The Geography of Overdoses and Dealer Locations

Opportunities for Law Enforcement Response in the City of Worcester, Massachusetts
Data Sources

- Worcester Police Department
  - Overdose Location Data from August 2014 to October 2015
  - Class A Dealer Arrests from January to November 2015
    - There are 67 Class A drugs listed in the General Laws of the Commonwealth of Massachusetts. The list includes heroin.
  - All Crime Incidents September 2014 to September 2015

- 2014 Census Data
  - Worcester County Census Tract data was pulled from the United States Census Bureau American FactFinder website by accessing the URL factfinder.census.gov
Descriptive Analysis is a Start...
FBI Boston - Worcester RA
City of Worcester
Overdose Fatalities
1 August 2014 to 2 October 2015

Fatalities
- Fatal (43)
- Non-Fatal (999)
FBI Boston - Worcester RA
City of Worcester
Arrest Location for Class A Substances
January to November 2015

Number of Arrests per Location
- 1
- 2
- 3
- 4 - 5

Created by Nikki Clemente - B3 Squad 67, FBI, 817-786-2955, Nikki.Clemente@FBI.gov, December 05, 2015. Derived from data provided by Worcester Police Department.

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...But We Need To Be Explanatory...
Methodology: Organizing the Data

Crime Data (7)

- Overdose Location
- Class A Arrest Location
- All crime incidents organized into 5 Groups:
  - Gang Incidents
  - Drug Violations
  - Sex Crimes or Related to Sexual Conduct
  - Violence or Impersonation
  - Property or Financial Crimes
Methodology: Organizing the Data
Census Data (6)

- Education Levels
  - High School Graduate
  - Bachelors or More
- Employment
  - Unemployment Total
- Gender and Age
  - Male/Female 17 or under
  - Male/Female 18 to 29
  - Male/Female 30 to 49
  - Male/Female 50 to 64
  - Male/Female 65 or over
- Age
  - Total 17 or under
  - Total 18 to 29
  - Total 30 to 49
  - Total 50 to 64
  - Total 65 or over
- Household Income
  - <$10,000
  - $10,000 to $34,999
  - $35,000 to $74,999
  - $75,000 to $149,999
  - >$150,000
Methodology: Organizing the Data

Census Data Continued

- Housing Units
  - Total Vacant
  - Total Occupied
- Race
  - White
  - African American
  - Native American, Alaskan
  - Asian
  - Native Hawaiian, Pacific Islander
  - Other
  - Two or more
Methodology: Identifying Key Explanatory Variables

Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Relationship to Overdose Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population with a Bachelors degree or higher</td>
<td>Positive</td>
</tr>
<tr>
<td>Total African American</td>
<td>Positive</td>
</tr>
<tr>
<td>Gang Incidents</td>
<td>Positive</td>
</tr>
<tr>
<td>Drug Violations</td>
<td>Positive</td>
</tr>
<tr>
<td>Sex Based Crimes</td>
<td>Positive</td>
</tr>
<tr>
<td>Total Male population 65 and older</td>
<td>Negative</td>
</tr>
<tr>
<td>Total population 17 and under</td>
<td>Negative</td>
</tr>
</tbody>
</table>

- **Model 1: Dependent Variable is Overdose Location**
  - Exploratory Regression performed on 12 independent variables; 7 variables explained 93% of OD locations
  - Ordinary Least Square Regression Analysis performed to examine the specific relationship with the dependent variable; Results indicate that Geography matters (Koenker Statistic was statistically significant)
  - Geographic Weighted Regression run on the variables and each variable reviewed; Rasters created to reflect scoring
**Model 2: Dependent Variable is Dealer Location**

- Exploratory Regression performed on 12 independent variables; 7 variables explained 79% of Dealer locations.

- Ordinary Least Square Regression Analysis performed to examine the specific relationship with the dependent variable; Results indicate that Geography does not matter (Koenker Statistic was not statistically significant).

- Each variable reviewed and rasters created to reflect scoring.

**Table 2**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Relationship to Dealer Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population with a high school diploma</td>
<td>Positive</td>
</tr>
<tr>
<td>Total number of Vacant Housing Units</td>
<td>Positive</td>
</tr>
<tr>
<td>Total Native Hawaiian and Pacific Islanders</td>
<td>Positive</td>
</tr>
<tr>
<td>Total Race of two or more</td>
<td>Positive</td>
</tr>
<tr>
<td>Drug Violations</td>
<td>Positive</td>
</tr>
<tr>
<td>Total Male population 17 and Under</td>
<td>Negative</td>
</tr>
<tr>
<td>Household Income of less than $10,000</td>
<td>Negative</td>
</tr>
</tbody>
</table>
Even Better If We Can Be Predictive
Questions?

Nikki Clemente
Desk: 508-798-1512
Email: nikki.clemente@ic.fbi.gov