

The Zip Code Ranking Project 2018-2020

Evaluation of Health Factors and Health Outcomes
in Montgomery County, MD

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The Zip Code Ranking Project 2018-2020: Evaluation of Health Factors and Health Outcomes in Montgomery County, MD

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County Health Rankings & Roadmaps

“The annual County Health Rankings measure vital health factors [...] revealing [a] snapshot of how health is influenced by where we live, learn, work and play. They [also] provide a starting point for change in communities.”

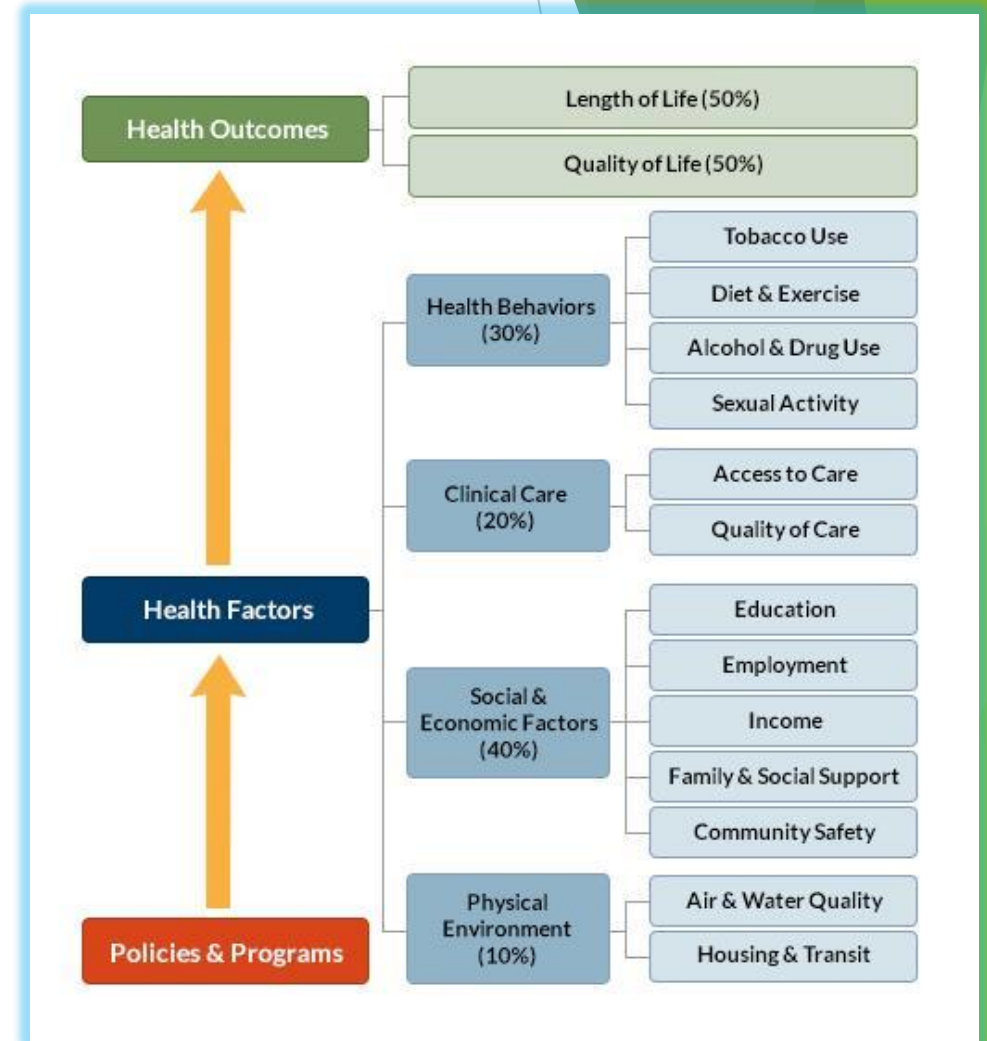


Figure 1. County Health Ranking framework/algorithm for calculating a county's rank.

Montgomery County's Standing

COUNTY

Montgomery, MD

2023 | ▾

Rank #1 of 24 ranked counties in [Maryland](#)

[Download Maryland data sets](#)

Search by county, state or ZIP code

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Health Outcomes

Health Outcomes tell us how long people live on average within a community, and how much physical and mental health people experience in a community while they are alive.

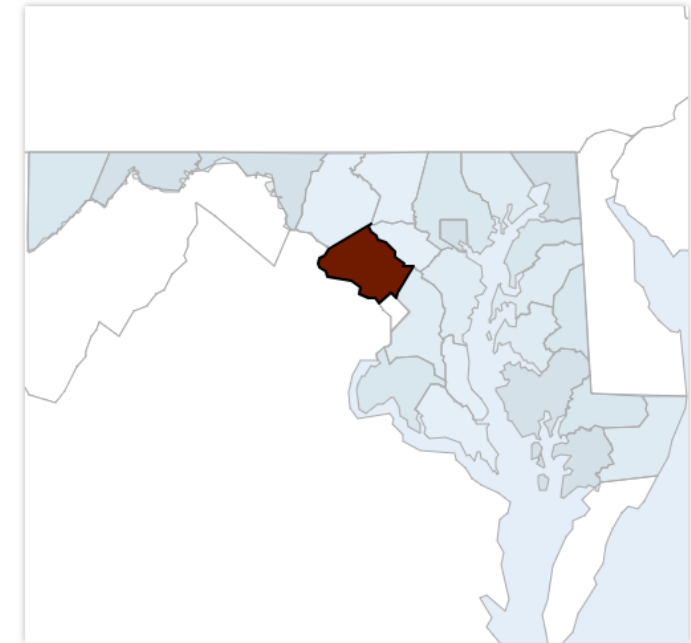
Montgomery (MO) is ranked among the healthiest counties in Maryland (Highest 75%-100%).



Health Factors

Many things influence how well and how long we live. Health Factors represent those things we can improve to live longer and healthier lives. They are indicators of the future health of our communities.

Montgomery (MO) is ranked among the healthiest counties in Maryland (Highest 75%-100%).



<https://www.countyhealthrankings.org/>

Sub-County Variation

- ▶ Even within a county, there can be substantial variation in health factors and outcomes.
- ▶ Most surveillance systems don't collect zip-code level data.
- ▶ Statisticians created a new algorithm using alternative data sources to rank zip codes using a framework that was still true to the original County Health Rankings algorithm.

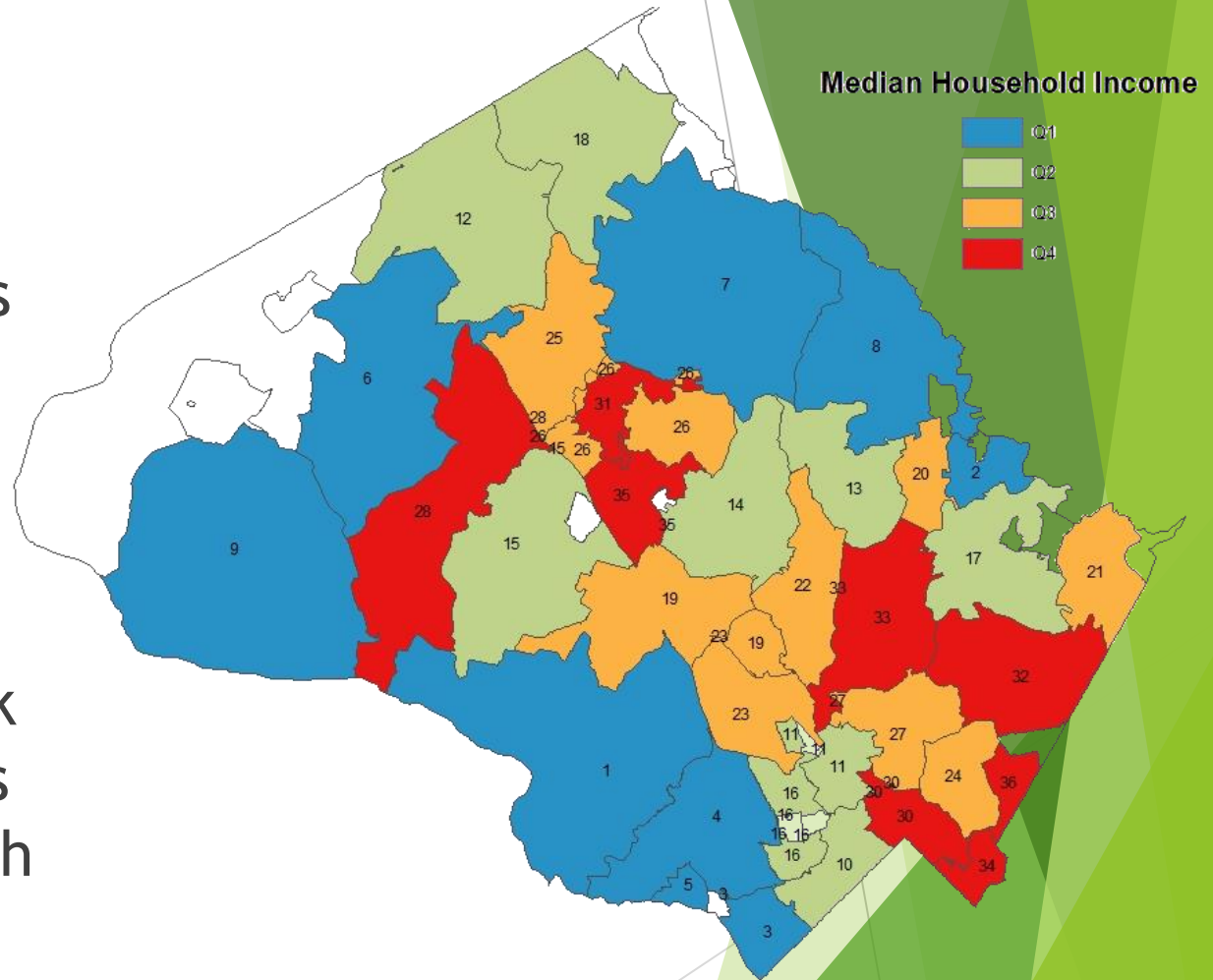


Figure 2. Sub-county Variation in Median Household Income, Montgomery County

Modified Algorithm

Measures

- Under 75 mortality rate
- Years of productive life lost

- Inpatient and ER hospitalization rate
- Mental health hospitalization rate
- Low birth weight

- Sexually transmitted infection rate
- Teen birth rate

- Percent of population employed in health care
- After-hours hospitalization rate
- Hospitalizations for preventable conditions

- Population with less than a HS education
- Percent unemployment
- Percent of children living in poverty
- Median household income

- Violent injury rate
- Injury death rate

Sub-Domains

Length of life

Quality of life

Health behaviors

Clinical care

Socioeconomic factors

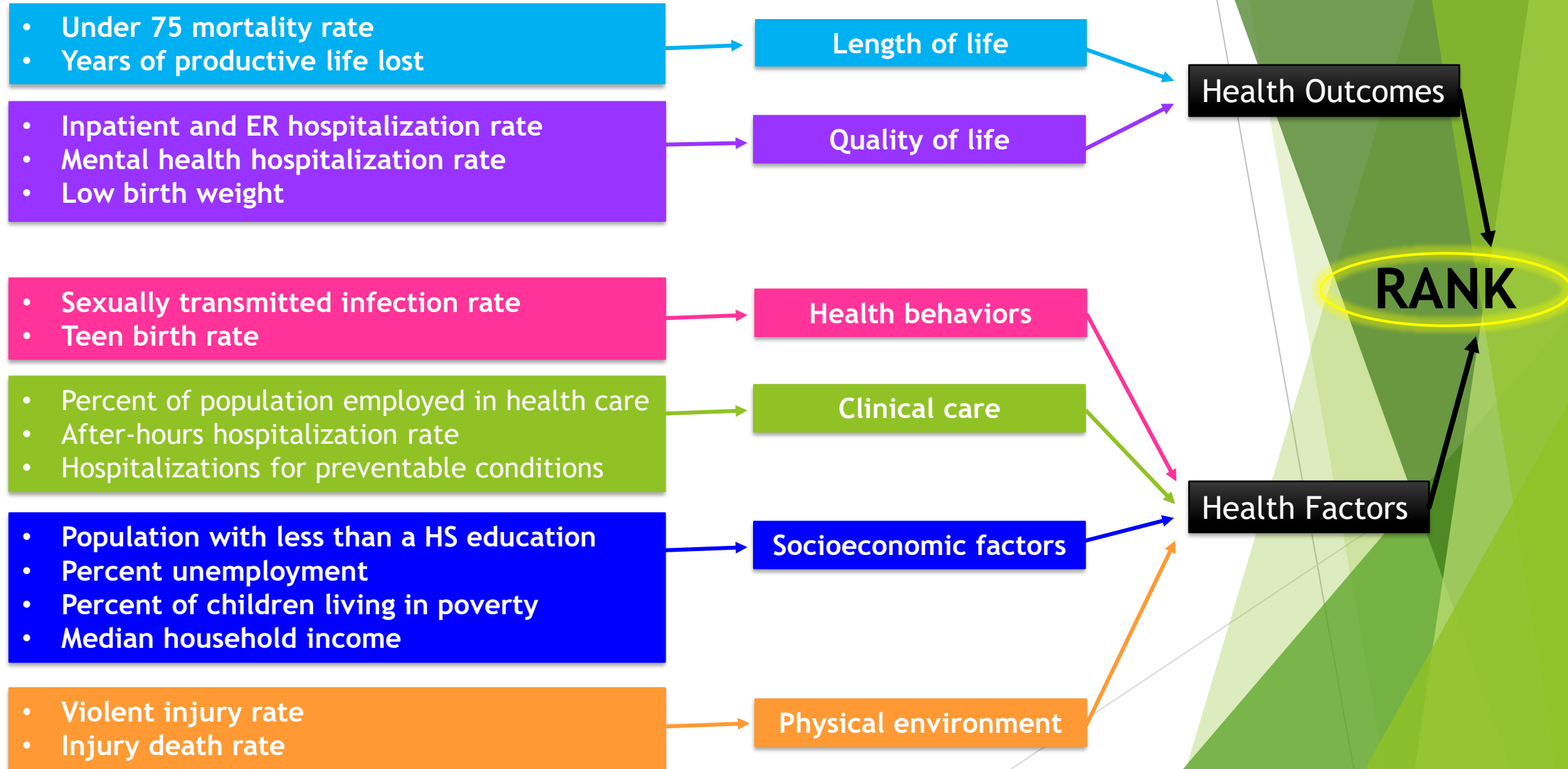
Physical environment

Domains

Health Outcomes

Health Factors

RANK

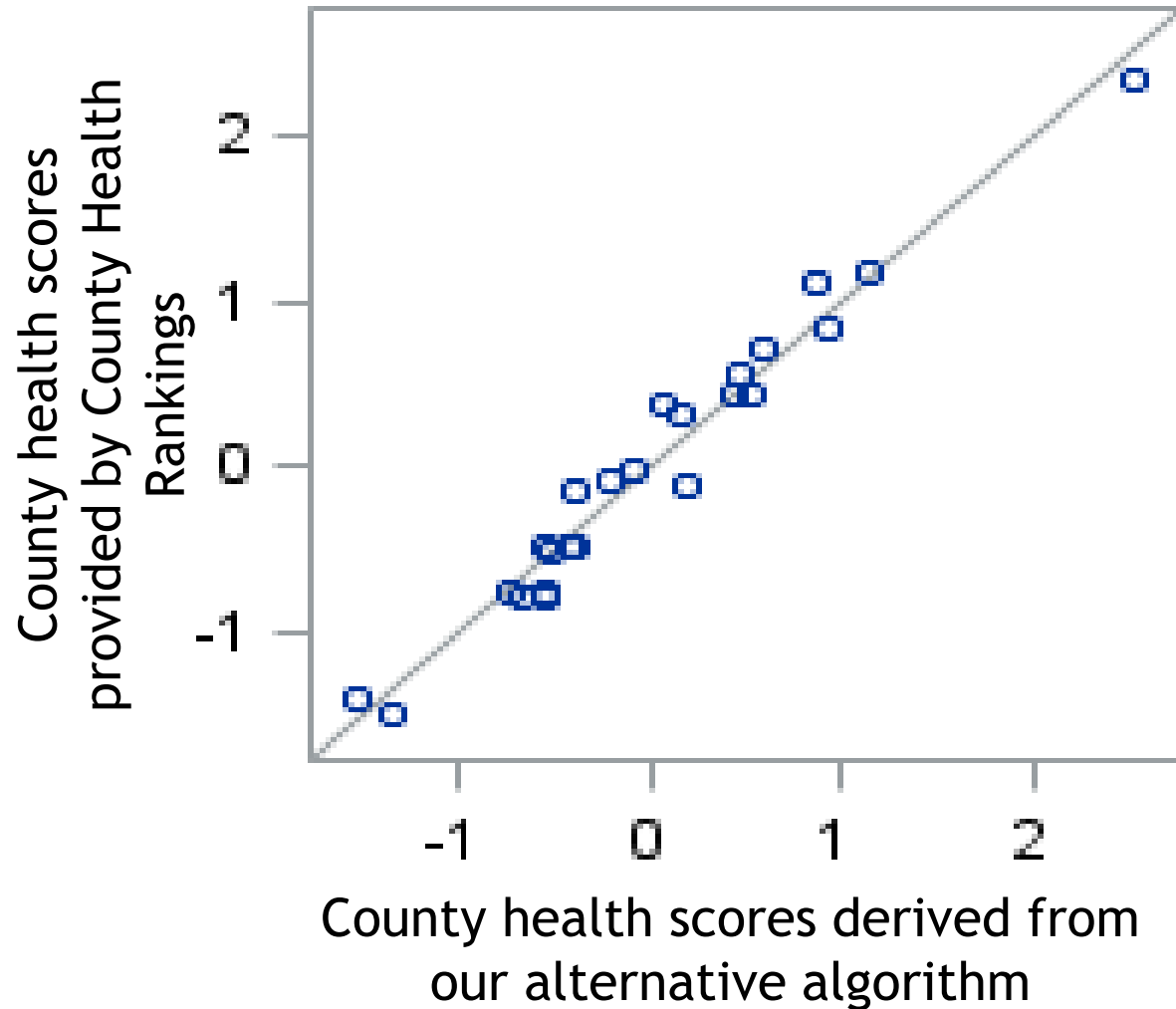


Methods

- ▶ Collected data (2018-2020) from:
 - ▶ Birth records
 - ▶ Death records
 - ▶ PRISM
 - ▶ American Community Survey
 - ▶ Inpatient and outpatient hospital records
- ▶ Used Principal Component Analysis and multiple linear regressions to derive alternative algorithm
- ▶ Compared results of alternative algorithm with actual County Health Rankings scores at the county level to validate model
- ▶ Applied alternative algorithm to Montgomery County zip codes
- ▶ Wilcoxon Signed Rank tests were used to compare results between 2018-20 and 2014-16 data for reliability of measures included



Results — Model Accuracy



Pearson Correlation

$R = 0.983$

Conclusion: Our algorithm creates health outcome scores that are highly correlated with the scores provided by county health rankings. Our model is a good fit and accurately predicts the true health scores.

Sub-Domain Scores

Length of life

Quality of life

Health behaviors

Clinical care

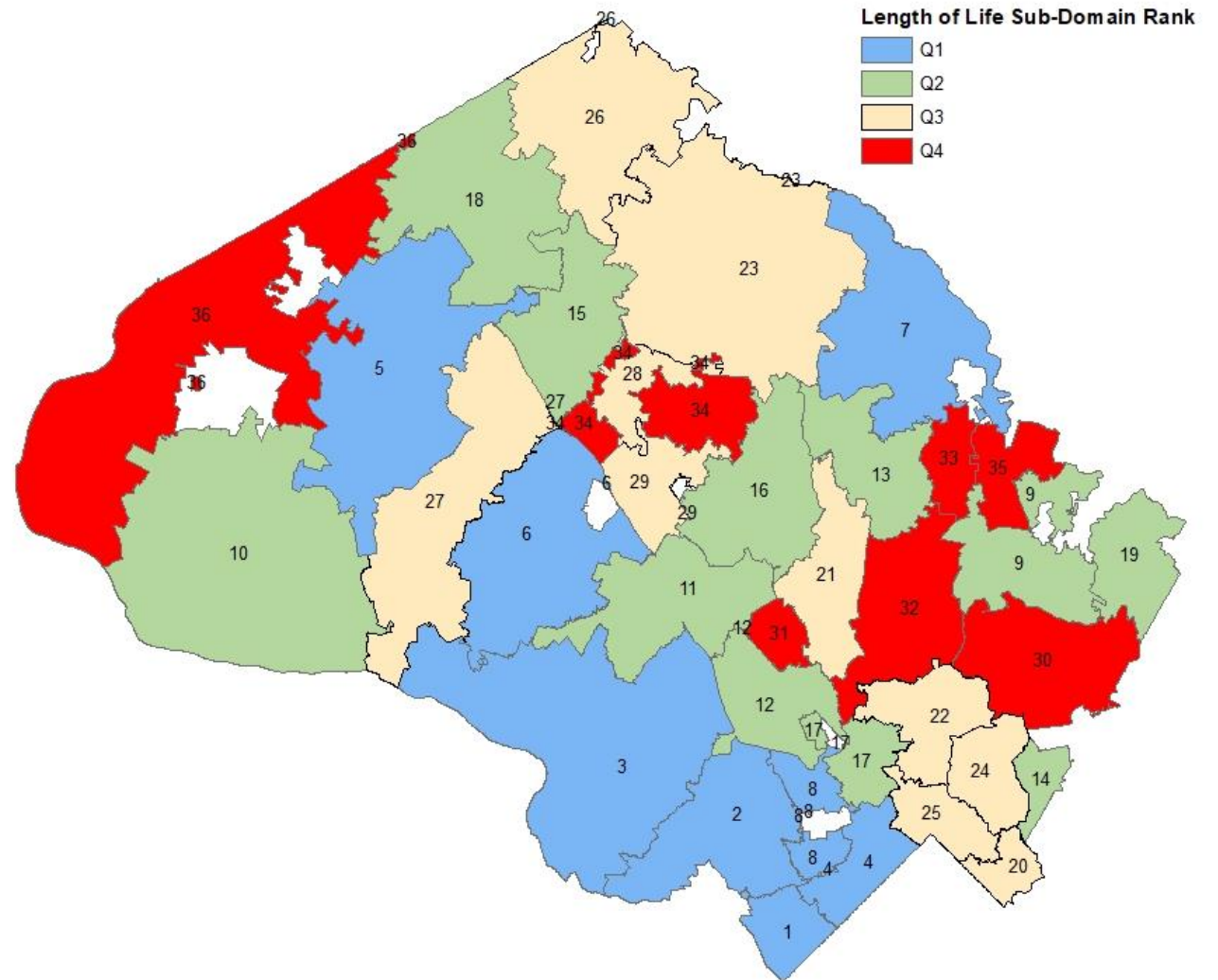
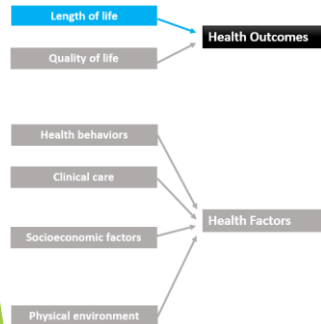
Socioeconomic

Physical environment

Results — Length of Life

Combines:

- Under 75 mortality rate
- Years of productive life lost



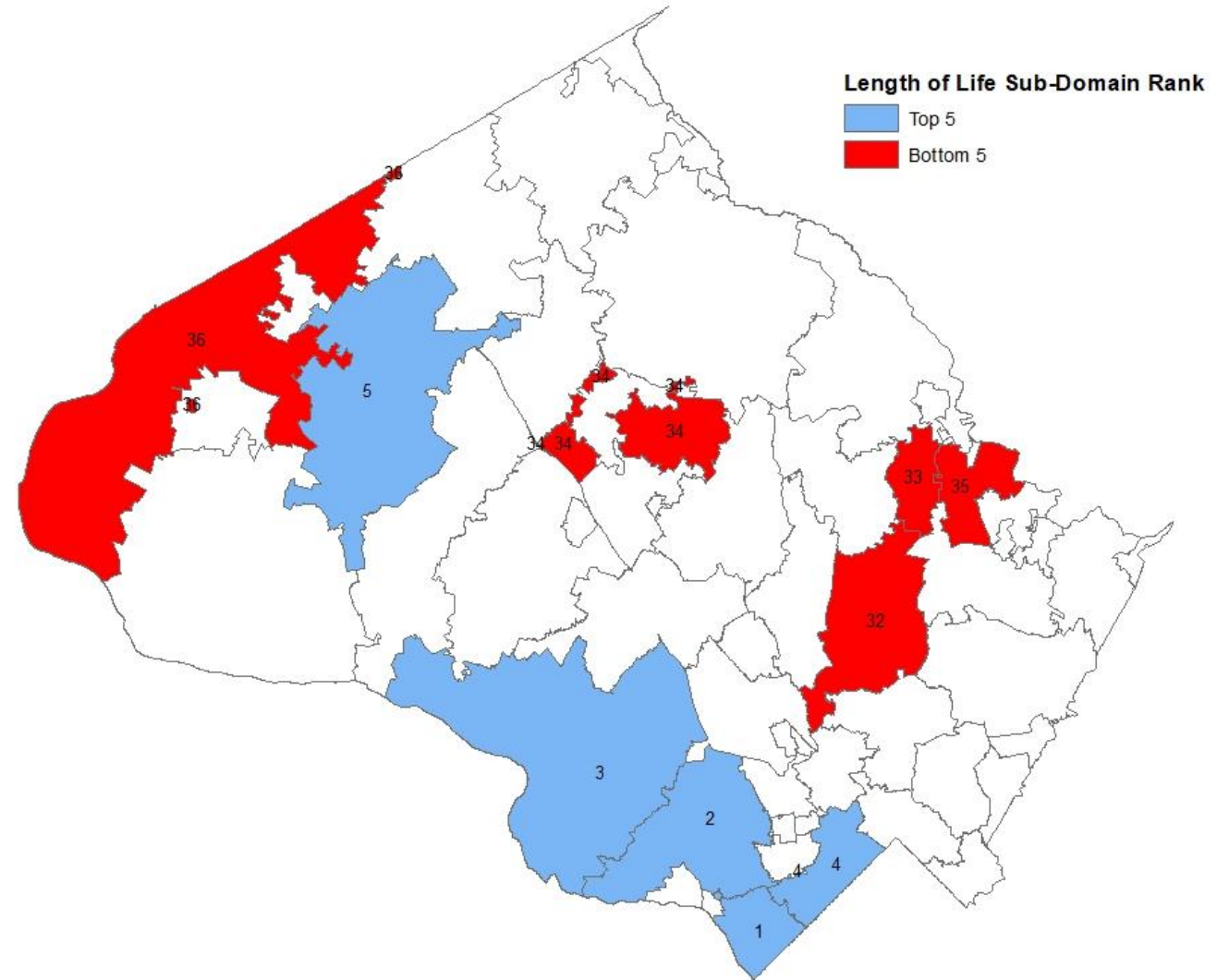
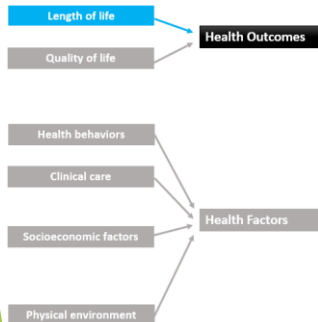
Results — Length of Life

Top 5 Zip Codes

1. 20816 - Bethesda
2. 20817 - West Bethesda
3. 20854 - Potomac
4. 20815 - Chevy Chase
5. 20841 - Boyds

Bottom 5 Zip Codes

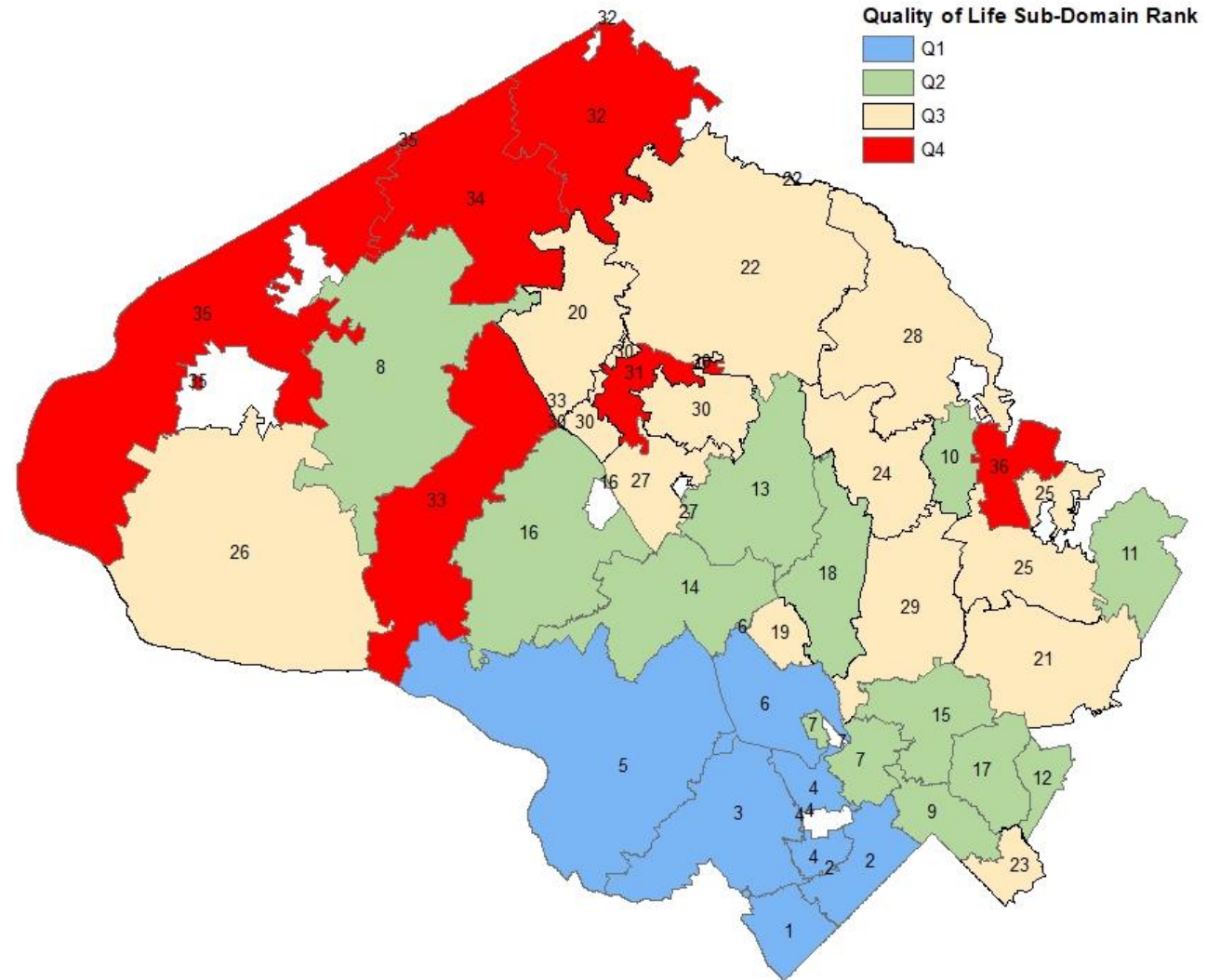
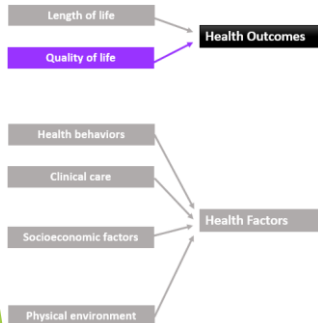
32. 20906 - Aspen Hill
33. 20860 - Sandy Spring
34. 20879 - Gaithersburg
35. 20861 - Ashton
36. 20842 - Dickerson



Results – Quality of Life

Combines:

- Inpatient and ER hospitalization rate
- Mental health hospitalization rate
- Low birth weight



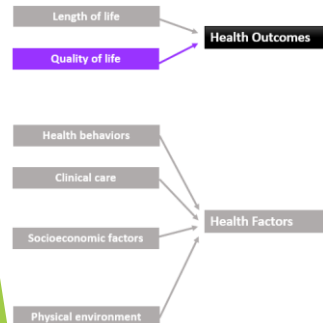
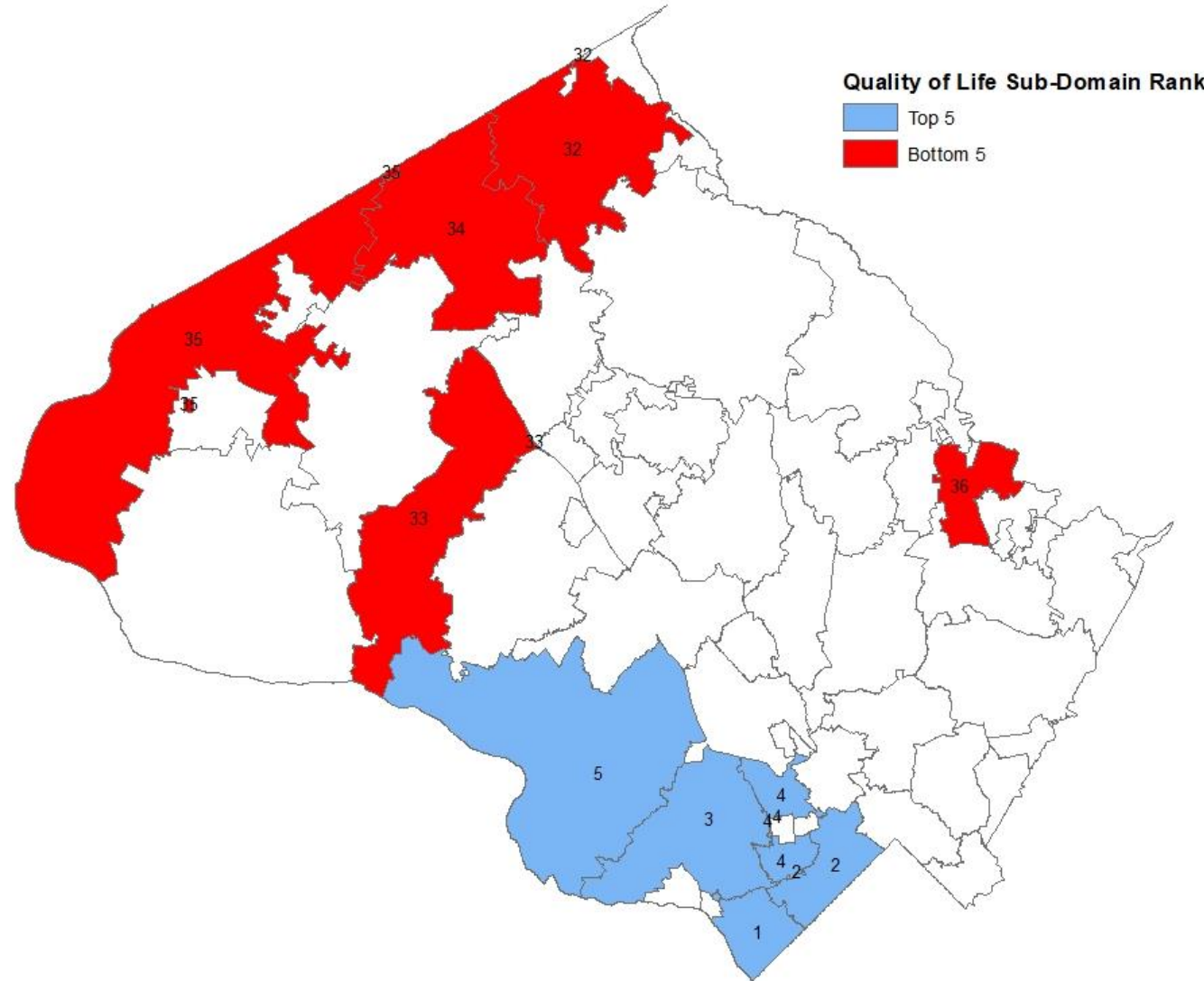
Results – Quality of Life

Top 5 Zip Codes

1. 20816 - Bethesda
2. 20815 - Chevy Chase
3. 20817 - West Bethesda
4. 20814 - Bethesda
5. 20854 - Potomac

Bottom 5 Zip Codes

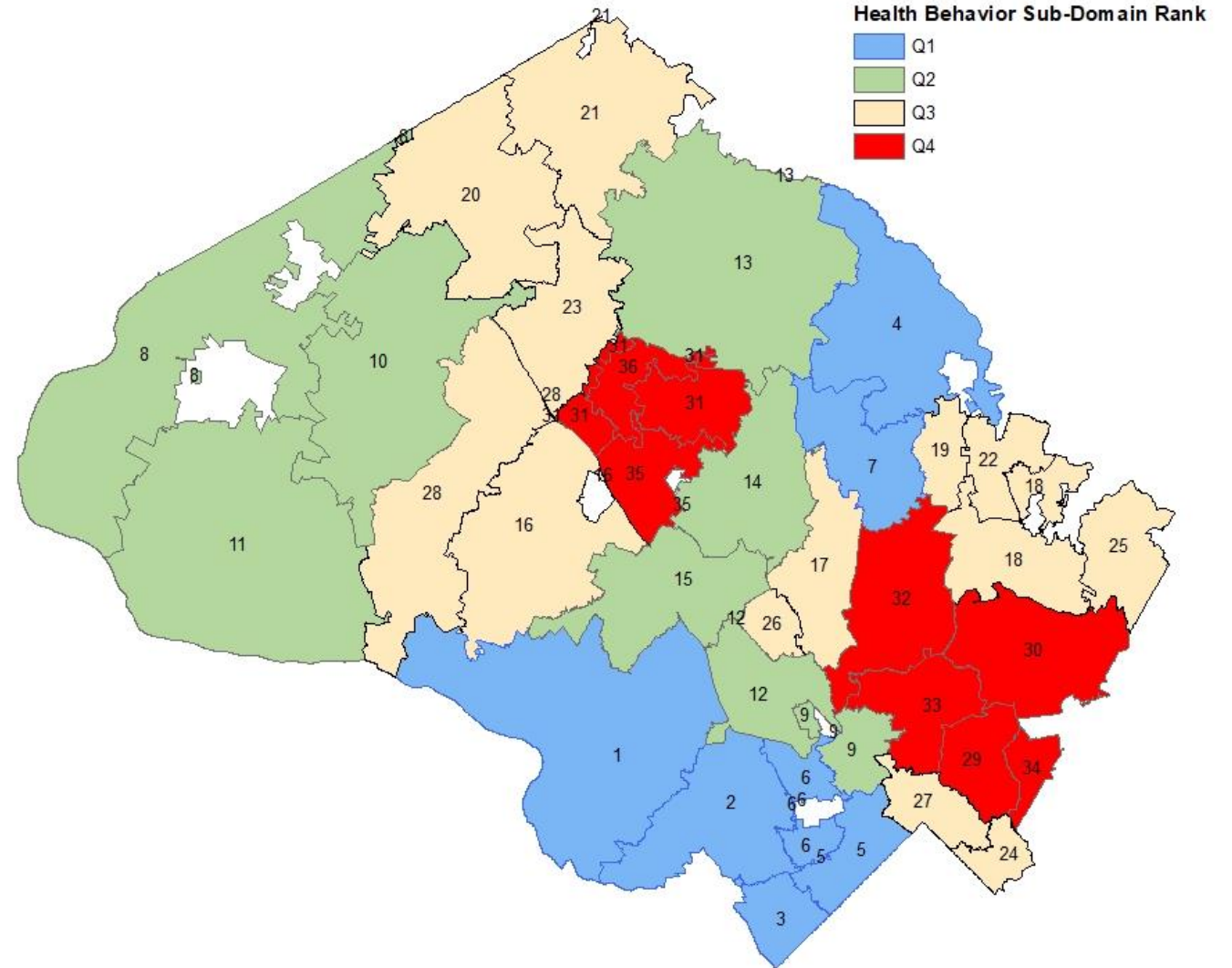
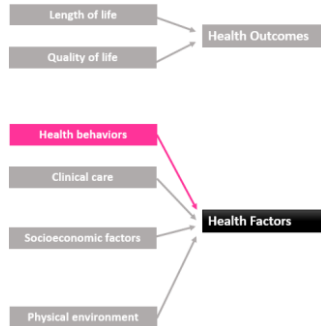
32. 20872 - Damascus
33. 20874 - Germantown
34. 20871 - Clarksburg
35. 20842 - Dickerson
36. 20861 - Ashton



Results – Health Behaviors

Combines:

- Sexually transmitted infection rate
- Teen birth rate



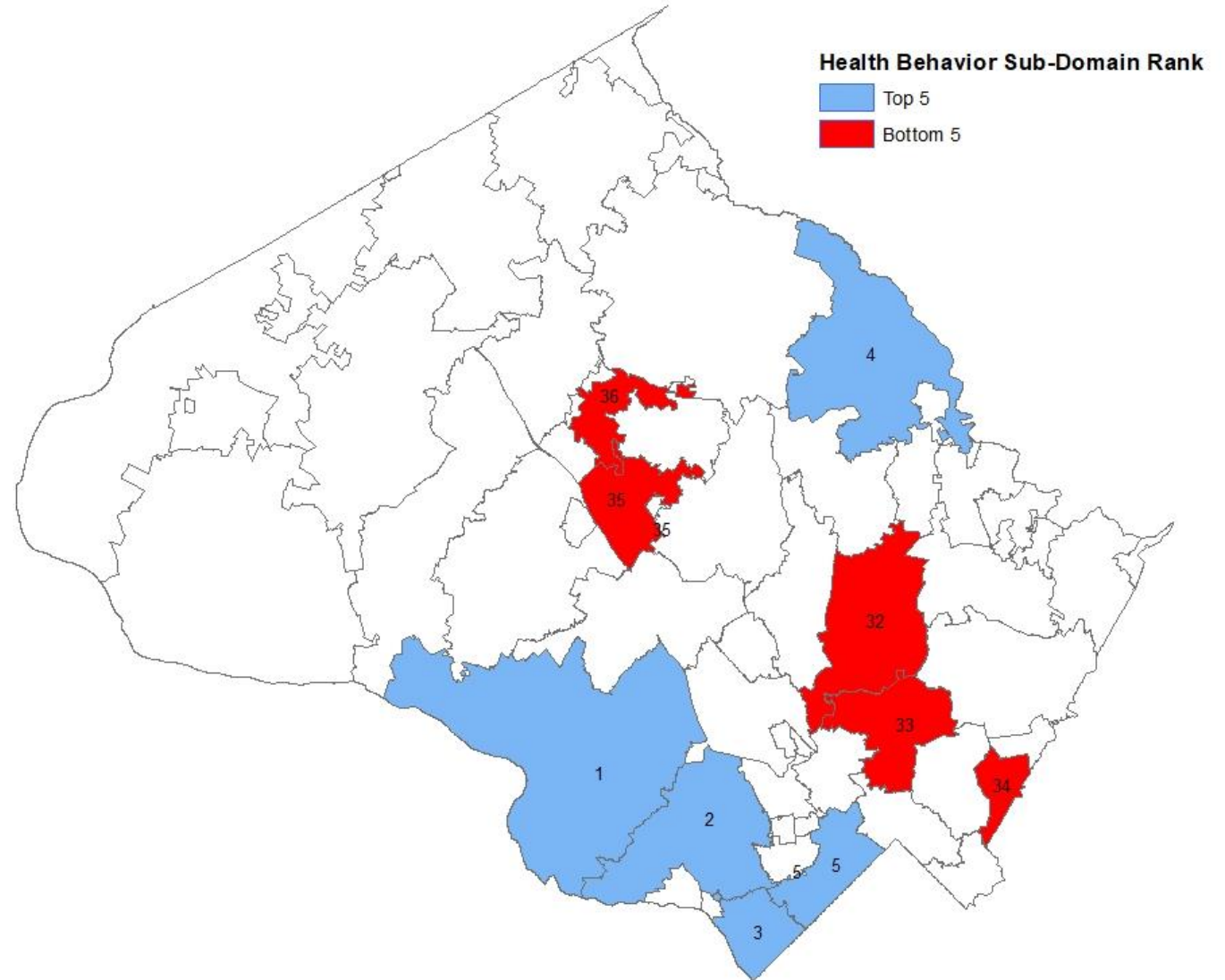
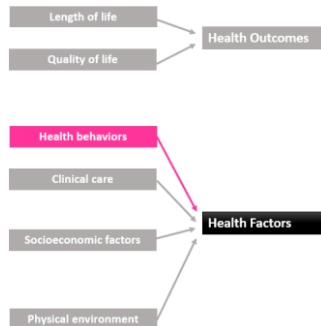
Results – Health Behaviors

Top 5 Zip Codes

1. 20854 - Potomac
2. 20817 - West Bethesda
3. 20816 - Bethesda
4. 20833 - Brookeville
5. 20815 - Chevy Chase

Bottom 5 Zip Codes

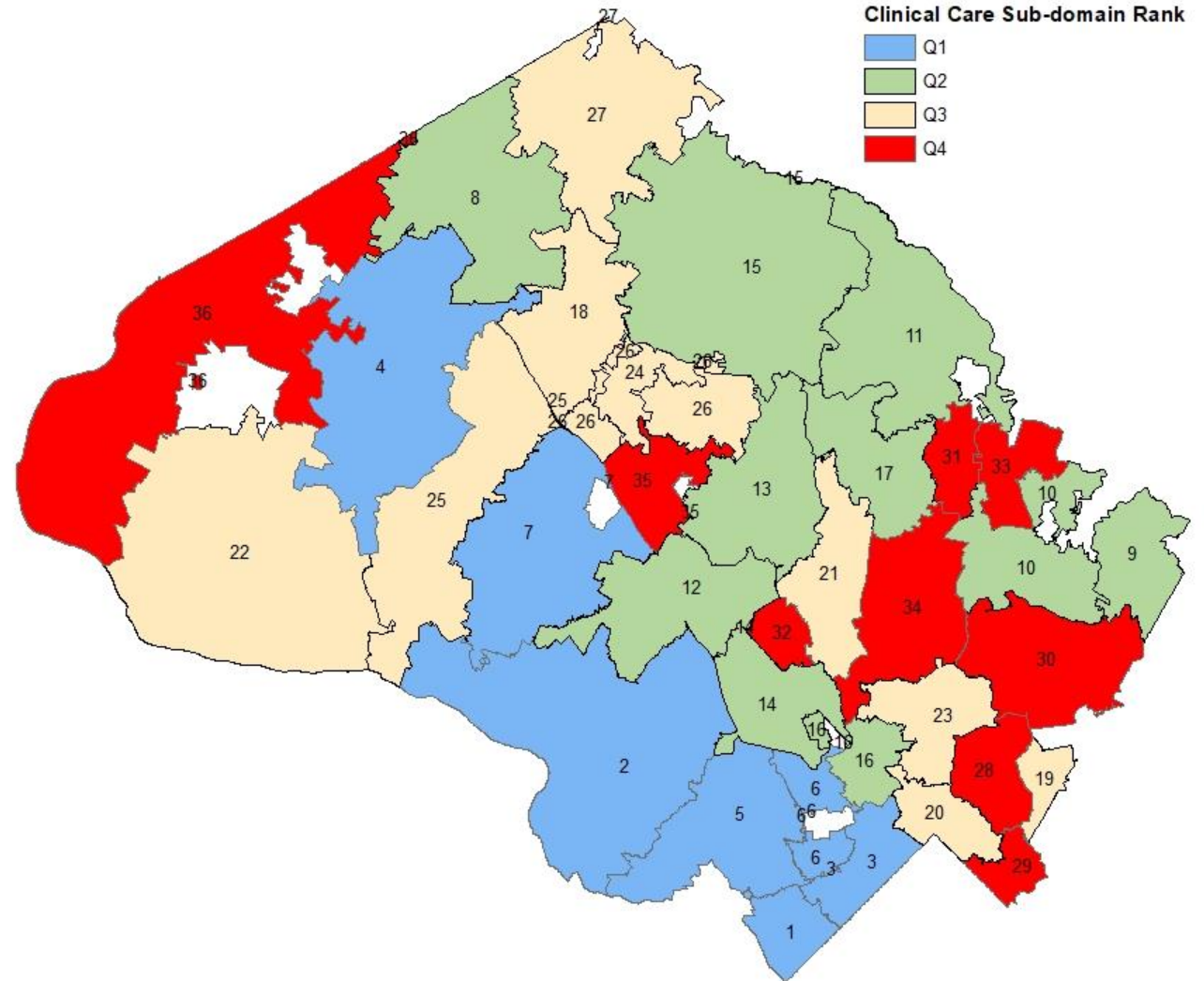
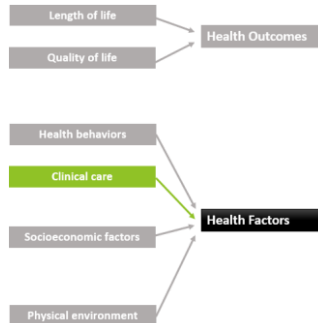
32. 20906 - Aspen Hill
33. 20902 - Wheaton
34. 20903 - Silver Spring
35. 20877 - Gaithersburg (Old Town)
36. 20886 - Montgomery Village



Results — Clinical Care Factors

Combines:

- Percent of population employed in healthcare
- After hours emergency department visits
- Hospitalizations for preventable conditions



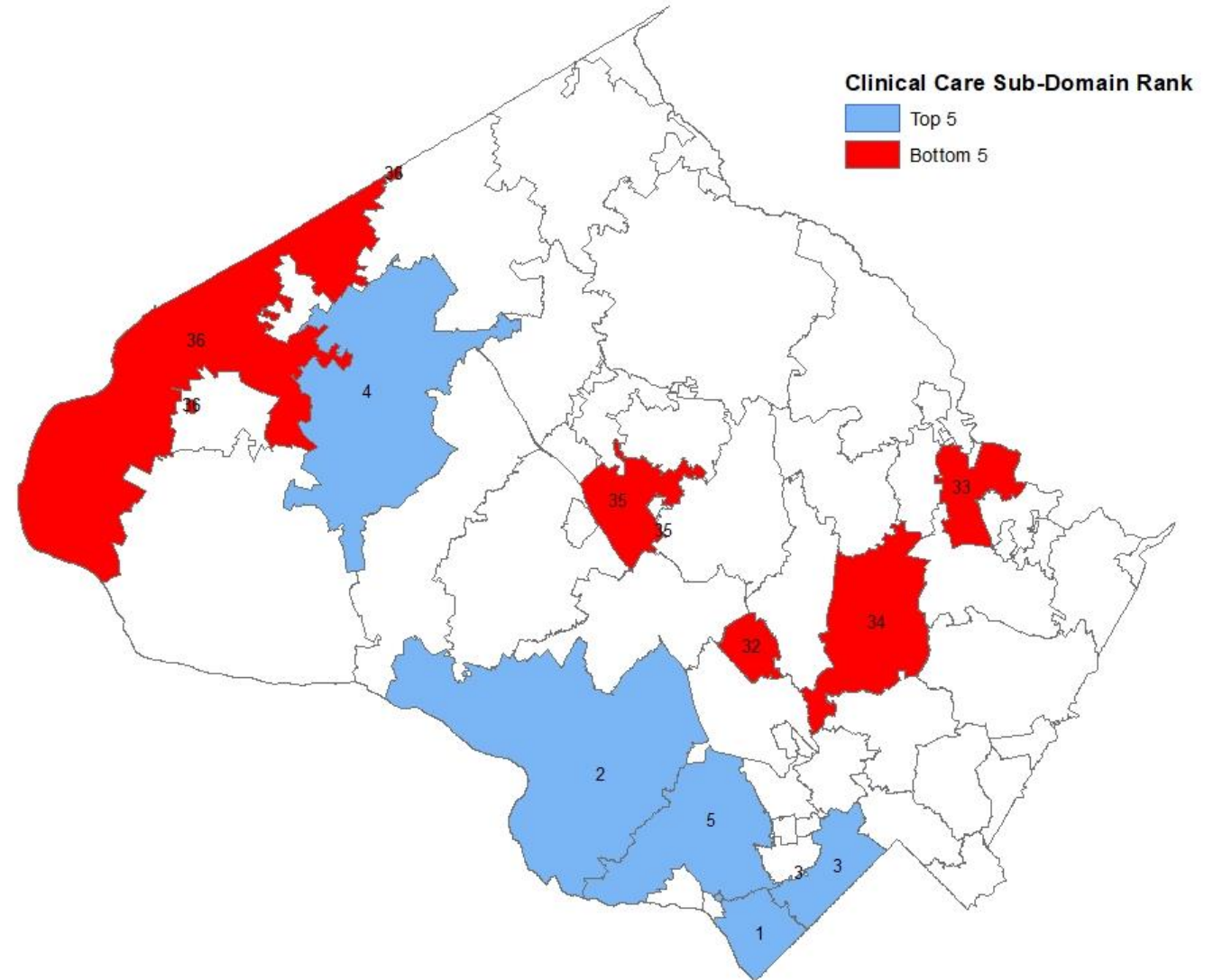
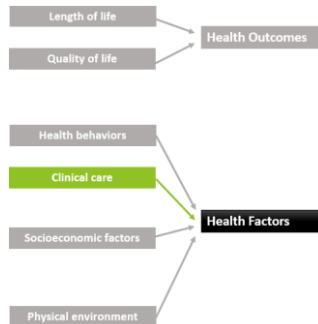
Results — Clinical Care Factors

Top 5 Zip Codes

1. 20816 - Bethesda
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4. 20841 - Boyds
5. 20817 - West Bethesda

Bottom 5 Zip Codes

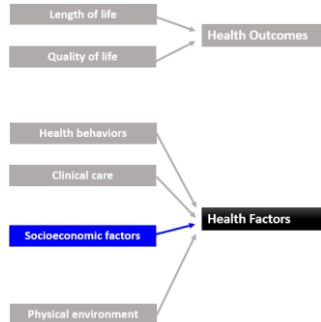
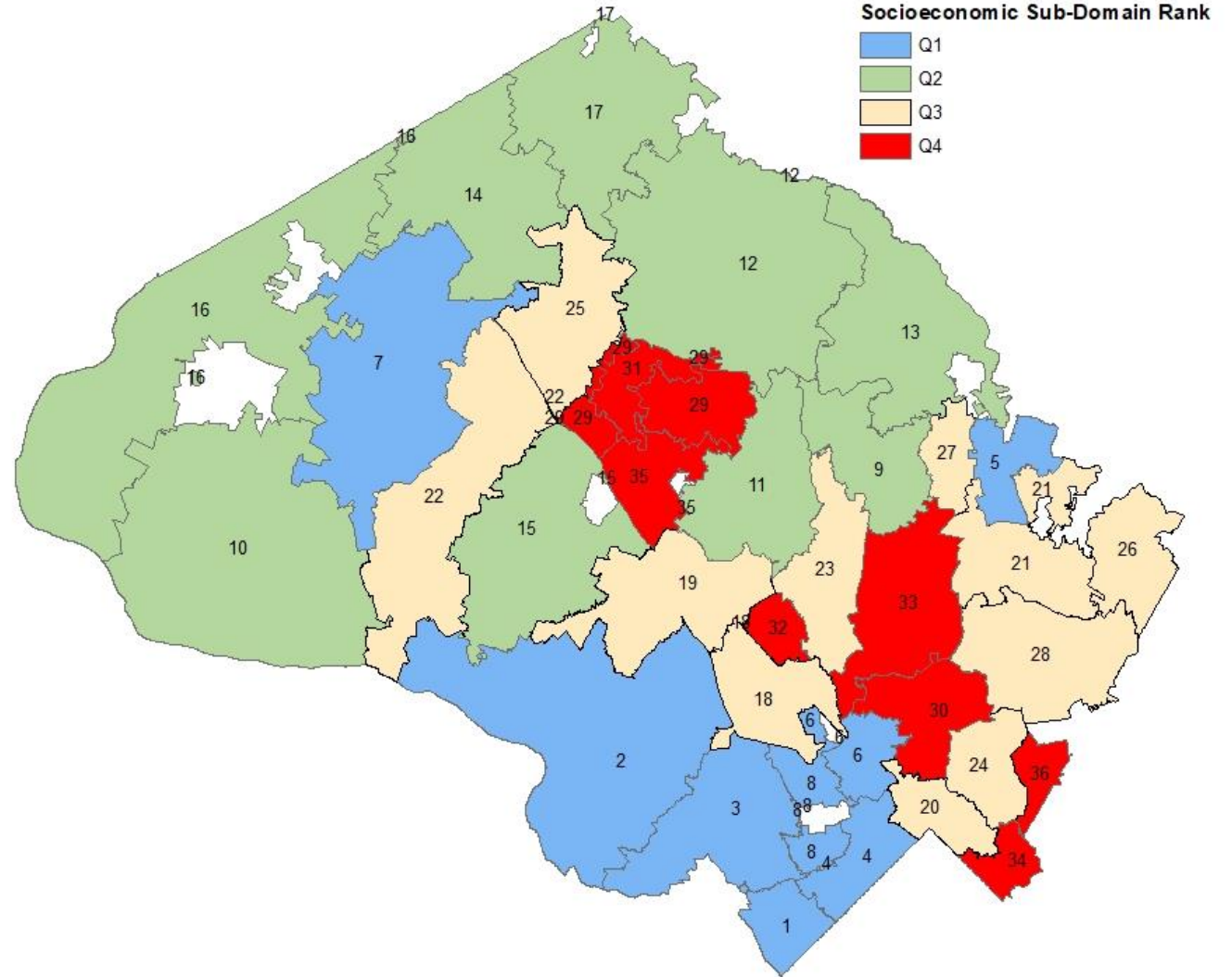
38. 20851 - Rockville/Twinbrook
39. 20861 - Ashton
40. 20906 - Aspen Hill
41. 20877 - Gaithersburg (Old Town)
42. 20842 - Dickerson



Results — Socioeconomic Factors

Combines:

- Population with less than a HS education
- Percent unemployment
- Percent of children living in poverty
- Median household income



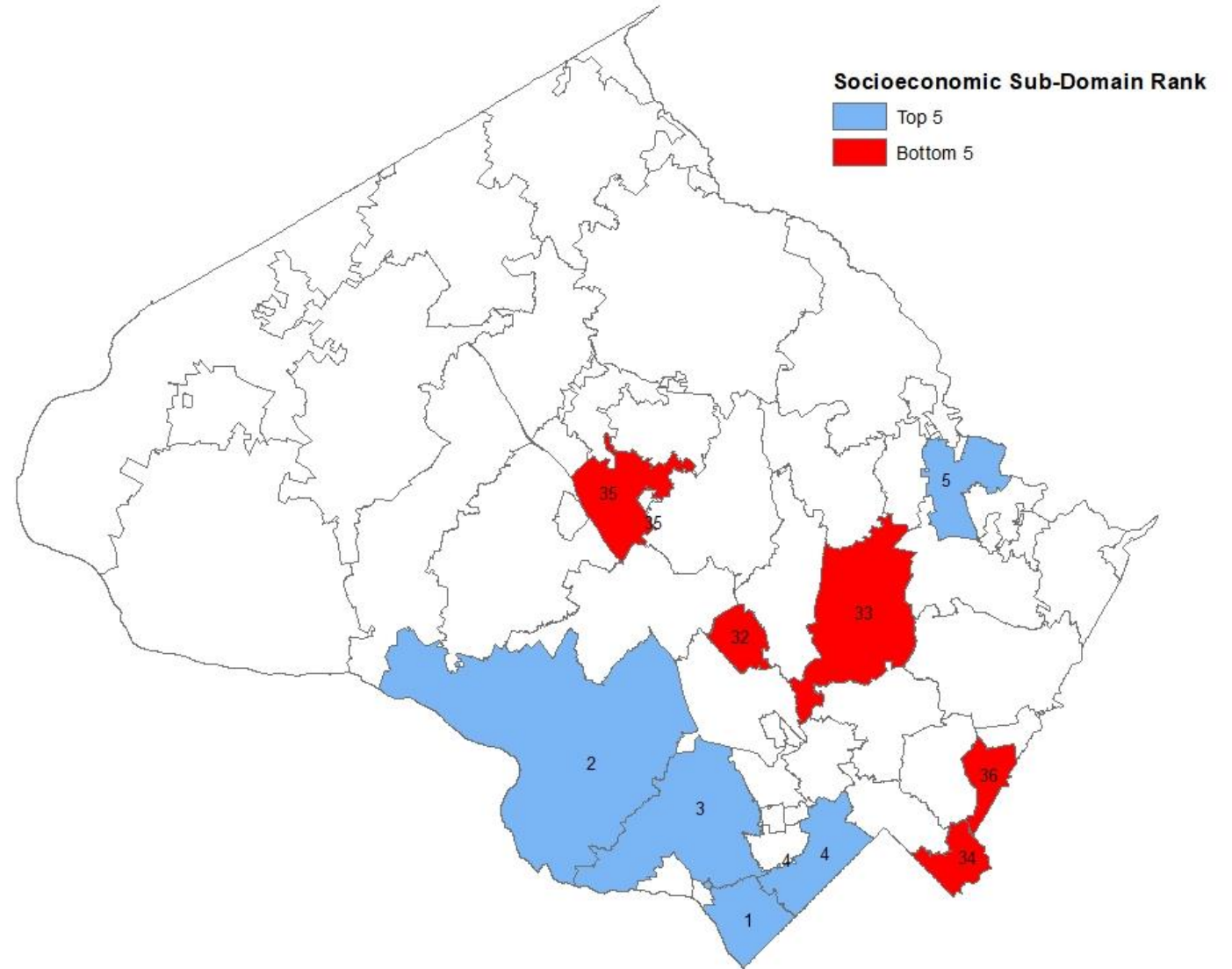
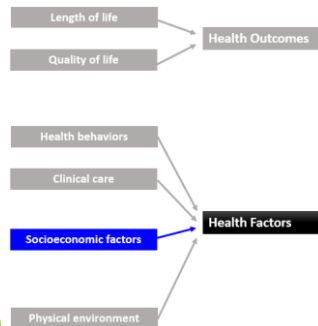
Results — Socioeconomic Factors

Top 5 Zip Codes

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4. 20815 - Chevy Chase
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Bottom 5 Zip Codes

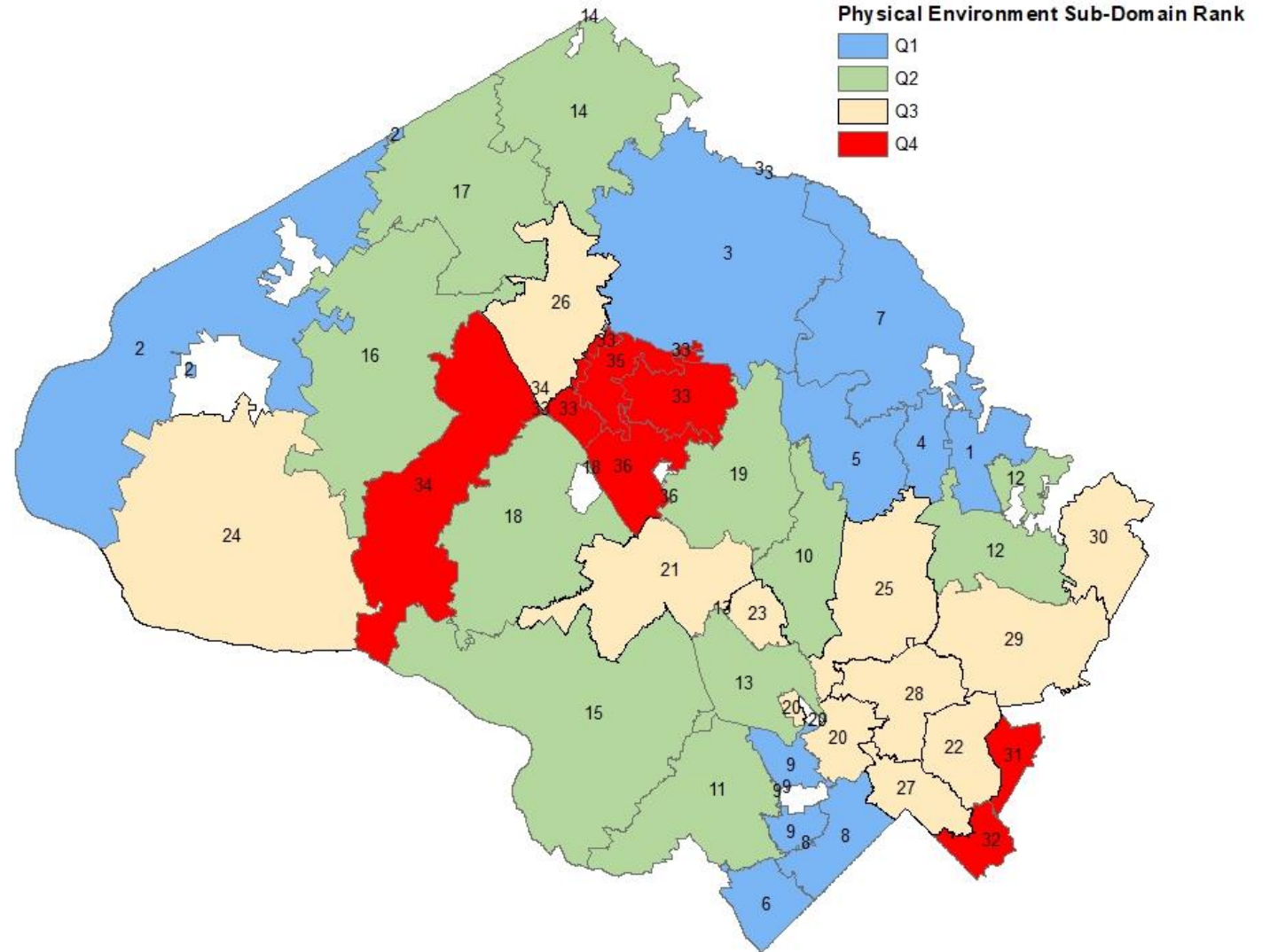
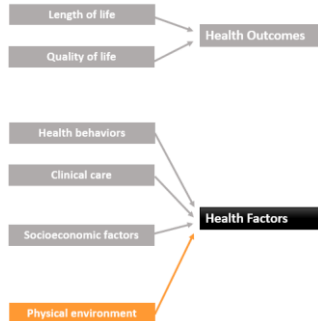
32. 20851 - Rockville/Twinbrook
33. 20906 - Aspen Hill
34. 20912 - Takoma Park
35. 20877 - Gaithersburg (Old Town)
36. 20903 - Silver Spring



Results — Physical Environment

Combines:

- Violent injury rate
- Injury death rate



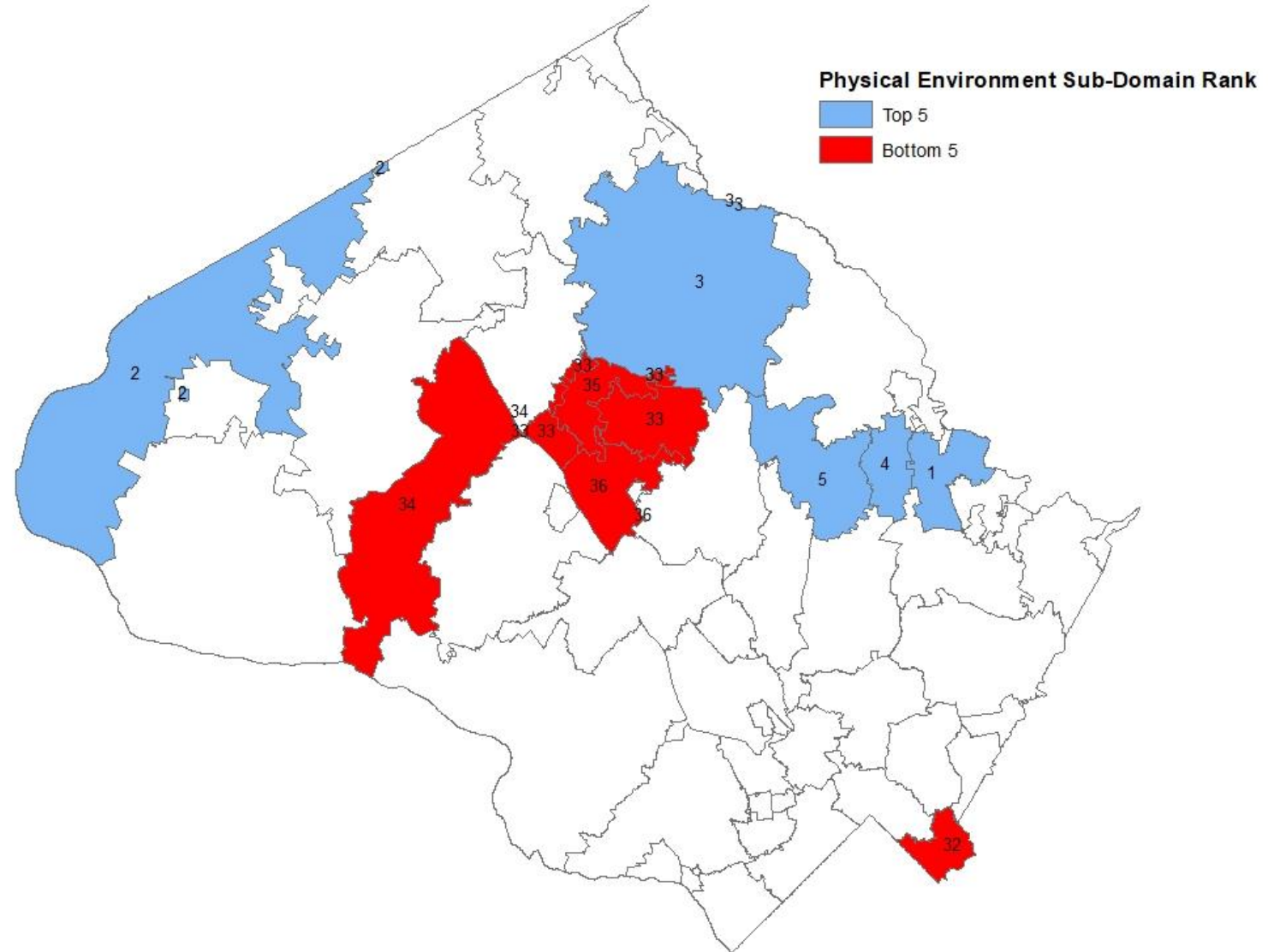
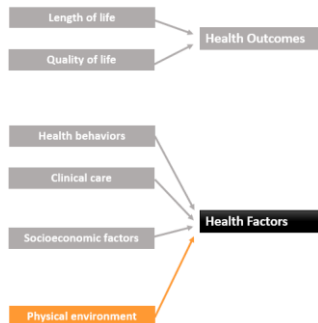
Results – Physical Environment

Top 5 Zip Codes

1. 20861 - Ashton
2. 20842 - Dickerson
3. 20882 - Laytonsville
4. 20860 - Sandy Spring
5. 20832 - Olney

Bottom 5 Zip Codes

32. 20912 - Takoma Park
33. 20879 - Gaithersburg
34. 20874 - Germantown
35. 20886 - Montgomery Village
36. 20877 - Gaithersburg (Old Town)

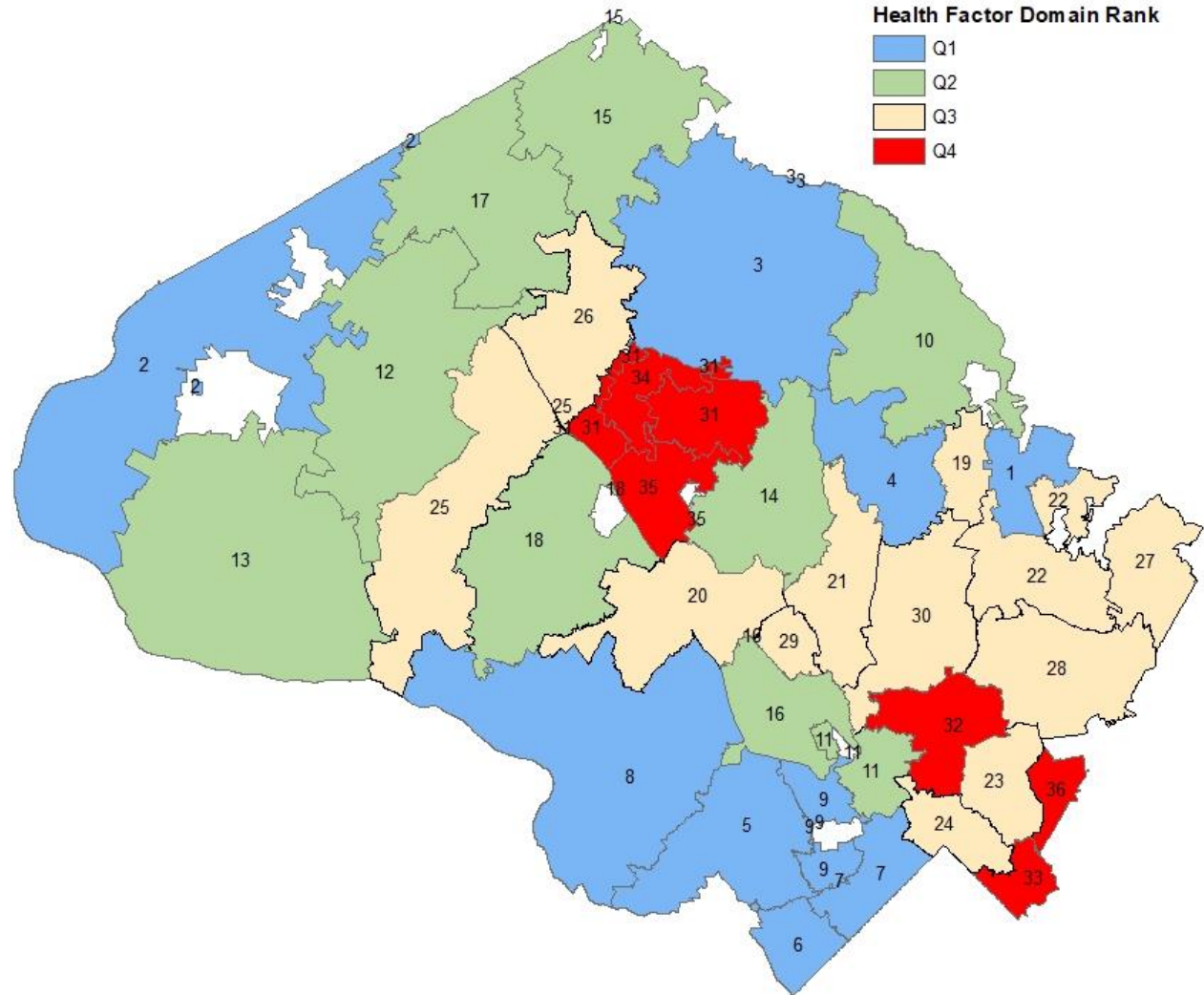
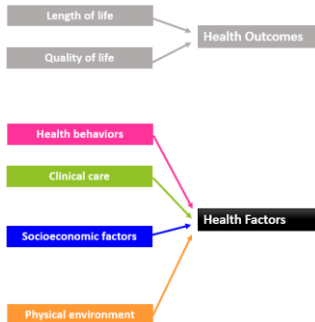


Domain Scores and Overall Rank

Results — Health Factor Domain Scores

Combines 4 sub-domains:

- Health Behaviors
- Clinical Care
- Socioeconomic Factors
- Physical Environment



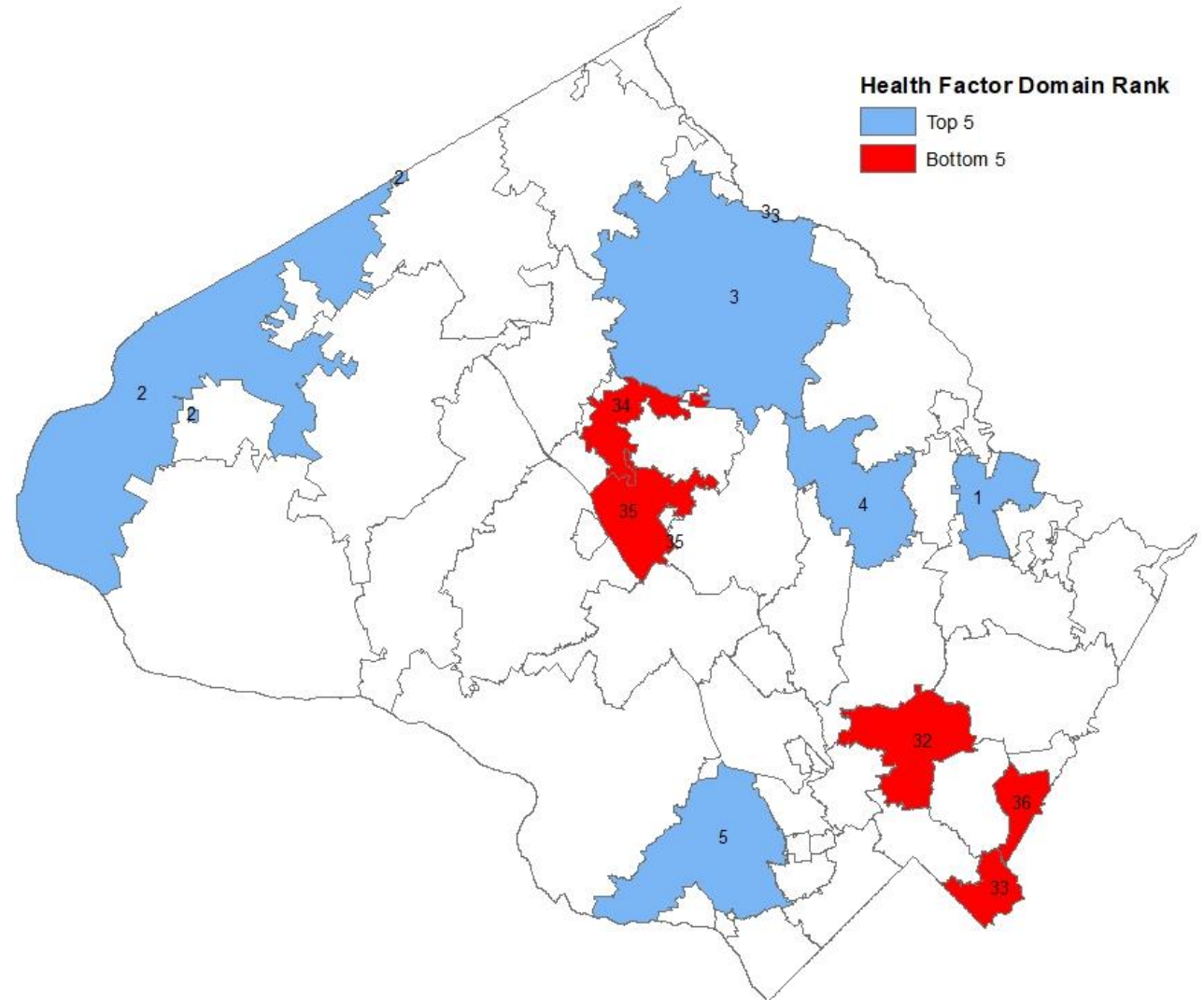
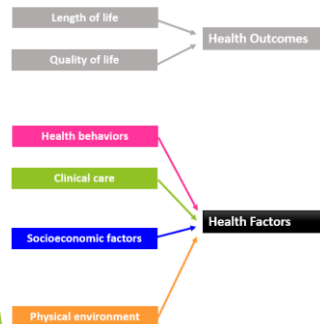
Results — Health Factor Domain Scores

Top 5 Zip Codes

1. 20861 - Ashton
2. 20842 - Dickerson
3. 20882 - Laytonsville
4. 20832 - Olney
5. 20817 - West Bethesda

Bottom 5 Zip Codes

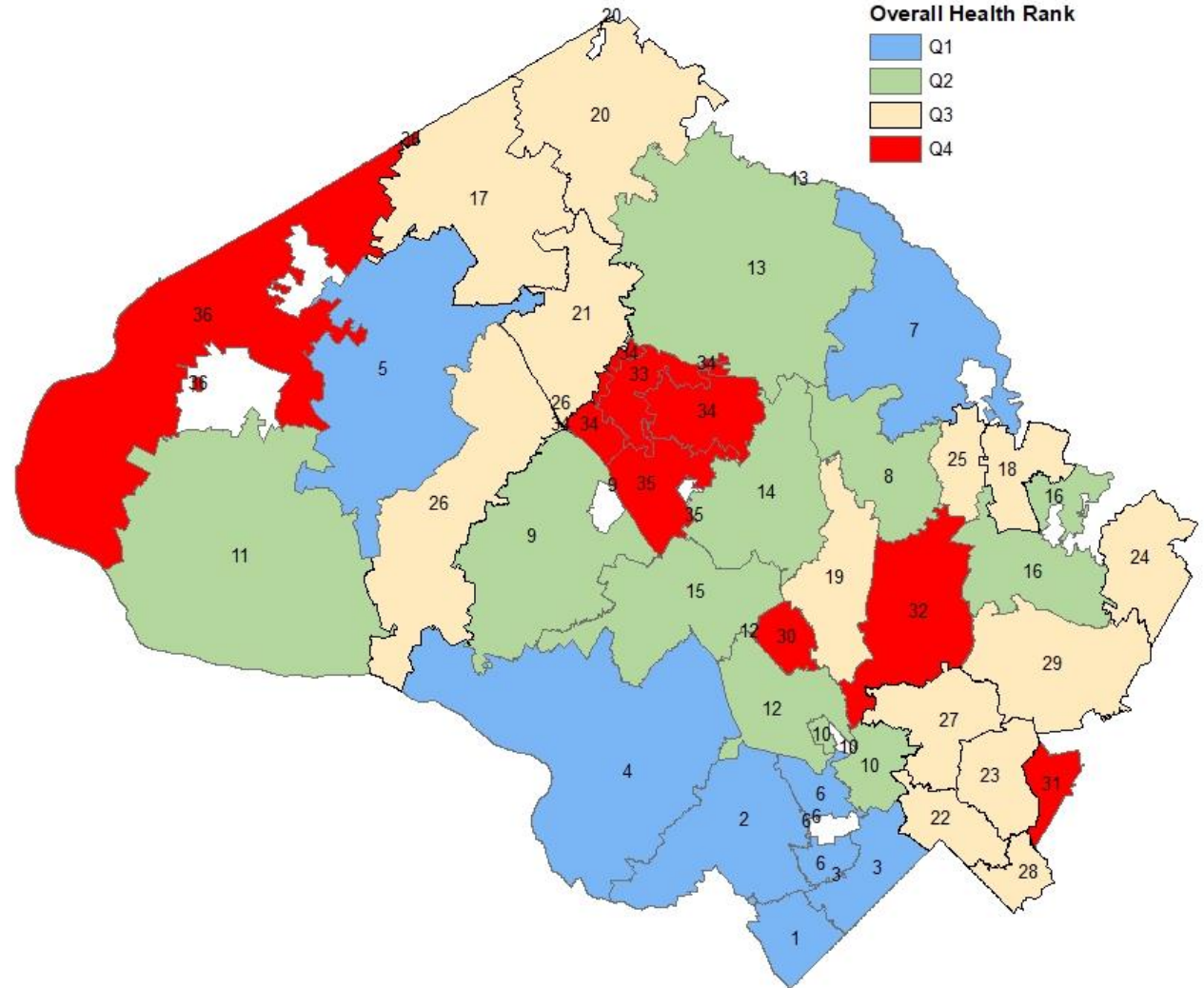
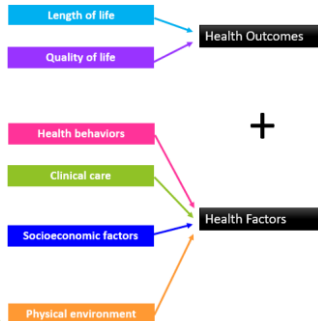
32. 20902 - Wheaton
33. 20912 - Takoma Park
34. 20886 - Montgomery Village
35. 20877 - Gaithersburg
36. 20903 - Silver Spring



Results — Overall Rank

Considers all 6 sub-domains:

- Length of Life
- Quality of Life
- Health Behaviors
- Clinical Care
- Socioeconomic Factors
- Physical Environment



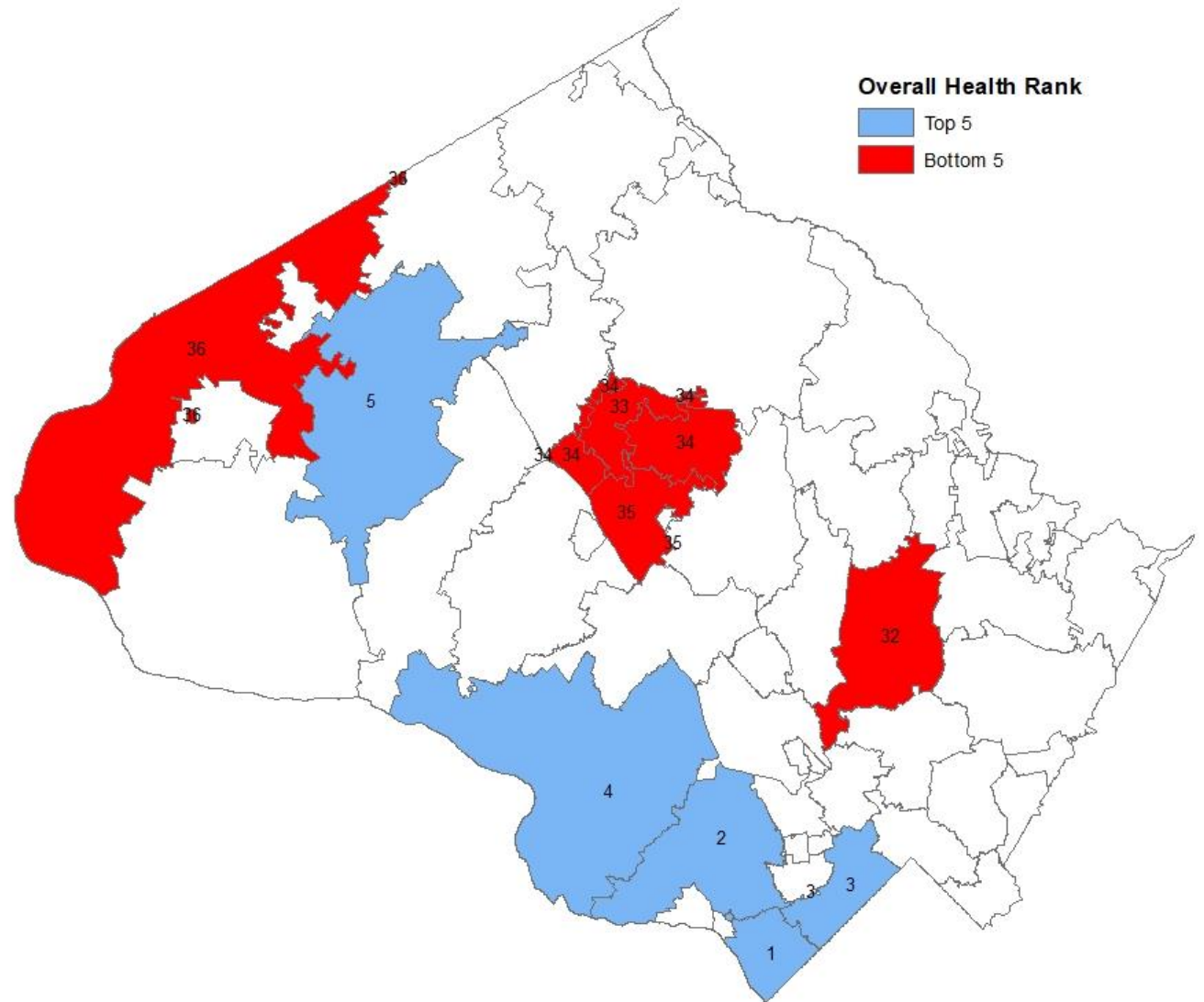
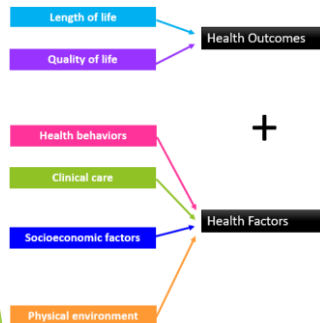
Results — Overall Rank

Top 5 Zip Codes

1. 20816 - Bethesda
2. 20817 - West Bethesda
3. 20815 - Chevy Chase
4. 20854 - Potomac
5. 20841 - Boyds

Bottom 5 Zip Codes

32. 20906 - Aspen Hill
33. 20886 - Montgomery Village
34. 20879 - Gaithersburg
35. 20877 - Gaithersburg (Old Town)
36. 20842 - Dickerson



Study Strengths

- ▶ Follows the validated methodology provided by Nagasako *et al.**
- ▶ Provides multi-level analysis.
- ▶ Secondary data analysis did not require additional data collection.
- ▶ Analysis could be expanded to look at zip codes across the state of Maryland.
- ▶ Looks at health holistically and considers how non-medical factors affect health.
- ▶ No statistical differences were found for health factor domain ($p=0.61$) and health outcome domain ($p=0.58$) comparing 2018-20 and 2014-16 results over time, the measures evaluated are considered reliable.

* Nagasako E, *et al.* Measuring Subcounty Differences in Population Health Using Hospital and Census-Derived Data Sets: The Missouri ZIP Health Rankings Project. *J Public Health Manag Pract.* 2018 Jul/Aug;24(4):340-349

Study Limitations

- ▶ Limited measure selection and data availability
- ▶ High mobility between zip codes
- ▶ Some domains, particularly quality of life, clinical care, and health behaviors, are not significant predictors of rank
- ▶ Zip codes with events that did not meet statistical criteria (i.e., stability), either numerators or denominators, were excluded

Conclusion and Next Steps

- ▶ Results are consistent with our knowledge of Montgomery County's health status.
- ▶ Socioeconomic and physical environment factors were the strongest contributors to the health factor domain scores.
- ▶ The health factor domain score and length of life subdomain scores were the strongest contributors to the overall rank.
- ▶ The disproportional impacts of COVID-19 pandemic on various communities since 2020 should be considered.
- ▶ This analysis can inform targeted resource allocation to improve health in 'hot spots' around the county.

So how does your zip code rank?

1. 20816 - Bethesda
2. 20817 - West Bethesda
3. 20815 - Chevy Chase
4. 20854 - Potomac
5. 20841 - Boyds
6. 20814 - Bethesda
7. 20833 - Brookeville
8. 20832 - Olney
9. 20878 - Darnestown
10. 20895 - Kensington
11. 20837 - Poolsville
12. 20852 - Rockville
13. 20882 - Laytonsville
14. 20855 - Derwood
15. 20850 - Rockville
16. 20905 - Colesville/Silver Spring
17. 20871 - Clarksburg
18. 20861 - Ashton
19. 20853 - Rockville
20. 20872 - Damascus
21. 20876 - Germantown/Clarksburg
22. 20910 - Silver Spring (Downtown)
23. 20901 - Silver Spring
24. 20866 - Burtonsville
25. 20860 - Sandy Spring
26. 20874 - Germantown
27. 20902 - Wheaton
28. 20912 - Takoma Park
29. 20904 - Colesville/Silver Spring
30. 20851 - Rockville/Twinbrook
31. 20903 - Silver Spring
32. 20906 - Aspen Hill
33. 20886 - Montgomery Village
34. 20879 - Gaithersburg
35. 20877 - Gaithersburg (Old Town)
36. 20842 - Dickerson