Election Night Preparation

Data Science Honors Program

Elizabeth Mastilak, Colleen Malloy, Hanh Nguyen,
Levi Sayles, Aaryan Bhatta, Sawyer Hurley,
Stephen Klayer, Alex Peinkofer, Rocco Roman, Cole Tenfelde

Dr. David Gerberry

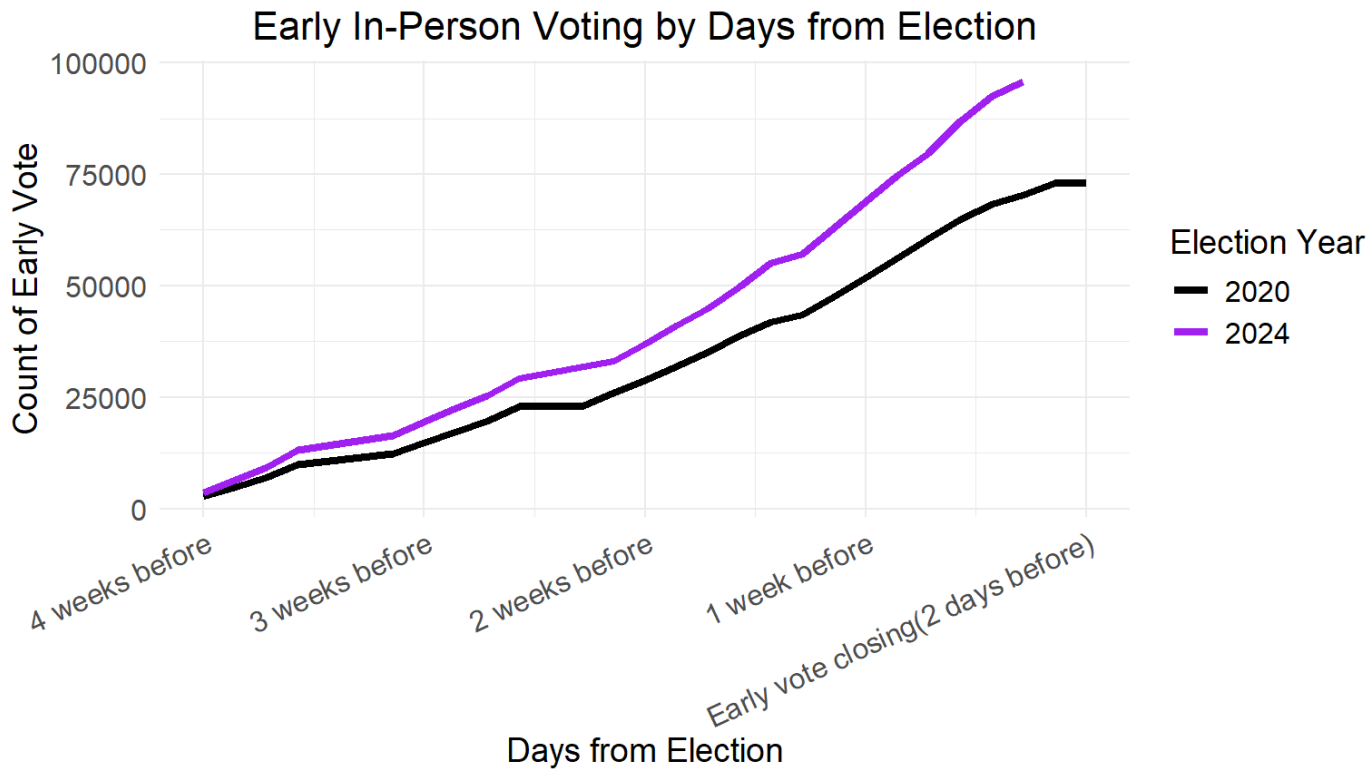
Potential graphics to be used for Election Night live broadcast

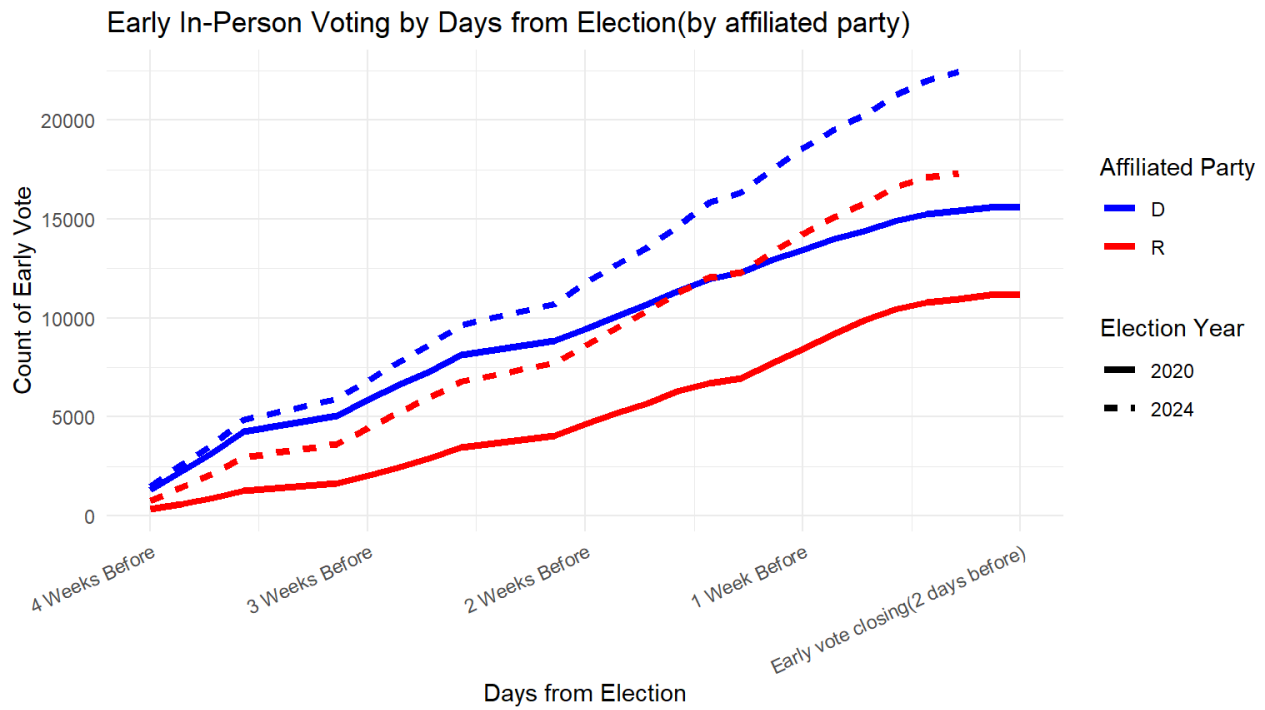
- In this document, we provide a menu of graphics that could be used during the live Election Night broadcast on November 5, 2024.
- We do not expect to use all of these graphics.
- Our goals with this document:
  - Illustrate the types of analysis and visualizations that the Data Science (DS) students have been working on this semester
  - Give an indication of the types of things DS students will be ready to discuss during the telecast.
  - Get feedback on the graphs! Are they unclear in some way? Can we improve them? Do they raise questions or ideas for another visualization that you might find interesting? With some early feedback, we could improve the end result.

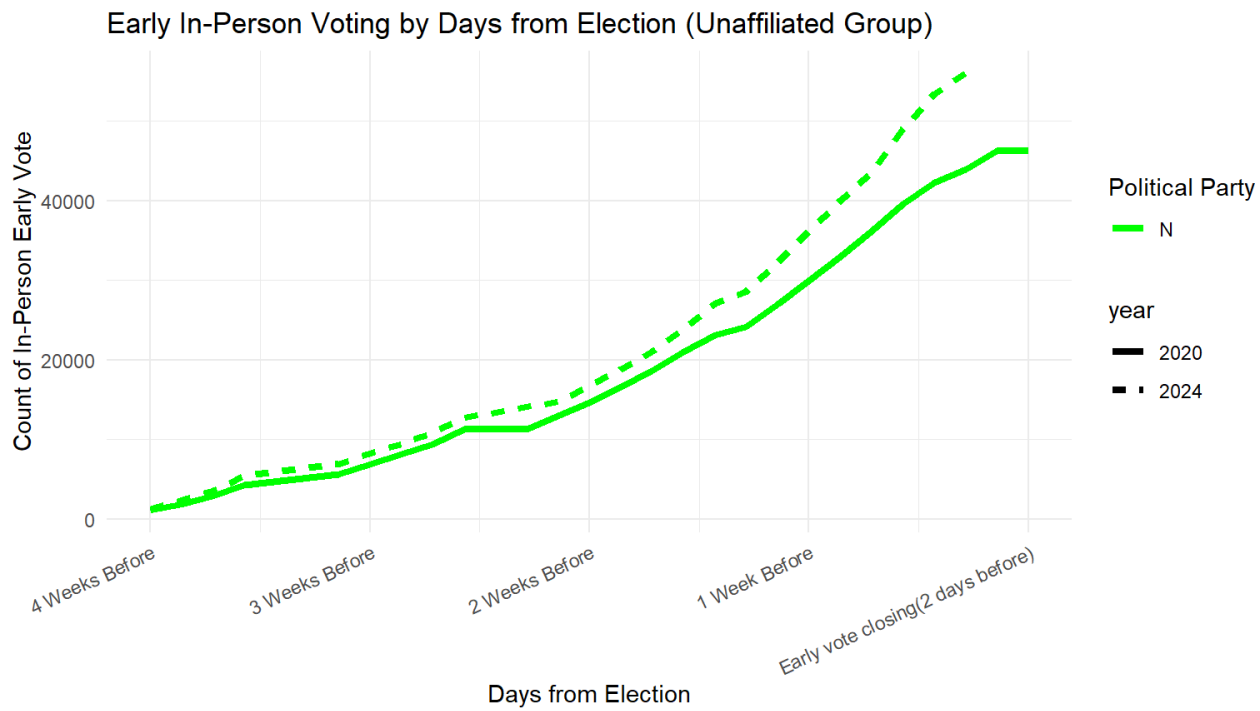
Trends in early in-person voting

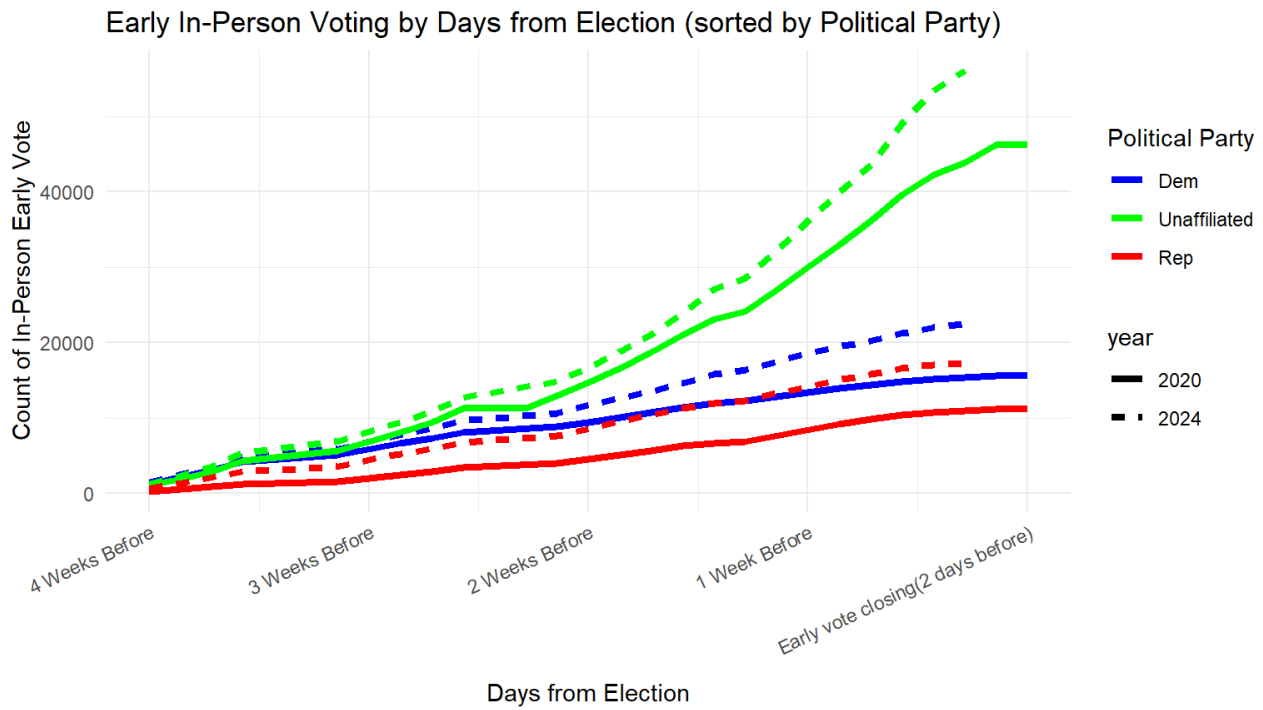
- We want to compare the rates of early voting in this year's election to those of previous years.

- This will be important as the results of early voting will be the only results we have early on in the broadcast. It is important then for us to have a relevant frame of reference to compare them to.


Early In-Person Voting by Days from Election
Count of Early Vote
100000
75000
50000
25000
0
4 weeks before
3 weeks before
2 weeks before
1 week before
Early vote closing(2 days before)
Days from Election
Election Year
2020
2024


Early In-Person Voting by Days from Election(by affiliated party)
Count of Early Vote
20000
15000
10000
5000
0
4 Weeks Before
3 Weeks Before
2 Weeks Before
1 Week Before
Early vote closing(2 days before)
Days from Election
Affiliated Party
D
R
Election Year
2020
2024


Early In-Person Voting by Days from Election (Unaffiliated Group)
Count of In-Person Early Vote
40000
20000
0
4 Weeks Before
3 Weeks Before
2 Weeks Before
1 Week Before
Early vote closing(2 days before)
Days from Election
Political Party
N
year
2020
2024



Early in-person 2024

D 22,454 (23.4%)

R 17,310 (18.1%)

U 56,057 (58.5%)

Total: 95,821

Early in-person 2020

D 15,603 (21.4%)

R 11,161 (15.3%)

U 46,256 (63.3%)

Total: 73,020

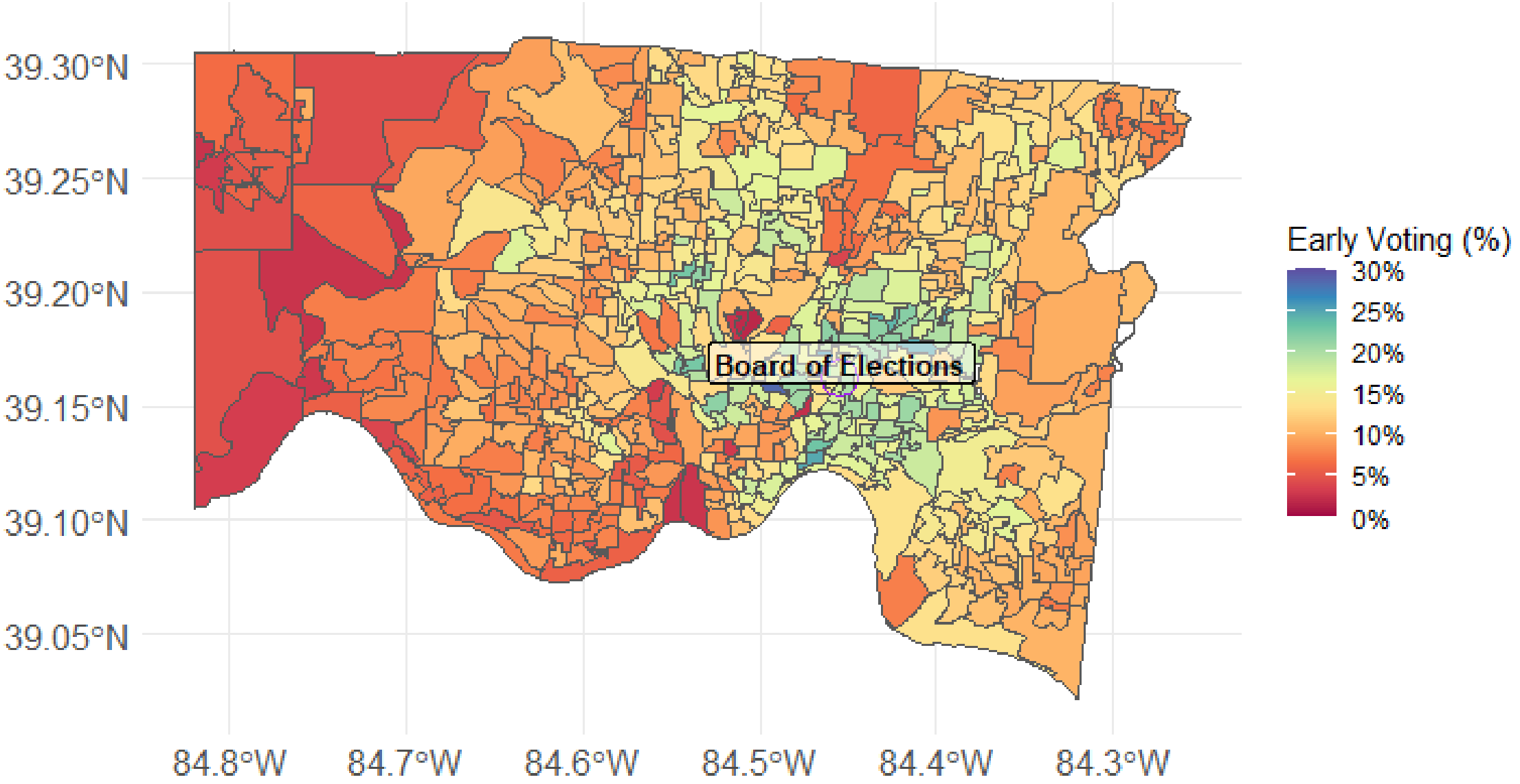
Early in-person voting - Geography

- Our motivation was to investigate if the pattern of early in-person voting is affected by the distance one needs to travel to get to the Hamilton County Board of Elections office to early vote.

- Includes:
  - Maps of the rates of early in-person voting by precinct
  - Visualization of early in-person voting rates as in relation to distance from BOE

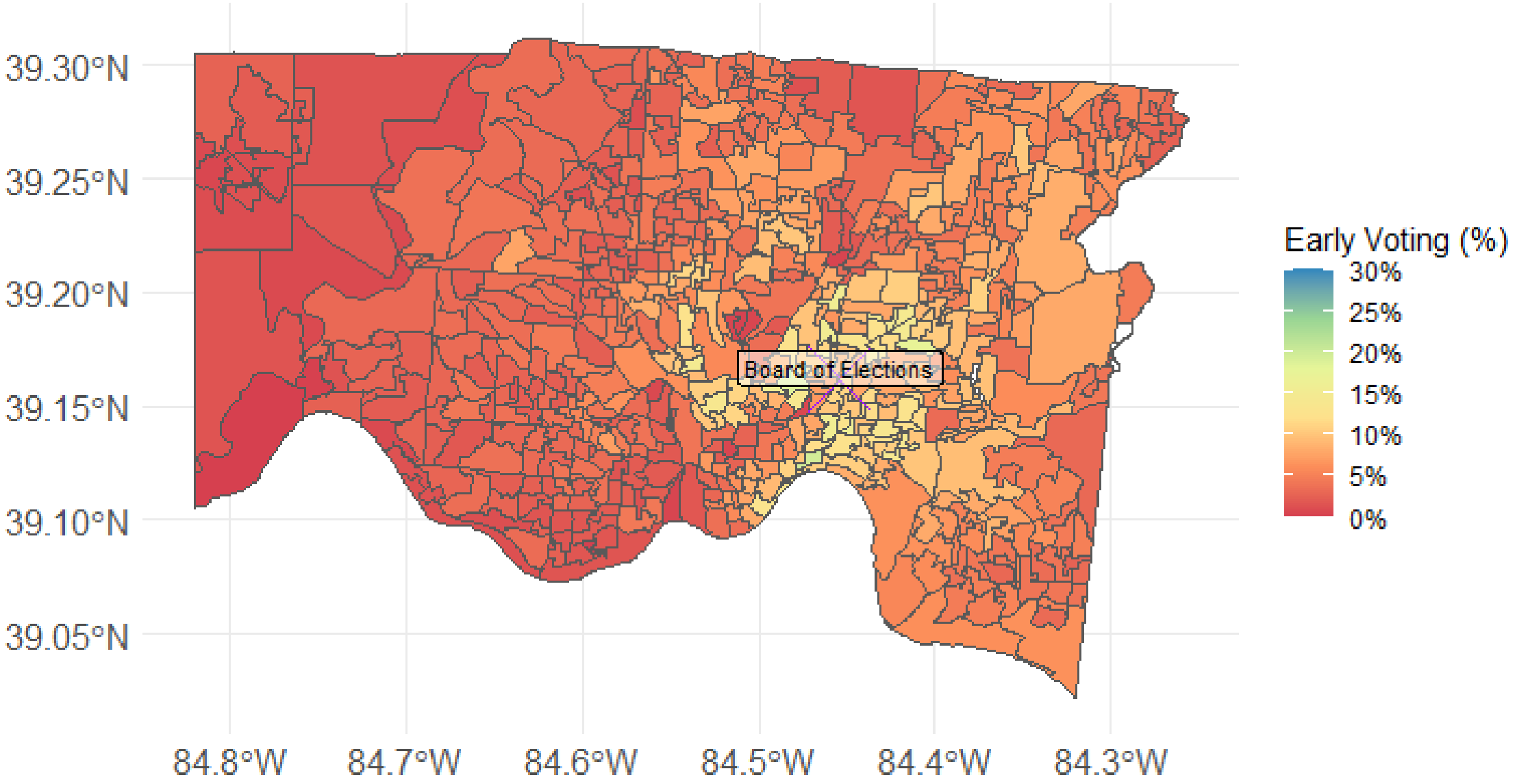
2020 Early In-Person Voting by Precinct

Percentage of Early Votes (Hamilton County): 12.07 %



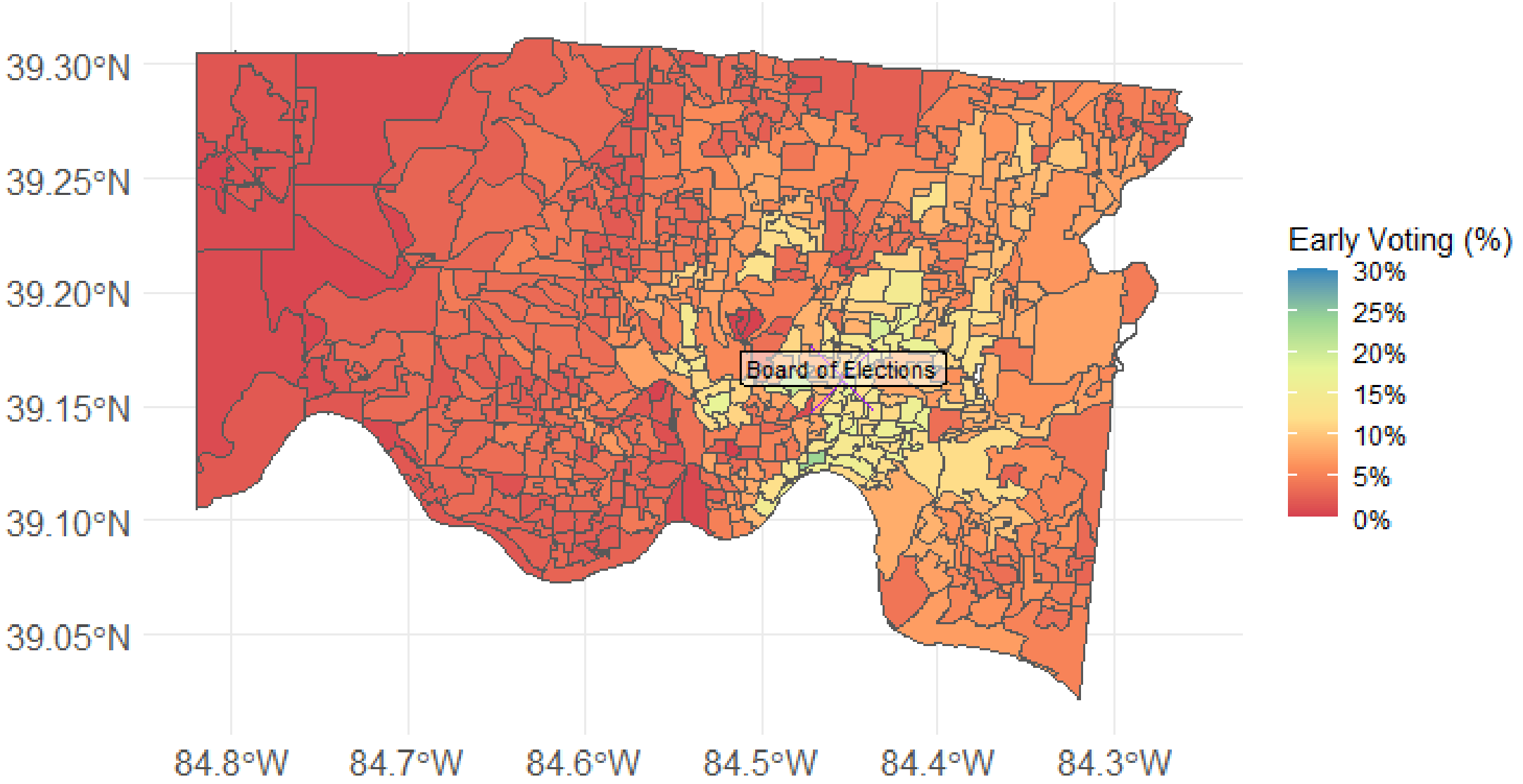
2022 Early In-Person Voting by Precinct

Percentage of Early Votes (Hamilton County): 5.47 %



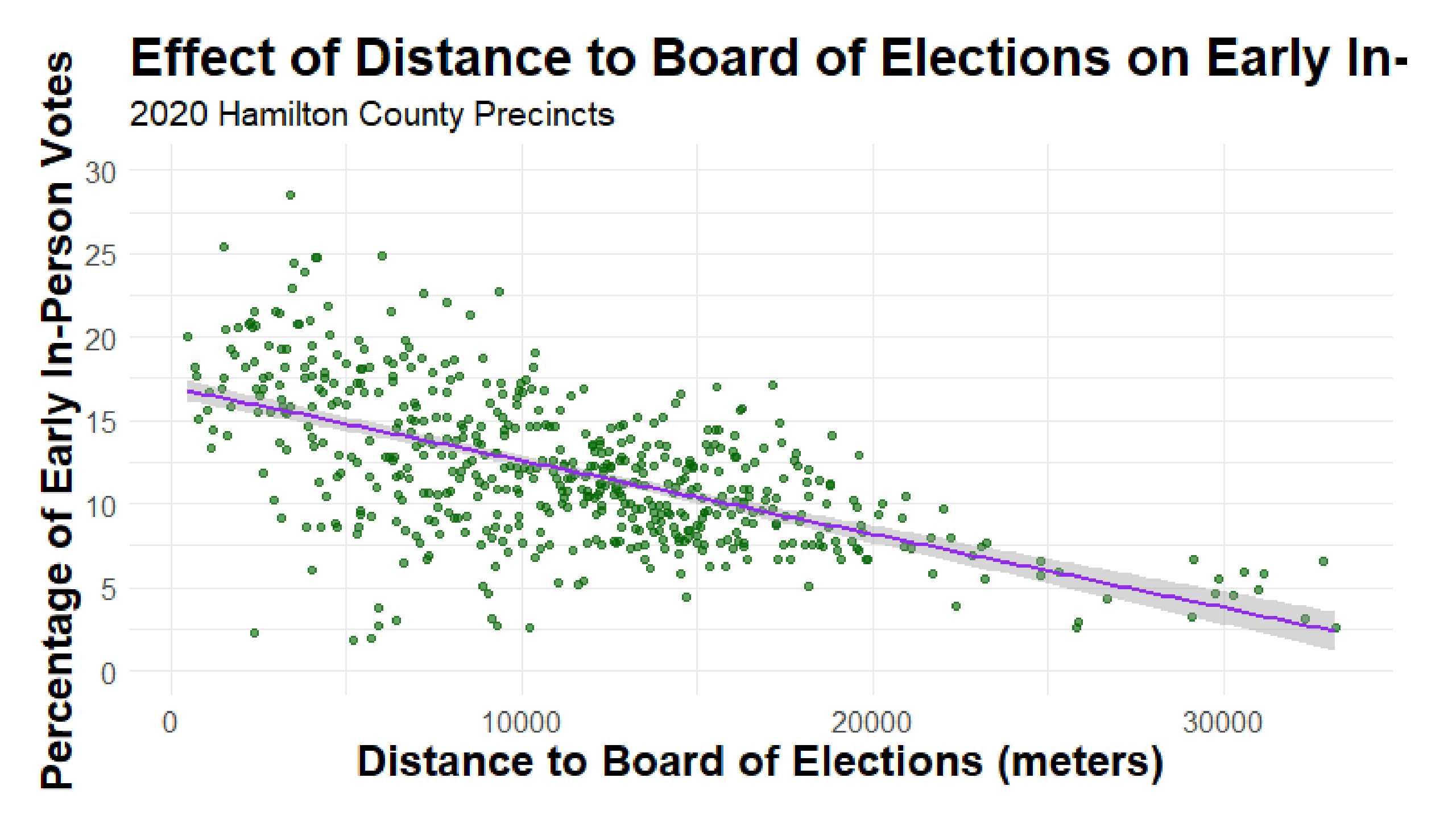
2023 Early In-Person Voting by Precinct

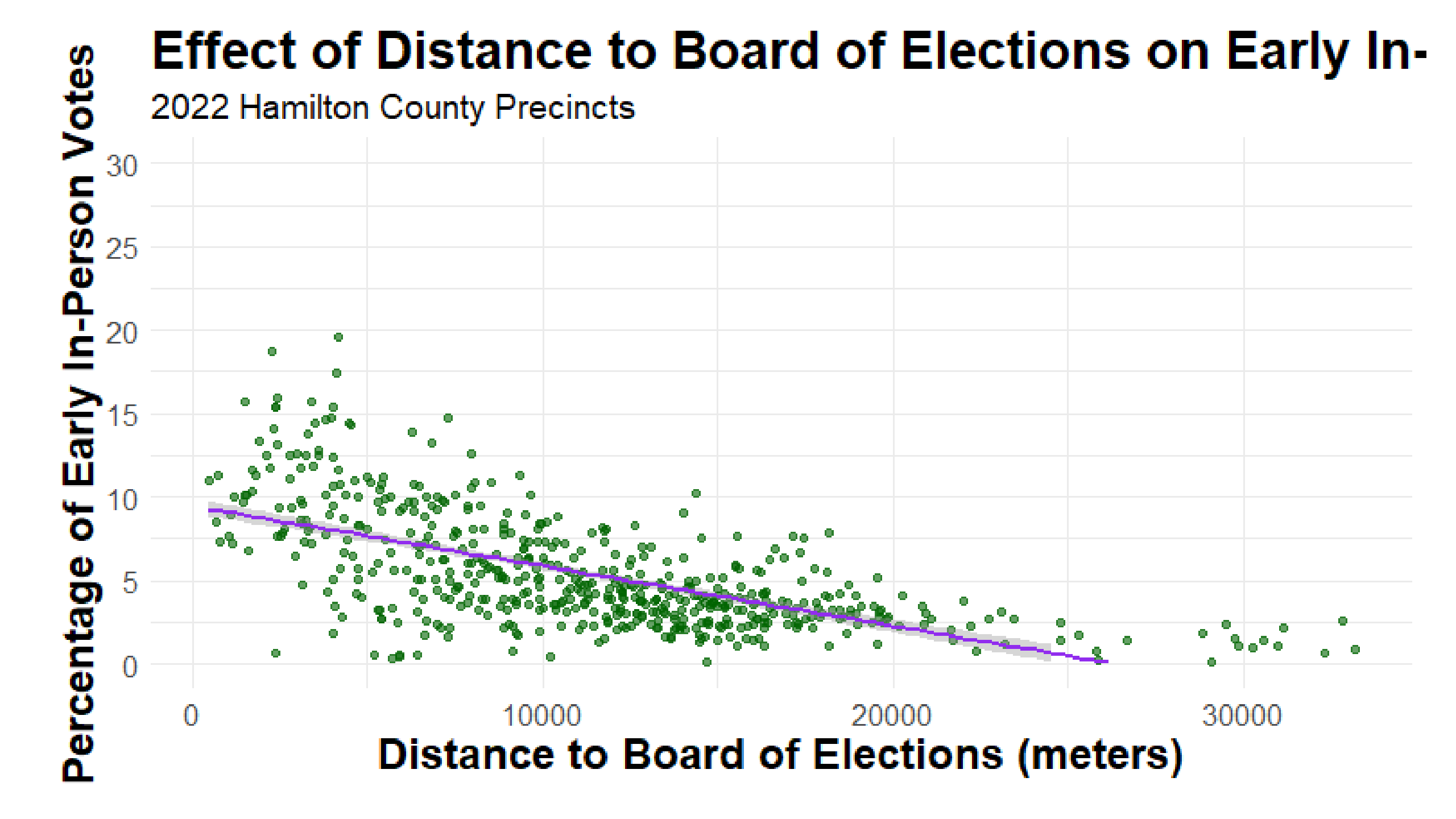
Percentage of Early Votes (Hamilton County): 5.98 %

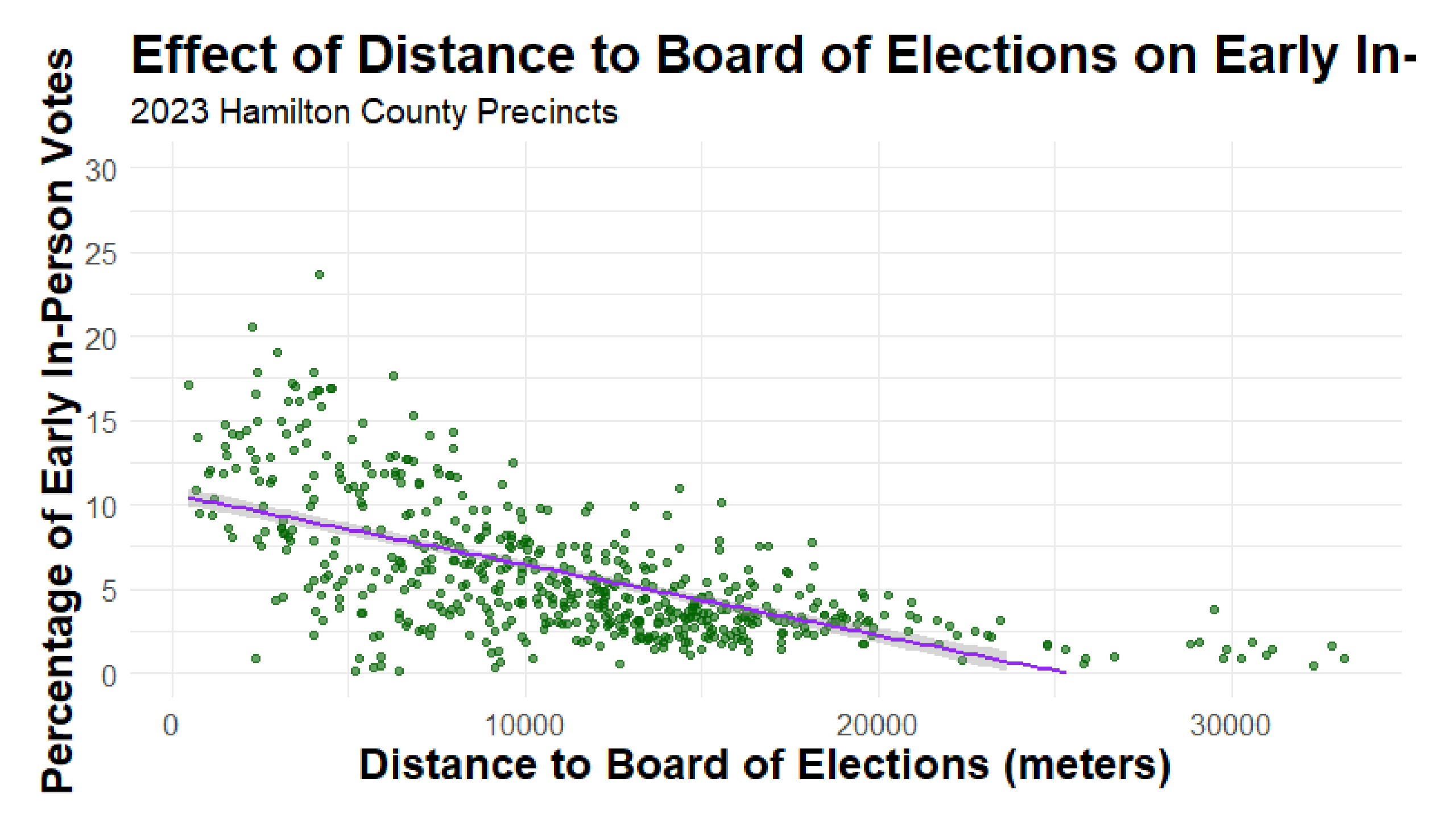


Key Take-aways

- Early in-person voting was highest in 2020 due to COVID


Effect of Distance to Board of Elections on Early In-
2020 Hamilton County Precincts
Percentage of Early In-Person Votes
30
25
20
15
10
5
0
0
10000
20000
30000
Distance to Board of Elections (meters)


Effect of Distance to Board of Elections on Early In-
2022 Hamilton County Precincts
Percentage of Early In-Person Votes
30
25
20
15
10
5
0
0
10000
20000
30000
Distance to Board of Elections (meters)

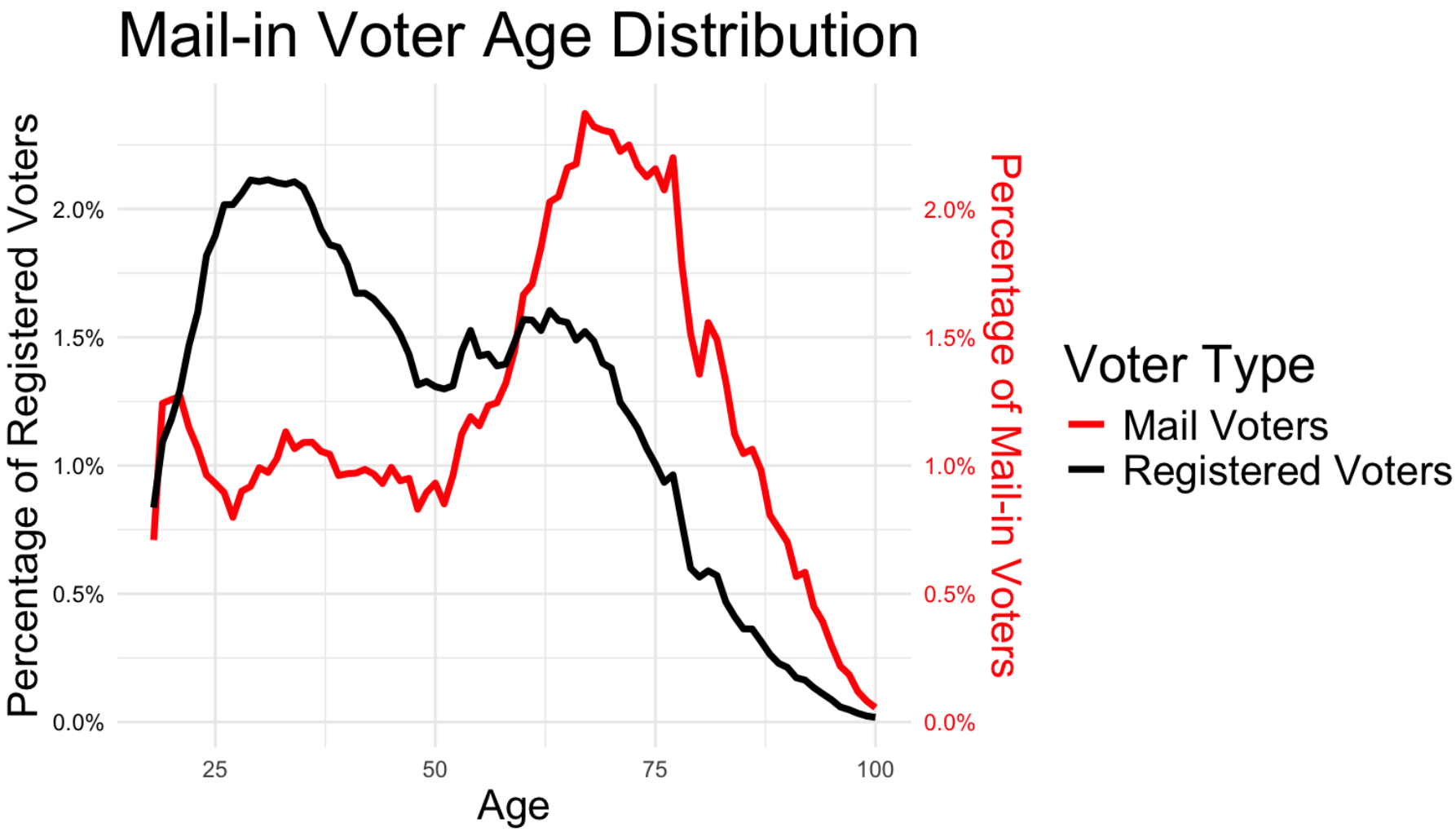

Effect of Distance to Board of Elections on Early In-
2023 Hamilton County Precincts
Percentage of Early In-Person Votes
30
25
20
15
10
5
0
0
10000
20000
30000
Distance to Board of Elections (meters)

Mail-in Voting Return Statistics

- 2024
  - 79,523 requested, 70,097 returned -> (88.1% returned)
    - DEM 11,018 / 11,615 (94.9%)
    - REP 13,063 / 13,658 (95.6%)
    - Unaffiliated 46,016 / 54,250 (84.8%)

- 2020
  - 155,883 requested, 148,026 returned -> (95.0% returned)
    - DEM 30,168 / 30,507 (98.9%)
    - REP 23,112/ 23,657 (97.7%)
    - Unaffiliated 94,746 /101,719 (93.1%)

Age distribution of mail-in voting



Overall partisan breakdown of "Early Votes" (in-person + mail-in)

In 2024: 165,918 TOTAL

- DEM = 33,472 -> 19.1%
- REP = 30,373 -> 17.3%
- UN = 102,073 -> 58.2%

In 2020: 221,064 TOTAL

- DEM = 45,771 -> 20.7%
- REP = 34,273 -> 15.5%
- UN = 141,020 -> 63.8%

Age distributions of Registered Voters

- Accepted wisdom says that younger voters are more likely to vote Democratic. We wanted to use the official list of registered voters to illustrate whether this is true and to what extent in Hamilton County

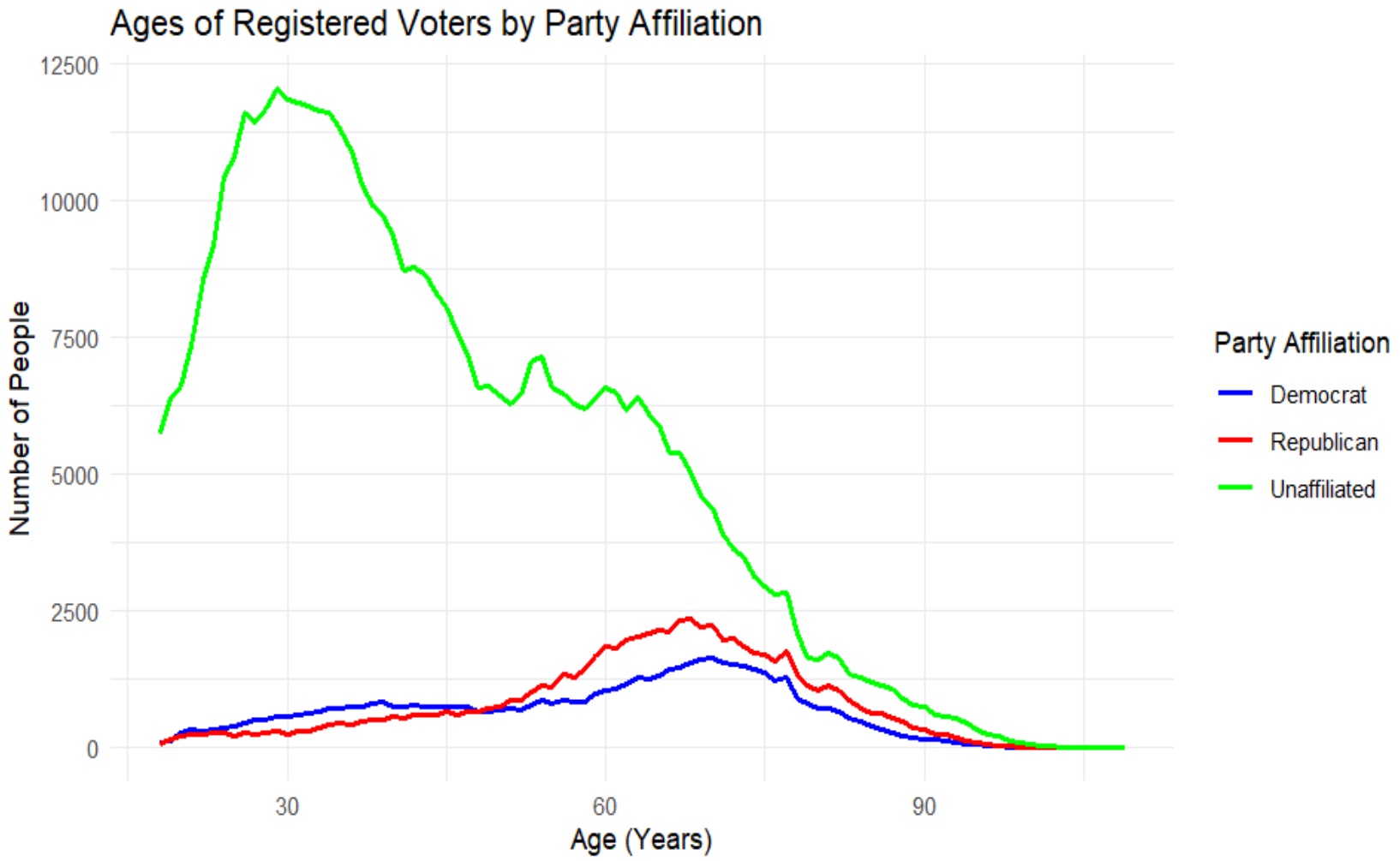
D	R	U
58840	71856	473353

- Includes:
  - Age distributions based on official party affiliation (by Ohio Law)
  - Age distributions based on our determination of party affiliation

D	R	U
128447	124725	350877

Party Affiliation

- By Ohio law a voter's partisan affiliation is determined by voting in a political party's primary election. A voter is a member of a political party if:
  - they voted in that party's primary election within the preceding two calendar years, or
  - they did not vote in any other party's primary election within the preceding two calendar years.
- Our modified definition
  - A voter is affiliated with the party if they voted in that party's primary election at any point in the past 3 presidential elections and have not voted in another party's primary since the most recent primary where that voter has cast a ballot.



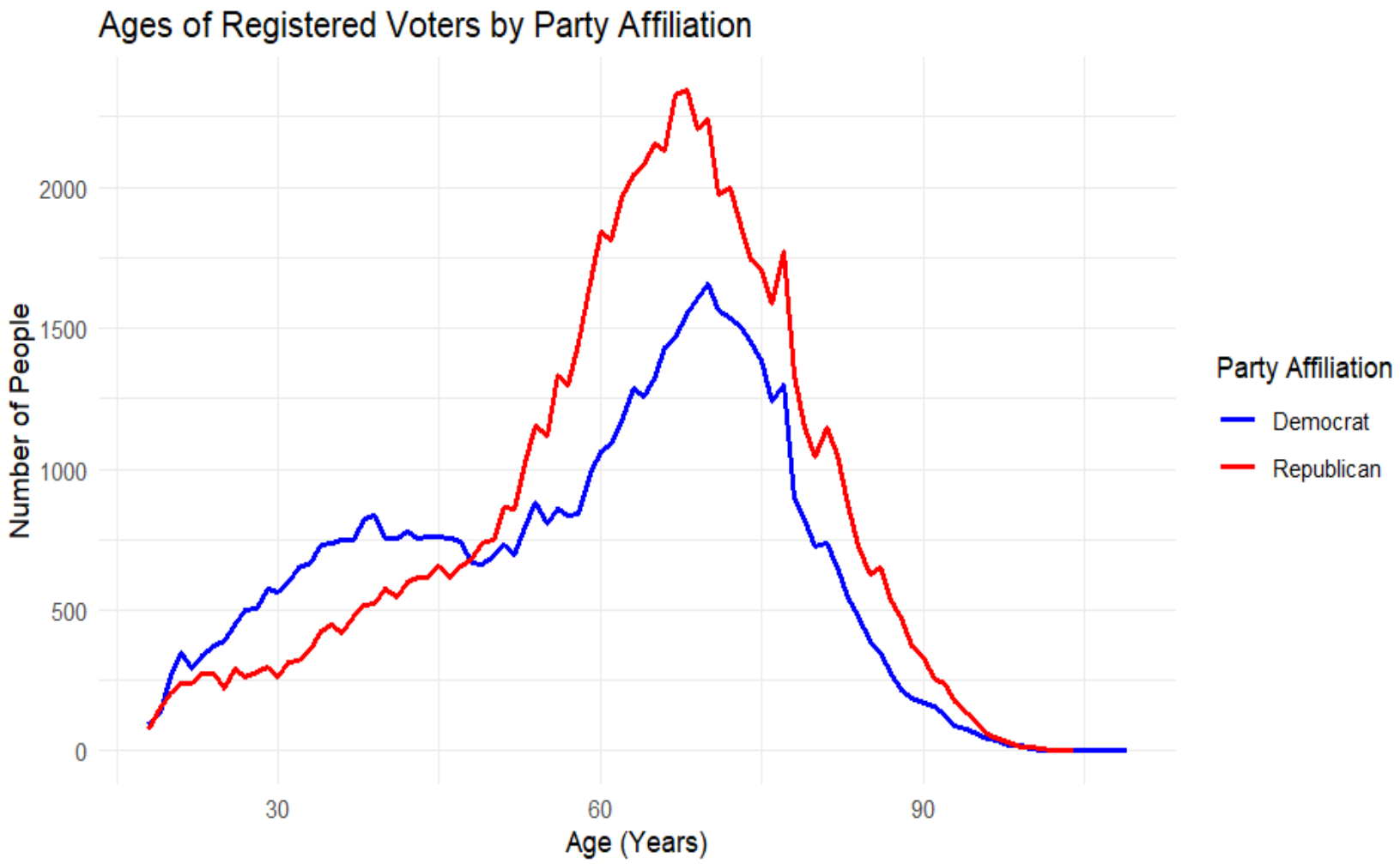
Average Ages:

Democrat: 58

Republican: 63

Unaffiliated: 45

Most registered voters in Hamilton County are not affiliated with a political party.

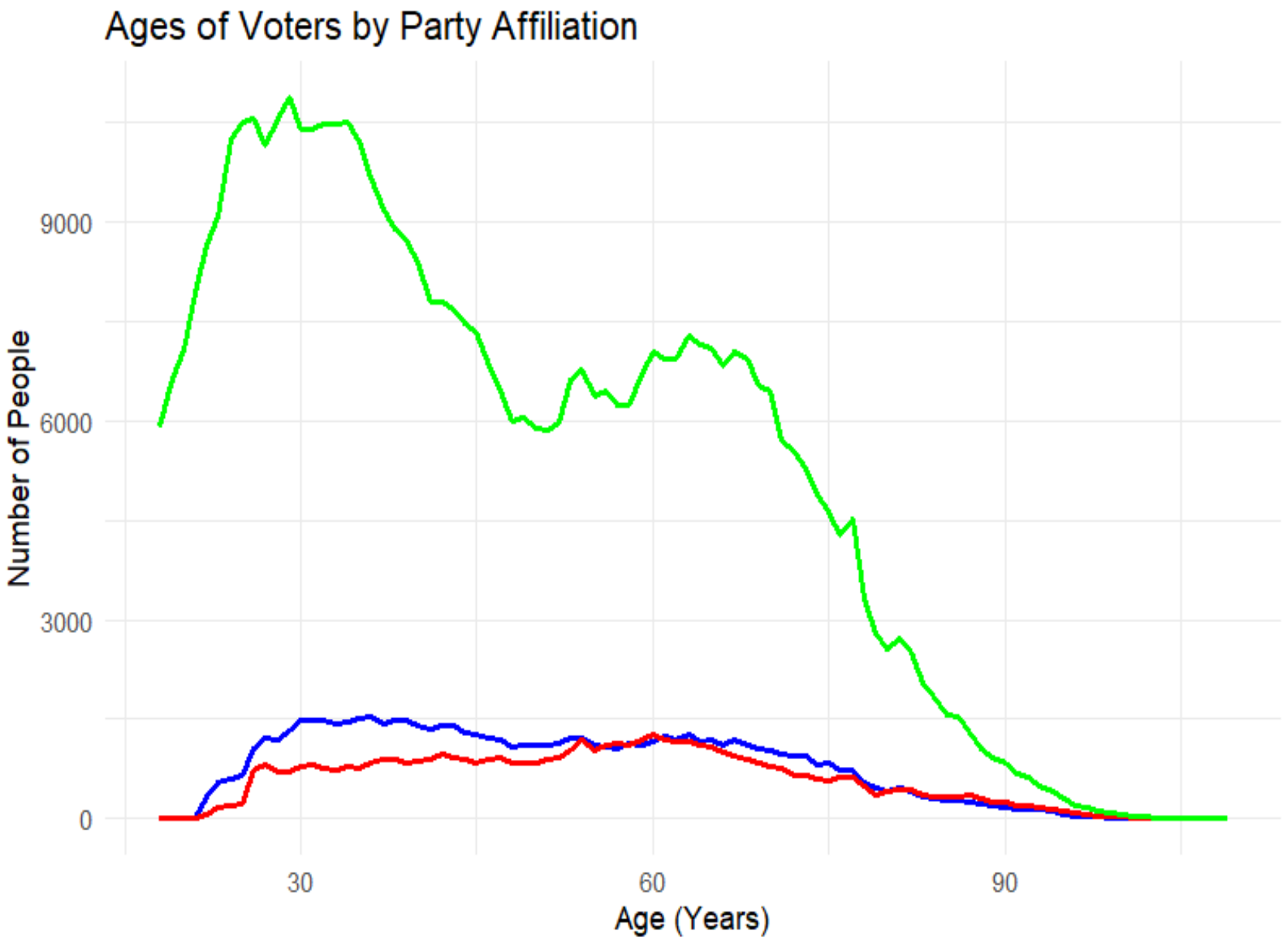


Average Ages:

Democrat: 58

Republican: 63

Younger voters are more likely to vote Democrat than Republican

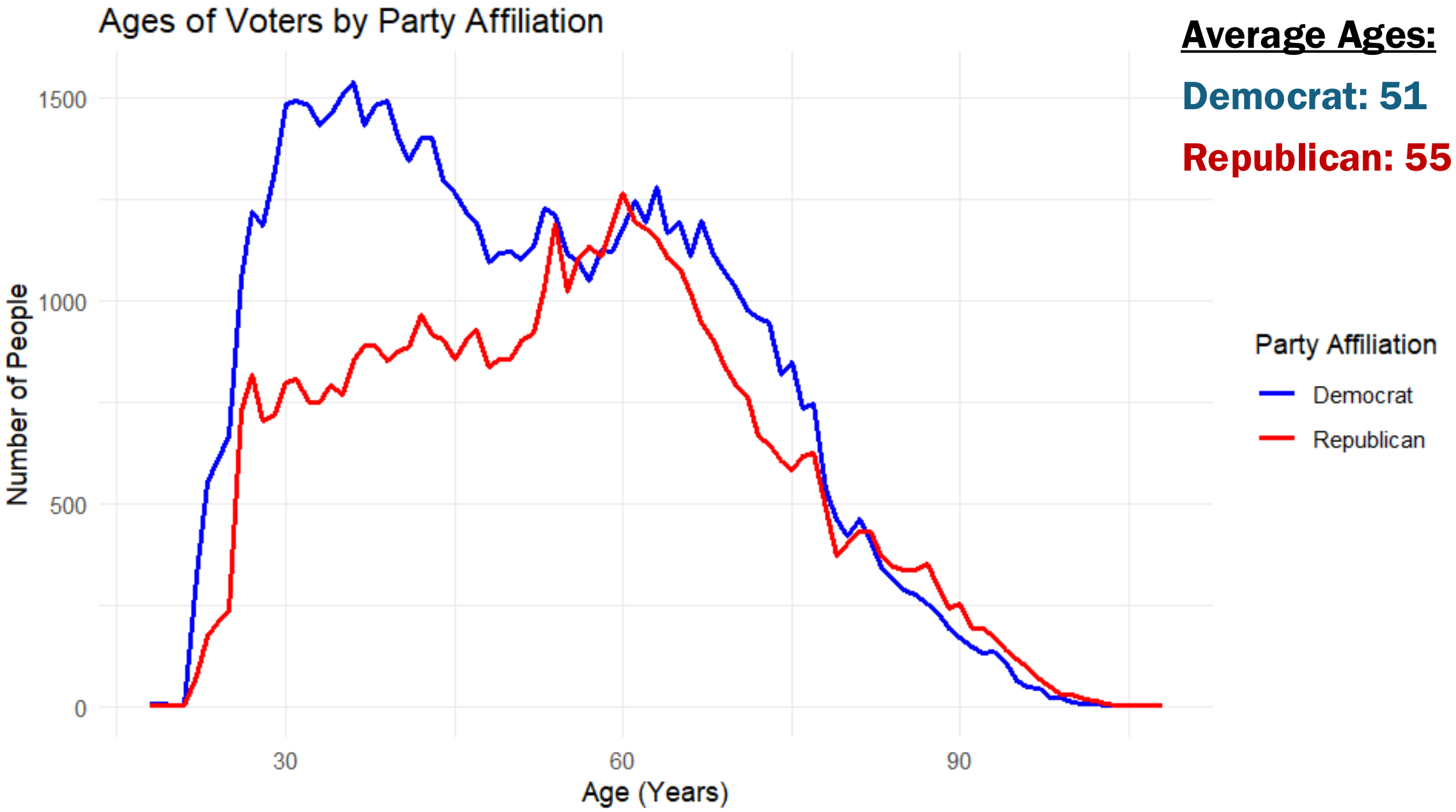


Average Ages:

Democrat: 51

Republican: 55

Unaffiliated: 47



Average Ages:

Democrat: 51

Republican: 55

Key Takeaways

- Limitation of legal definition of party affiliation
  - Leaves more voters officially unaffiliated

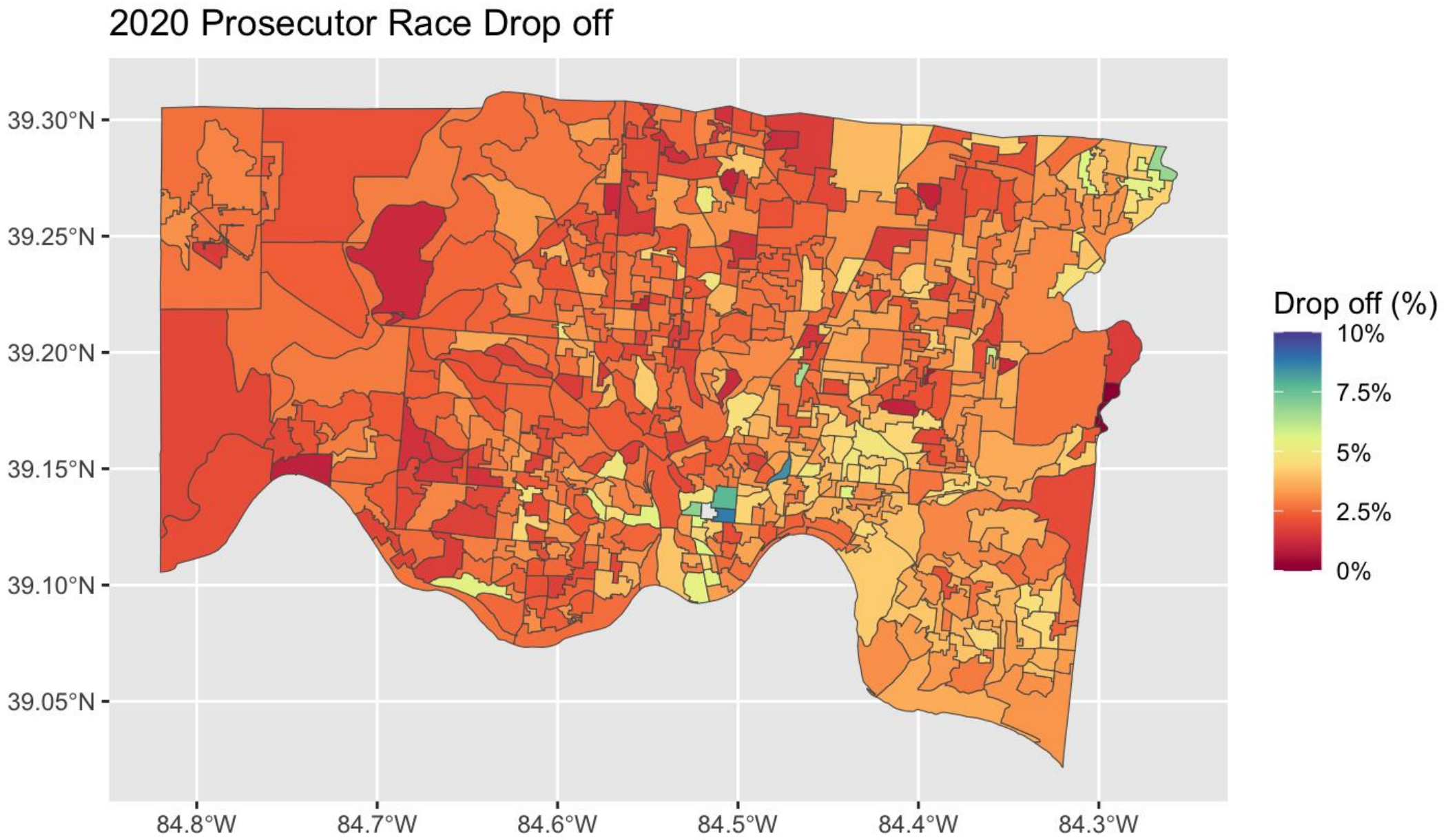
- Younger voters more likely to be unaffiliated
  - Of those affiliated, more likely to be Democrats

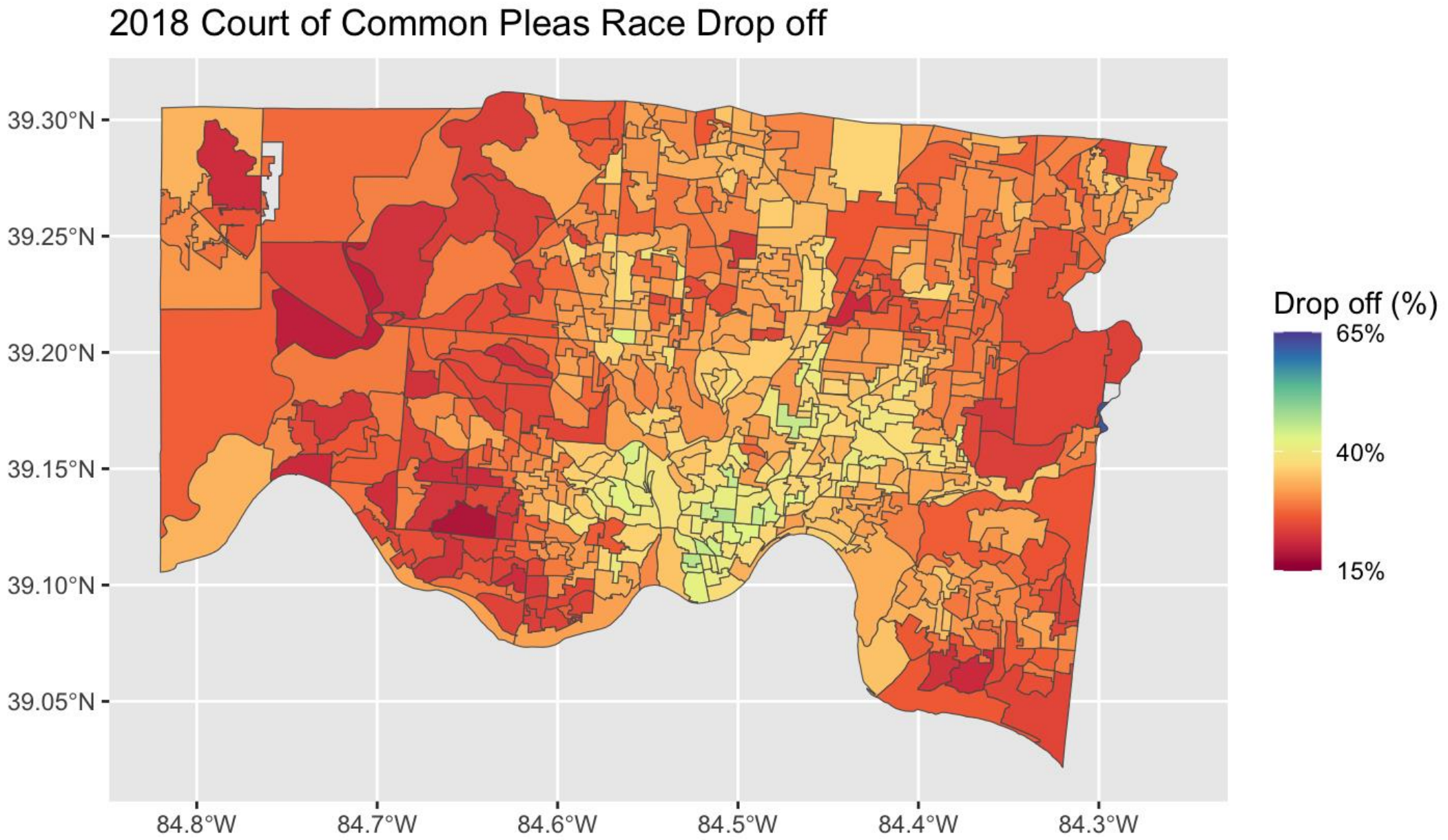
- Older voters more likely to be Republican

Dropoff for down ballot races

- For previous prosecutor's race

- For previous Court of Common Pleas field race

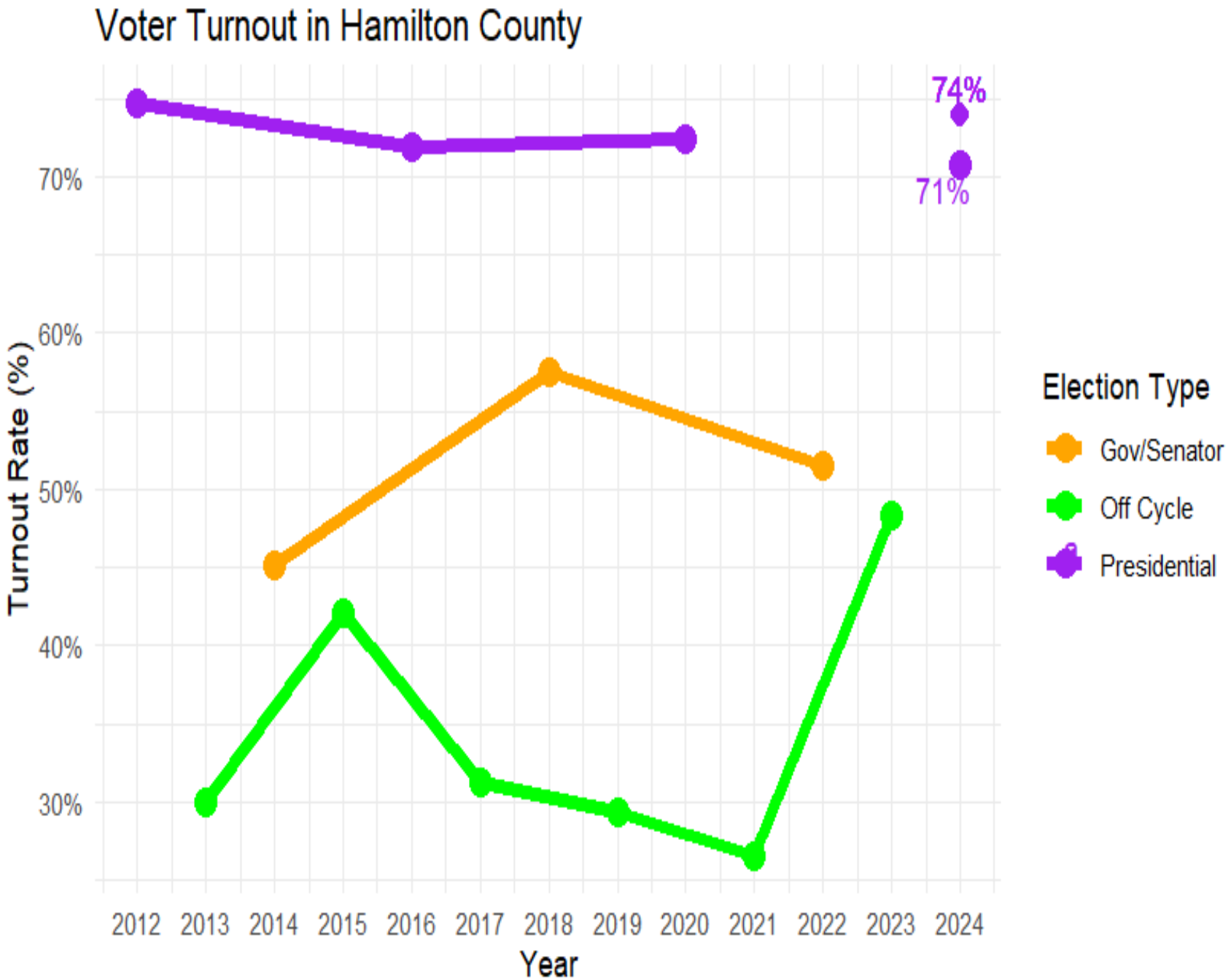

2020 Prosecutor Race Drop off
39.30°N
39.25°N
39.20°N
39.15°N
39.10°N
39.05°N
84.8°W
84.7°W
84.6°W
84.5°W
84.4°W
84.3°W
Drop off (%)
10%
7.5%
5%
2.5%
0%


2018 Court of Common Pleas Race Drop off
39.30°N
39.25°N
39.20°N
39.15°N
39.10°N
39.05°N
84.8°W
84.7°W
84.6°W
84.5°W
84.4°W
84.3°W
Drop off (%)
65%
40%
15%

Estimating voter turnout for 2024

- Key component of campaign strategy and magic number calculation.

- Voter turnout is highly variable depending on the type of races that are in an election.



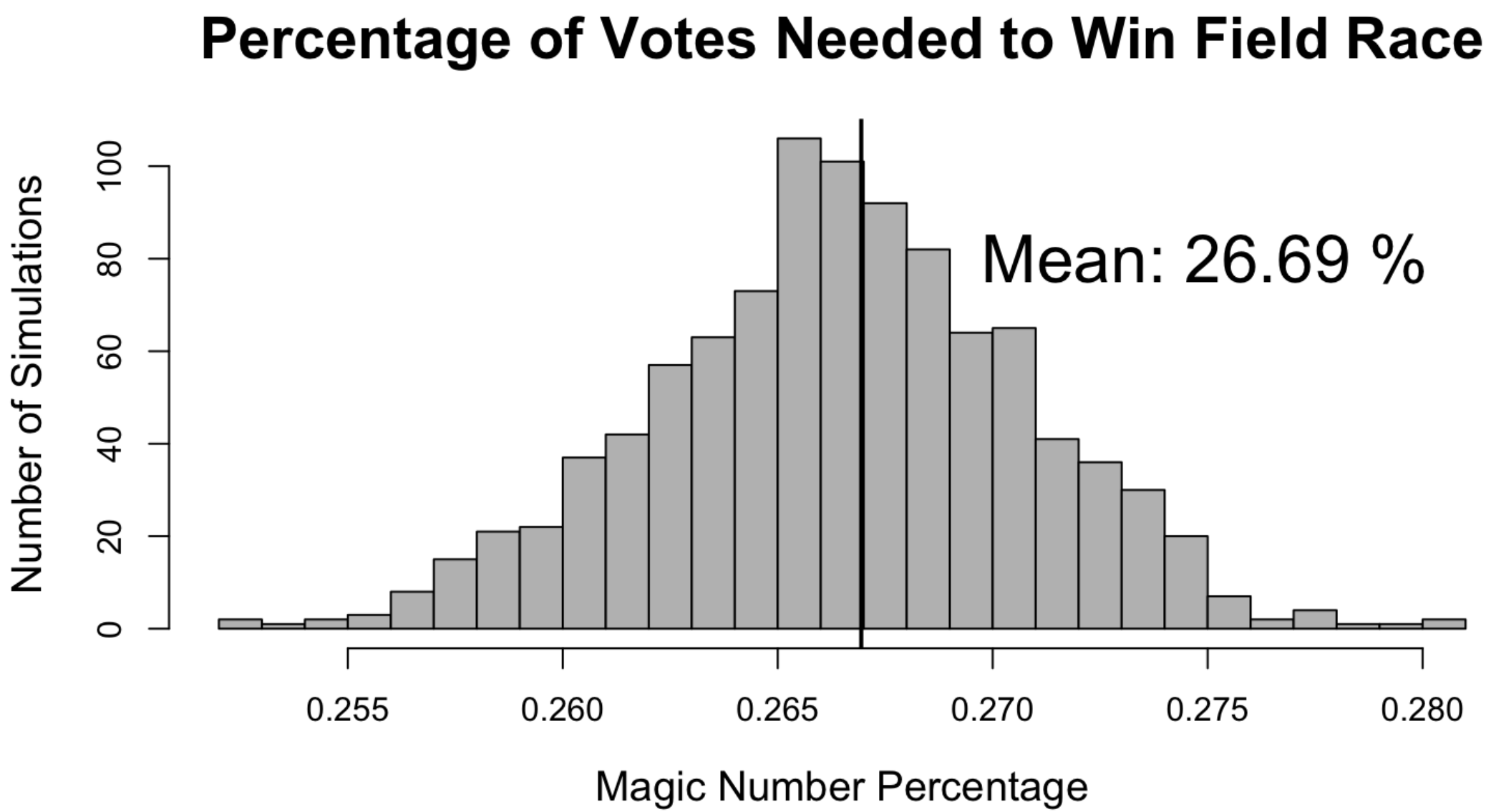
Range of turnout predictions

- Reasons it could be higher
  - Key issues in the elections
  - Voting options are more accessible
- Reasons it could be lower
  - Voters are not happy with any candidates, so they abstain from voting

Estimating the percentage of votes needed to win a field race

- Head-to-head races are simple: a candidate needs to get 50% of the vote + 1 additional vote to guarantee a victory. In field races, this is more complicated.

- Our goal was to estimate the percentage of votes necessary for a "Choose two out of five candidates" field race
  - Used computer simulation to run 1,000 such elections with randomness.
  - For each, we identified the percentage of votes needed to finish in the top two.
  - Evaluated the resulting distribution.


Percentage of Votes Needed to Win Field Race
Mean: 26.69 %
Number of Simulations
0
20
40
60
80
100
0.255
0.260
0.265
0.270
0.275
0.280
Magic Number Percentage

Comparison with previous results

- 2018 Court of Common Pleas Field Race

  Four-person field race:

31.5%

29.7%

25.5%

13.2%

These results show that with an additional candidate, a magic number of 26.7% would make sense due to a greater distribution of votes

Fact sheet

- We wanted a place to keep track of relevant numbers, statistics going into Election Night.

- Please let us know of other things we should include.

2016 General Election

- In 2016 there were 580,354 total registered voters. Only 417,456 votes were cast.
- Of those 417,456 voters 111,844 were absentee ballots.
- 215,719 votes for Clinton and Kaine, 63,150 of those votes coming from absentee ballots
- 173,665 votes for Trump and Pence. 41,531 of those votes came from absentee ballots
- No data for issued absentee ballots for 2016 or 2020

2020 General Election

- In 2020 there was 600,401 total registered voters. Only 434,956 votes were cast.
- Of those 434,965 voters 250,866 were absentee ballots.
- I could not find the data for Republican vs Democrat votes for 2020

2024 Early Voting

- Total of 114,079 absentee ballots requested
- As of 10/22/24, 77,738 ballots have been returned
- Democratic ballots issued: 18,223. Democratic ballots returned: 14,290
- Republican ballots issued: 18,618. Republican ballots returned: 13,915
- Party less ballots issued: 77,238. Party less ballots returned: 49,533
- 603,980 registered voters in Hamilton County
- 37,128 in office early votes have been placed since 10/8/24
- 11,762 of them were designated as Democratic, 8,617 of them Republican, and 16,749 did not carry any party tag

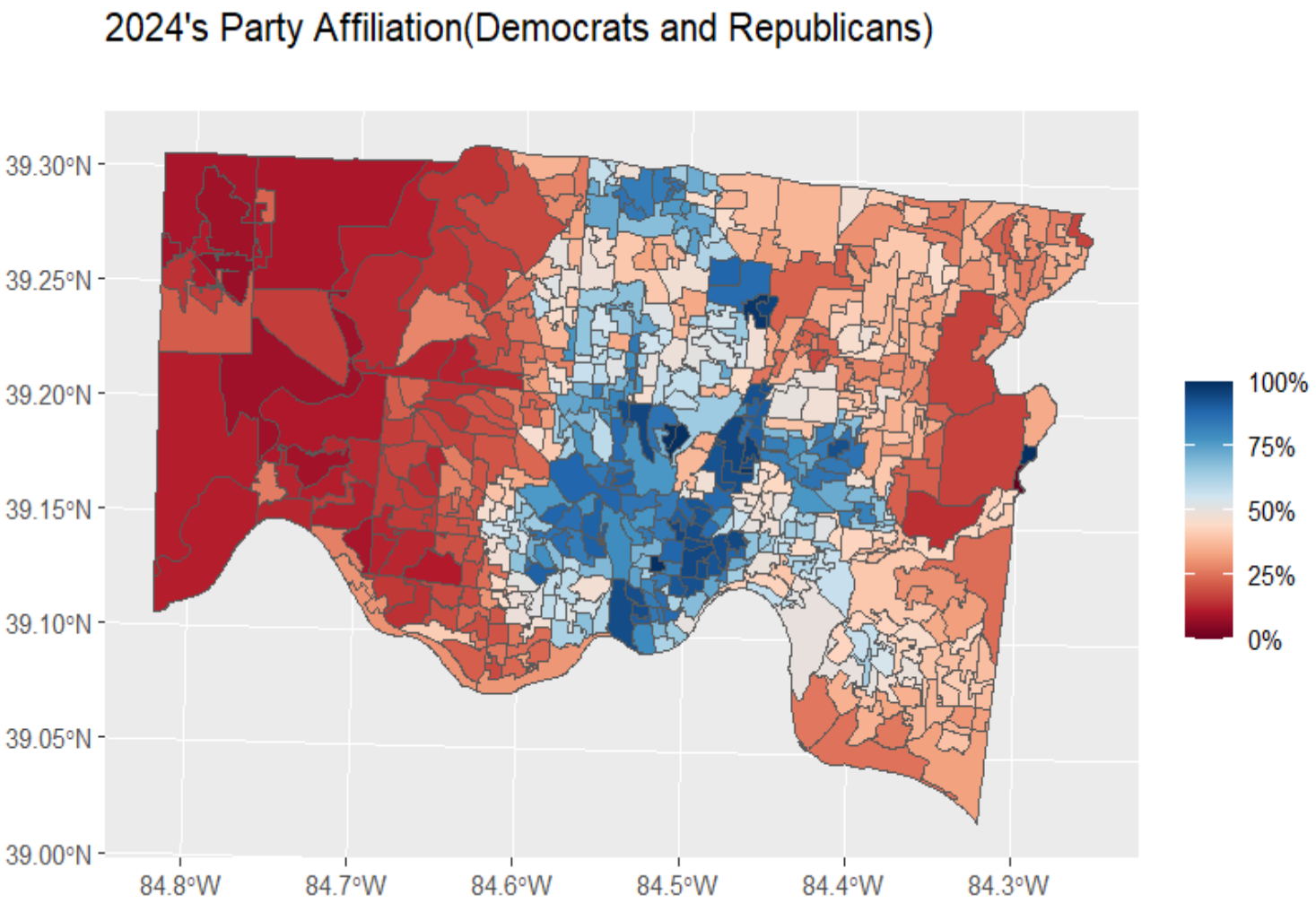
Comparisons

- Already more registered voters in 2024 than both 2016 and 2020
- To be exact: 100.596% more than 2020 and 104.071% more than 2016
- There is no way to calculate percentages to compare the official results of absentee ballots because the 2024 election is not over yet
- Based on registered voter's numbers being up we can expect the absentee total to be slightly higher than the last 2 elections

Political affiliation - Geography

- As election results come in, people at the BOE will be looking at what precincts are reporting and speculating about what type of areas are left and how that could affect the results.

- For these purposes, we make maps of the partisan leanings of the county
  - Official party affiliation by state law
  - Our adapted definition of party affiliation



Top Democratic Areas

1. LINCOLN HEIGHTS VILLAGE:97.8%
2. CINTI WARD 18: 93.8%
3. CINTI WARD 7: 93.1%
4. CINTI WARD 17: 88.8%
5. CINTI WARD 13:88.4%

Top Republican Areas:

1. HARRISON TWP: 88.4%
2. CROSBY TWP: 87.9%:
3. MIAMI TWP: 87.7%
4. WHITEWATER TWP: 87.3%
5. THE VILLAGE OF INDIAN HILL CITY: 81.5%

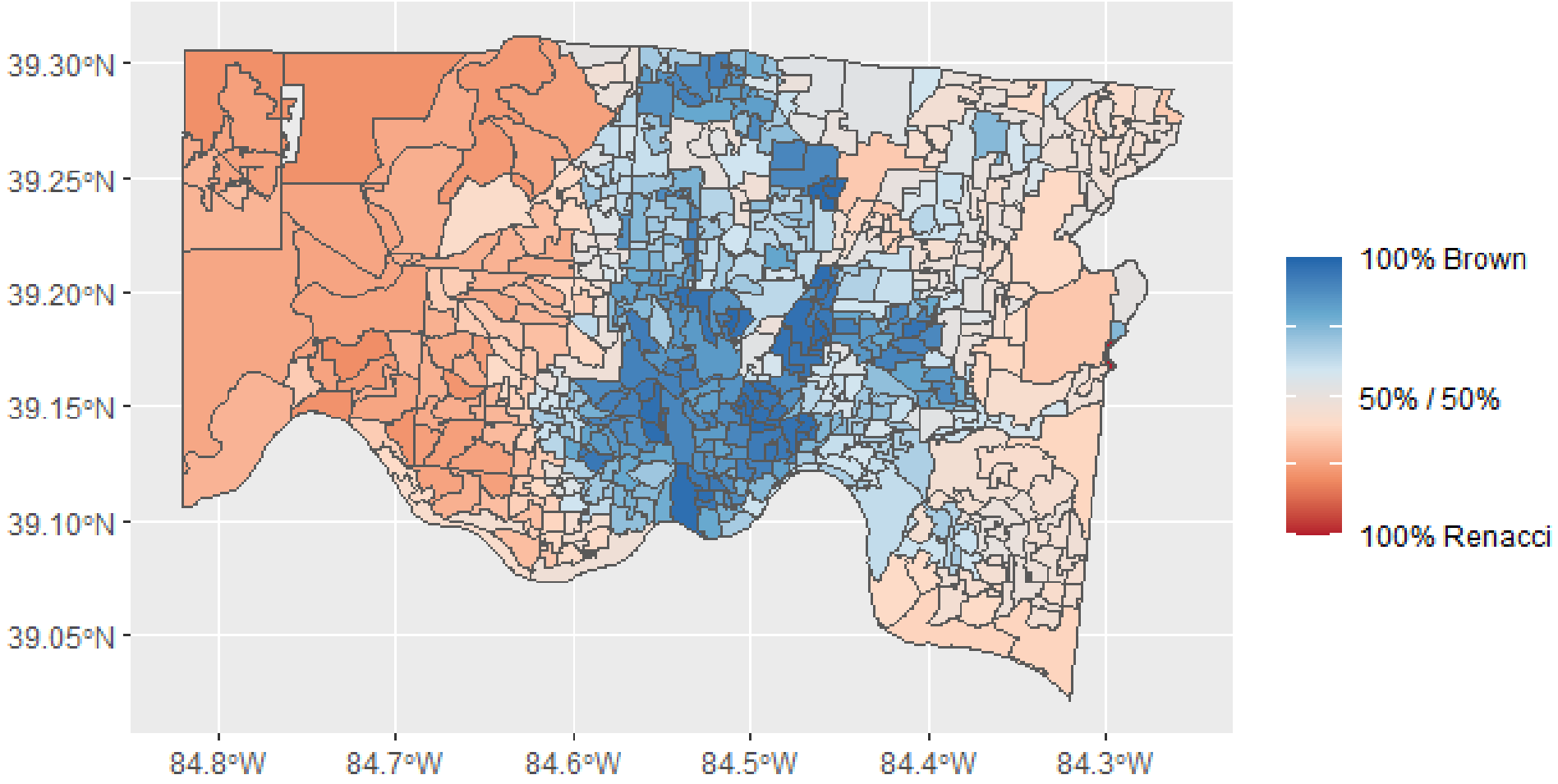
Election results - Geography

- Many races on the ballot this year have direct analogs in previous elections. These previous results are a driving force in campaign strategy and help us interpret incoming results on election night.

- Previous results included
  - Brown vs. Renacci (2018) - Brown won Hamilton County
  - Trump vs. Biden (2020) - Biden won Hamilton County
  - Deters vs. Rucker (2020) - Deters won
  - Vance vs. Ryan (2022) - Ryan won Hamilton County
  - Issue #1 Reproductive Rights (2023)
  - Issue #2 Cannabis Legalization (2023)

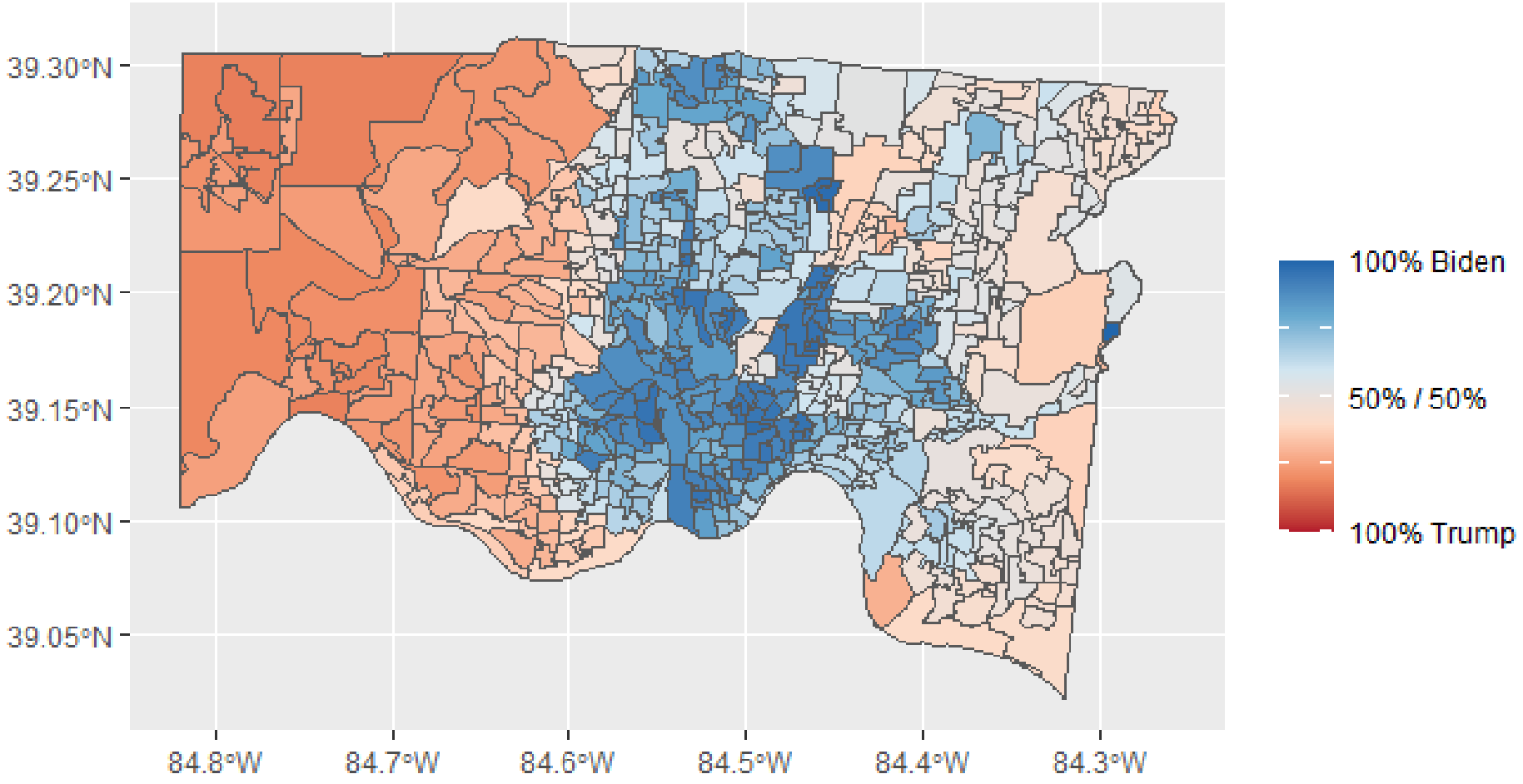
2018 Senator Election in Hamilton County

Sherrod Brown (D) 59.3% vs Jim Renacci (R) 40.6%



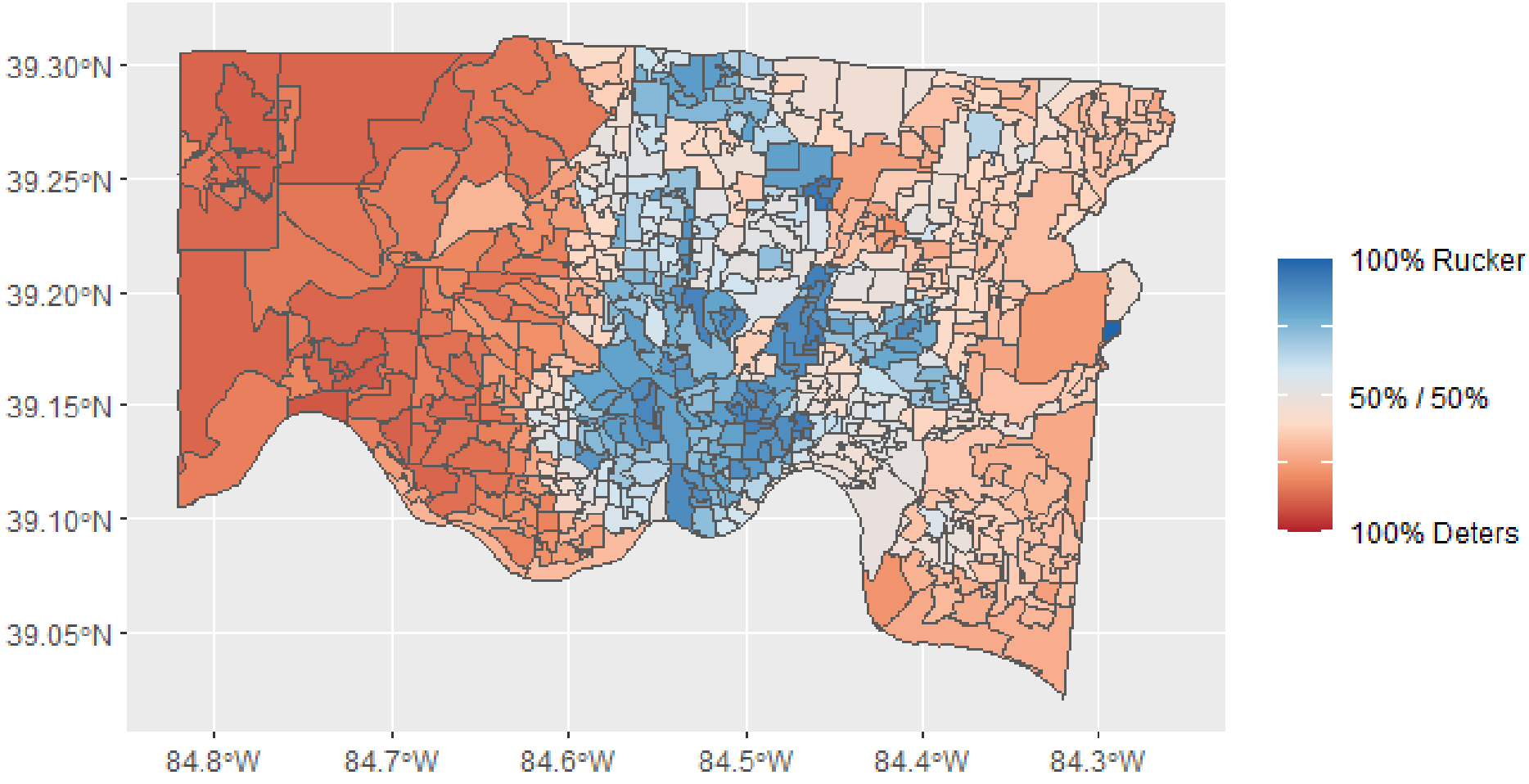
2020 Presidential Election in Hamilton County

Joe Biden (D) 57.1% vs Donald Trump (R) 41.3%



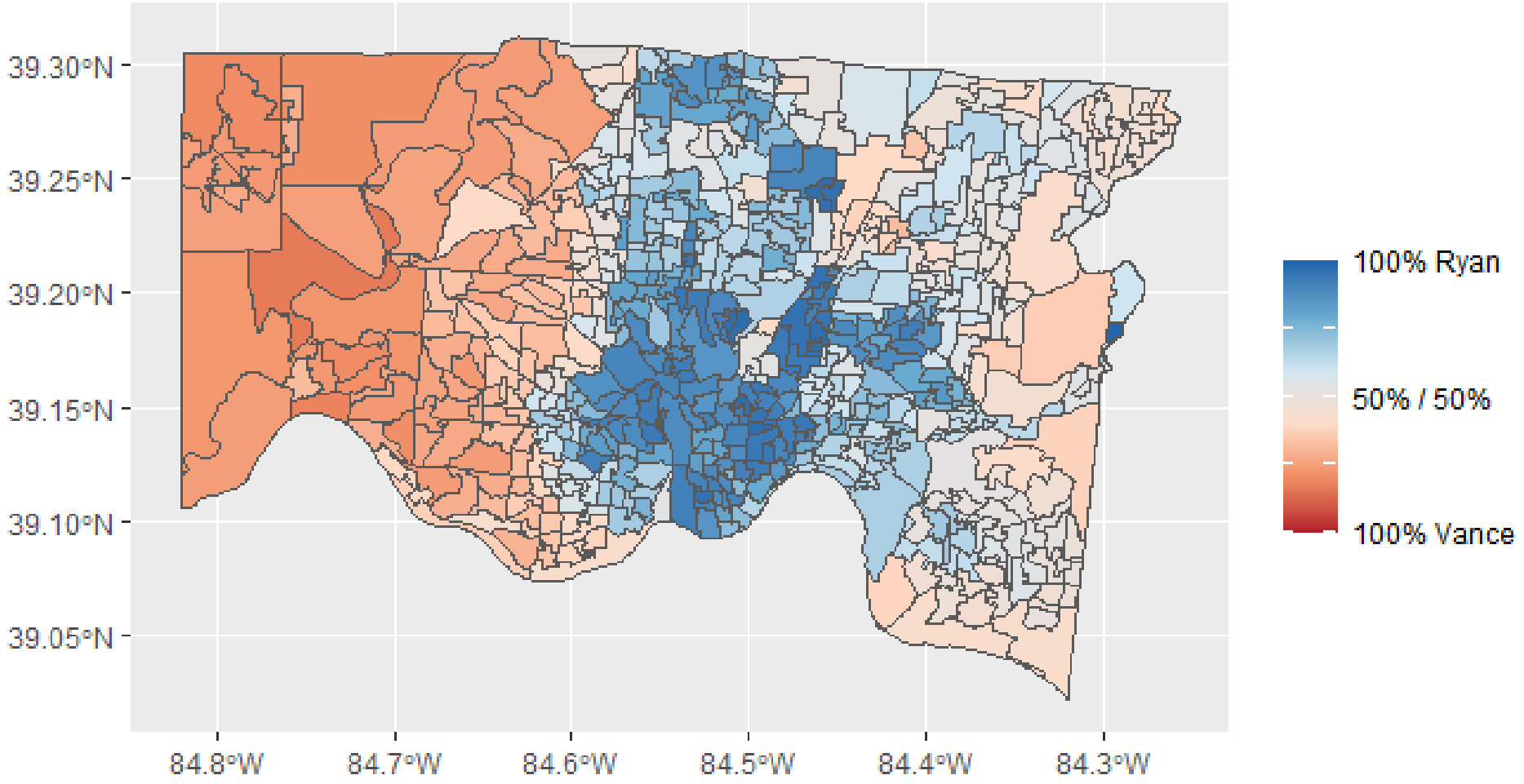
2020 Hamilton County Prosecutor Attorney

Joe Deters (R) 52.4% vs Fanon Rucker (D) 47.6%



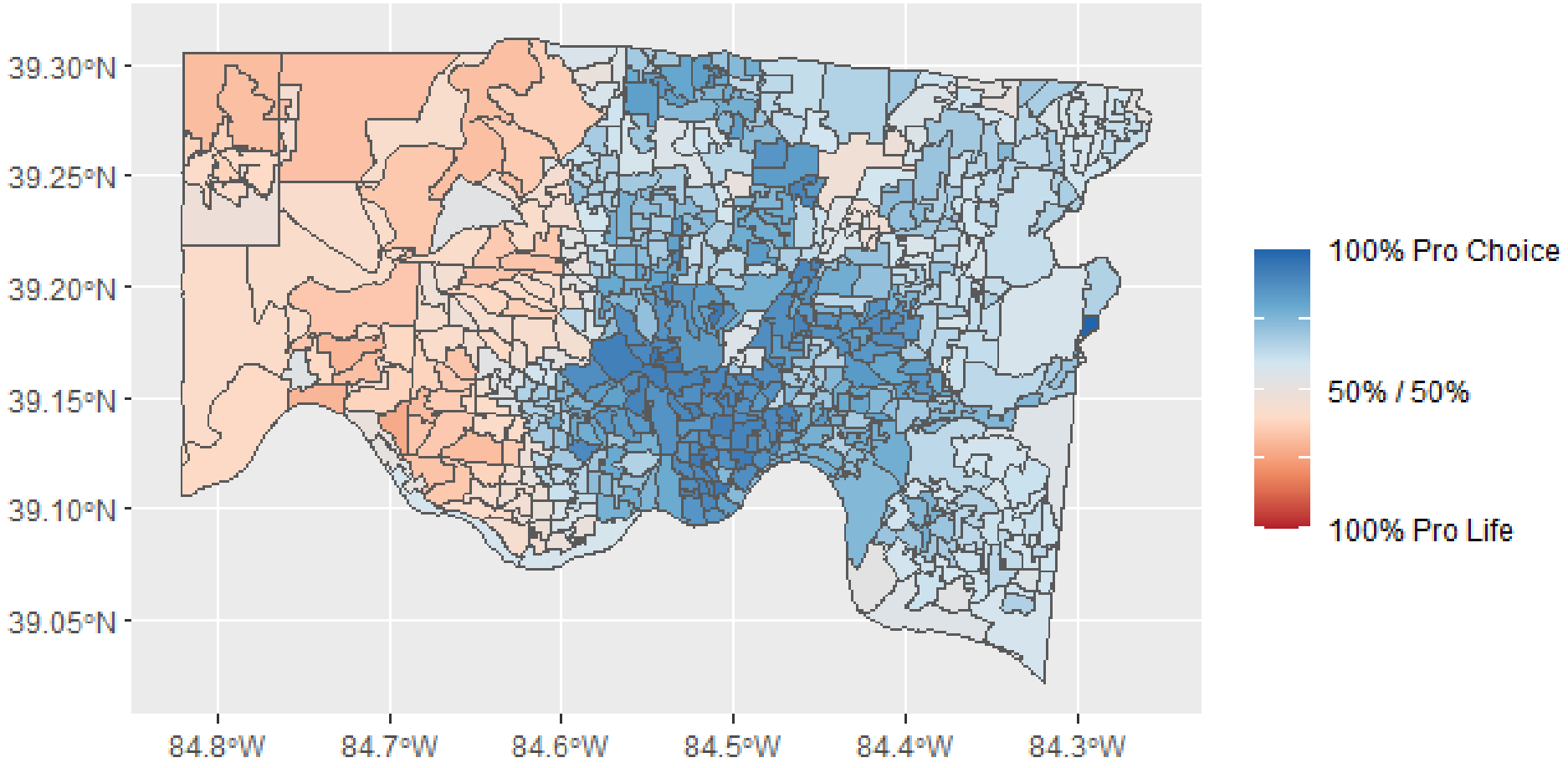
2022 Senator Election in Hamilton County

Tim Ryan (D) 57.7% vs J.D. Vance (R) 42.2%



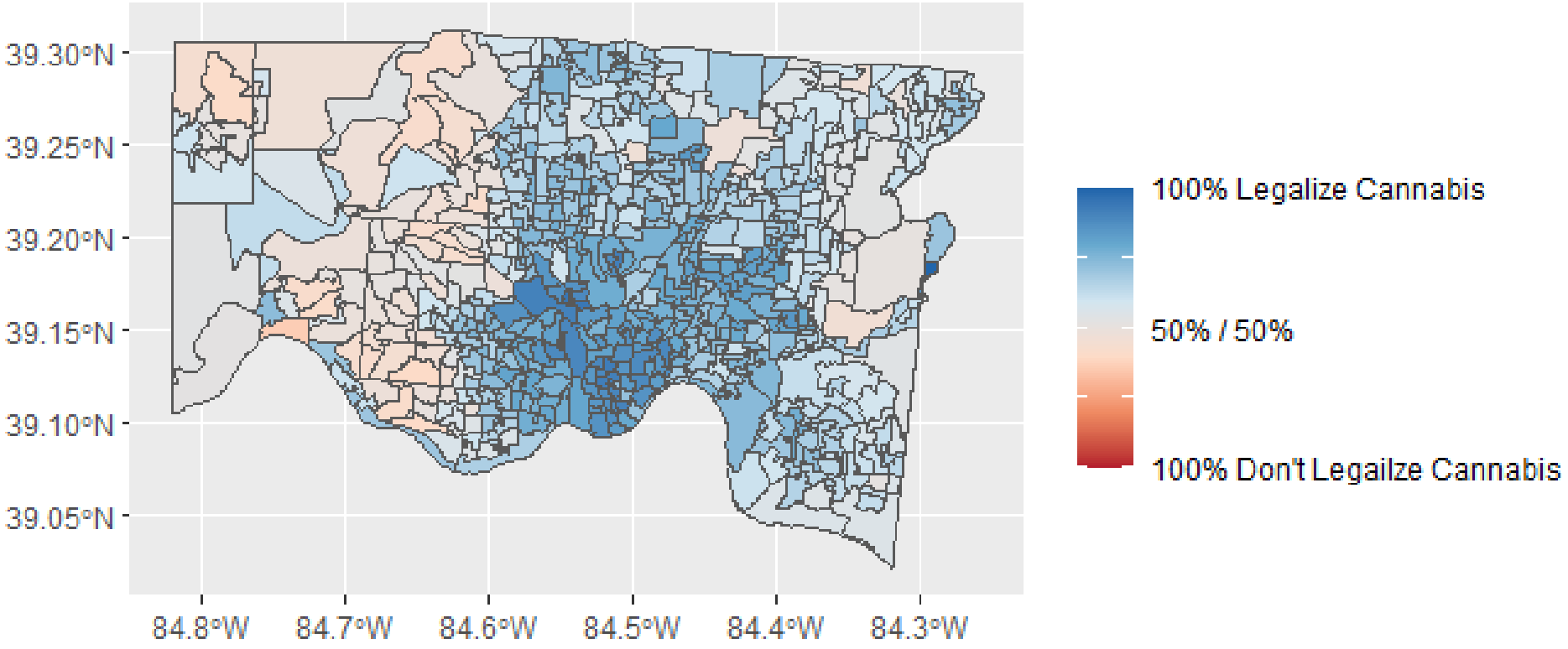
2023 Ohio Issue 1 (Reproductive Rights) Election in Hamilton County

Yes/Pro Choice (65.1%) vs No/Pro Life (34.9%)



2023 Ohio Issue 2 (Cannabis Legalization) Election in Hamilton County

Yes/Legalize Cannabis (65.8%) vs No/Don't Legalize Cannabis (34.2%)



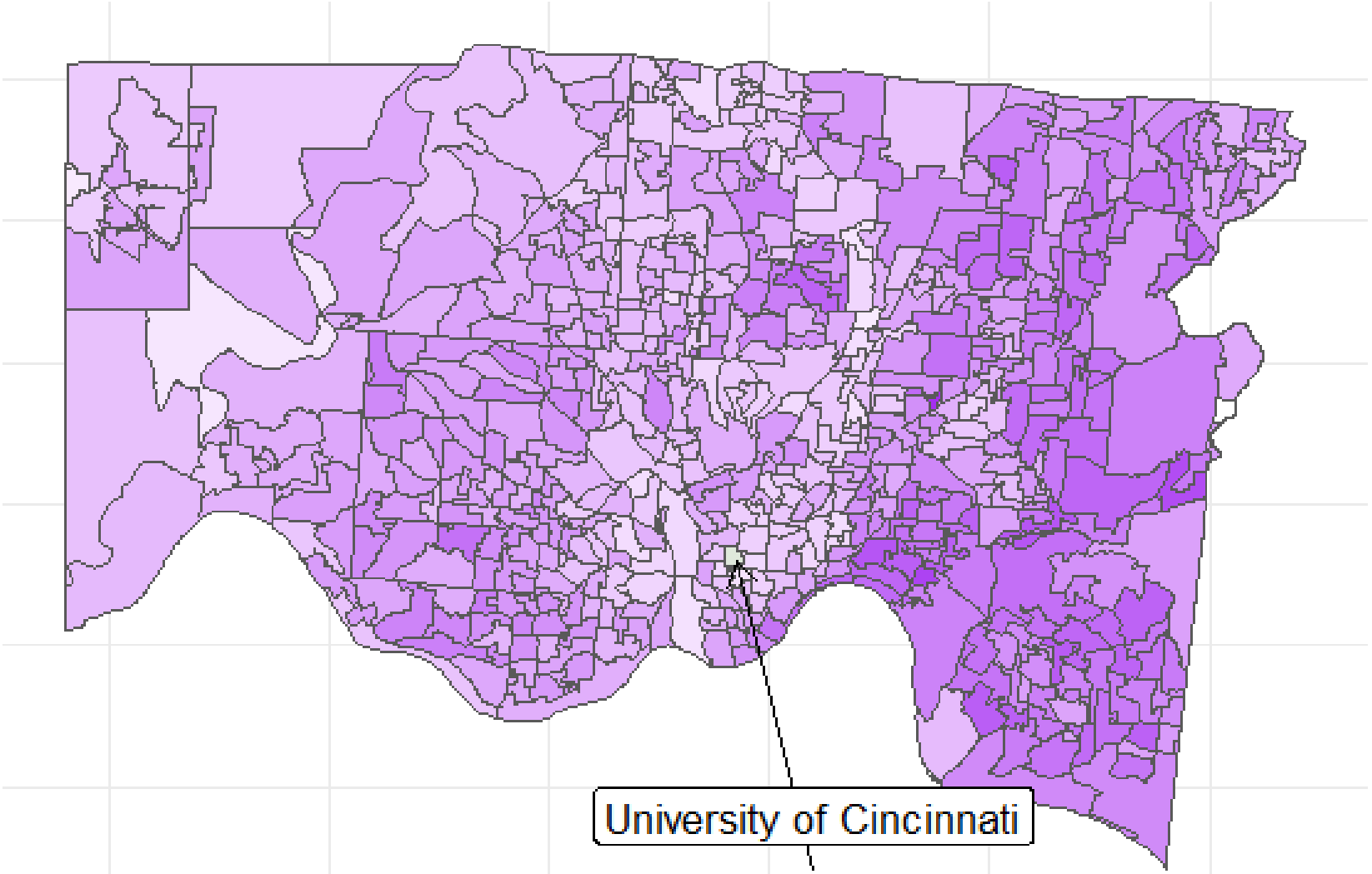
Split-ticket voting - Geography

- Despite our current hyperpartisan climate, Democrats win certain highly contested races while Republicans win others. Consequently, there are voters who are willing to vote for either political party depending on the race/candidates.

- To assess this, we look at the difference in support between Joe Deters (a Republican that won Hamilton County in 2020) and Donald Trump (a Republican that lost Hamilton County in 2020)
  - The largest differences indicate areas where voters are more open to split-ticket voting

Difference in Votes for Deters and Trump in 2020

Deters won with 52.44% of votes, Trump lost with 41.28% of votes



Vote for Deters - Trump (%)

22
15
10
5
0
-5