

# West Nile Virus in Chicago

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# Problem: WNV Spreading

- ▶ Cases 2017
- ▶ Treatment
- ▶ Prevalence
- ▶ Spread

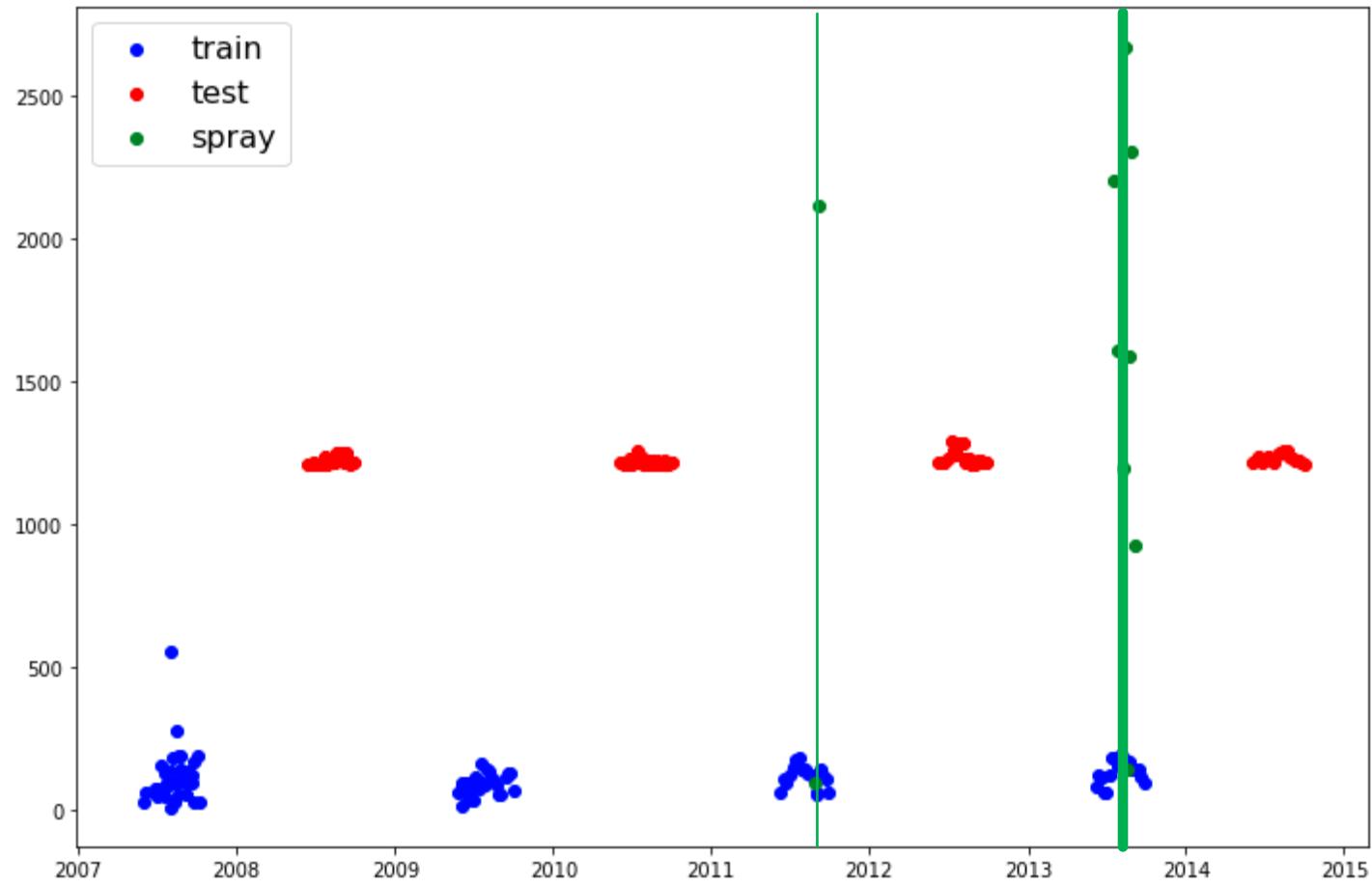


# Data

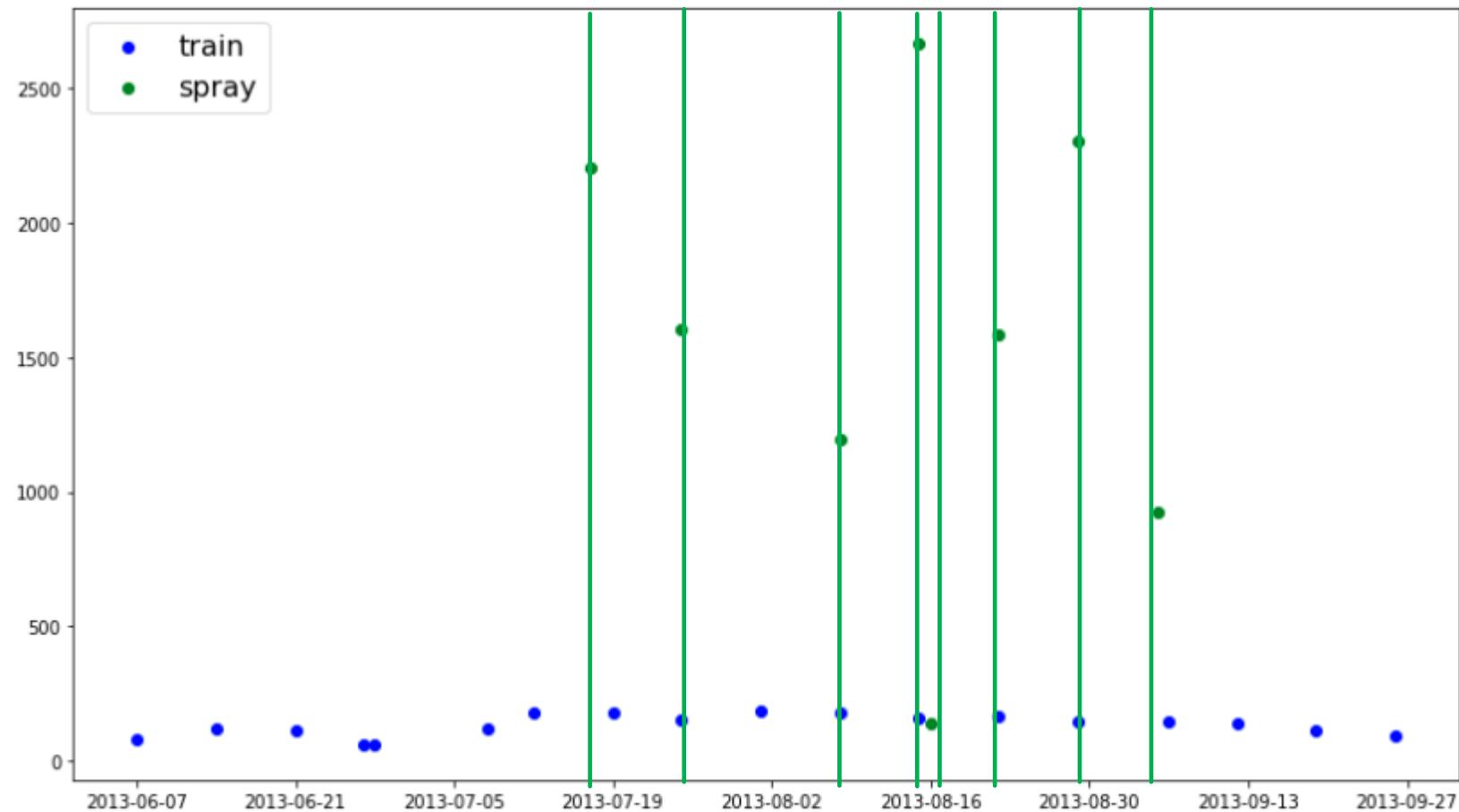
- ▶ Trapped
- ▶ Spray
- ▶ Date
- ▶ Latitude & Longitude
- ▶ Weather
- ▶ Altitude
- ▶ Daylight Time



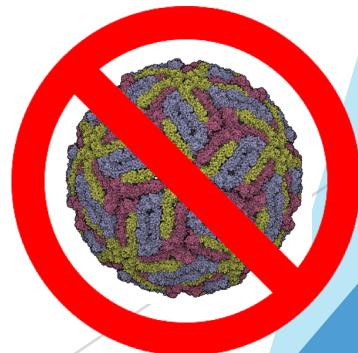
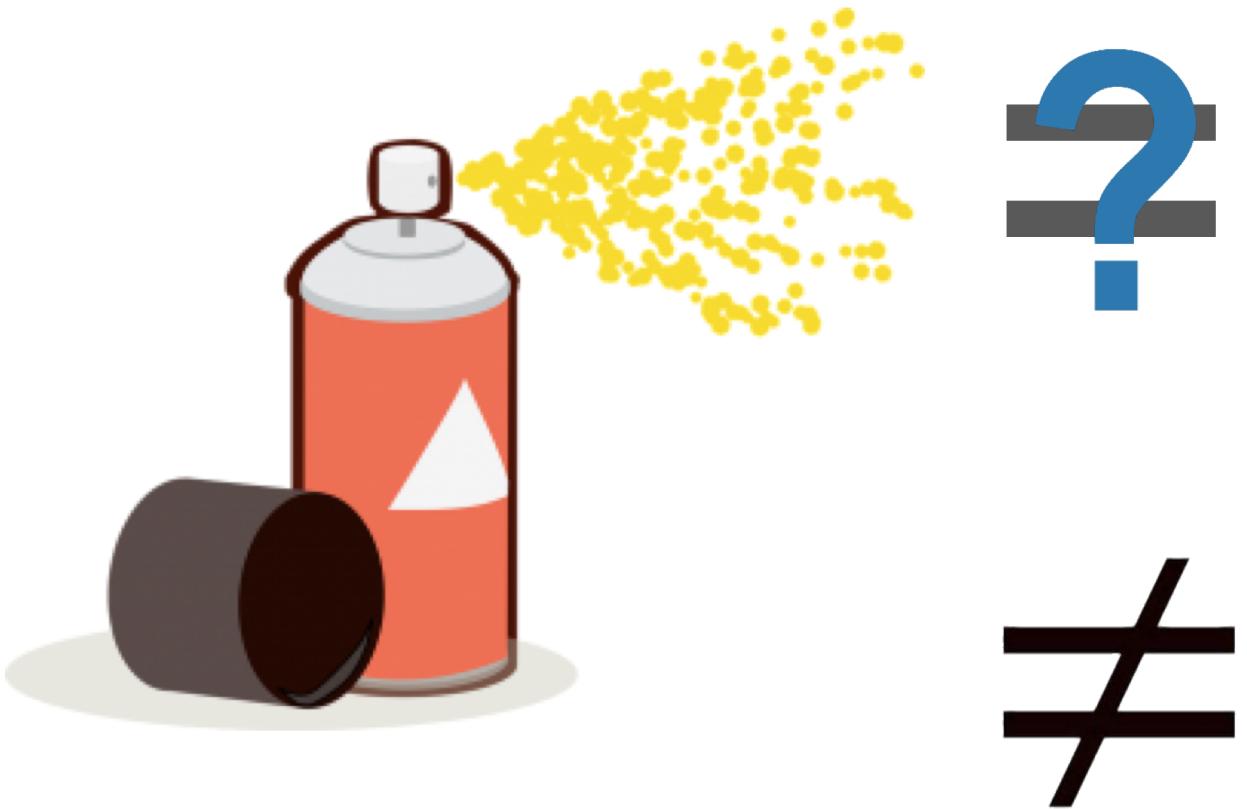
# Spraying History



# Spraying - 2013



# Problem Spraying



# Philosophy

- ▶ 2013 Spray Data
- ▶ 2007 through 2015
  - ▶ Over Sampling
  - ▶ Feature Engineering
  - ▶ Built a Model

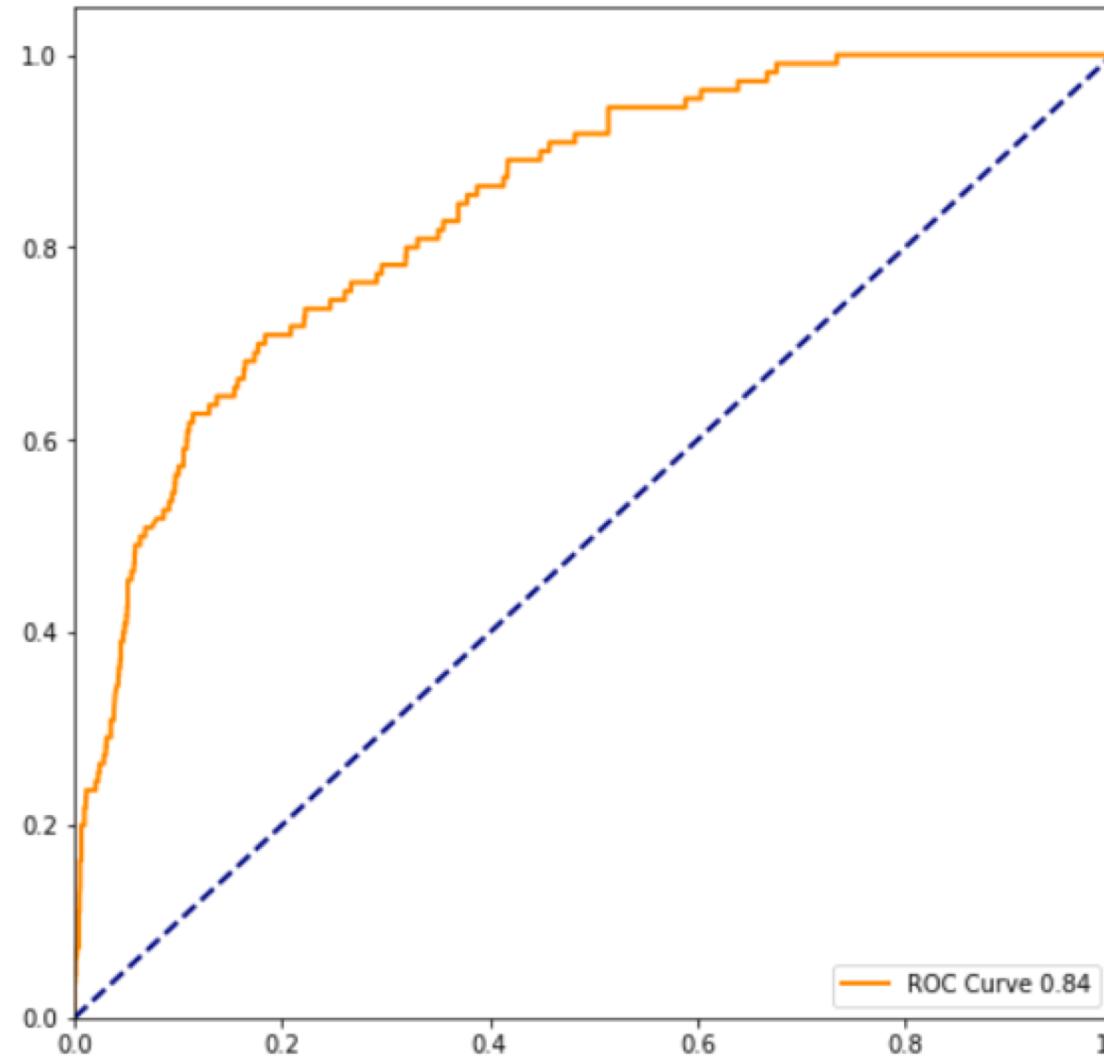
# 2007 to 2015 Logistic Model

	Train	Test
Accuracy	85.8%	91.8%
F1-Score	46.5%	37.4%
Neg Predictive Power	88.4%	95.9%
Pos Predictive Power	62.1%	35.8%
Sensitivity	37.2%	39.1%
Specificity	95.5%	95.3%

# Logistic Confusion Matrix

	Actual Positive	Actual Negative
Predicted Positive	492	300
Predicted Negative	831	6,318

# AUC ROC Curve



# What to do?



# Cost Benefit Analysis

- ▶ Spraying
  - ▶ Not worked
- ▶ Continued Monitoring and Warning
  - ▶ 2017
    - ▶ 8 Deaths
    - ▶ 90 Human Cases ~ \$135,000 Per year
    - ▶ Researchers \$70,000 Per Person + Trap Locations ~ \$1,000,000
    - ▶ Project High Cost to Maintain

# Thank You