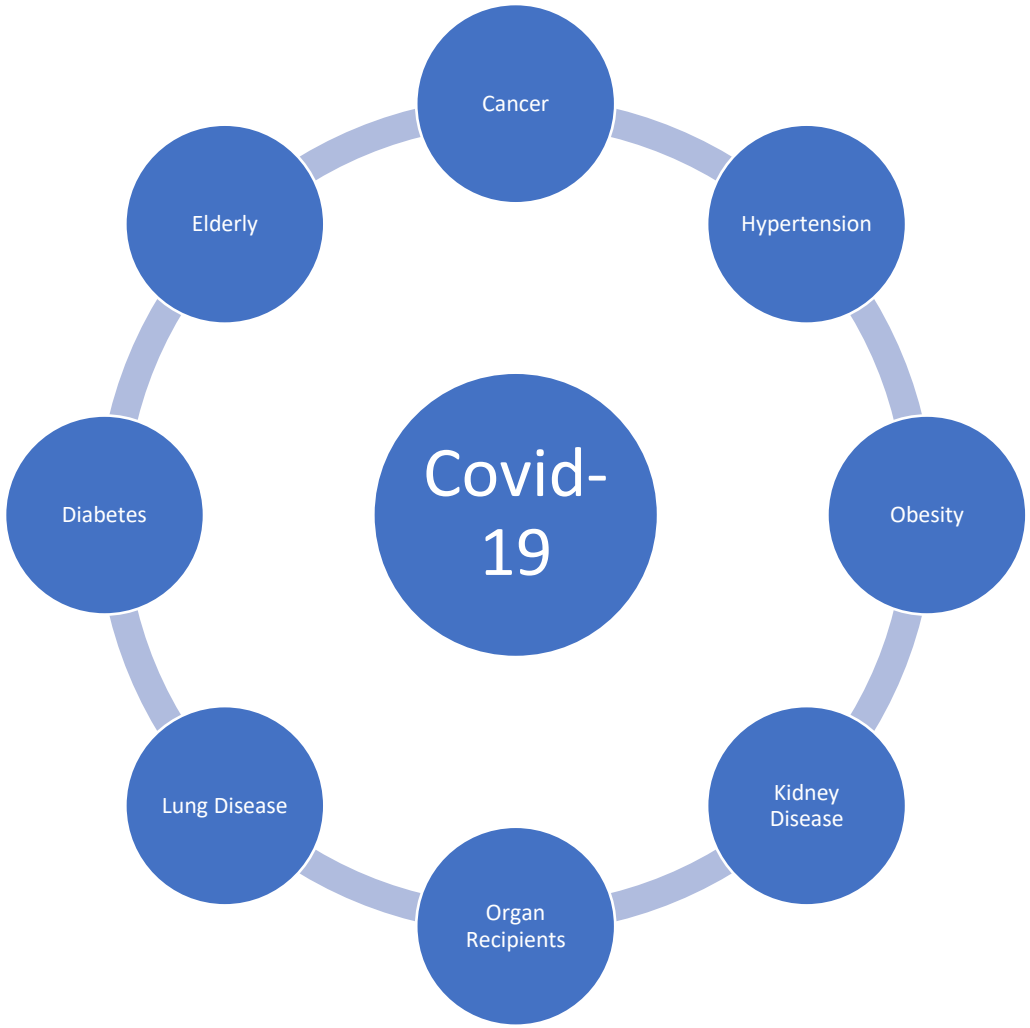
Exploring Socio-Ecological Mechanisms that Influence Mosquito-Borne Disease Vulnerability

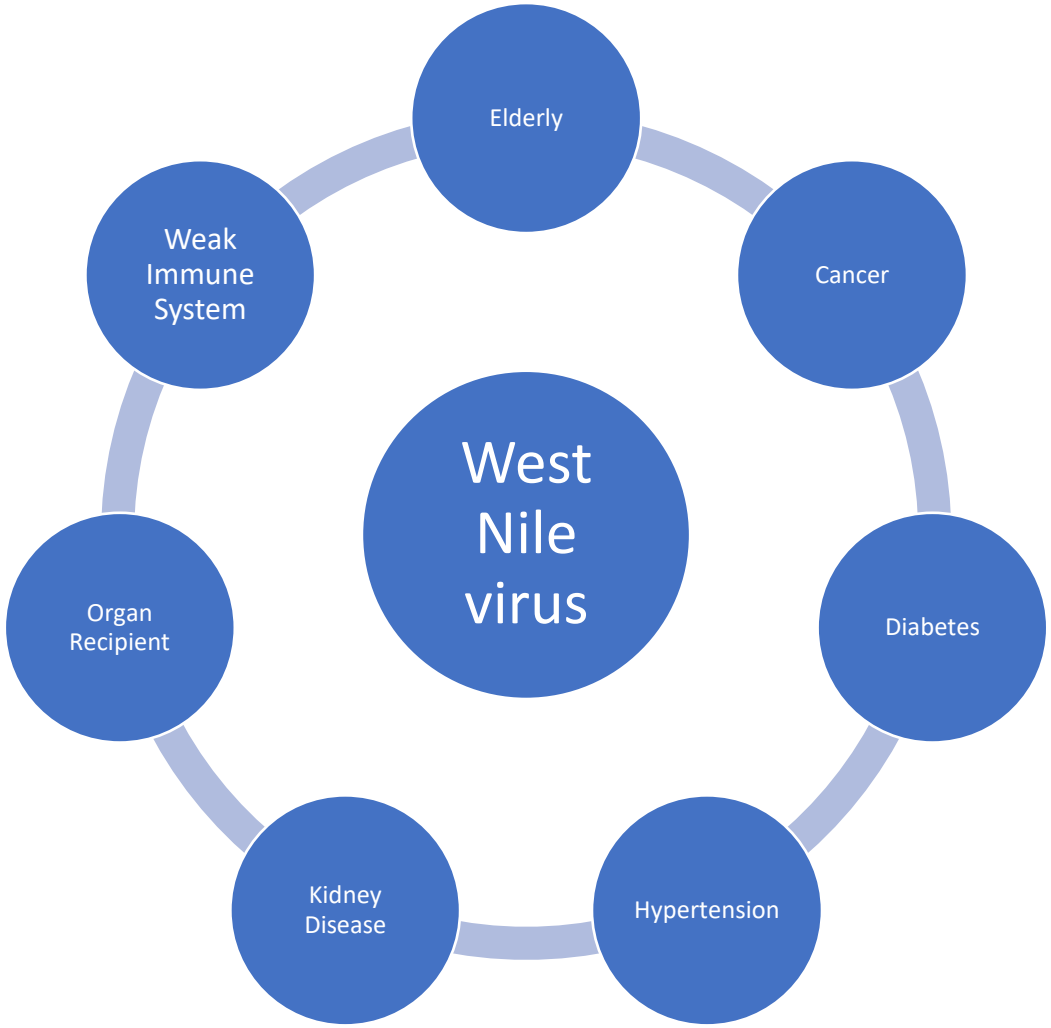
Ryan Levering

What Influences Vulnerability For Mosquito-Borne Disease?

1. Landscape elements such as land cover, natural and manmade wetlands, habitat fragmentation
2. Indicators of disease activity such as positive mosquito pools, surveillance data
3. Socioeconomic conditions relevant to human ecology

Who is Most At Risk?





Socioeconomic Risk Factors

- Disability
- Housing
- Healthcare Access
- Unemployment
- Education
- Poverty
- Minority Status

CDC Social Vulnerability Index

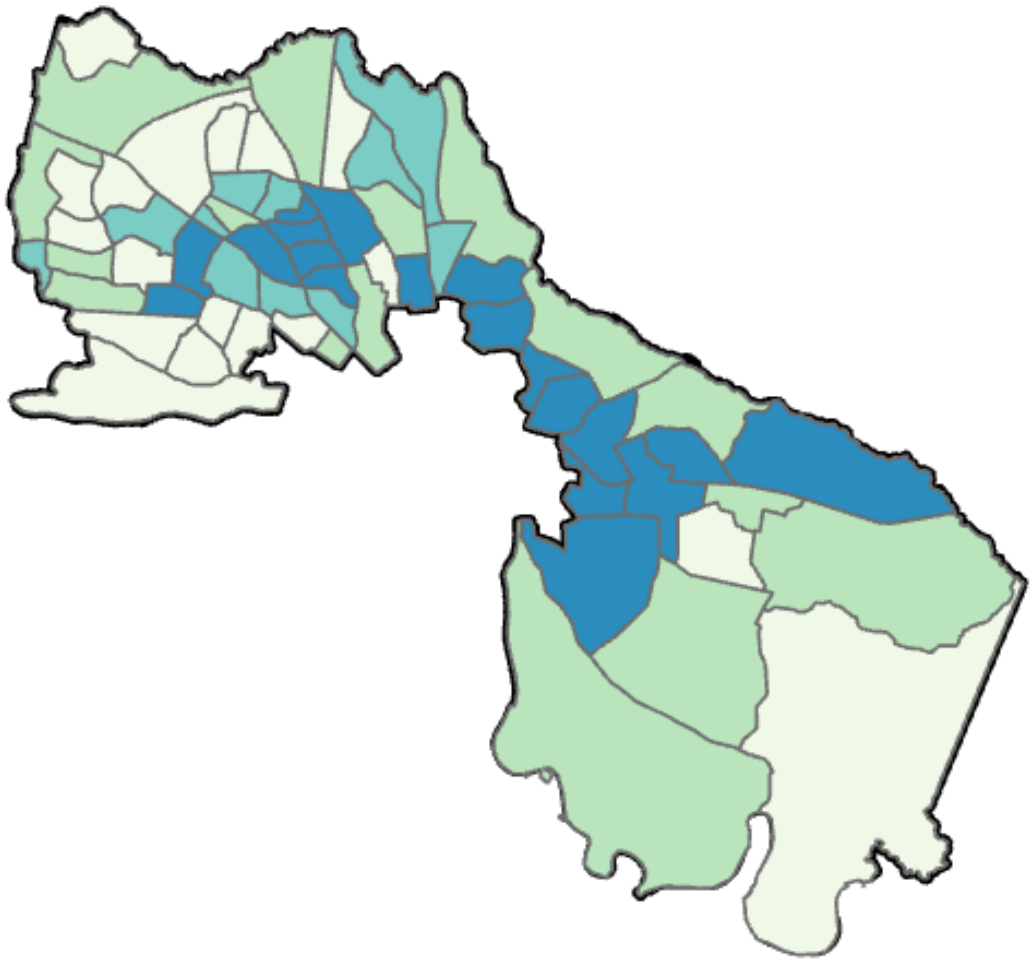
- Developed by the CDC using 15 different variables to identify communities that may need support before, during, or after disasters
- Summarized into 4 main themes + 1 summary theme
    1. Socioeconomic Status
    2. Housing Composition and Disability Status
    3. Minority Status and Language
    4. Housing and Transportation
    5. Overall Vulnerability

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

2018 Social Vulnerability Index (SVI)

Overall Vulnerability

- Lowest Vulnerability
- 0.2501-0.5
- 0.501-0.75
- Highest Vulnerability



What About Mosquitoes?

- We can overlay mosquito data to determine which areas may be more susceptible
- Mosquito collection totals show population “hotspots” within vulnerable communities
- Viral surveillance may also show regions where most positive pools are located from year to year

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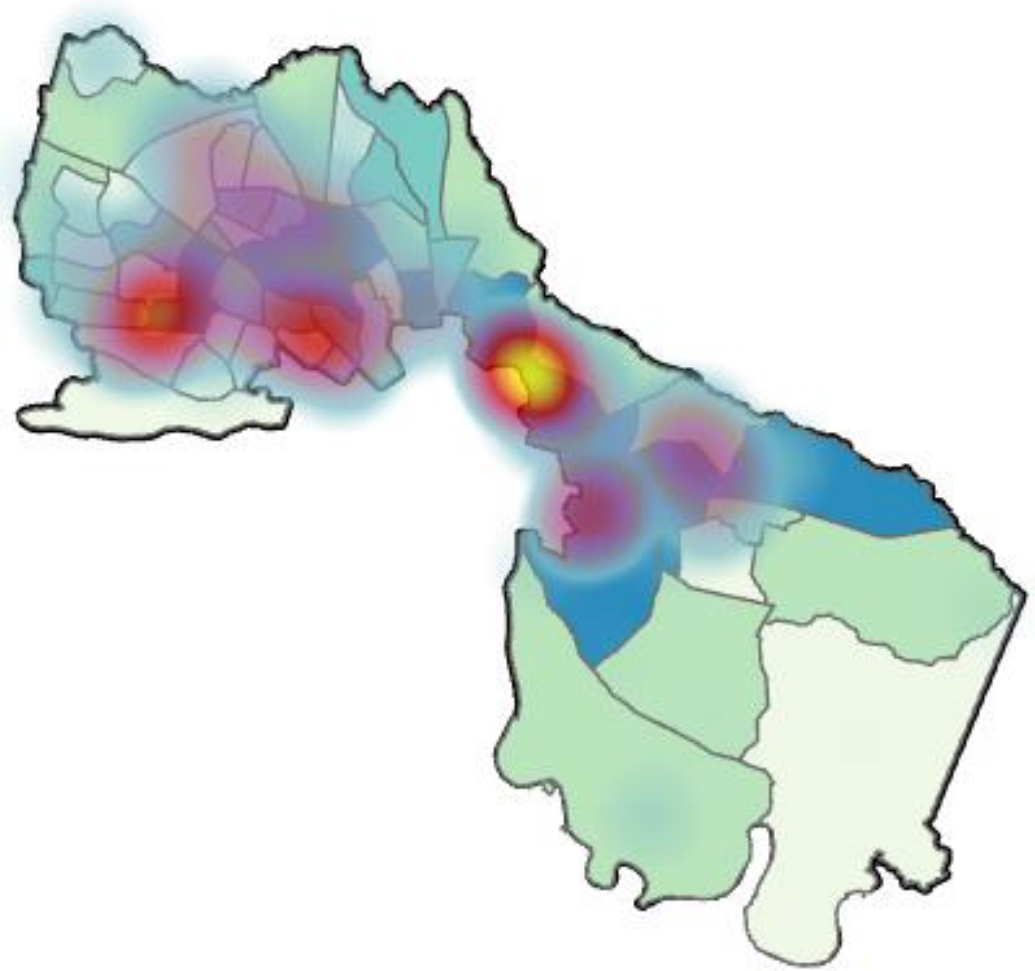
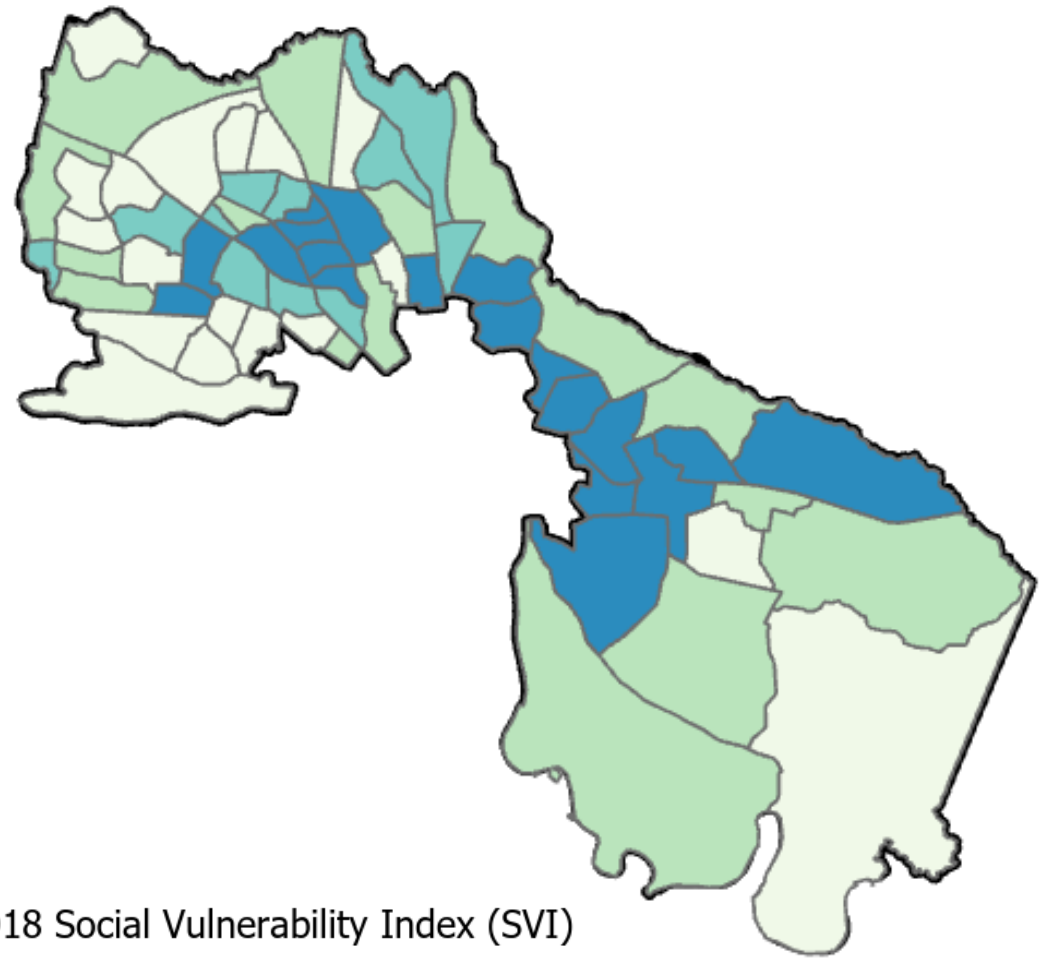
Trap Collections- Aedes albopictus

Number Collected

- Sparse
- Dense





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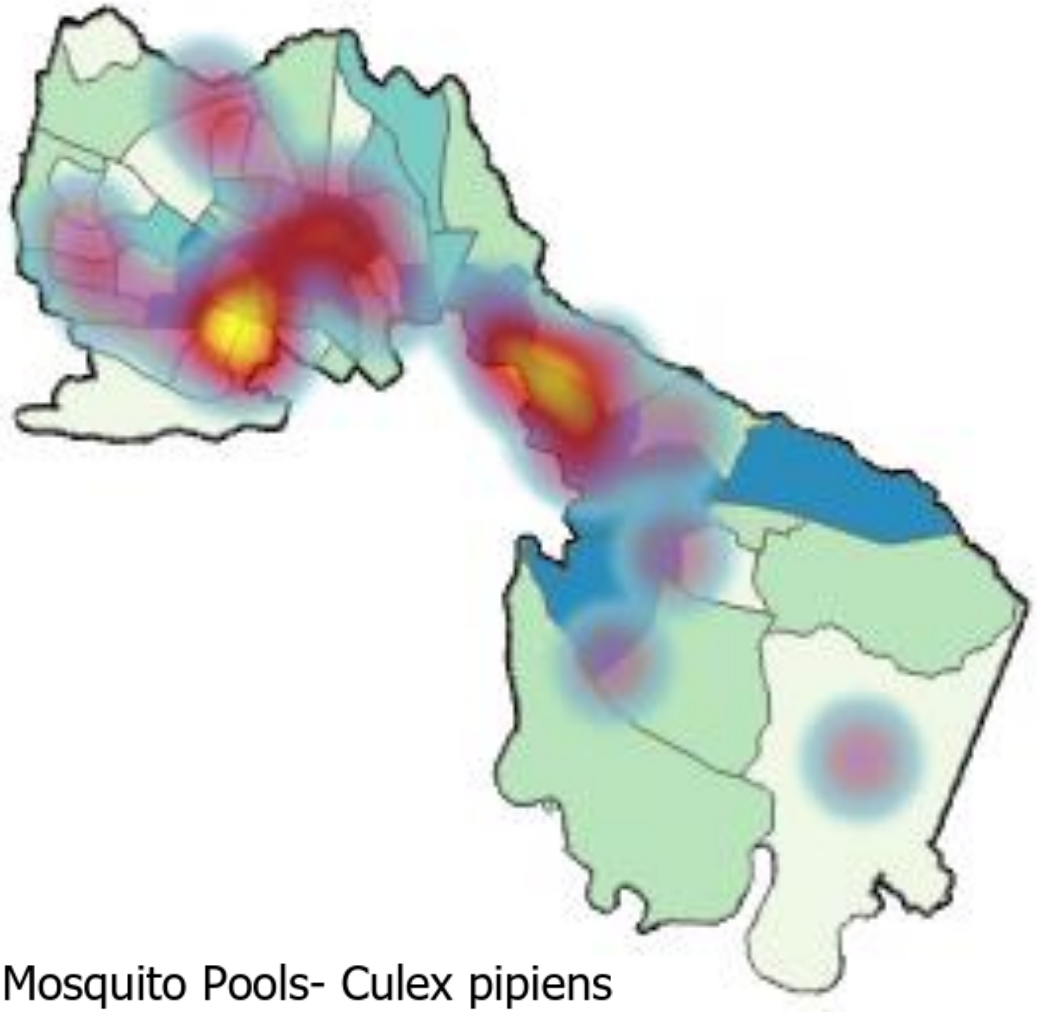

Mosquito Pools- Culex pipiens

- Sparse
- Dense

Things to consider…

- More mosquitos does not necessarily mean higher probability of infection
- Step back from GIS and think about these areas- are these issues due to the problem house on Stillwell Road? Are they underlying, broader issues?
- Other factors that might influence mosquito production and/or social vulnerability: urban heat island, urban decay, impervious surfaces, combined sewer system, etc.

Conclusions

- We can use Vulnerability Index as a tool to make more informed decisions in mosquito control (Increased outreach, surveillance, treatments) in vulnerable areas
- Vector control localities have a responsibility to be equitable and serve all members of our communities, especially those who are most vulnerable
- Consider that these communities may be more vulnerable due to historical factors (https://dsl.richmond.edu/panorama/redlining/#loc=12/37.549/-77.545&city=richmond-va)
- Take a moment to consider how your program may be able to improve operations in underserved communities


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Questions?