Exploring the Link Between Education and Illegal Pet Ownership in NYC

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Our Research Focus

1

Data Exploration

Analyzing NYC Open Data and US Census Bureau data on illegal pets and education attainment.

2

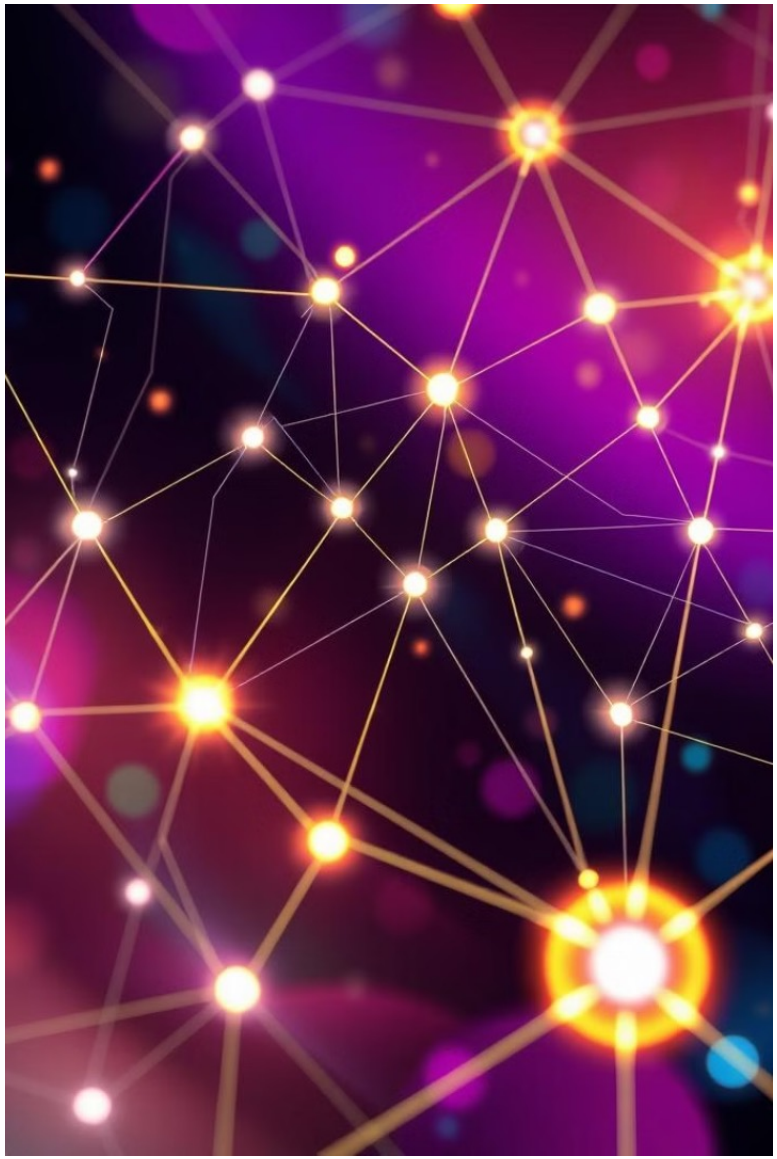
Statistical Analysis

Utilizing regression models to quantify relationships between education levels and incident rates.

3

Policy Insights

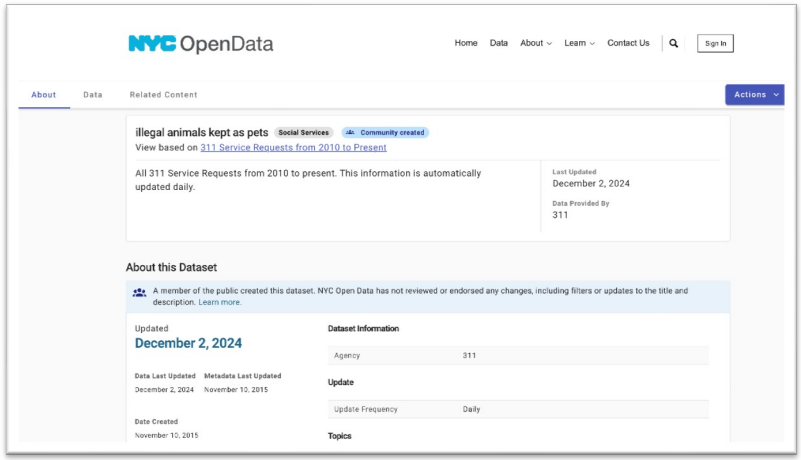
Identifying potential policy responses based on key findings and areas for further research.



Data Sources

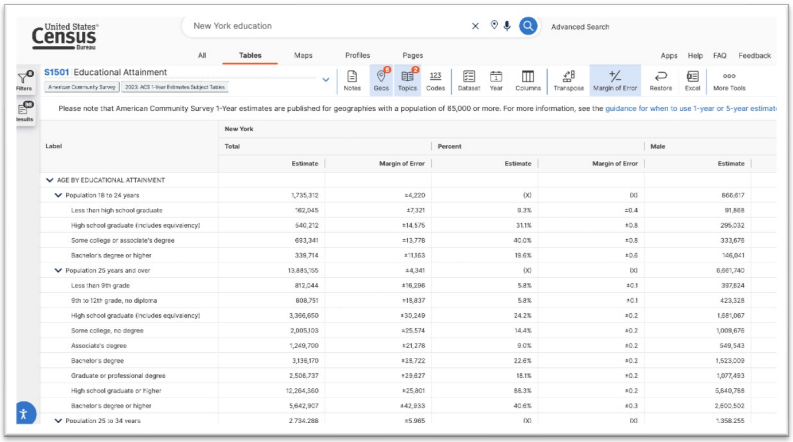
Illegal Pets Data

NYC Open Data: complaint records on illegal pets



Education Attainment Data

US Census Bureau: education levels for NYC boroughs



Data Sources

Education Attainment Data

We chose 5-years estimates from 2010 to 2022 because they are the **most reliable** indicators, though not the most current ones.

Distinguishing features of ACS 1-year, 1-year supplemental, 3-year, and 5-year estimates

1-year estimates	1-year supplemental estimates	3-year estimates*	5-year estimates
12 months of collected data *Example:* 2023 ACS 1-year estimates *Date collected between:* January 1, 2023 and December 31, 2023	12 months of collected data *Example:* 2023 ACS 1-year supplemental estimates *Date collected between:* January 1, 2023 and December 31, 2023	36 months of collected data *Example:* 2011-2013 ACS 3-year estimates *Date collected between:* January 1, 2011 and December 31, 2013	60 months of collected data *Example:* 2019-2023 ACS 5-year estimates *Date collected between:* January 1, 2019 and December 31, 2023
Data for areas with populations of 65,000+	Data for areas with populations of 20,000+	Data for areas with populations of 20,000+	Data for all areas
Smallest sample size	Smallest sample size	Larger sample size than 1-year	Largest sample size
Less reliable than 3-year or 5-year	Less reliable than 5-year	More reliable than 1-year; less reliable than 5-year	Most reliable
Most current data	Most current data	Less current than 1-year estimates; more current than 5-year	Least current

Data Cleaning and Standardization

Data Merging

Joining annual education datasets from 2010 to 2022 to annual illegal pet incidents in NYC with time variable (in year format as the key)

Variable Selection

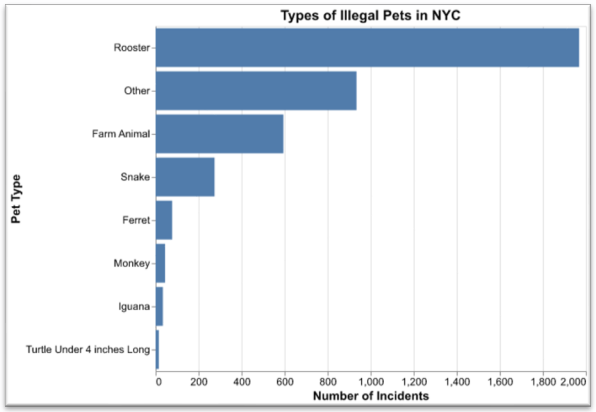
Selecting the education attainment of the population aged 25 and older

Selecting variables related to incident locations and illegal pet types to connect the two datasets.

Incident Normalization

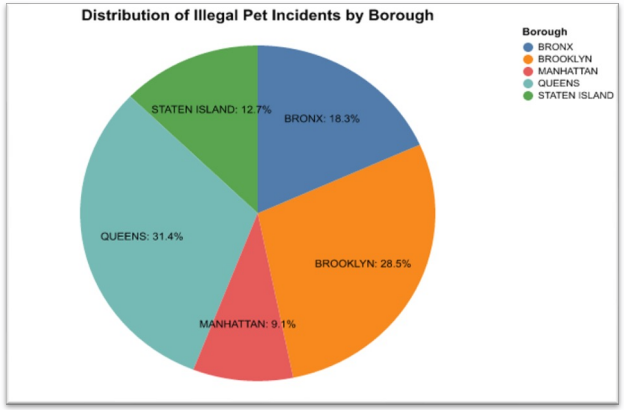
Normalizing incident counts per 10,000 people for fair comparisons because some borough might have higher population and higher incident count.

Visualizations



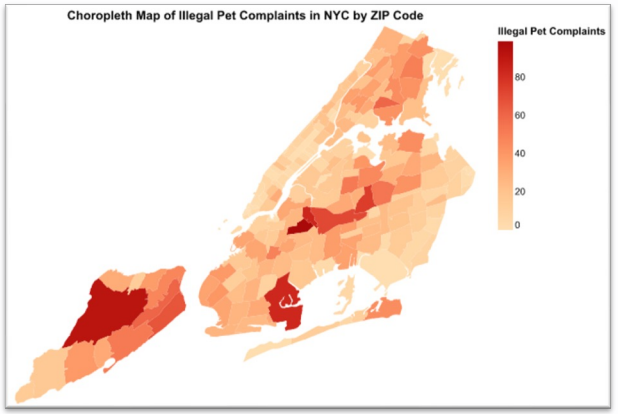
Types of Illegal Pets

A bar chart reveals roosters as the most common illegal pet type.



Distribution of Illegal Pet Incidents

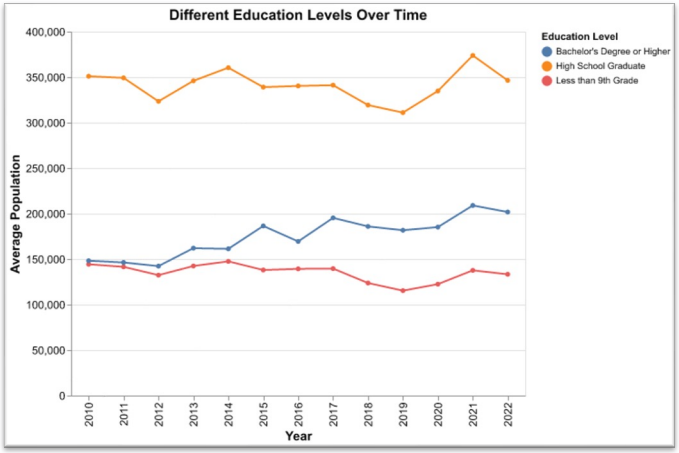
Pie chart highlights the geographic distribution of incidents, with Brooklyn and Queens leading in complaint counts, reflecting their population density.



Spatial Patterns of Incidents

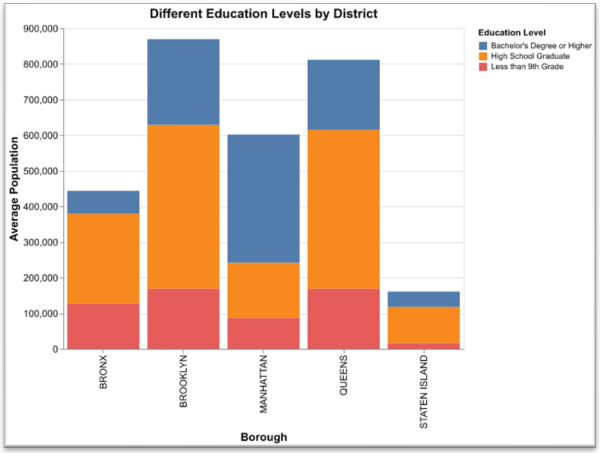
Choropleth map shows ZIP-level variability in illegal pet complaints, highlighting dense clusters.

Visualizations



Education Attainment Trend

Line plot illustrates trends in educational attainment (e.g., high school graduates, bachelor's degrees) over the study period



Education Levels by Borough

Bar chart highlights uneven distribution of bachelor degree holders among boroughs, with Manhattan leading the total share and amount

Regression Analysis Results

-0.0466

Less than 9th Grade

Negative correlation between education level and incident rate.

-0.0336

High School Graduates

Slight negative correlation between education level and incident rate.

-0.0400

Bachelor's Degree

Negative correlation between education level and incident rate.

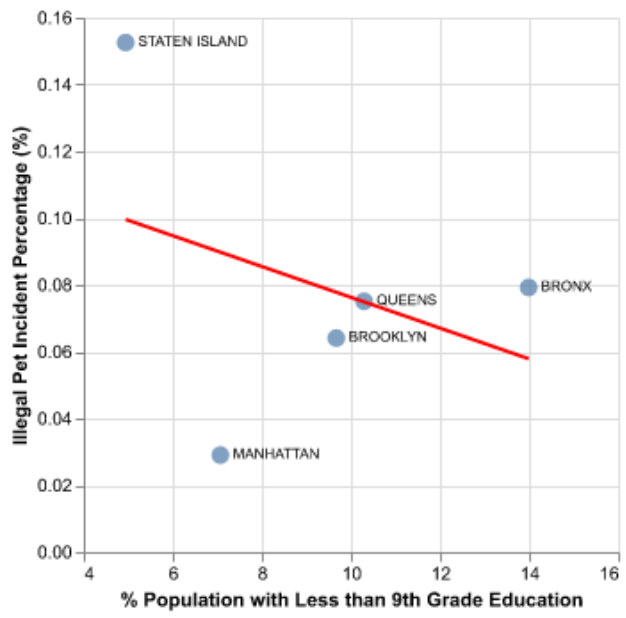
OLS Regression Results

Dep. Variable:	Incident_Percentage(%)	R-squared:	0.999
Model:	OLS	Adj. R-squared:	0.997
Method:	Least Squares	F-statistic:	474.2
Date:	Tue, 03 Dec 2024	Prob (F-statistic):	0.0337
Time:	17:00:05	Log-Likelihood:	27.108
No. Observations:	5	AIC:	-46.22
Df Residuals:	1	BIC:	-47.78
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	1.9435	0.160	12.153	0.052	-0.088	3.975
pop_25_less_9th_percentage	-0.0466	0.003	-14.102	0.045	-0.089	-0.005
pop_25_hs_grad_percentage	-0.0336	0.003	-10.392	0.061	-0.075	0.007
pop_25_bach_plus_percentage	-0.0400	0.003	-12.152	0.052	-0.082	0.002

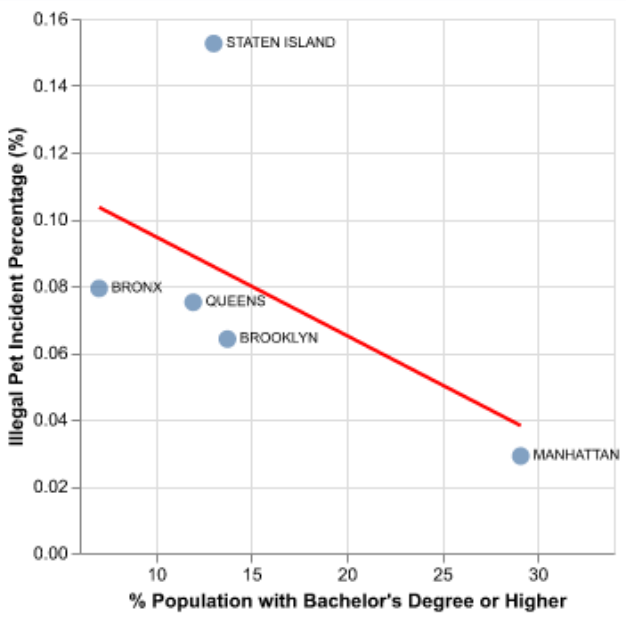
Omnibus:	nan	Durbin-Watson:	1.873
Prob(Omnibus):	nan	Jarque-Bera (JB):	0.799
Skew:	-0.967	Prob(JB):	0.671
Kurtosis:	2.698	Cond. No.	4.58e+03

Regression Analysis Results



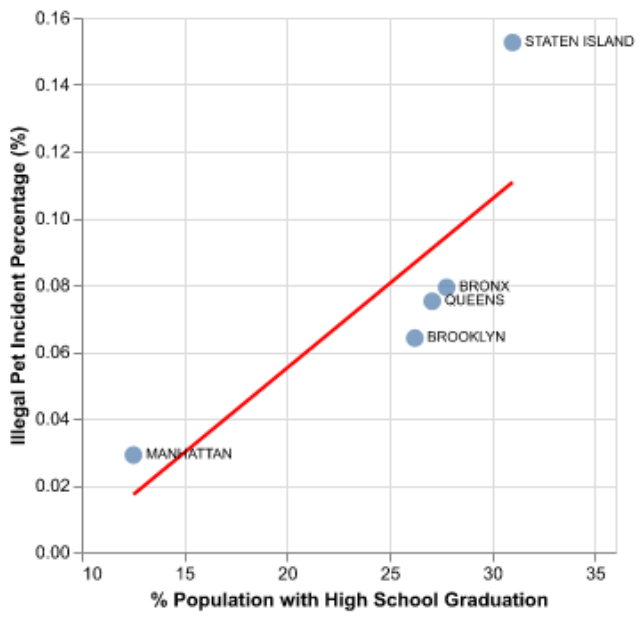
-0.0466

Less than 9th Grade



-0.0336

High School Graduates



-0.0400

Bachelor's Degree

NLP Sentiment and Resolution Analysis

"Warning Issued"

Most common resolution

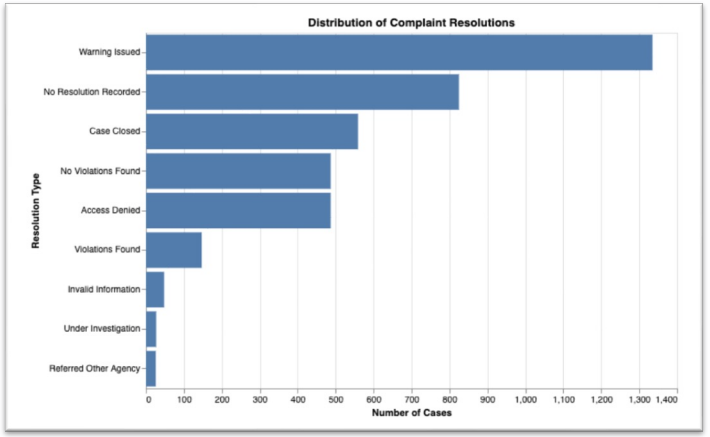
"Access Denied"

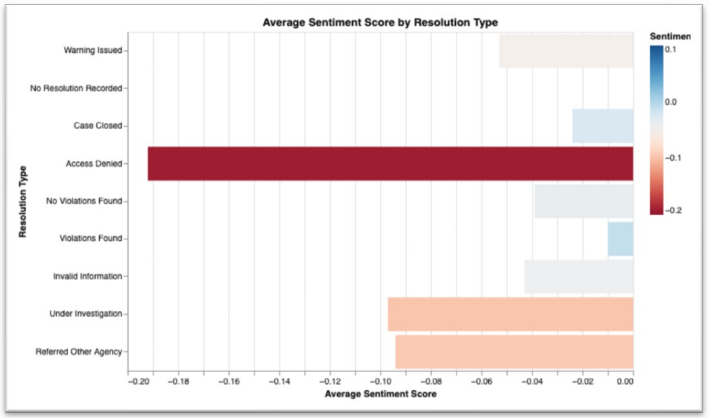
Most negative tone

Slightly Negative to Neutral

Overall tone

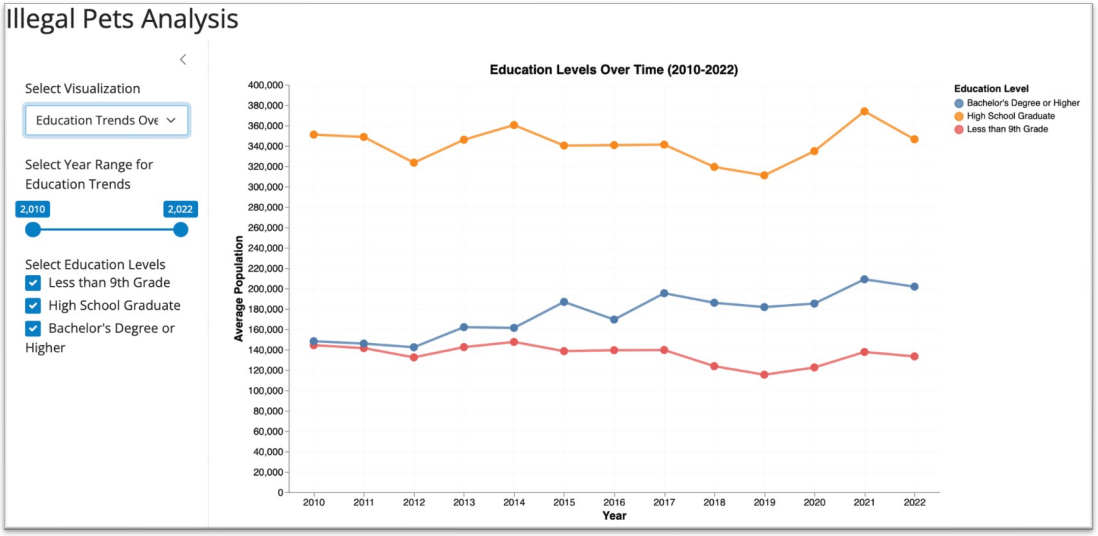
reflecting a professional yet firm communication style



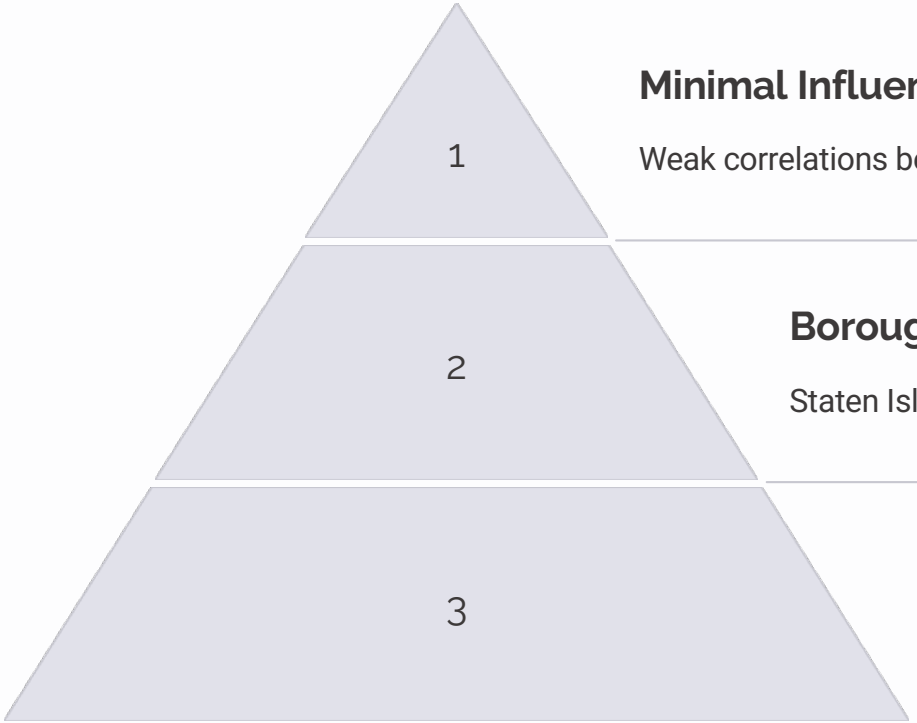


Shiny App with Interactions

With interactive **toggles** and **checkboxes**, **dropdown menu**, and **range sliders**, users can filter data by **specific years, year ranges, or education levels.** These features allow them to explore the spatial and socioeconomic factors affecting illegal pet incidents.



Key Findings and Limitations



Minimal Influence

Weak correlations between education and illegal pet ownership.

Borough Variability

Staten Island exhibits higher-than-predicted incident rates.

Spatial Clusters

ZIP-level analysis highlights areas with dense complaint clusters, not evenly distributed

Policy Implications and Next Steps

1

Community Outreach

Educational campaigns in high-incident areas.

2

Enhanced Enforcement

Strengthening enforcement in areas with dense clusters to avoid ”access denied” problem.

3

Interactive Tools

Developing tools to engage the public and policymakers.

Future Directions for Research

Neighborhood-Level Data

Examining localized trends and variations of education.

1

Illegal Pets Type

Examining the popularity of certain illegal pets type (rooster, snake, etc.)

3

2

Socioeconomic Factors

Exploring income, housing, and cultural influences.