0.0069802	0.0041856	-1.668	0.095555 .
perc_Pop_Hispanic_Latino	0.0081523	0.0060823	1.340	0.180304
perc_Pop_Asian	-0.0301485	0.0079114	-3.811	0.000143 ***
perc_Pop_More_Races	0.0286227	0.0425697	0.672	0.501431
perc_Pop_Other_Races	0.0040546	0.0299192	0.136	0.892217
perc_Poverty	0.0189494	0.0123799	1.531	0.126026
perc_unemployed_16_over	-0.0003649	0.0241608	-0.015	0.987951
log(Median_Household_Income_2019)	0.0057899	0.0030786	1.881	0.060172 .
perc_Origin_FO_NCitizen	-0.0546899	0.0133485	-4.097	4.36e-05 ***
perc_Origin_FO_Citizen	0.0119858	0.0107762	1.112	0.266179
perc_children_in_school	-0.0084999	0.0078701	-1.080	0.280274
---				
Signif. codes:	0 '***'	0.001 '**'	0.01 '*'	0.05 '.'
	0.1 ' '	1		

Residual standard error: 0.03582 on 1848 degrees of freedom

(116 observations deleted due to missingness)

Multiple R-squared: 0.04815, Adjusted R-squared: 0.04249

F-statistic: 8.499 on 11 and 1848 DF, p-value: 8.778e-15

**Y = % children with public health insurance**

```
lm(formula = perc_children_with_ins_public ~ perc_Pop_Black +
  perc_Pop_Hispanic_Latino + perc_Pop_Asian + perc_Pop_More_Races +
  perc_Pop_Other_Races + perc_Poverty + perc_unemployed_16_over +
  log(Median_Household_Income_2019) + perc_Origin_FO_NCitizen +
  perc_Origin_FO_Citizen + perc_children_in_school, data = data)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.48120	-0.08679	-0.00095	0.08772	0.45877

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	3.26111	0.14320	22.774	< 2e-16 ***
perc_Pop_Black	0.04862	0.01547	3.143	0.0017 **
perc_Pop_Hispanic_Latino	0.09360	0.02246	4.167	3.23e-05 ***
perc_Pop_Asian	-0.05991	0.02923	-2.050	0.0405 *
perc_Pop_More_Races	0.12196	0.15721	0.776	0.4380
perc_Pop_Other_Races	0.47476	0.11049	4.297	1.82e-05 ***
perc_Poverty	0.46096	0.04582	10.061	< 2e-16 ***
perc_unemployed_16_over	-0.07603	0.08930	-0.851	0.3946
log(Median_Household_Income_2019)	-0.26765	0.01139	-23.499	< 2e-16 ***
perc_Origin_FO_NCitizen	0.51417	0.04931	10.428	< 2e-16 ***
perc_Origin_FO_Citizen	0.05078	0.03990	1.273	0.2033
perc_children_in_school	0.01613	0.02907	0.555	0.5791
---				
Signif. codes:	0 '***'	0.001 '**'	0.01 '*'	0.05 '.'
	0.1 ' '	1		

Residual standard error: 0.1323 on 1847 degrees of freedom

(117 observations deleted due to missingness)

Multiple R-squared: 0.7316, Adjusted R-squared: 0.73

F-statistic: 457.7 on 11 and 1847 DF, p-value: < 2.2e-16

# MULTIVARIATE LINEAR MODEL

## Kings (Brooklyn)

$Y = \% \text{ children with health insurance}$

```
lm(formula = perc_children_with_ins ~ perc_Pop_Black + perc_Pop_Hispanic_Latino +
  perc_Pop_Asian + perc_Pop_More_Races + perc_Pop_Other_Races +
  perc_Poverty + perc_unemployed_16_over + log(Median_Household_Income_2019) +
  perc_Origin_FO_NCitizen + perc_Origin_FO_Citizen + perc_children_in_school,
  data = data)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.19678	-0.01168	0.01181	0.02183	0.03333

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	0.961082	0.061604	15.601	<2e-16 ***
perc_Pop_Black	-0.006970	0.005415	-1.287	0.198
perc_Pop_Hispanic_Latino	-0.006706	0.010107	-0.664	0.507
perc_Pop_Asian	-0.007399	0.012985	-0.570	0.569
perc_Pop_More_Races	-0.055430	0.061215	-0.906	0.366
perc_Pop_Other_Races	0.010134	0.104762	0.097	0.923
perc_Poverty	0.020634	0.018636	1.107	0.269
perc_unemployed_16_over	-0.027731	0.034349	-0.807	0.420
log(Median_Household_Income_2019)	0.002604	0.004933	0.528	0.598
perc_Origin_FO_NCitizen	-0.041715	0.024183	-1.725	0.085 .
perc_Origin_FO_Citizen	0.001635	0.014479	0.113	0.910
perc_children_in_school	-0.006152	0.013388	-0.460	0.646
---				
Signif. codes:	0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1			

Residual standard error: 0.03324 on 694 degrees of freedom  
 (38 observations deleted due to missingness)  
 Multiple R-squared: 0.02274, Adjusted R-squared: 0.007254  
 F-statistic: 1.468 on 11 and 694 DF, p-value: 0.1386

$Y = \% \text{ children with public health insurance}$

```
lm(formula = perc_children_with_ins_public ~ perc_Pop_Black +
  perc_Pop_Hispanic_Latino + perc_Pop_Asian + perc_Pop_More_Races +
  perc_Pop_Other_Races + perc_Poverty + perc_unemployed_16_over +
  log(Median_Household_Income_2019) + perc_Origin_FO_NCitizen +
  perc_Origin_FO_Citizen + perc_children_in_school, data = data)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.44404	-0.07860	-0.00335	0.08334	0.34380

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	3.59747	0.22976	15.658	< 2e-16 ***
perc_Pop_Black	0.01501	0.02020	0.743	0.45770
perc_Pop_Hispanic_Latino	0.09701	0.03769	2.574	0.01027 *
perc_Pop_Asian	-0.01379	0.04843	-0.285	0.77591
perc_Pop_More_Races	-0.30710	0.22831	-1.345	0.17903
perc_Pop_Other_Races	0.08702	0.39072	0.223	0.82382
perc_Poverty	0.52209	0.06951	7.512	1.80e-13 ***
perc_unemployed_16_over	-0.37619	0.12811	-2.937	0.00343 **
log(Median_Household_Income_2019)	-0.28863	0.01840	-15.689	< 2e-16 ***
perc_Origin_FO_NCitizen	0.64350	0.09019	7.135	2.45e-12 ***
perc_Origin_FO_Citizen	-0.01382	0.05400	-0.256	0.79808
perc_children_in_school	-0.05085	0.04993	-1.018	0.30885
---				
Signif. codes:	0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1			

Residual standard error: 0.124 on 694 degrees of freedom  
 (38 observations deleted due to missingness)  
 Multiple R-squared: 0.7357, Adjusted R-squared: 0.7315  
 F-statistic: 175.6 on 11 and 694 DF, p-value: < 2.2e-16

# MULTIVARIATE LINEAR MODEL

New York (Manhattan)

$Y = \% \text{ children with health insurance}$

```
lm(formula = perc_children_with_ins ~ perc_Pop_Black + perc_Pop_Hispanic_Latino +
  perc_Pop_Asian + perc_Pop_More_Races + perc_Pop_Other_Races +
  perc_Poverty + perc_unemployed_16_over + log(Median_Household_Income_2019) +
  perc_Origin_FO_NCitizen + perc_Origin_FO_Citizen + perc_children_in_school,
  data = data)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.155441	-0.008007	0.012520	0.018116	0.047810

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	1.087364	0.095897	11.339	<2e-16 ***
perc_Pop_Black	0.002682	0.018869	0.142	0.8871
perc_Pop_Hispanic_Latino	-0.003370	0.026973	-0.125	0.9007
perc_Pop_Asian	-0.038511	0.033624	-1.145	0.2532
perc_Pop_More_Races	0.117972	0.131918	0.894	0.3721
perc_Pop_Other_Races	0.125349	0.235599	0.532	0.5952
perc_Poverty	-0.028161	0.036967	-0.762	0.4469
perc_unemployed_16_over	-0.072222	0.068924	-1.048	0.2958
log(Median_Household_Income_2019)	-0.006632	0.007466	-0.888	0.3753
perc_Origin_FO_NCitizen	-0.006105	0.040653	-0.150	0.8808
perc_Origin_FO_Citizen	-0.005474	0.048265	-0.113	0.9098
perc_children_in_school	-0.023417	0.013027	-1.798	0.0735 .
---				
Signif. codes:	0 '***'	0.001 '**'	0.01 '*'	0.05 '.'
	0.1 ' '	1		

Residual standard error: 0.03138 on 240 degrees of freedom

(16 observations deleted due to missingness)

Multiple R-squared: 0.04463, Adjusted R-squared: 0.0008428

F-statistic: 1.019 on 11 and 240 DF, p-value: 0.4298

$Y = \% \text{ children with public health insurance}$

```
lm(formula = perc_children_with_ins_public ~ perc_Pop_Black +
  perc_Pop_Hispanic_Latino + perc_Pop_Asian + perc_Pop_More_Races +
  perc_Pop_Other_Races + perc_Poverty + perc_unemployed_16_over +
  log(Median_Household_Income_2019) + perc_Origin_FO_NCitizen +
  perc_Origin_FO_Citizen + perc_children_in_school, data = data)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.38528	-0.06018	-0.00953	0.06292	0.51727

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	2.05137	0.34790	5.896	1.25e-08 ***
perc_Pop_Black	0.30594	0.06845	4.469	1.21e-05 ***
perc_Pop_Hispanic_Latino	0.47821	0.09786	4.887	1.87e-06 ***
perc_Pop_Asian	0.25045	0.12198	2.053	0.0411 *
perc_Pop_More_Races	0.20020	0.47858	0.418	0.6761
perc_Pop_Other_Races	-0.03926	0.85472	-0.046	0.9634
perc_Poverty	0.25936	0.13411	1.934	0.0543 .
perc_unemployed_16_over	-0.15790	0.25005	-0.631	0.5283
log(Median_Household_Income_2019)	-0.17451	0.02709	-6.443	6.35e-10 ***
perc_Origin_FO_NCitizen	-0.11829	0.14748	-0.802	0.4233
perc_Origin_FO_Citizen	0.15602	0.17510	0.891	0.3738
perc_children_in_school	0.08653	0.04726	1.831	0.0684 .
---				
Signif. codes:	0 '***'	0.001 '**'	0.01 '*'	0.05 '.'
	0.1 ' '	1		

Residual standard error: 0.1138 on 240 degrees of freedom

(16 observations deleted due to missingness)

Multiple R-squared: 0.8595, Adjusted R-squared: 0.853

F-statistic: 133.4 on 11 and 240 DF, p-value: < 2.2e-16

# MULTIVARIATE LINEAR MODEL

## Bronx

$Y = \% \text{ children with health insurance}$

```
lm(formula = perc_children_with_ins ~ perc_Pop_Black + perc_Pop_Hispanic_Latino +
  perc_Pop_Asian + perc_Pop_More_Races + perc_Pop_Other_Races +
  perc_Poverty + perc_unemployed_16_over + log(Median_Household_Income_2019) +
  perc_Origin_FO_NCitizen + perc_Origin_FO_Citizen + perc_children_in_school,
  data = data)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.157556	-0.009653	0.008102	0.018660	0.038357

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	0.9474711	0.1051397	9.012	< 2e-16 ***
perc_Pop_Black	0.0095971	0.0154850	0.620	0.53588
perc_Pop_Hispanic_Latino	0.0514580	0.0185091	2.780	0.00578 **
perc_Pop_Asian	0.0157602	0.0388106	0.406	0.68497
perc_Pop_More_Races	0.0807487	0.1549610	0.521	0.60269
perc_Pop_Other_Races	-0.0296361	0.1216399	-0.244	0.80768
perc_Poverty	-0.0234814	0.0257986	-0.910	0.36346
perc_unemployed_16_over	-0.0359757	0.0453086	-0.794	0.42782
log(Median_Household_Income_2019)	-0.0006071	0.0086905	-0.070	0.94435
perc_Origin_FO_NCitizen	-0.0500972	0.0266910	-1.877	0.06150 .
perc_Origin_FO_Citizen	0.0011430	0.0350271	0.033	0.97399
perc_children_in_school	0.0276166	0.0195829	1.410	0.15951
---				
Signif. codes:	0 '***'	0.001 '**'	0.01 '*'	0.05 '.'
	0.1 '	' 1		

Residual standard error: 0.03047 on 299 degrees of freedom  
 (16 observations deleted due to missingness)  
 Multiple R-squared: 0.05984, Adjusted R-squared: 0.02525  
 F-statistic: 1.73 on 11 and 299 DF, p-value: 0.06621

$Y = \% \text{ children with public health insurance}$

```
lm(formula = perc_children_with_ins_public ~ perc_Pop_Black +
  perc_Pop_Hispanic_Latino + perc_Pop_Asian + perc_Pop_More_Races +
  perc_Pop_Other_Races + perc_Poverty + perc_unemployed_16_over +
  log(Median_Household_Income_2019) + perc_Origin_FO_NCitizen +
  perc_Origin_FO_Citizen + perc_children_in_school, data = data)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.34179	-0.05413	0.00941	0.07094	0.24437

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	1.67042	0.37415	4.465	1.14e-05 ***
perc_Pop_Black	0.33387	0.05559	6.006	5.54e-09 ***
perc_Pop_Hispanic_Latino	0.51538	0.06562	7.854	7.34e-14 ***
perc_Pop_Asian	0.26808	0.13756	1.949	0.052250 .
perc_Pop_More_Races	1.24195	0.54914	2.262	0.024442 *
perc_Pop_Other_Races	-0.41341	0.43106	-0.959	0.338311
perc_Poverty	0.30829	0.09274	3.324	0.000997 ***
perc_unemployed_16_over	0.34596	0.16184	2.138	0.033358 *
log(Median_Household_Income_2019)	-0.15136	0.03092	-4.895	1.62e-06 ***
perc_Origin_FO_NCitizen	0.39145	0.09461	4.138	4.57e-05 ***
perc_Origin_FO_Citizen	-0.09353	0.12734	-0.734	0.463232
perc_children_in_school	0.04455	0.06954	0.641	0.522285
---				
Signif. codes:	0 '***'	0.001 '**'	0.01 '*'	0.05 '.'
	0.1 '	' 1		

Residual standard error: 0.108 on 298 degrees of freedom  
 (17 observations deleted due to missingness)  
 Multiple R-squared: 0.7975, Adjusted R-squared: 0.79  
 F-statistic: 106.7 on 11 and 298 DF, p-value: < 2.2e-16

# MULTIVARIATE LINEAR MODEL

## Queens

$Y = \% \text{ children with health insurance}$

```
lm(formula = perc_children_with_ins ~ perc_Pop_Black + perc_Pop_Hispanic_Latino +
  perc_Pop_Asian + perc_Pop_More_Races + perc_Pop_Other_Races +
  perc_Poverty + perc_unemployed_16_over + log(Median_Household_Income_2019) +
  perc_Origin_FO_NCitizen + perc_Origin_FO_Citizen + perc_children_in_school,
  data = data)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.27238	-0.01417	0.01284	0.02449	0.06428

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	0.729186	0.109129	6.682	5.55e-11 ***
perc_Pop_Black	-0.005516	0.009521	-0.579	0.5626
perc_Pop_Hispanic_Latino	0.019566	0.016434	1.191	0.2343
perc_Pop_Asian	-0.037846	0.017994	-2.103	0.0359 *
perc_Pop_More_Races	0.095971	0.082162	1.168	0.2433
perc_Pop_Other_Races	-0.020209	0.044564	-0.453	0.6504
perc_Poverty	0.016535	0.034523	0.479	0.6322
perc_unemployed_16_over	0.090220	0.061701	1.462	0.1442
log(Median_Household_Income_2019)	0.021896	0.009067	2.415	0.0161 *
perc_Origin_FO_NCitizen	-0.051683	0.030192	-1.712	0.0875 .
perc_Origin_FO_Citizen	0.026543	0.030560	0.869	0.3855
perc_children_in_school	-0.009745	0.017984	-0.542	0.5881
---				
Signif. codes:	0 '***'	0.001 '**'	0.01 '*'	0.05 '.'
	0.1 ' '	1		

Residual standard error: 0.04202 on 579 degrees of freedom

(46 observations deleted due to missingness)

Multiple R-squared: 0.09921, Adjusted R-squared: 0.0821

F-statistic: 5.797 on 11 and 579 DF, p-value: 6.137e-09

$Y = \% \text{ children with public health insurance}$

```
lm(formula = perc_children_with_ins_public ~ perc_Pop_Black +
  perc_Pop_Hispanic_Latino + perc_Pop_Asian + perc_Pop_More_Races +
  perc_Pop_Other_Races + perc_Poverty + perc_unemployed_16_over +
  log(Median_Household_Income_2019) + perc_Origin_FO_NCitizen +
  perc_Origin_FO_Citizen + perc_children_in_school, data = data)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.38269	-0.09251	-0.00449	0.09296	0.42711

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	2.43436	0.35380	6.881	1.55e-11 ***
perc_Pop_Black	0.16139	0.03087	5.229	2.39e-07 ***
perc_Pop_Hispanic_Latino	0.39143	0.05328	7.347	6.94e-13 ***
perc_Pop_Asian	0.13088	0.05834	2.244	0.025239 *
perc_Pop_More_Races	0.10862	0.26637	0.408	0.683577
perc_Pop_Other_Races	0.72201	0.14448	4.997	7.71e-07 ***
perc_Poverty	0.25288	0.11193	2.259	0.024235 *
perc_unemployed_16_over	0.69938	0.20004	3.496	0.000508 ***
log(Median_Household_Income_2019)	-0.19757	0.02940	-6.721	4.33e-11 ***
perc_Origin_FO_NCitizen	0.41863	0.09788	4.277	2.22e-05 ***
perc_Origin_FO_Citizen	-0.21507	0.09908	-2.171	0.030357 *
perc_children_in_school	-0.05767	0.05831	-0.989	0.323013
---				
Signif. codes:	0 '***'	0.001 '**'	0.01 '*'	0.05 '.'
	0.1 ' '	1		

Residual standard error: 0.1362 on 579 degrees of freedom

(46 observations deleted due to missingness)

Multiple R-squared: 0.5743, Adjusted R-squared: 0.5662

F-statistic: 71.02 on 11 and 579 DF, p-value: < 2.2e-16

## REFLECTION...

When analyzing children's with health insurance coverage for each county individually, the significance and correlation coefficient for each factor changes.

Thus, when suggesting policies or actions for increasing % children with health care coverage, it is important to analyze and study at county or smaller scales to understand the needs and constraints for the specific population and community.

For example:

- + Kings is the only county that there is significant negative correlation between unemployment rate and children's enrollment rate of public healthcare.
- + In Queens county, % of children with health insurance is negatively correlated with race (Asian) and foreign origin with no citizenship population. Perhaps the barriers for Asian population are variables not existed in the study, such as languages and culture etc. Thus, health department may want to study further into Asian population and the population without citizenship's children's healthcare access.

# ON ONE OF THE FINDINGS...

$Y = \% \text{ children with health insurance}$

Independent variable -Percentage of Population: Asian- is the only positively correlated common variable among all five models...

***Which area in Queens should we be concerning with?***

## All Counties

Coefficients:		
	Estimates	Pr(> t )
(Intercept)	0.92289625	< 2e-16 ***
perc_Pop_Black	-0.00698023	0.095555 .
perc_Pop_Hispanic_Latino	0.00815230	0.180304
perc_Pop_Asian	-0.03014851	0.000143 ***
perc_Pop_More_Races	0.02862272	0.501431
perc_Pop_Other_Races	0.00405465	0.892217
perc_Poverty	0.01894941	0.126026
perc_unemployed_16_over	-0.00036495	0.987951
log(Median_Household_Income_2019)	0.00578991	0.060172 .
perc_Origin_FO_NCitizen	-0.05468997	4.36e-05 ***
perc_Origin_FO_Citizen	0.01198582	0.266179
perc_children_in_school	-0.00849990	0.280274

## New York (Manhattan)

Coefficients:		
	Estimate	Pr(> t )
(Intercept)	1.087364	<2e-16 ***
perc_Pop_Black	0.002682	0.8871
perc_Pop_Hispanic_Latino	-0.003370	0.9007
perc_Pop_Asian	-0.038511	0.2532
perc_Pop_More_Races	0.117972	0.3721
perc_Pop_Other_Races	0.125349	0.5952
perc_Poverty	-0.028161	0.4469
perc_unemployed_16_over	-0.072222	0.2958
log(Median_Household_Income_2019)	-0.006632	0.3753
perc_Origin_FO_NCitizen	-0.006105	0.8808
perc_Origin_FO_Citizen	-0.005474	0.9098
perc_children_in_school	-0.023417	0.0735 .

## Kings (Brooklyn)

Coefficients:		
	Estimate	Pr(> t )
(Intercept)	0.961082	<2e-16 ***
perc_Pop_Black	-0.006970	0.198
perc_Pop_Hispanic_Latino	-0.006706	0.507
perc_Pop_Asian	-0.007399	0.569
perc_Pop_More_Races	-0.055430	0.366
perc_Pop_Other_Races	0.010134	0.923
perc_Poverty	0.020634	0.269
perc_unemployed_16_over	-0.027731	0.420
log(Median_Household_Income_2019)	0.002604	0.598
perc_Origin_FO_NCitizen	-0.041715	0.085 .
perc_Origin_FO_Citizen	0.001635	0.910
perc_children_in_school	-0.006152	0.646

## Queens

Coefficients:		
	Estimate	Pr(> t )
(Intercept)	0.729186	5.55e-11 ***
perc_Pop_Black	-0.005516	0.5626
perc_Pop_Hispanic_Latino	0.019566	0.2343
perc_Pop_Asian	-0.037846	0.0359 *
perc_Pop_More_Races	0.095971	0.2433
perc_Pop_Other_Races	-0.020209	0.6504
perc_Poverty	0.016535	0.6322
perc_unemployed_16_over	0.090220	0.1442
log(Median_Household_Income_2019)	0.021896	0.0161 *
perc_Origin_FO_NCitizen	-0.051683	0.0875 .
perc_Origin_FO_Citizen	0.026543	0.3855
perc_children_in_school	-0.009745	0.5881

## Bronx

Coefficients:		
	Estimates	Pr(> t )
(Intercept)	0.94747112	< 2e-16 ***
perc_Pop_Black	0.00959710	0.53588
perc_Pop_Hispanic_Latino	0.05145800	0.00578 **
perc_Pop_Asian	0.01576025	0.68497
perc_Pop_More_Races	0.08074871	0.60269
perc_Pop_Other_Races	-0.02963614	0.80768
perc_Poverty	-0.02348140	0.36346
perc_unemployed_16_over	-0.03597574	0.42782
log(Median_Household_Income_2019)	-0.00060710	0.94435
perc_Origin_FO_NCitizen	-0.05009727	0.06150 .
perc_Origin_FO_Citizen	0.00114303	0.97399
perc_children_in_school	0.02761660	0.15951

# ON ONE OF THE FINDINGS...

Y = % children with health insurance

Positive Correlation  
Negative Correlation

## Gap Closed: The Affordable Care Act's Impact on Asian Americans' Health Coverage



Independent variable -Percentage of Population: Asian- is the only positively correlated common variable among all five models...

***How is my study different from the finding of this article?***

### All Counties

Coefficients:	Estimates	Pr(> t )
(Intercept)	0.92289625	< 2e-16 ***
perc_Pop_Black	-0.00698028	0.095555 .
perc_Pop_Hispanic_Latino	0.00815230	0.180304
perc_Pop_Asian	-0.03014851	0.000143 ***
perc_Pop_More_Races	0.02862272	0.501431
perc_Pop_Other_Races	0.00405465	0.892217
perc_Poverty	0.01894941	0.126026
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perc_Origin_FO_Citizen	0.026543	0.3855
perc_children_in_school	-0.009745	0.5881

### Bronx

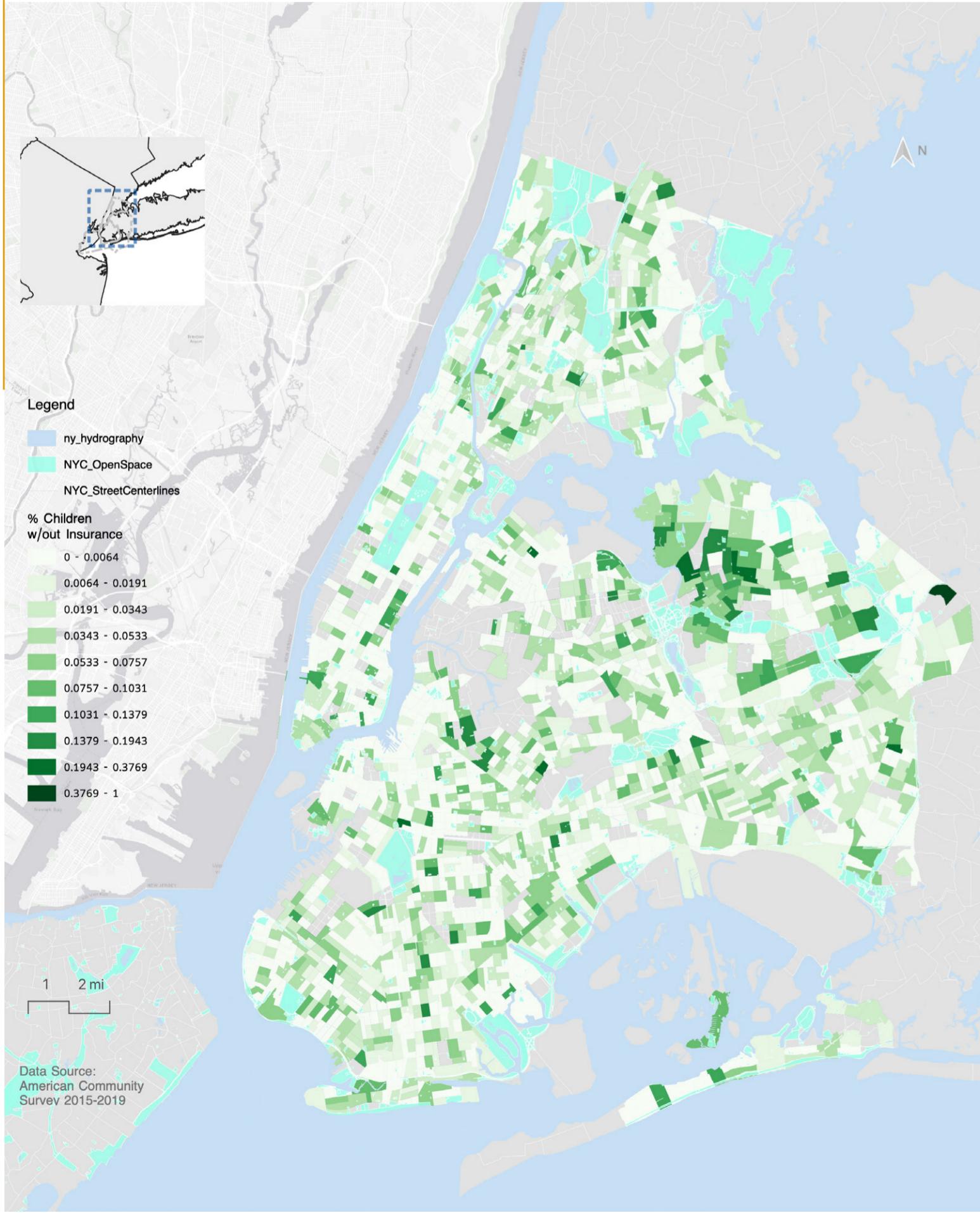
Coefficients:	Estimates	Pr(> t )
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perc_Pop_Hispanic_Latino	0.05145800	0.00578 **
perc_Pop_Asian	0.01576025	0.68497
perc_Pop_More_Races	0.08074871	0.60269
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# % CHILDREN WITHOUT HEALTH INSURANCE IN QUEENS

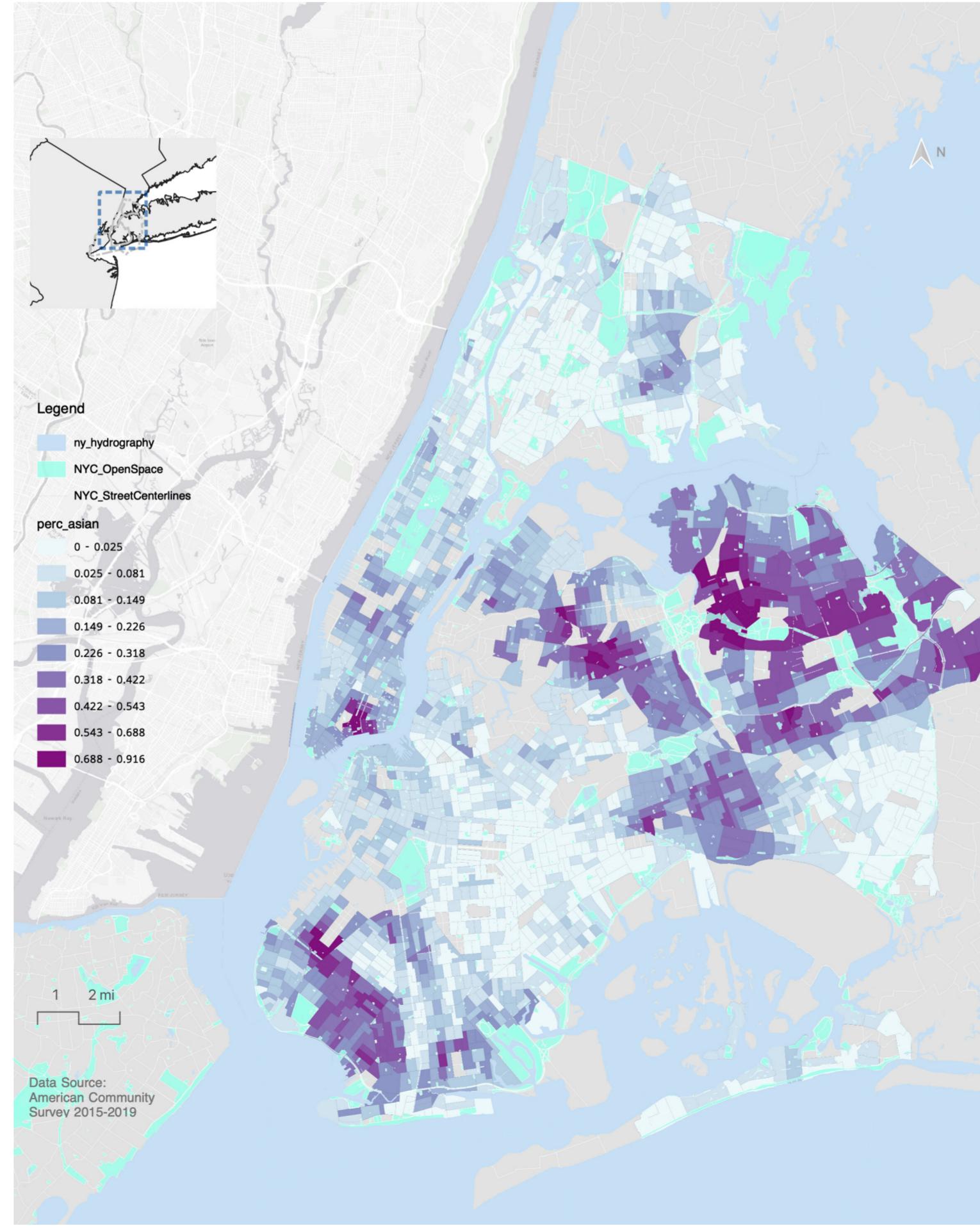
Positive Correlation  
Negative Correlation

Findings & Questions

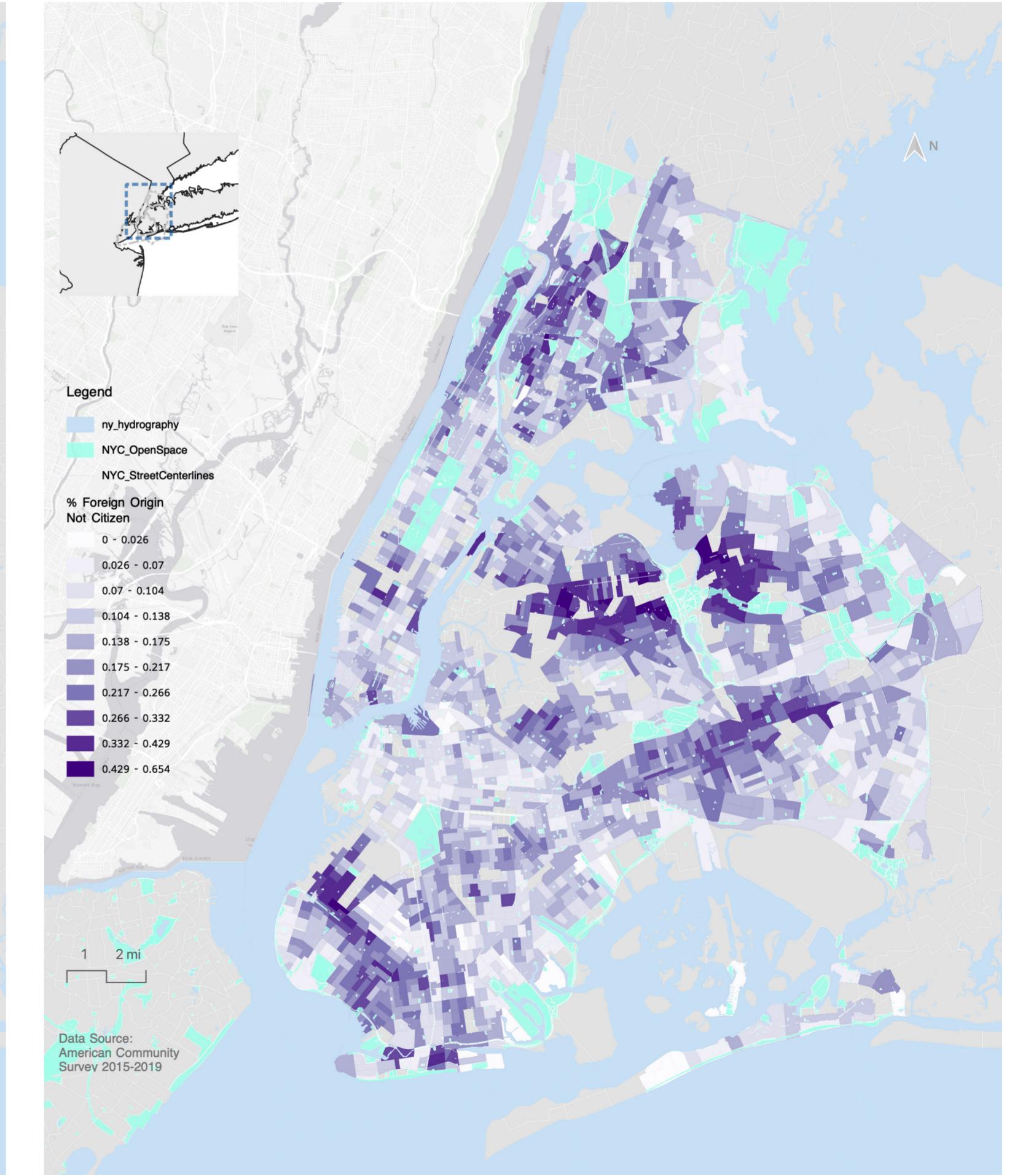
% Children without Health Insurance



% Population: Asian



% Population: Foreign Origin Not Citizen

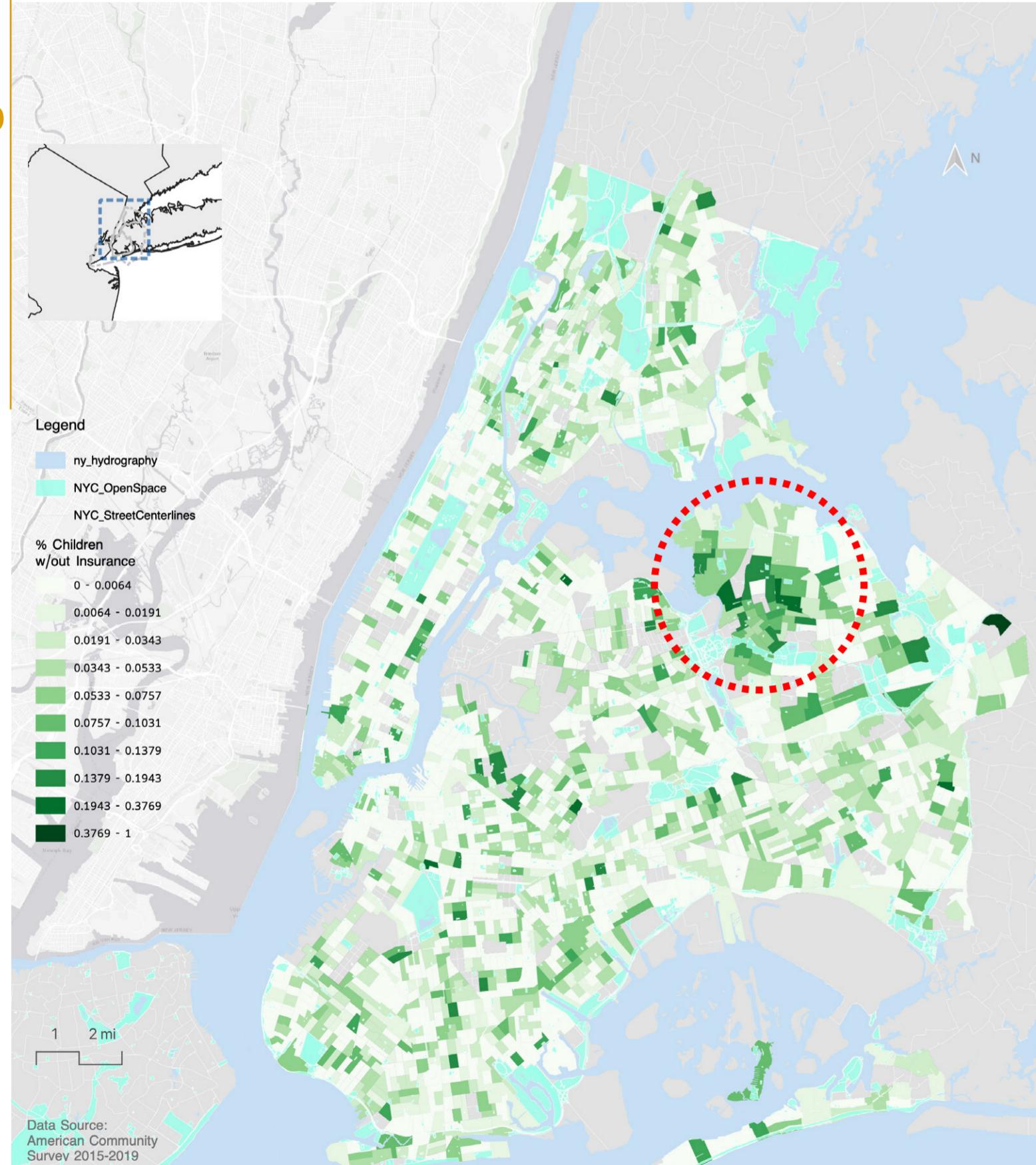


# % CHILDREN WITHOUT HEALTH INSURANCE IN QUEENS

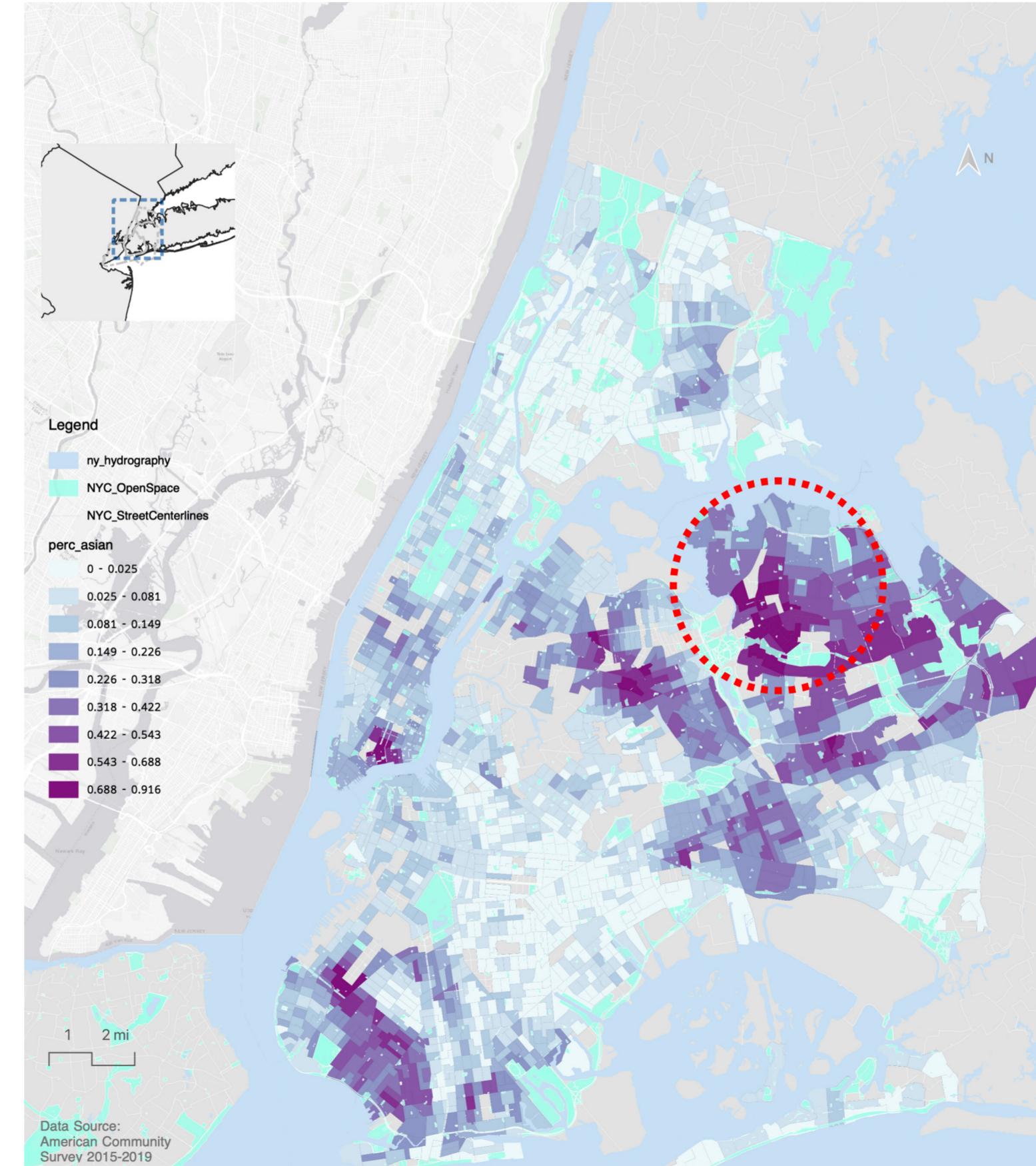
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Findings & Questions

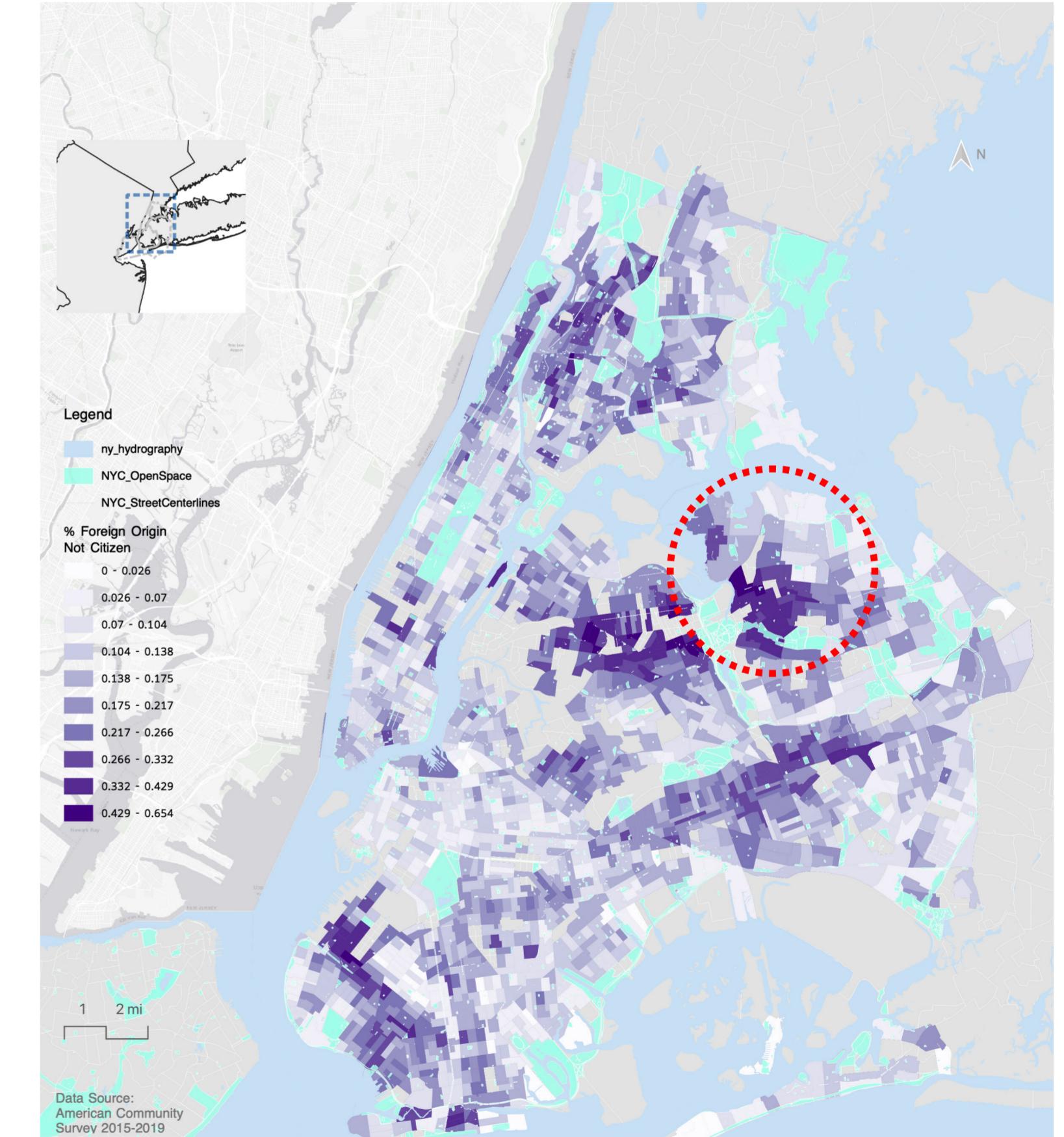
% Children without Health Insurance



% Population: Asian



% Population: Foreign Origin Not Citizen



Visualizing the neighborhood that the model is pointing towards: ~Flushing

## CHALLENGES

- \* New York State address health insurance coverage challenges through broad eligibility for Medicaid Affordable Care Act (ACA)
- \* Almost all children have healthcare coverage thanks to the Medicaid, which covers about 50% of all births in the New York state, and Child Health Plus (CHIP) programs, which covers for about 35% of New York's children under 19, that supports families regardless income and immigration status; however, their parents' health insurance is much less certain.
- \* There are various reasons that prevent racial minorities and foreign born population from getting health insurance. For example, "legislative barriers, such as the threat of being labeled a public charge, or a fear of unknown and high out-of-pocket costs may prevent many from seeking medical attention at all" (citation from Health of Asians and Pacific Islanders in New York City by NYC Health)
- \* According to the Community Service Society, there are 4 main reasons that prevent people from getting health insurance: "(1) they are unaware of or do not understand their coverage options and the enrollment processes; (2) they choose not to enroll for political or religious reasons; (3) they have a high risk tolerance and self-perceived good health status; or (4) they consider the coverage available to them to be unaffordable."

## IDEAS FOR ACTIONS

1. Health related social work groups may consider working on areas with higher concentration racial minorities and foreign born population
2. Host information sessions, hand out flyers, or conduct other forms of communication in the native languages to the (uninsured) immigrant populations to address concerns and issues about insurance.
3. Increase enrollment timeline flexibility by introducing additional eligible enrollment time frame/life events outside of the open enrollment period to address coverage gaps and other time related limitations
4. Combine enrollment eligibility check with other services, such as local events or tax return.
5. Provide more subsidy options for low-income population
6. Actions and evaluations should be county specific.
7. Help more children enroll health coverages with education system; use schools as one of the messengers to communicate insurance options to the parents.