An abstract network diagram consisting of numerous black dots (nodes) connected by thin black lines (edges). The nodes are distributed across the left and center of the image, forming a complex, interconnected web. The density of the connections is higher in some areas, creating a sense of depth and complexity. The background is white, and the overall aesthetic is clean and modern.

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# OPEN DATA, EPIDEMIOLOGY AND HOMICIDES IN BALTIMORE, 2005 TO 2017

Rene F. Najera, MPH, DrPH

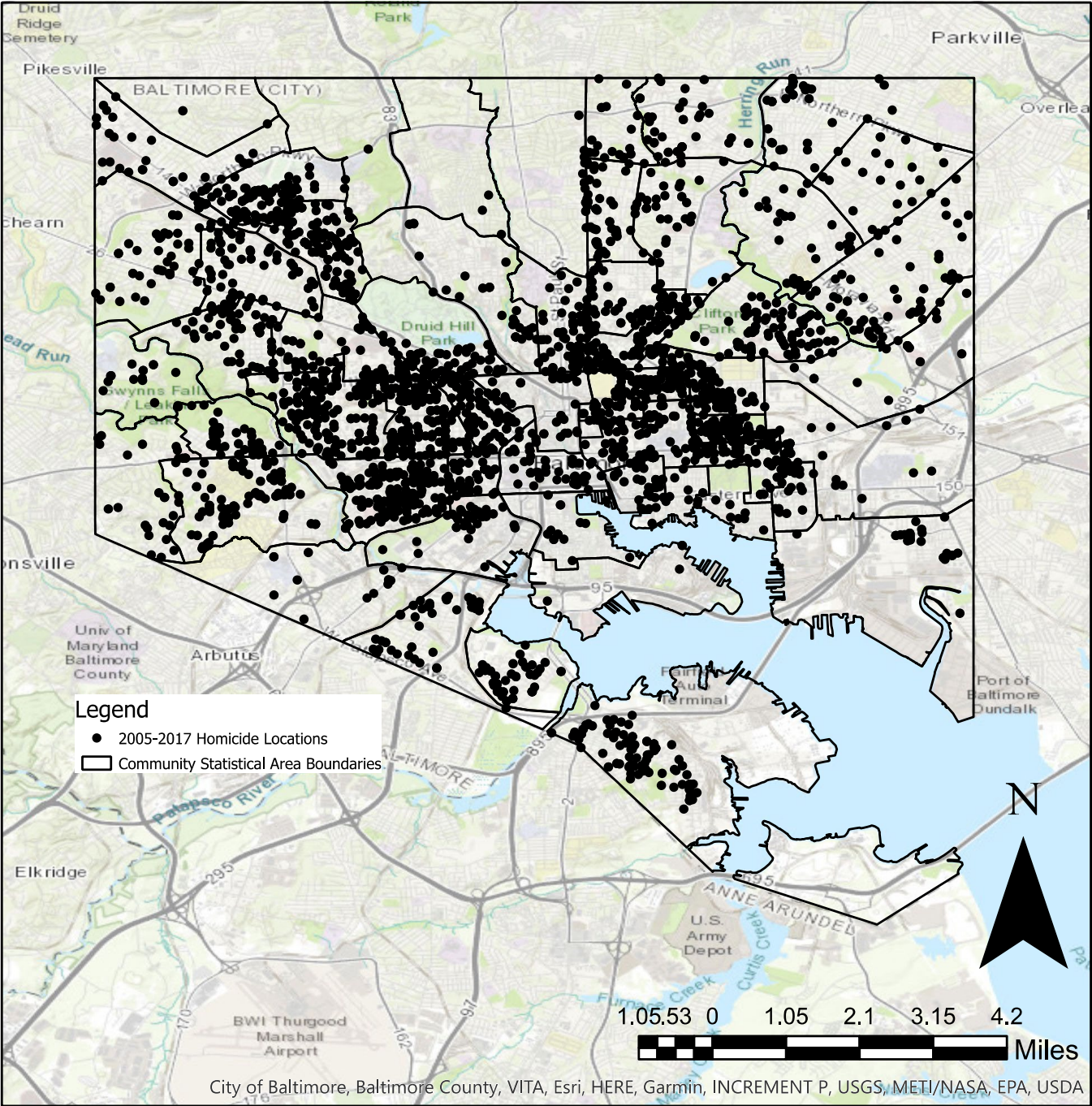
Johns Hopkins University

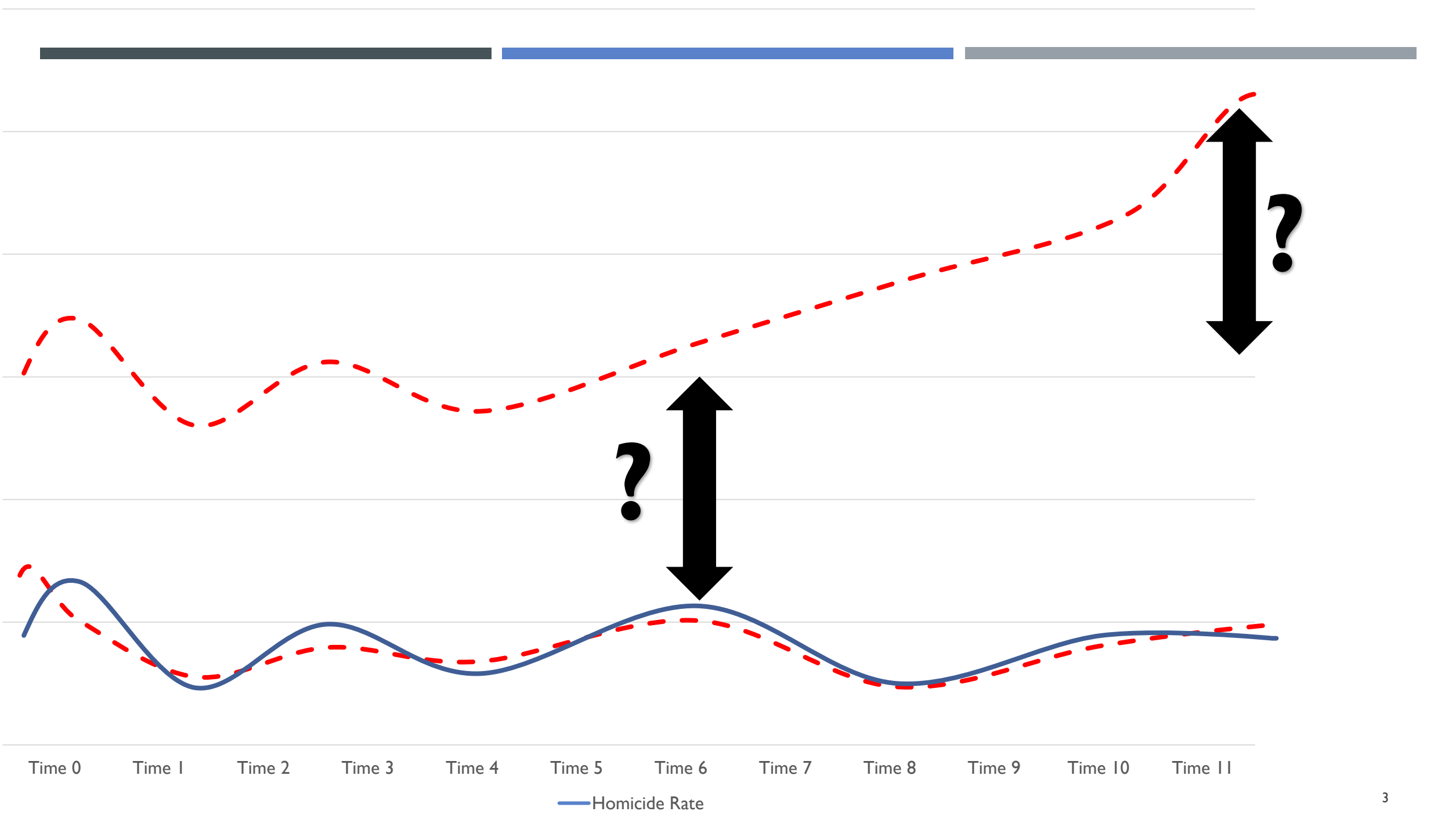
Fairfax County Health Department

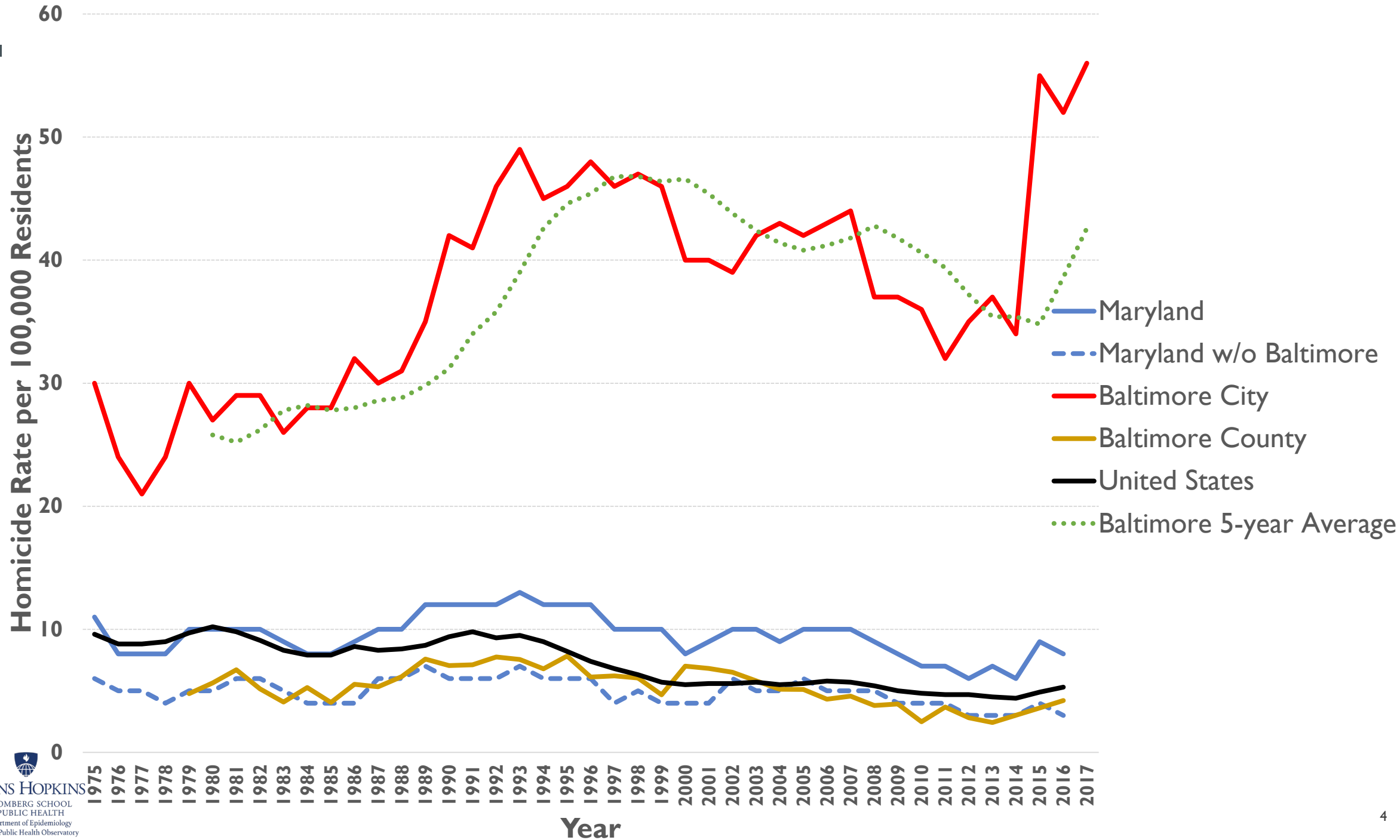
# VIOLENCE S

# IOUS DISEASES

Clustering, Spread, an



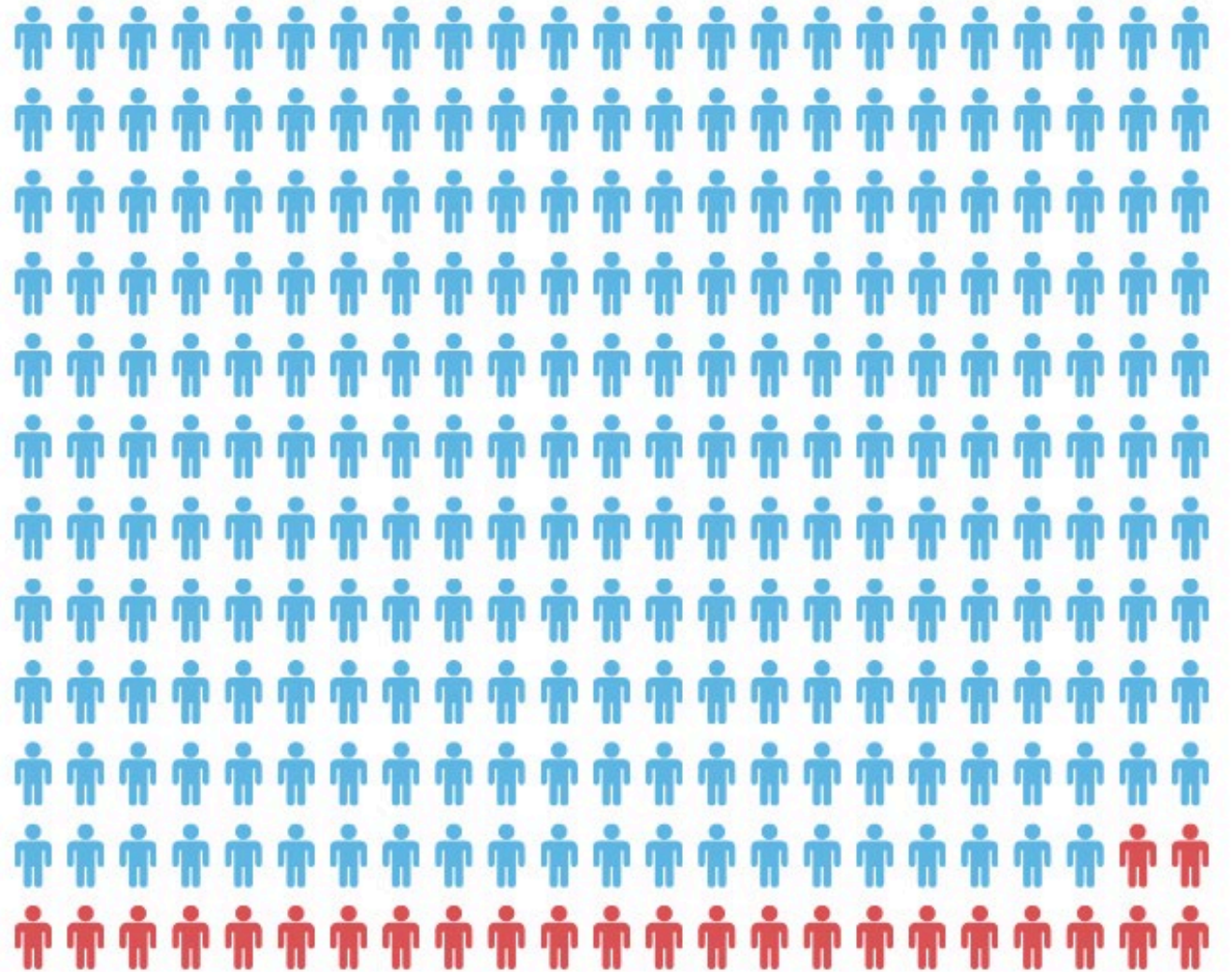






91% MEN

N = 3,366



● MEN ● WOMEN

# 85% AFRICAN AMERICAN MEN

N = 3,366

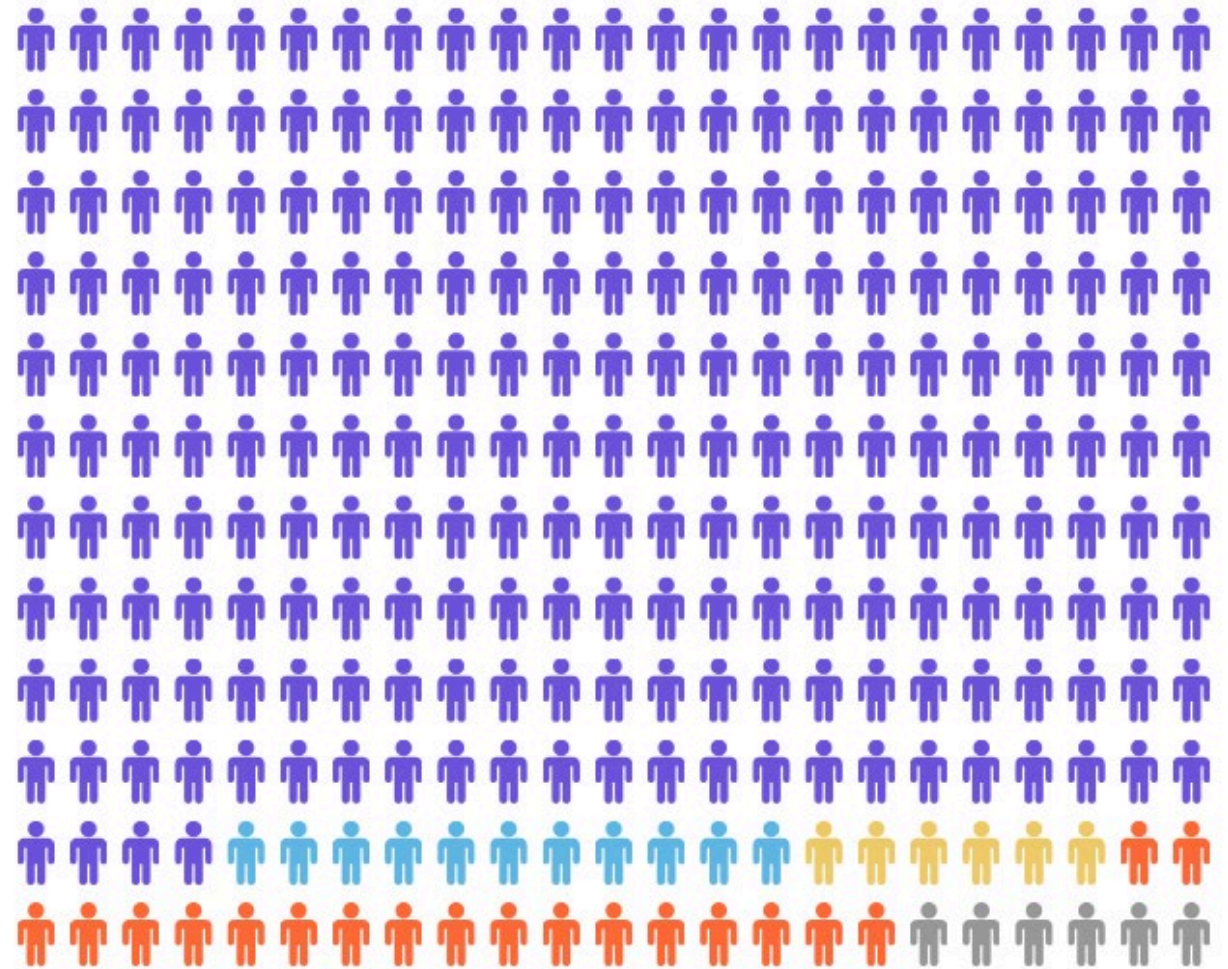
African American Women = 7%

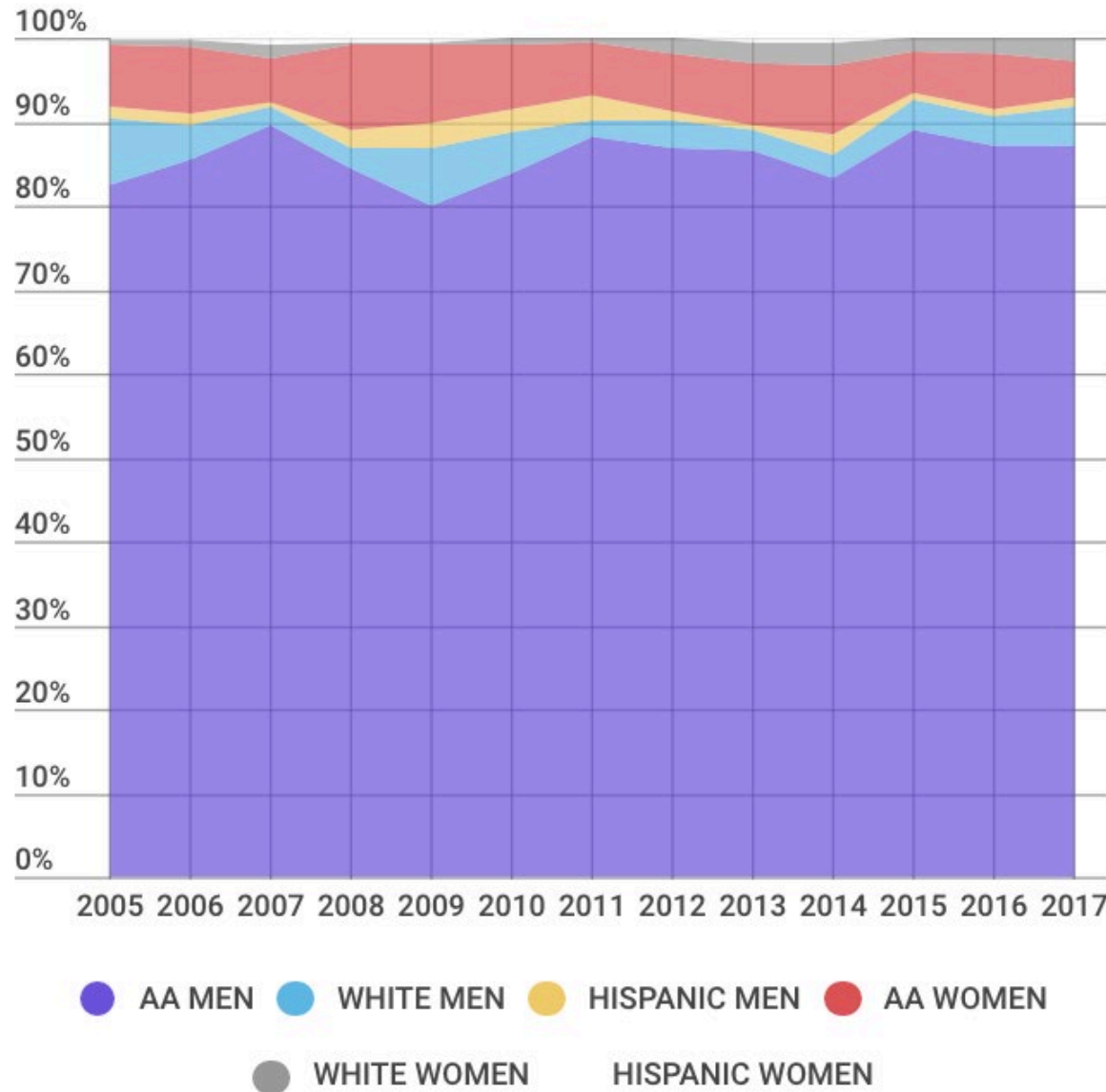
White Men = 4%

Hispanic Men = 2%

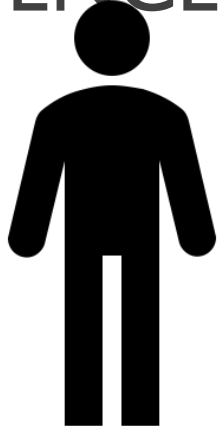
White Women = 2%

Hispanic Women = <1%

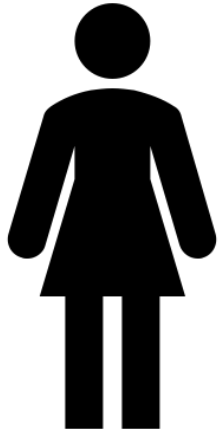




# INCIDENCE RATE PER 100,000 RESIDENTS (AGE ADJUSTED)



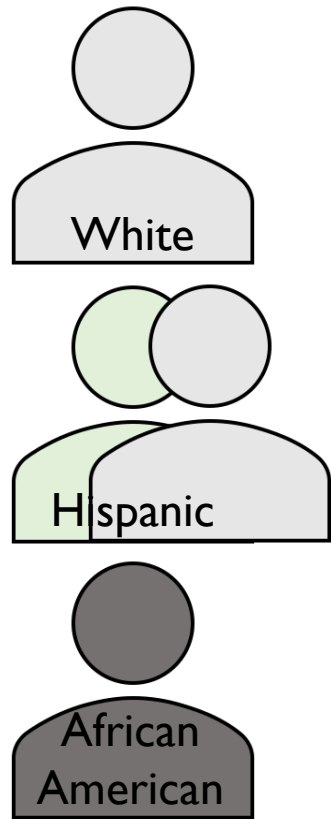
~75 per year per 100,000 residents



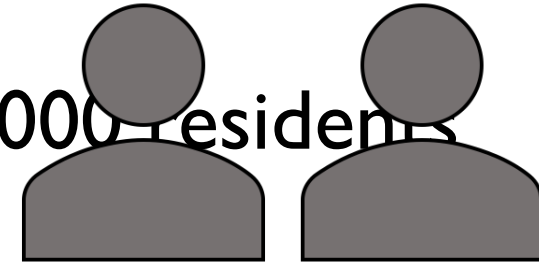
$\times 11 =$   
~6.8 per year per 100,000 residents



# INCIDENCE RATE PER 100,000 RESIDENTS (AGE ADJUSTED)

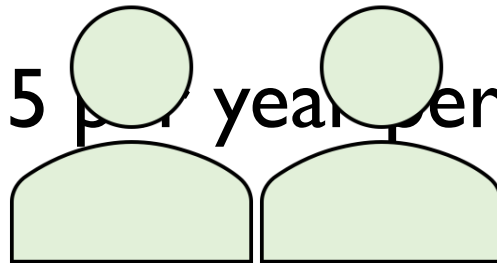


~about 7.8 per year per 100,000 residents

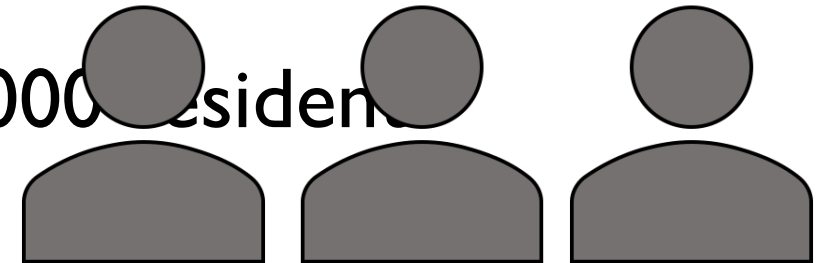


~about 15 per year per 100,000 residents

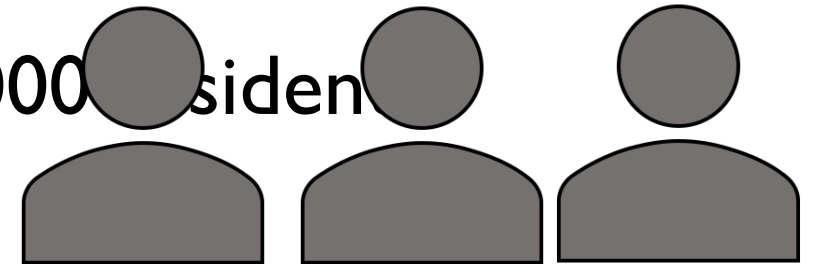
=

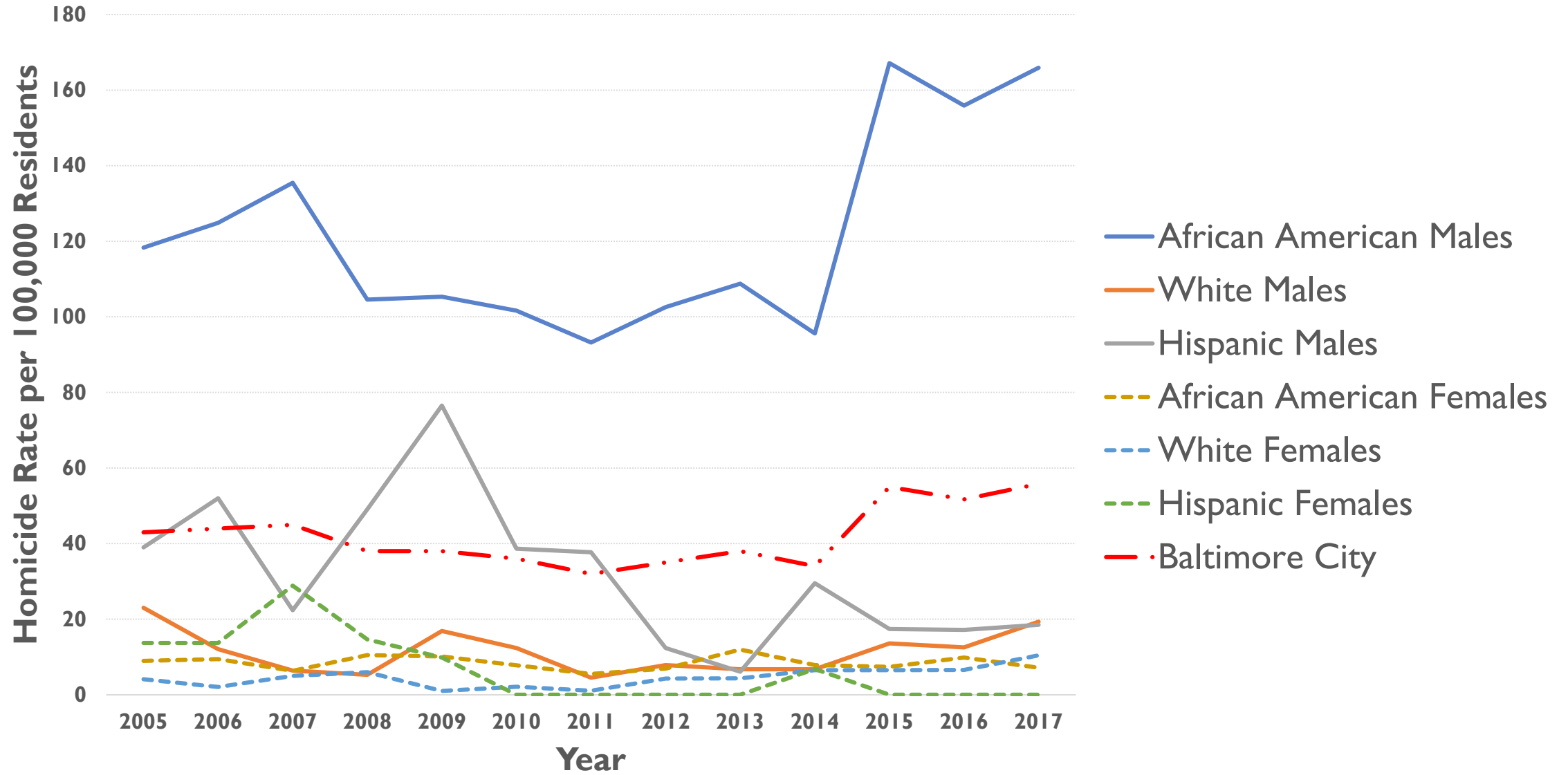


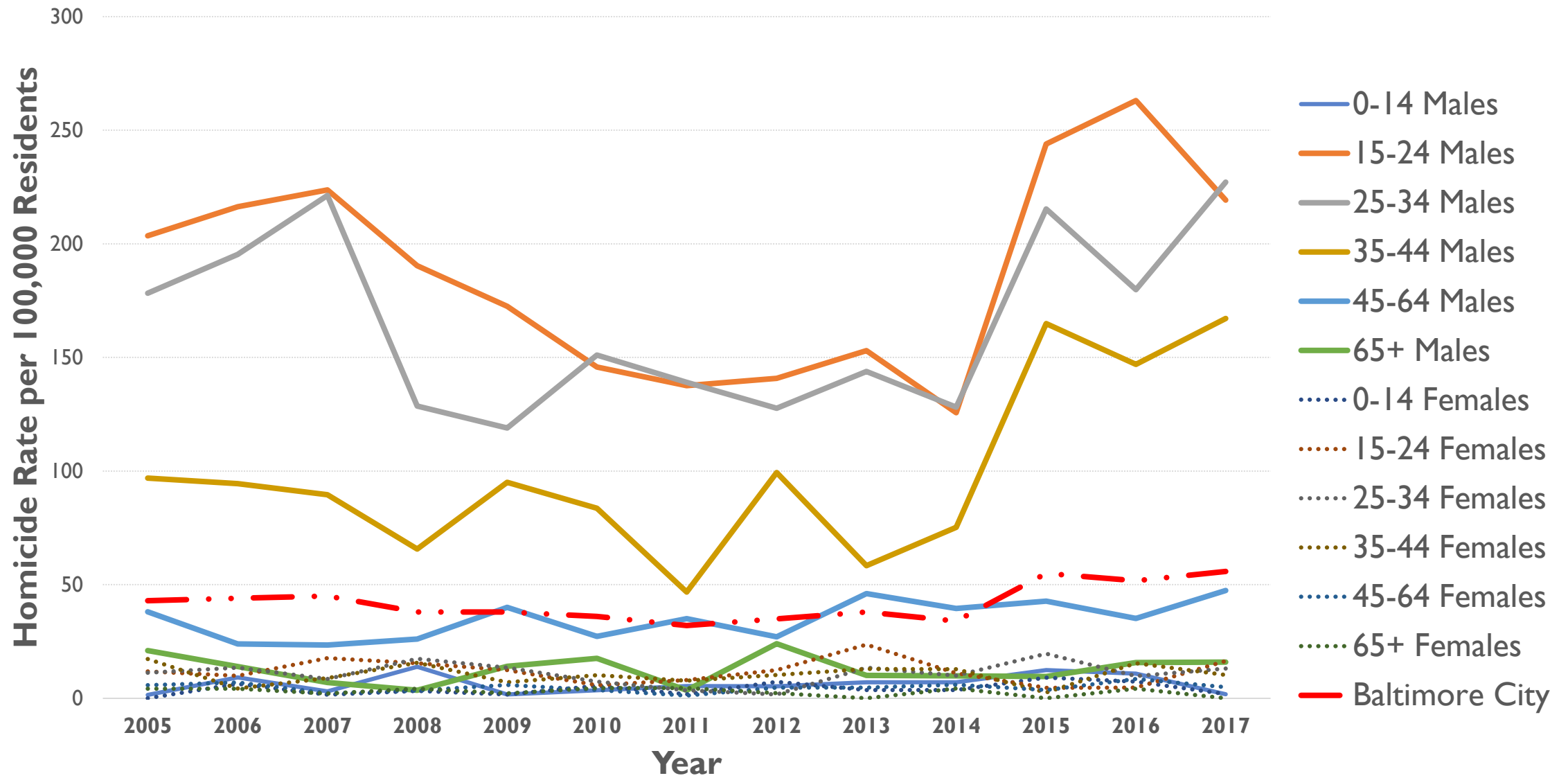
=



~about 62 per year per 100,000 residents





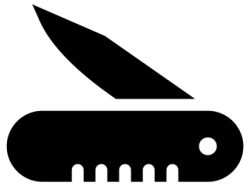


## CAUSE OF DEATH (N = 3,366)



Firearm

Total Firearm Homicides:  
**2,779 (83%)**



Stabbing

Total Homicides from Stabbing:  
**311 (9.2%)**

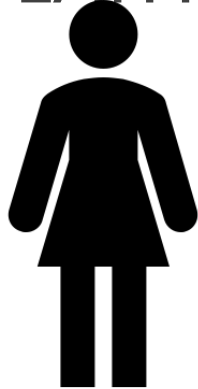


Other  
Causes

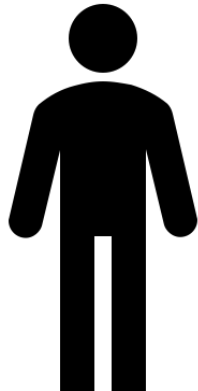
Total Homicides from Other:  
**276 (8.2%)**



## CAUSE OF DEATH (N = 3,366)

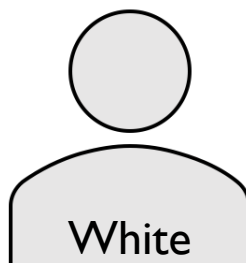


- 2005–2017: 157 (**51%**) of female homicide victims were killed by firearm
  - 58 (19%) by stabbing
  - 92 (30%) by other

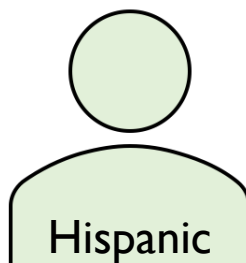


- 2005–2017: 2,622 (**86%**) of male homicide victims were killed by firearm
  - 253 (8%) by stabbing
  - 184 (6%) by other

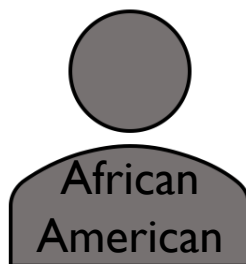
## CAUSE OF DEATH (N = 3,366)



- 2005–2017: 98 (**52%**) of white homicide victims were killed by firearm
  - 36 (19%) by stabbing
  - 5 (29%) by other



- 2005–2017: 34 (**60%**) of Hispanic homicide victims were killed by firearm
  - 11 (19%) by stabbing
  - 12 (21%) by other



- 2005–2017: 2,637 (**85%**) of African American homicide victims were killed by firearm
  - 259 (8%) by stabbing
  - 204 (7%) by other

# INDIVIDUAL CHARACTERISTICS: FEMALE VICTIMS

- Older than male victims\*
  - Female Average: 33
  - Male Average: 30
- More likely to be Intimate Partner Violence
  - 68% of IPV victims were female
  - 7% of non-IPV victims were female
- More likely to be killed at home
  - 33% of victims killed at home were female
  - 6% of victims not killed at home were female
- Less likely to be killed by firearm
  - 25% of victims killed by non-firearms were female
  - 5% of victims killed by firearm were female



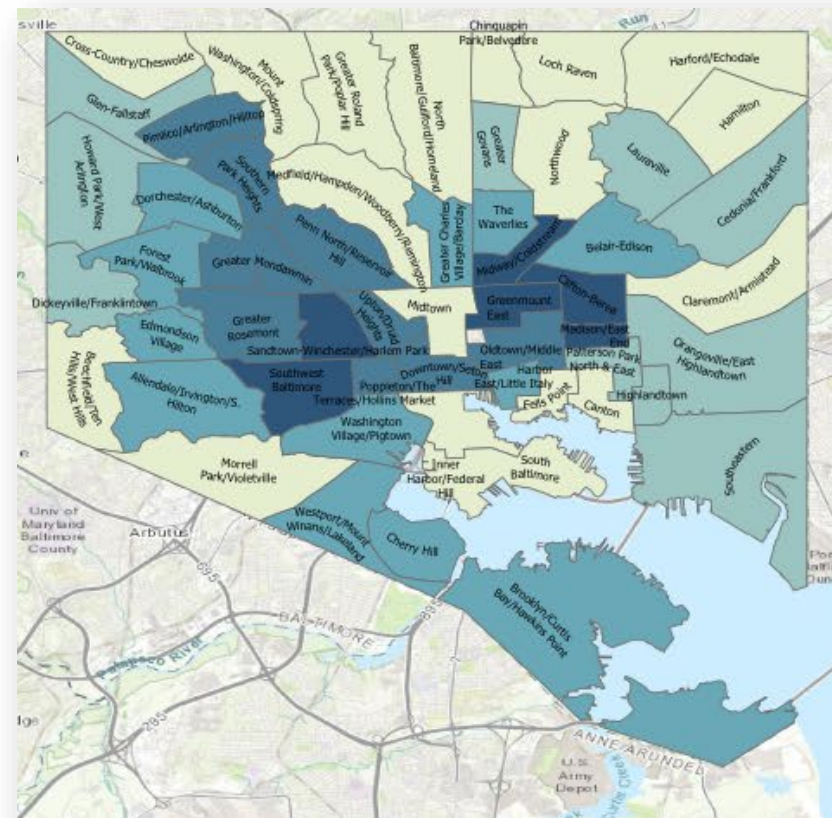
\*Statistically significant difference,  $p < 0.05$ , t-test

# INDIVIDUAL CHARACTERISTICS AND ODDS OF BEING A FIREARM HOMICIDE VICTIM

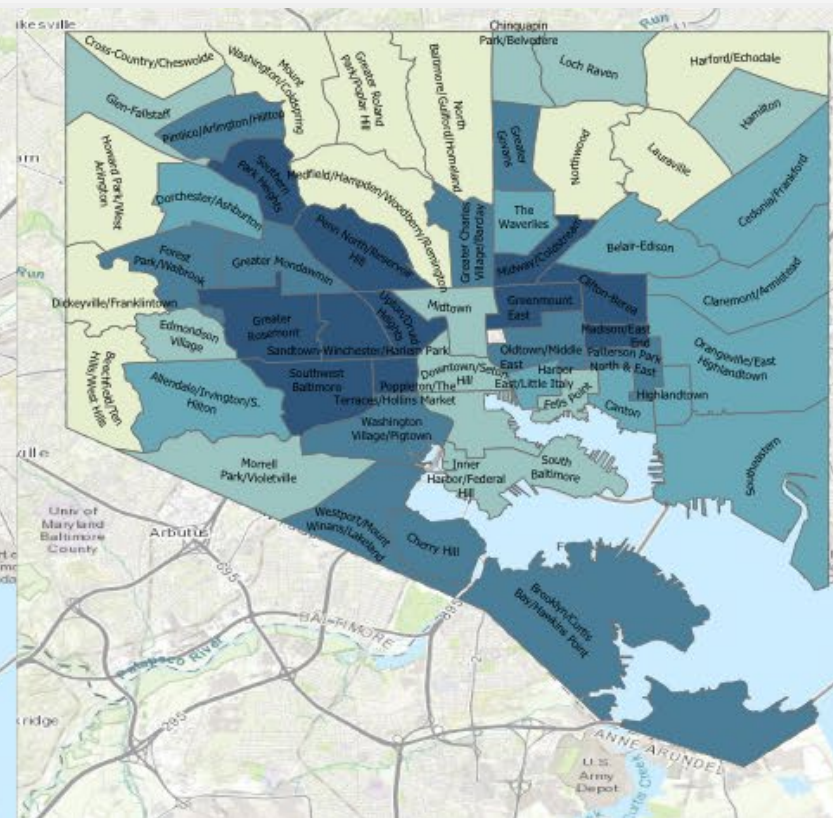
- Gender, Male: **4.65 (3.52 - 6.14)**
- Race, African American: **4.65 (3.52 - 6.14)**
- Age, Adult: **2.38 (1.70 - 3.35)**
- Education,  $\geq$  High School: 0.79 (0.61 - 1.04)
- Marital Status, Married: 0.89 (0.64 - 1.23)
- Presence of Alcohol, Present: **0.38 (0.26 - 0.56)**
- Employment, Employed: **0.71 (0.55 - 0.92)**
- Injured at Home, Yes: **0.26 (0.20 - 0.34)**
- Intimate Partner Violence, Yes: **0.24 (0.14 - 0.40)**
- Homeless, Yes: **0.14 (0.06 - 0.36)**
- Gang-Involved, Yes: 1.51 (0.51 - 4.48)

Adjusting for gender, race, and age  $\geq 18$   
**Bold is statistically significant,  $<0.05$**

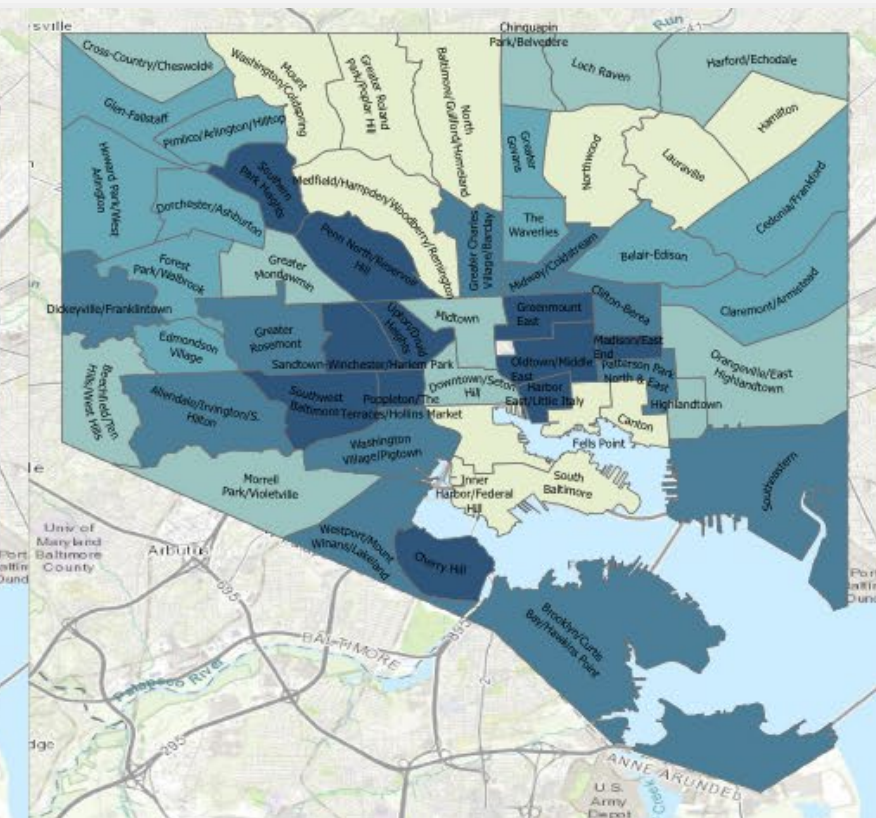




Homicide Rate



Index of Physical Disorder



Percent of Households Under Poverty Line

Community Statistical Area Indicator	Univariate Model Incidence Rate Ratio (95% CI) <sup>a</sup>
<b>Percentage of Households Living Under the Poverty Line (10% Increments)</b>	<b>1.73 (1.47 - 2.04)</b>
<b>Index of Physical Disorder</b>	<b>1.64 (1.49 - 1.80)</b>
<b>Average Number of Homicides in Neighboring CSAs (10 Homicide Increments)</b>	<b>1.19 (1.11 - 1.27)</b>
<b>Percentage of Residential Properties That Are Vacant and Abandoned (10% Increments)</b>	<b>1.77 (1.50 - 2.10)</b>
<b>High School Completion Rate (10% Increments)</b>	<b>0.39 (0.24 - 0.63)</b>
<b>Population Density (1,000 people per square mile increments)</b>	<b>1.05 (1.01 - 1.09)</b>
<b>Racial Diversity Index</b>	<b>0.89 (0.82 - 0.96)</b>

Results from negative binomial regression on homicide counts (rates) per Community Statistical Area (CSA) by CSA indicators. <sup>a</sup> Each row represents a univariate model. <sup>b</sup> Results represent a multivariable model. <sup>c</sup> Results from single, multivariable model with **Percentage of Households Living Under the Poverty Line, Physical Disorder, and Average Number of Homicides in Neighboring CSAs** as independent variables. (**Bold** indicates statistical significance at  $p \leq 0.05$  level.)

## WHAT DOES THE FINAL MODEL MEAN?



**10%** Households  
Under Poverty Level

21% Higher  
Homicide Rate



**20%** Households  
Under Poverty Level

# WHAT DOES THE FINAL MODEL MEAN?



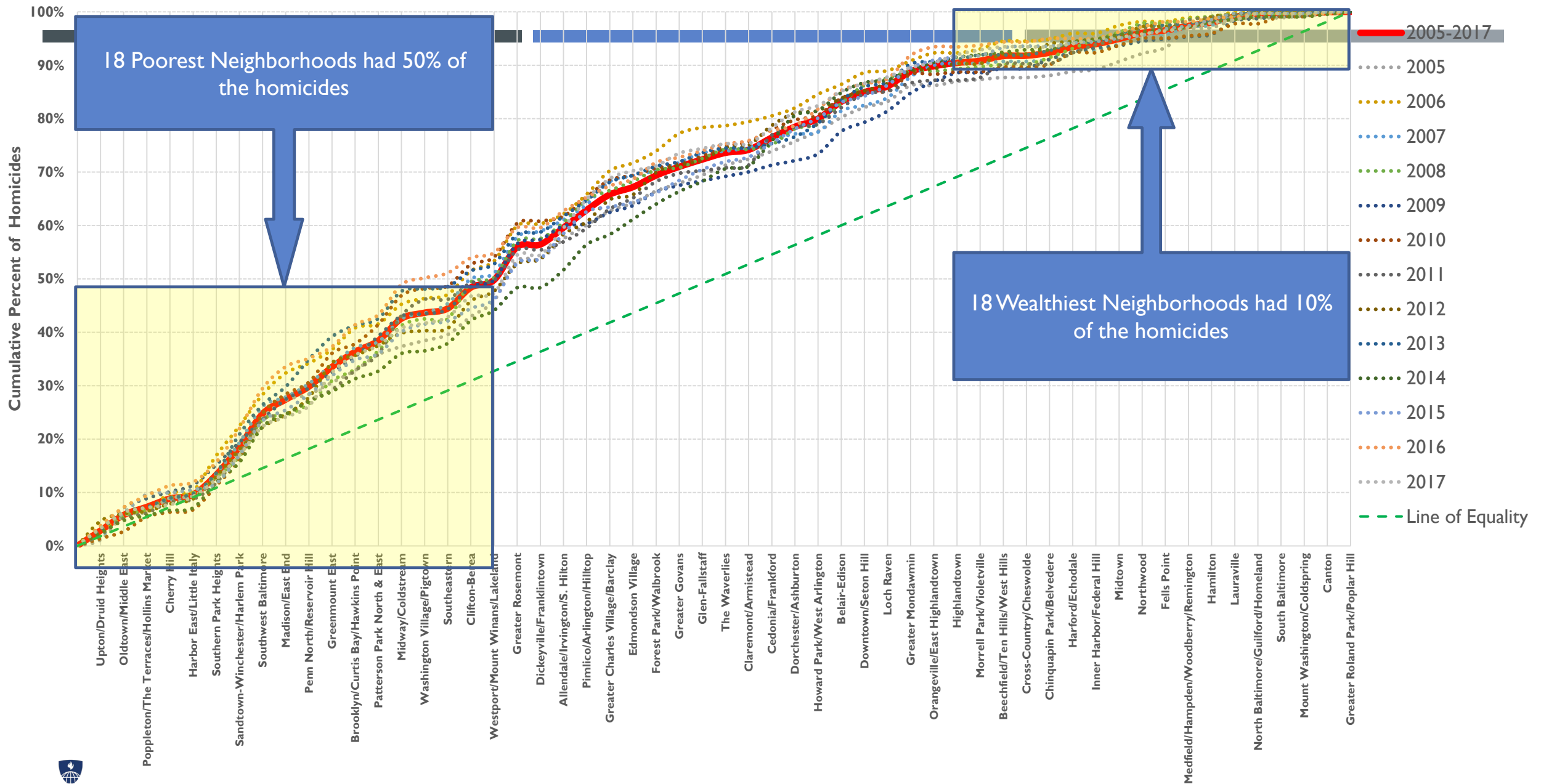
**1**  
Physical Disorder  
Index

47% Higher  
Homicide Rate



**2**  
Physical Disorder  
Index



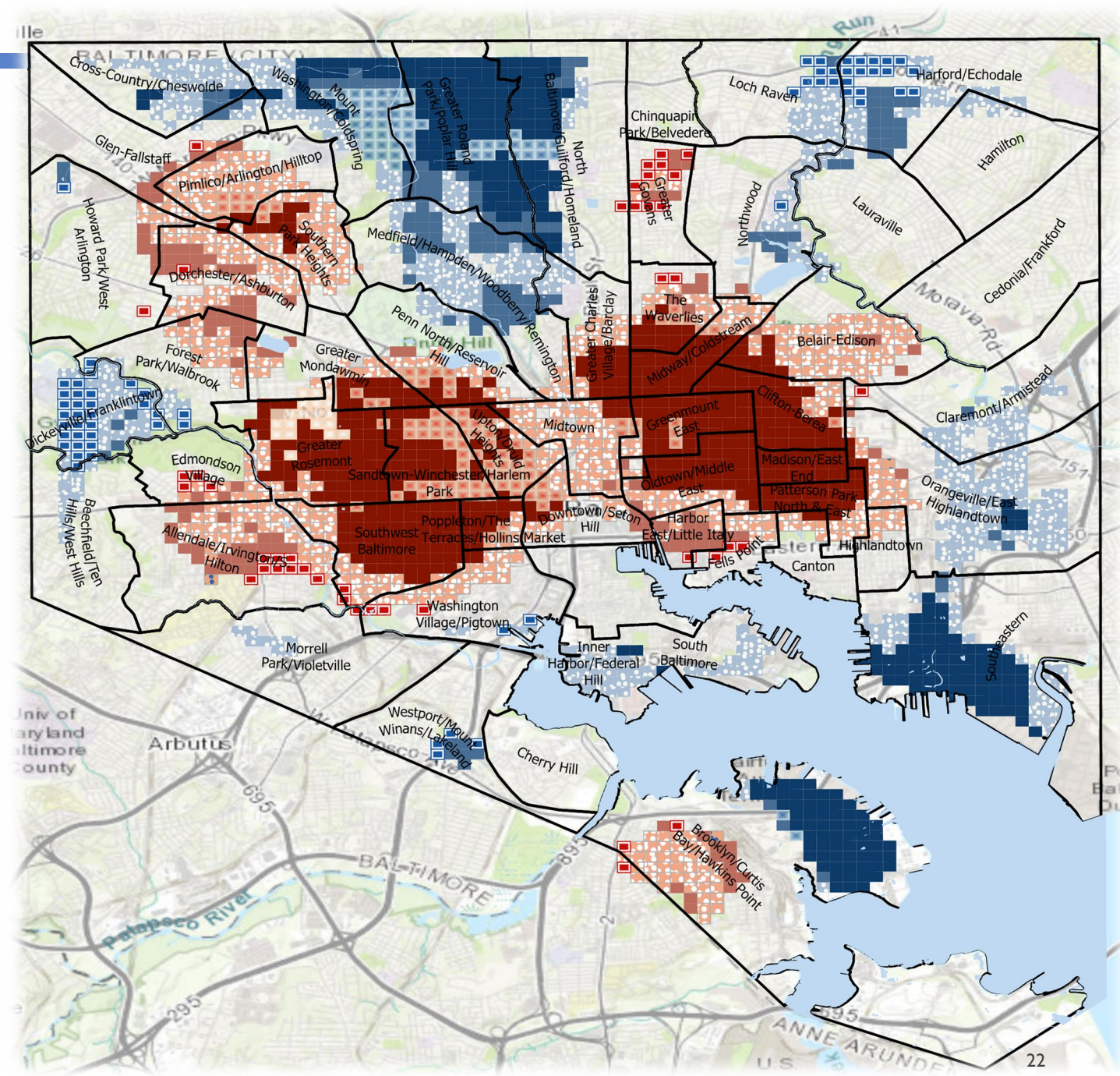


**Baltimore Community Statistical Areas in Order of Decreasing Proportion of Households Below the Poverty Line**

# EMERGING HOT SPOT ANALYSIS, 2005 TO 2017

Two large **persistent** hot spots over east and west Baltimore, surrounded by **sporadic** hot spots. In the west, there is an area of **intensifying** hot spots. Greater Govans shows many **new** hot spots.

There are some cold spots as well.  
There is a large area of **new** cold spots in Dickeyville/Franklintown and another in Loch Raven and Harford/Echodale.  
There are **persistent** cold spots in the more affluent CSAs in the north and in the less populated industrial areas.

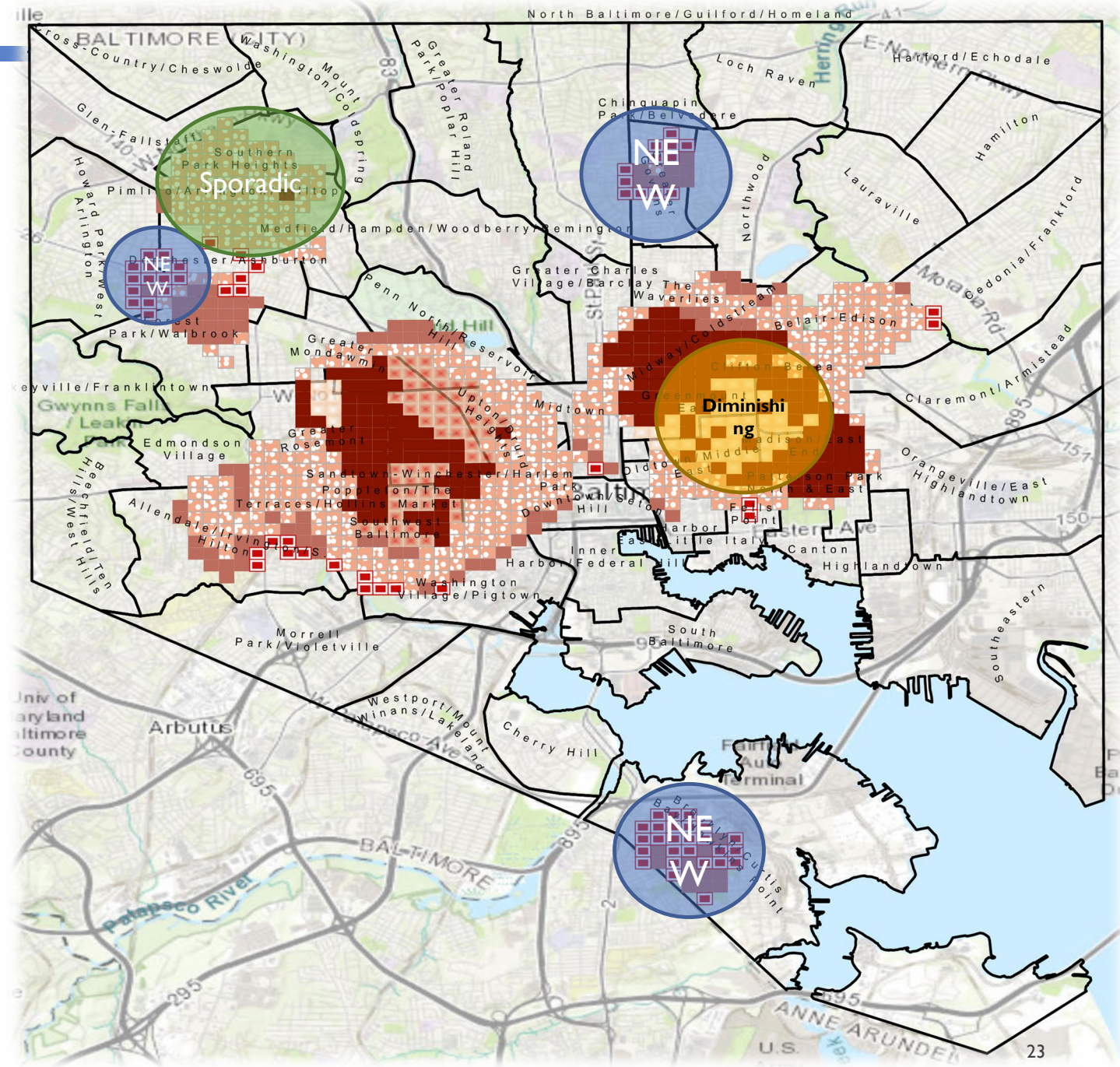




# EMERGING HOT SPOT ANALYSIS, BLACK MALES, 15-34, KILLED BY FIREARM, 2005 TO 2017

The **persistent** hot spots are now less so, replaced by **sporadic** and **new** hot spots. In the west, there are **intensifying** hot spots within the larger western hot spot. In the east, there are **diminishing** hot spots within the larger eastern hot spot.

There is also an area of **new** and **consecutive** hot spots in Greater Govans. There are also **new** and **consecutive** hot spots in Howard Park/West Arlington and Forest Park/Walbrook. And the area to the northwest is mostly **sporadic**.





## A Closer Look at Homicides in Baltimore Occurring Since 2005

Follow the instructions below to create a map of homicide locations in Baltimore. The map will update dynamically as you make your choices. You can then click on GRAPHS to see some graphs based on the data you chose, or click on TABLE to look at a searchable table of data.

Please note:

(1) Data obtained from official announcements by official sources (e.g. Baltimore Police Department). (2) Addresses are at the block level and may have been edited during the geocoding process. For example, jittering may have been used to prevent points from overlapping. (3) This map is not intended to identify individual victims or circumstances. (4) Some cases may have been later classified differently from what was originally stated in the official announcement. (5) By using this app, you agree to use these data responsibly.

[Visit my other projects on GitHub](#)

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Begin by choosing what you want the colors of the markers to represent (also determines the legend colors).

Choose Marker Categories

Next, choose the date (or date range) you want to explore.

01-01-2005 to 06-12-2019

View all events, or only those within a Community Statistical Area (CSA)? A CSA is an aggregation of neighborhoods with similar characteristics.

Select All

Add a layer with additional information.

Choose Layer

Next, pick the individual characteristics of the victims: Age, Race, Gender.

Age/Age Range



Race/Ethnicity

- ☒ African American
- ☒ White
- ☒ Hispanic
- ☒ Asian
- ☒ Other/Unknown

Gender

- ☒ Female
- ☒ Male

Pick the cause of death: Shooting, Stabbing, or Other.

Cause of Death

- ☒ Shooting
- ☒ Stabbing
- ☒ Other

Reset Selections

Data Sources:

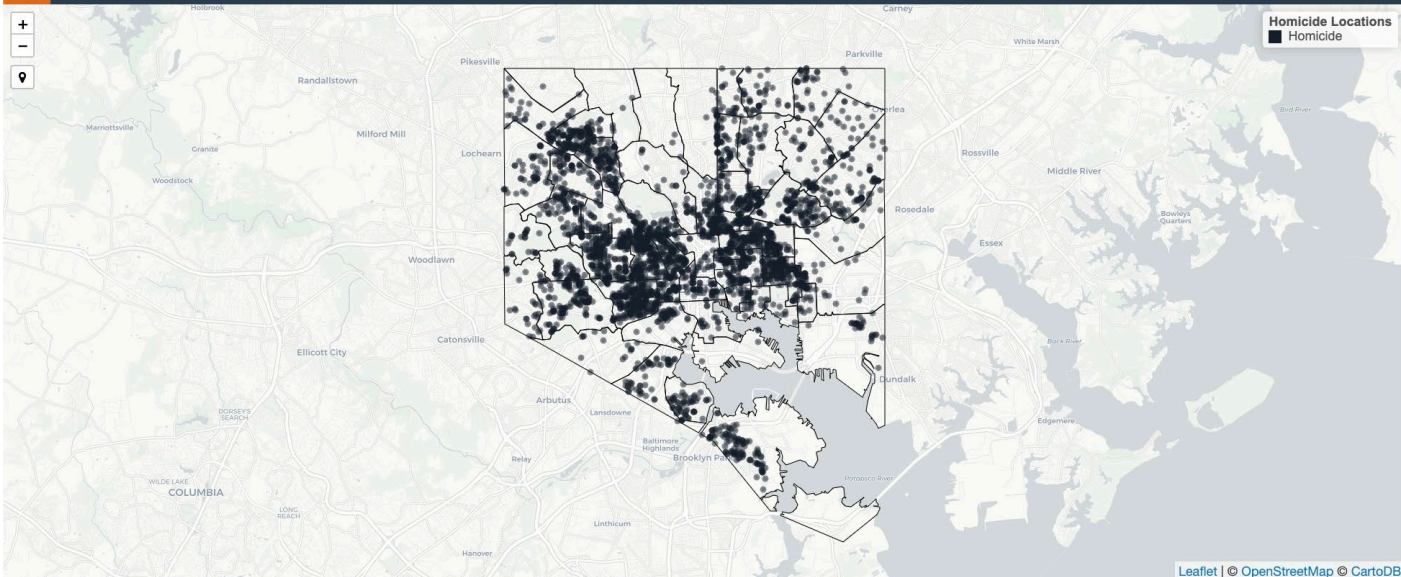
CSA shapefiles - [https://bnlajfi.org/vital\\_signs/data\\_downloads/](https://bnlajfi.org/vital_signs/data_downloads/)

Homicide Data - The Baltimore Sun (<https://homicides.news.baltimoresun.com/>) & own doctoral dissertation research.

This application's code is Copyright 2019, René F. Najera, DrPH.

App Version 1.3.3.1 | Released December 4, 2018 | Updated June 17, 2019

Map Graphs Data Table Change Log



[https://rfnajera.shinyapps.io/homicide\\_app/](https://rfnajera.shinyapps.io/homicide_app/)