Neighborhood Characteristics of Poisoning

Howell Sasser
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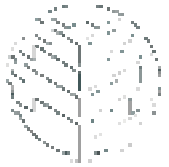
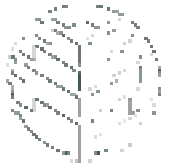


Potential poisons are common…

Household products
Agricultural chemicals
Fuels
Natural substances
Pollutants
Rx & OTC drugs



Poison Control Centers

61 nationwide

800 number → sorting

Callers

- Individuals
- Physicians' offices
- Hospitals

>2,000,000 calls per year

Information Collected

Basic demographics

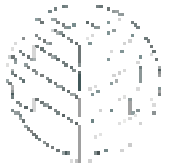
Includes some location data

Available details about the agent

(+/- confirmation after the fact)

Any treatments/antidotes given

Symptoms

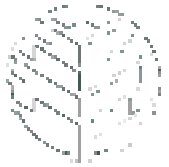


…but actual poisonings are rare

Makes generalization for policy a problem

Individual event characteristics are difficult to interpret

Aggregation is needed

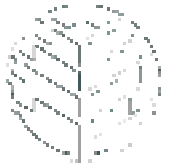


Geographical Representation of Data

Combines mapping and database information
Intuitive interpretation of results
Useful for targeting programs

But…

Assumption of homogeneity
Lots of drill-down may be needed



Data for this analysis

TESS

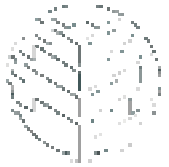
Call database maintained by the American Association of Poison Control Centers

Claritas

Proprietary database containing demographic characteristics

ARC-MAP

GIS program & source of geographic features



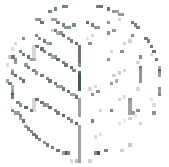
Data for this analysis

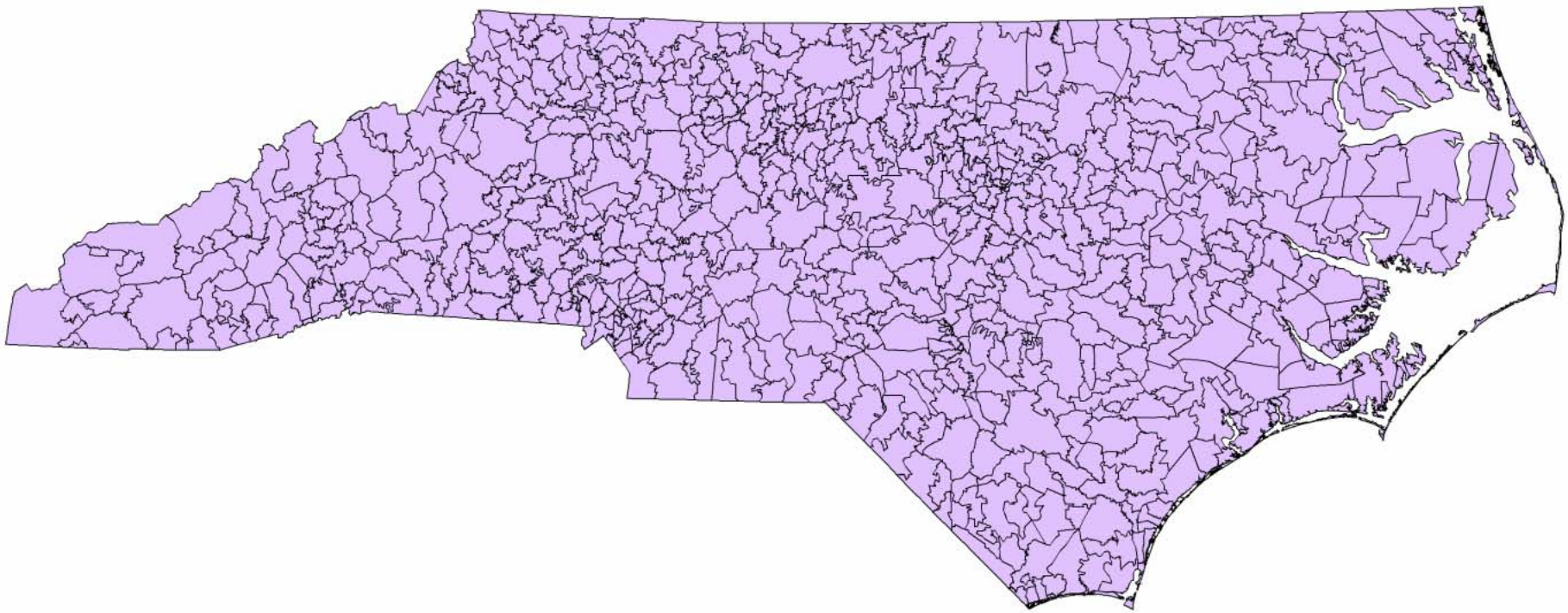
January-December 2005 Data

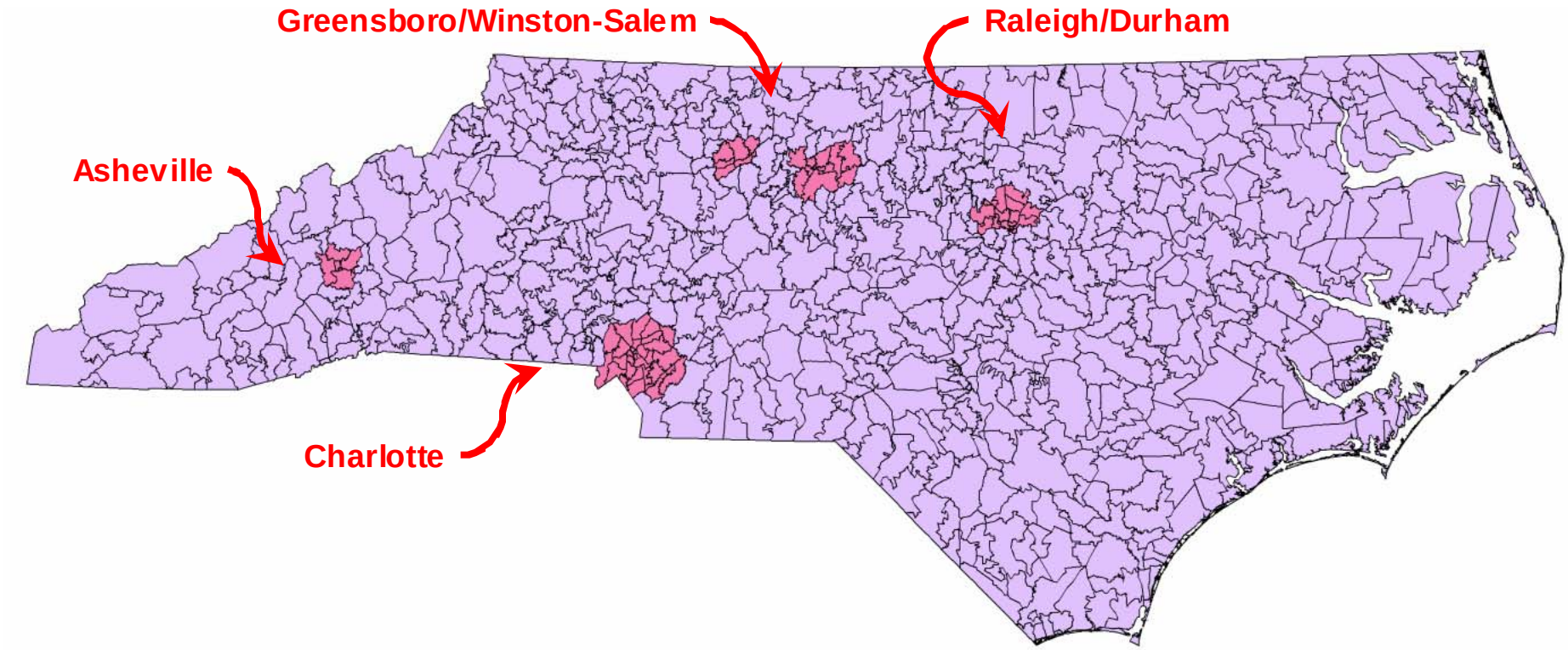
70,963 unique observations

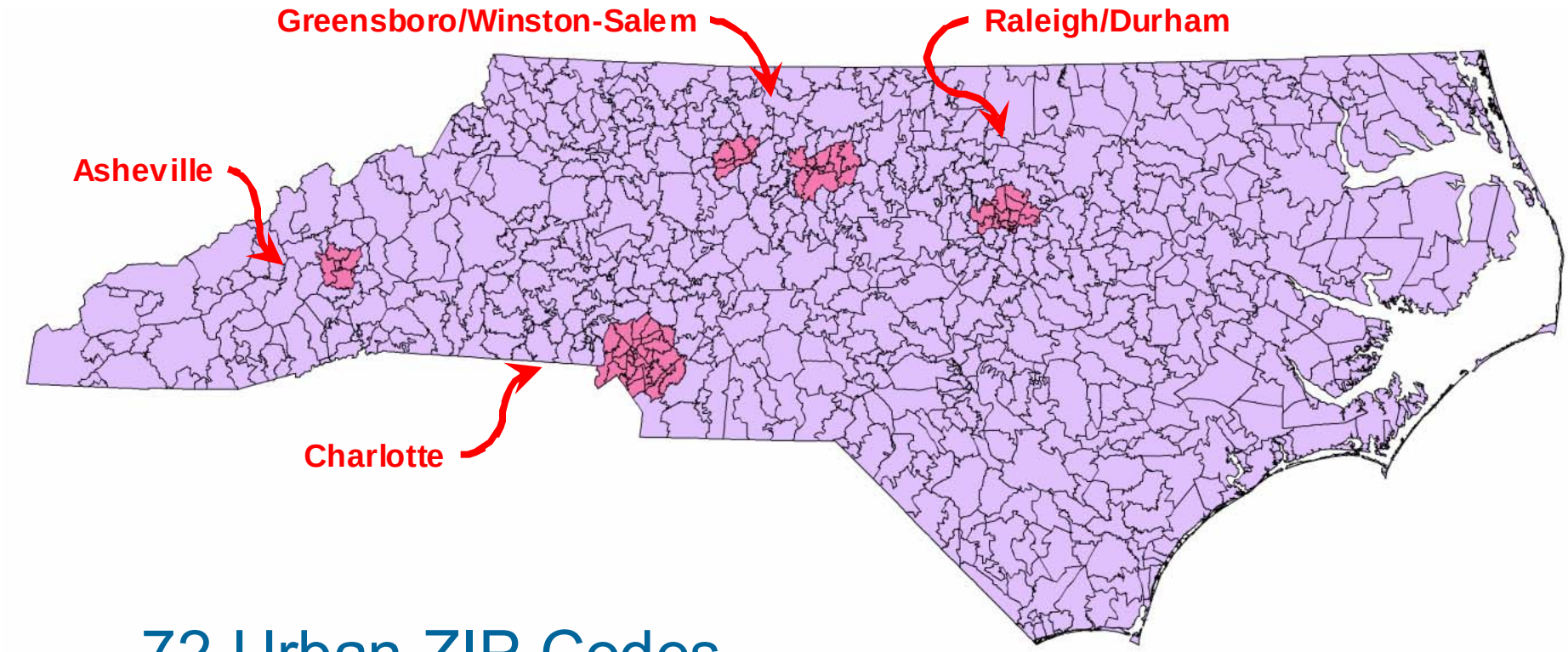
Three categories chosen for analysis:

Household cleaners	N=4,546
Prescription drugs	N=9,315
Herbicides & pesticides	N=1,889





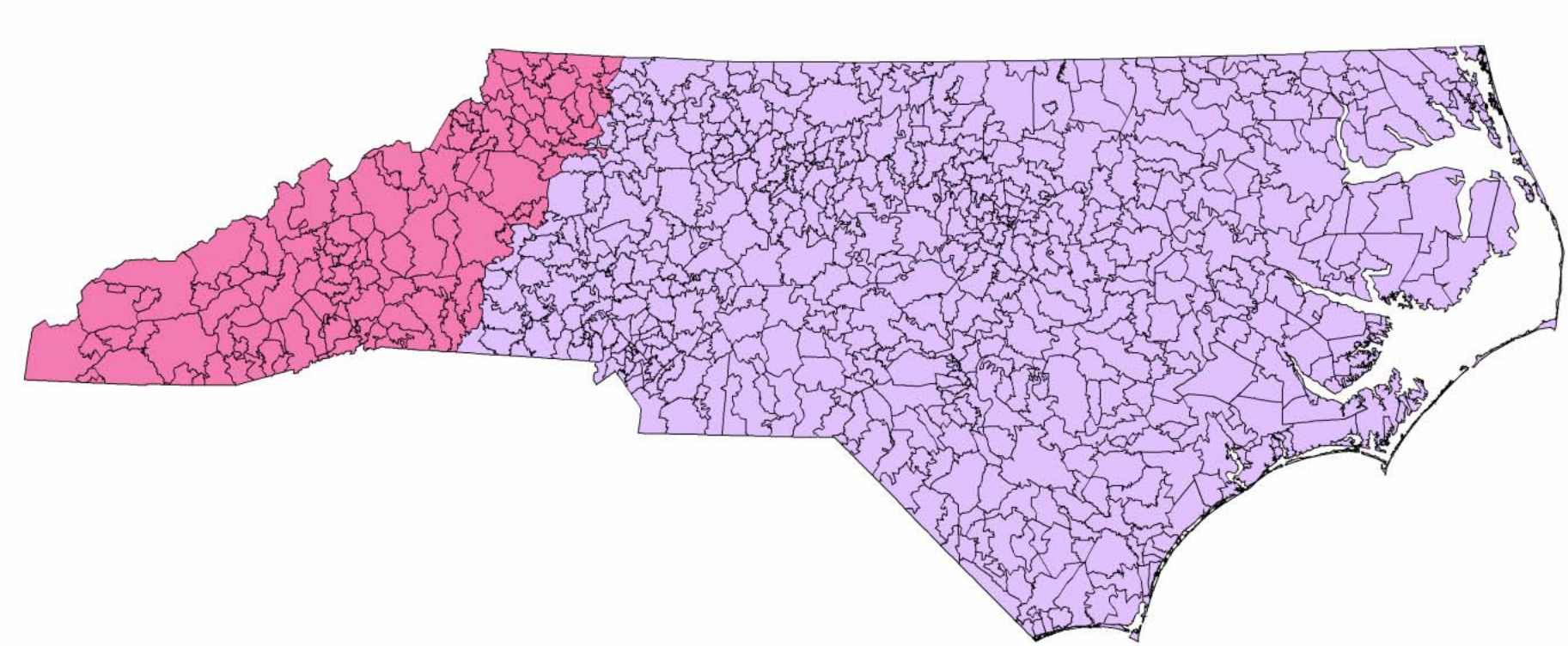




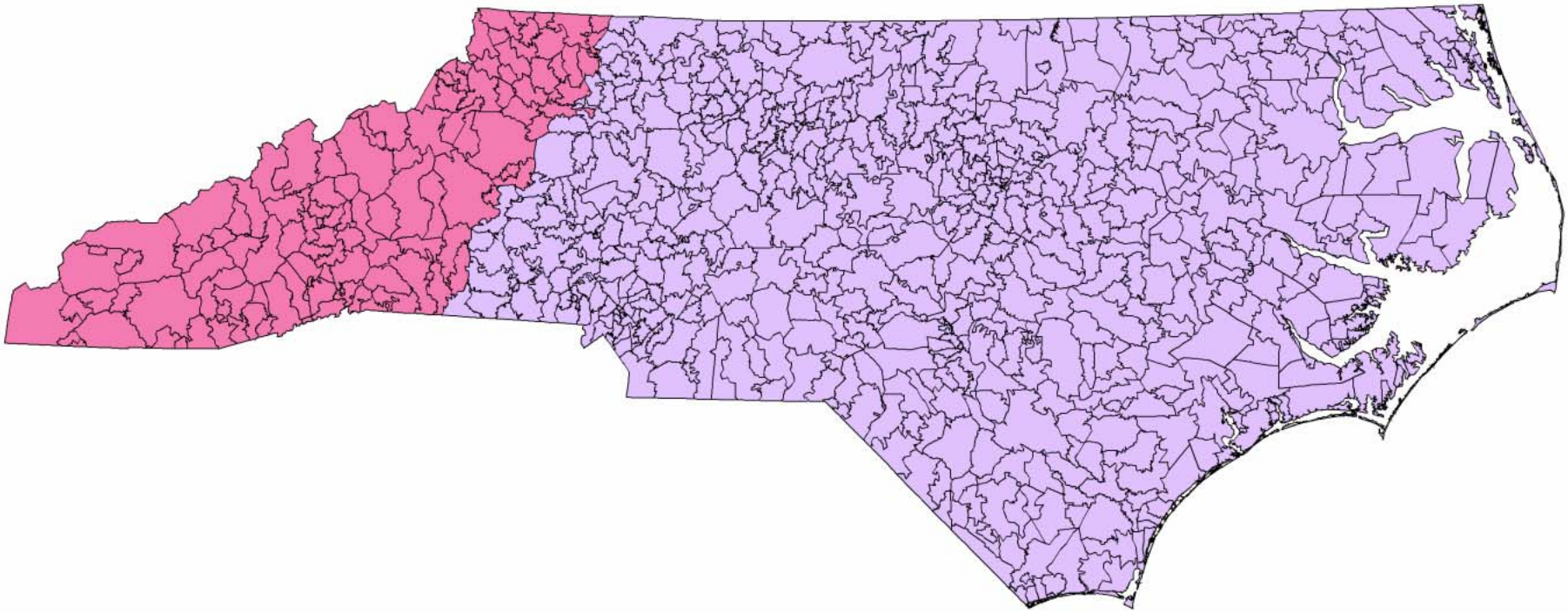
72 Urban ZIP Codes

563 Rural ZIP Codes

Appalachia

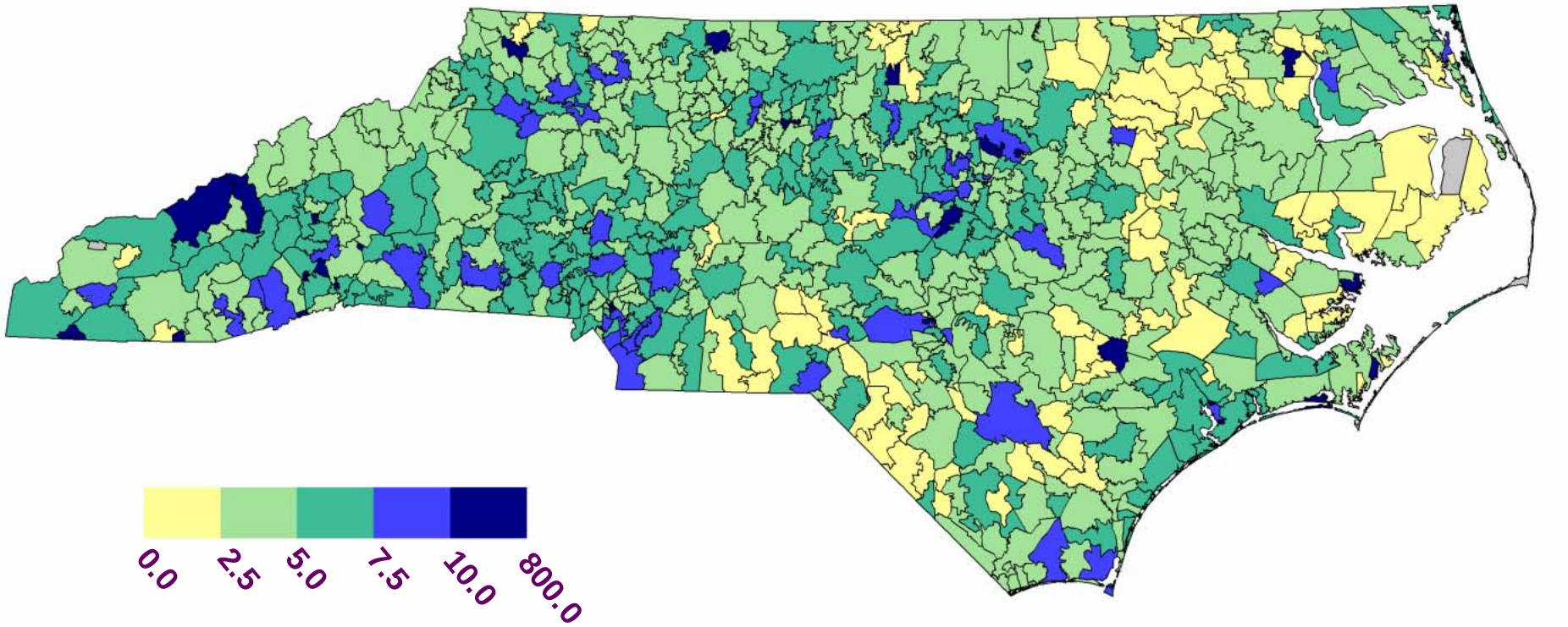


Appalachia



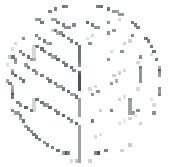
123 Appalachian ZIP Codes
512 Non-Appalachian ZIP Codes

Poison Calls per 1,000 Population by ZIP Code



Calls Involving Household Cleaners

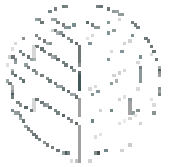
- Bleach
- Soap (Bar)
- Disinfectants
- Alkaline Cleaners (ex. Drano®, Easy-Off®)
- Glass Cleaners
- Polishes & Waxes
- Rust Removers



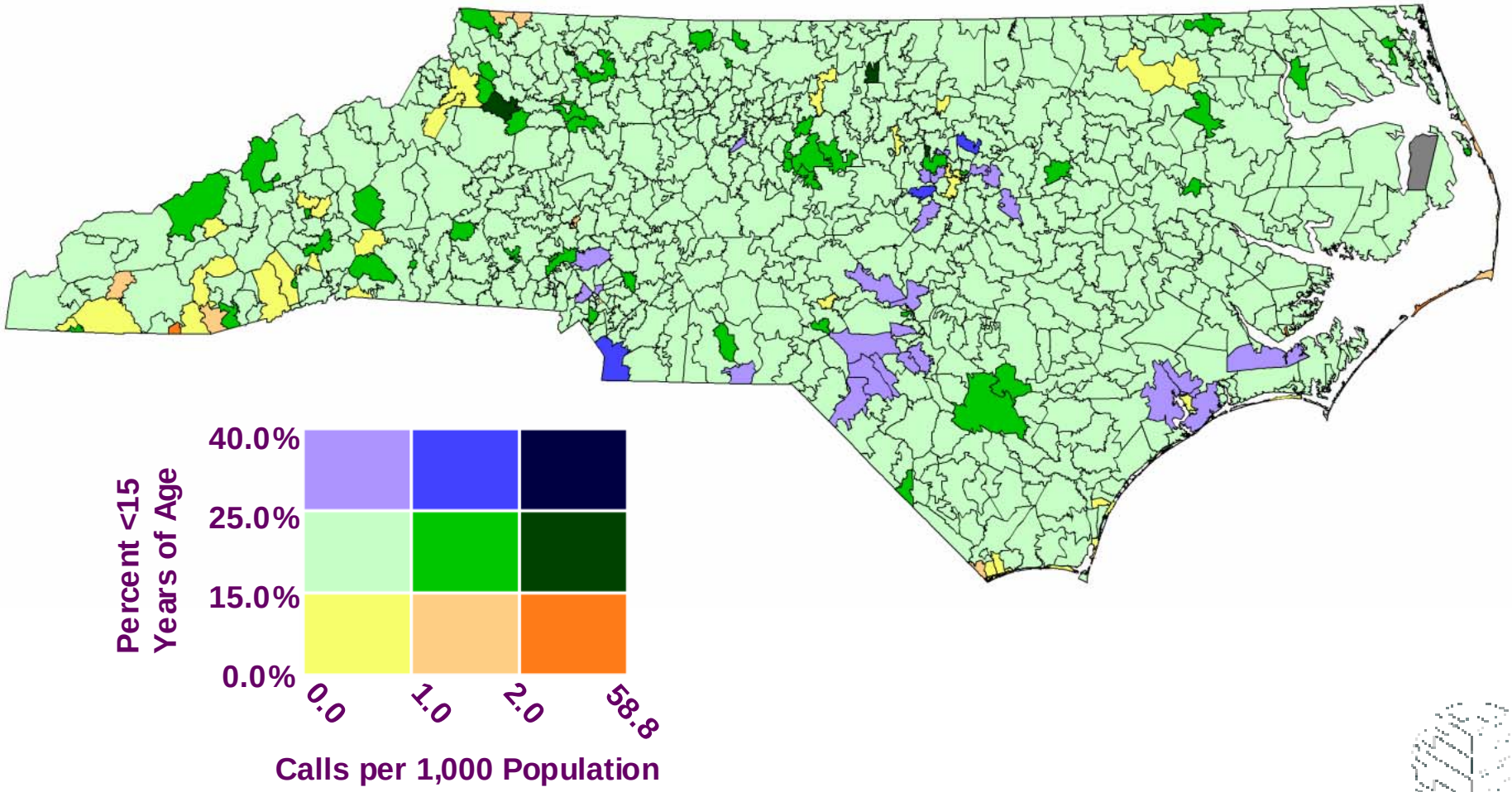
Calls Involving Household Cleaners

Demographic Characteristics

- Percent population less than 15 years of age
- Percent population with less than a high school diploma
- Percent population living in poverty (federal definition)



Calls Involving Poisonings with Household Cleaners By ZIP Code and Percent Population <15 Years of Age



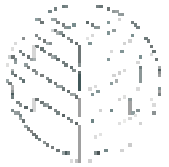
Household Cleaners – Age <15

ZIP Code as unit of analysis

Percent <15 Years of Age	0 to <1	1 to <2	≥2
≥25%	30 88.2%	3 8.8%	1 2.9%
15-24.99%	462 89.9%	47 9.1%	5 1.0%
0-14.99%	33 70.2%	10 21.3%	4 8.5%

p=0.0007

Poison Calls per 1,000 Population



Household Cleaners – Age <15

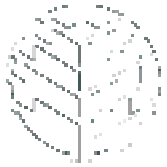
ZIP Code as unit of analysis

Percent <15 Years of Age

	0 to <1	1 to <2	≥2
≥25%	30 88.2%	3 8.8%	1 2.9%
15-24.99%	462 89.9%	47 9.1%	5 1.0%
0-14.99%	33 70.2%	10 21.3%	4 8.5%

p=0.0037

Poison Calls per 1,000 Population



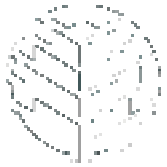
Household Cleaners – Age <15

ZIP Code as unit of analysis

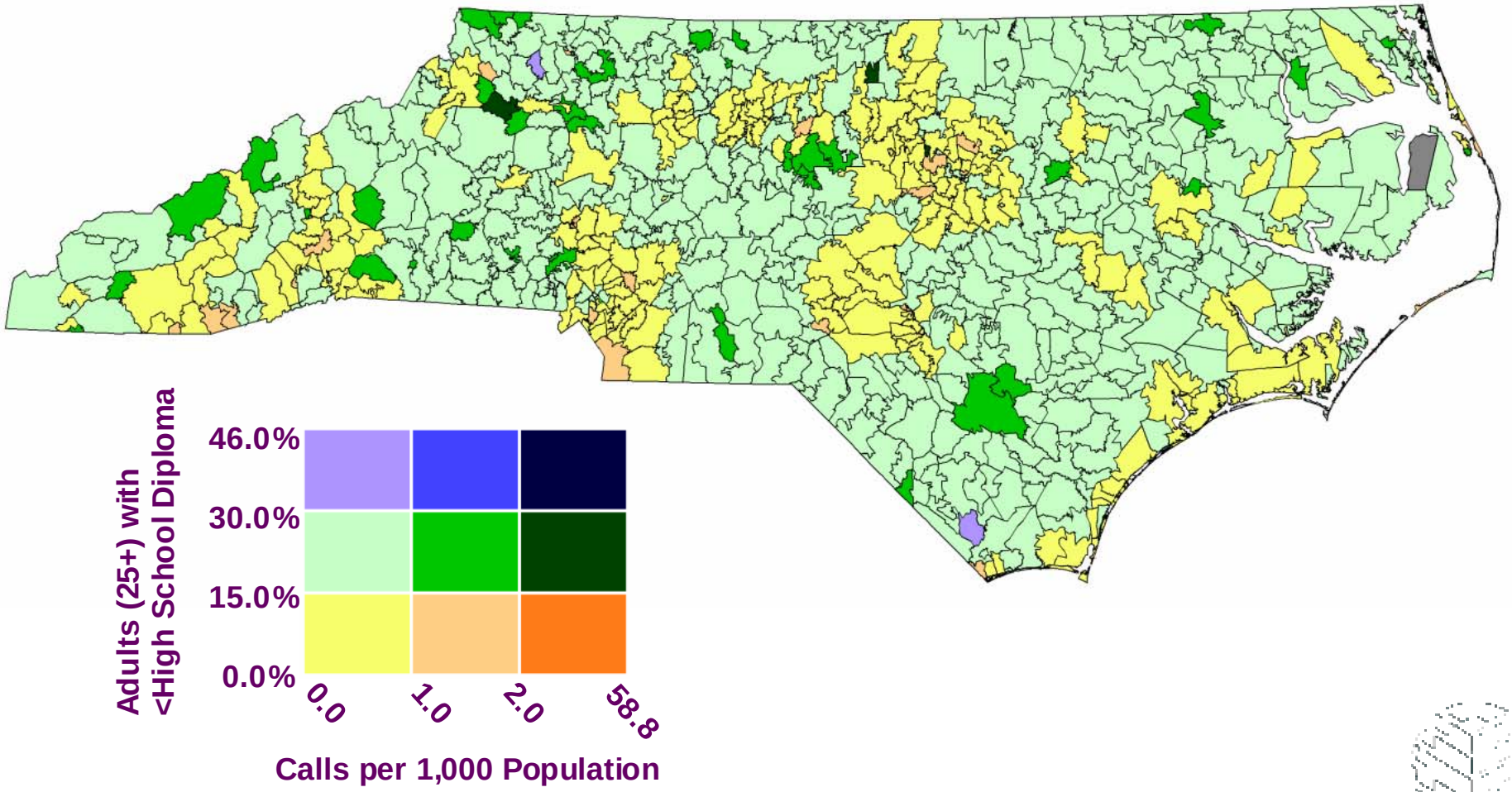
	0 to 1	≥1
Urban	63 87.50%	9 12.50%
Rural	502 89.20%	61 10.80%

p=0.67

Poison Calls per
1,000 Population



Calls Involving Poisonings with Household Cleaners By ZIP Code and Educational Attainment



Household Cleaners – Education

ZIP Code as unit of analysis

Percent <High School Diploma

	0 to <1	1 to <2	≥2
≥25%	2 66.7%	1 33.3%	0 0.0%
15-24.99%	308 87.7%	39 11.1%	4 1.1%
0-14.99%	215 89.2%	20 8.3%	6 2.5%

p=0.19

Poison Calls per 1,000 Population

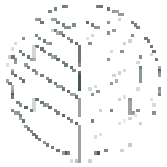
Household Cleaners - Education

ZIP Code as unit of analysis

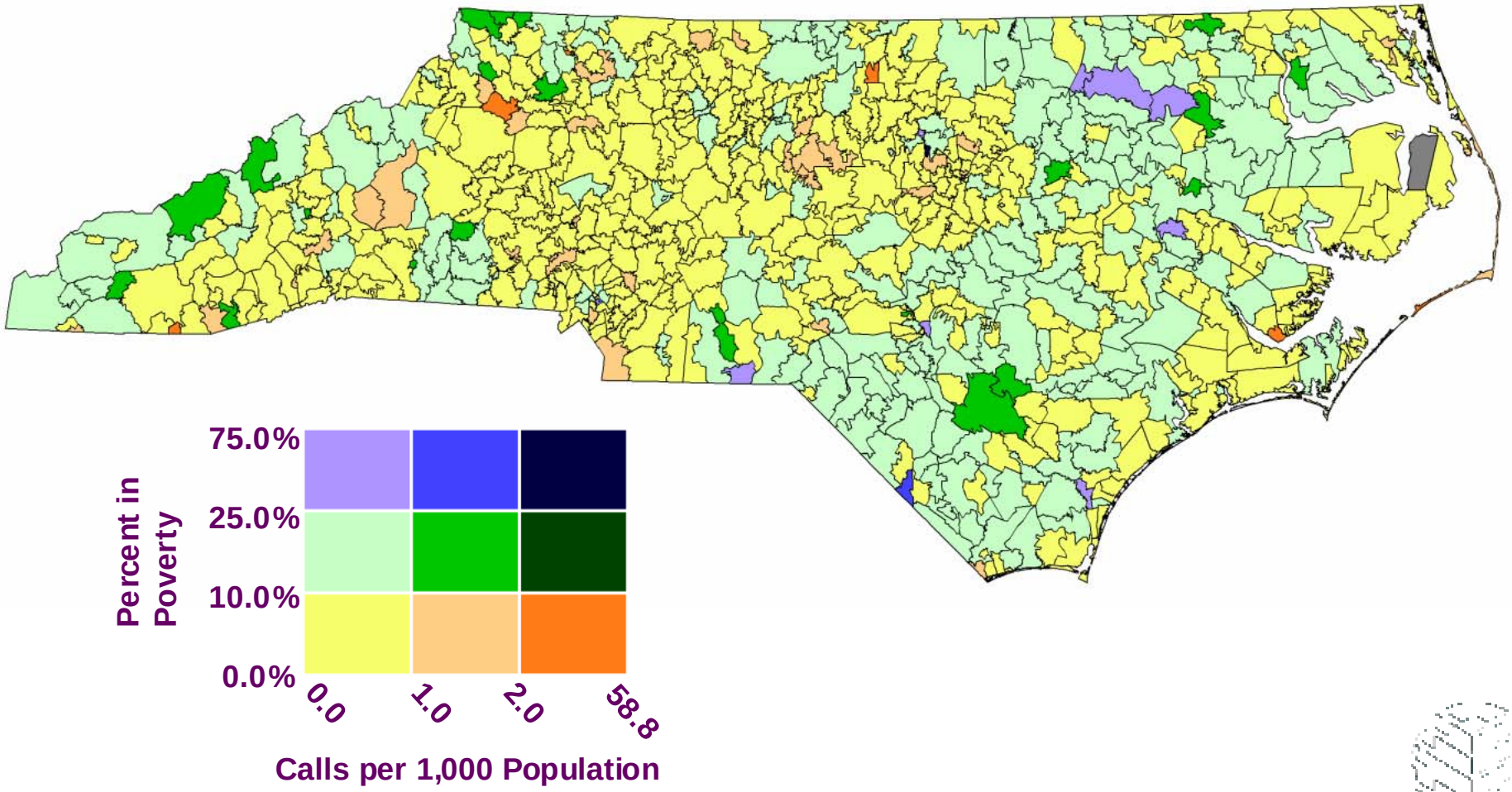
	0 to 1	≥1
Urban	64 88.90%	8 11.10%
Rural	501 89.00%	62 11.00%

p=0.98

Poison Calls per
1,000 Population



Calls Involving Poisonings with Household Cleaners By ZIP Code and Percent Population Living in Poverty



Household Cleaners - Poverty

ZIP Code as unit of analysis

Percent in Poverty	0 to <1	1 to <2	≥2
≥25%	10 71.4%	3 21.4%	1 7.1%
10-24.99%	214 90.3%	21 8.9%	2 0.8%
0-9.99%	301 87.5%	36 10.5%	7 2.0%

p=0.16

Poison Calls per 1,000 Population

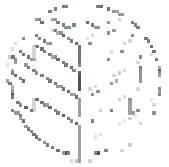
Household Cleaners - Poverty

ZIP Code as unit of analysis

	0 to 1	≥1
Urban	65 90.30%	7 9.70%
Rural	500 88.80%	63 11.20%

p=0.71

Poison Calls per
1,000 Population



Calls Involving Prescription Drugs

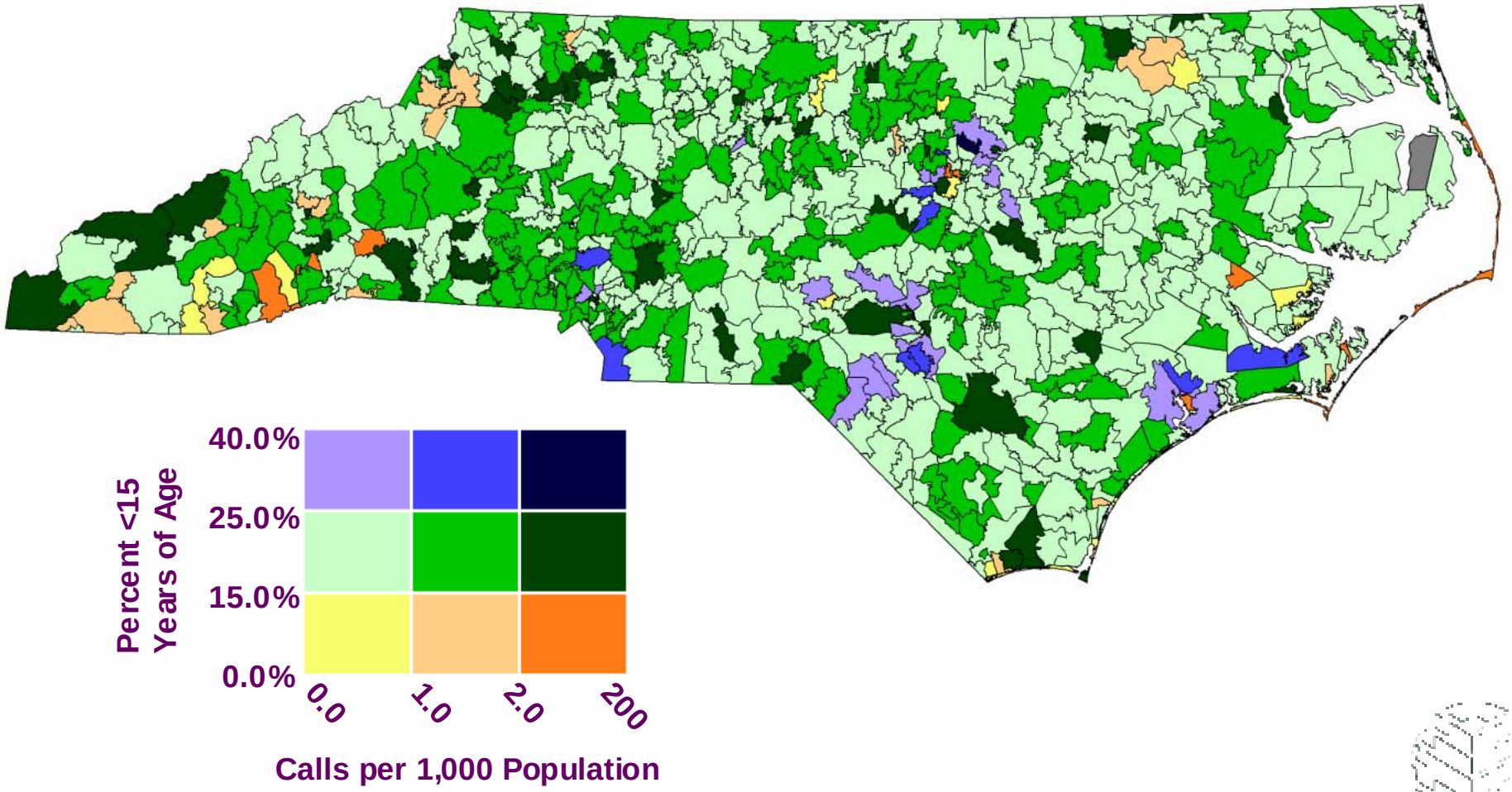
- Benzodiazepines
- Antibiotics
- SSRIs
- Atypical Antipsychotics
- Other Antidepressants
- Anticonvulsants
- Beta Blockers

Calls Involving Prescription Drugs

Demographic Characteristics

- Percent population less than 15 years of age
- Percent population greater than 65 years of age
- Percent population with less than a high school diploma
- Percent population living in poverty

Calls Involving Poisonings with Prescription Drugs By ZIP Code and Percent Population <15 Years of Age



Prescription Drugs – Age <15

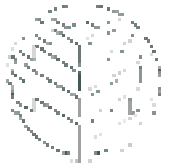
ZIP Code as unit of analysis

Percent <15 Years of Age

	0 to <1	1 to <2	≥2
≥25%	22 68.8%	9 28.1%	1 3.1%
15-24.99%	314 56.9%	194 35.1%	44 8.0%
0-14.99%	22 43.1%	17 33.3%	12 23.5%

p=0.0021

Poison Calls per 1,000 Population



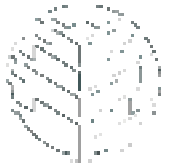
Prescription Drugs – Age <15

ZIP Code as unit of analysis

	0 to 1	≥1
Urban	40 55.60%	32 44.40%
Rural	318 56.50%	245 43.50%

p=0.88

Poison Calls per
1,000 Population



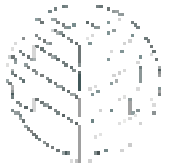
Prescription Drugs – Age <15

ZIP Code as unit of analysis

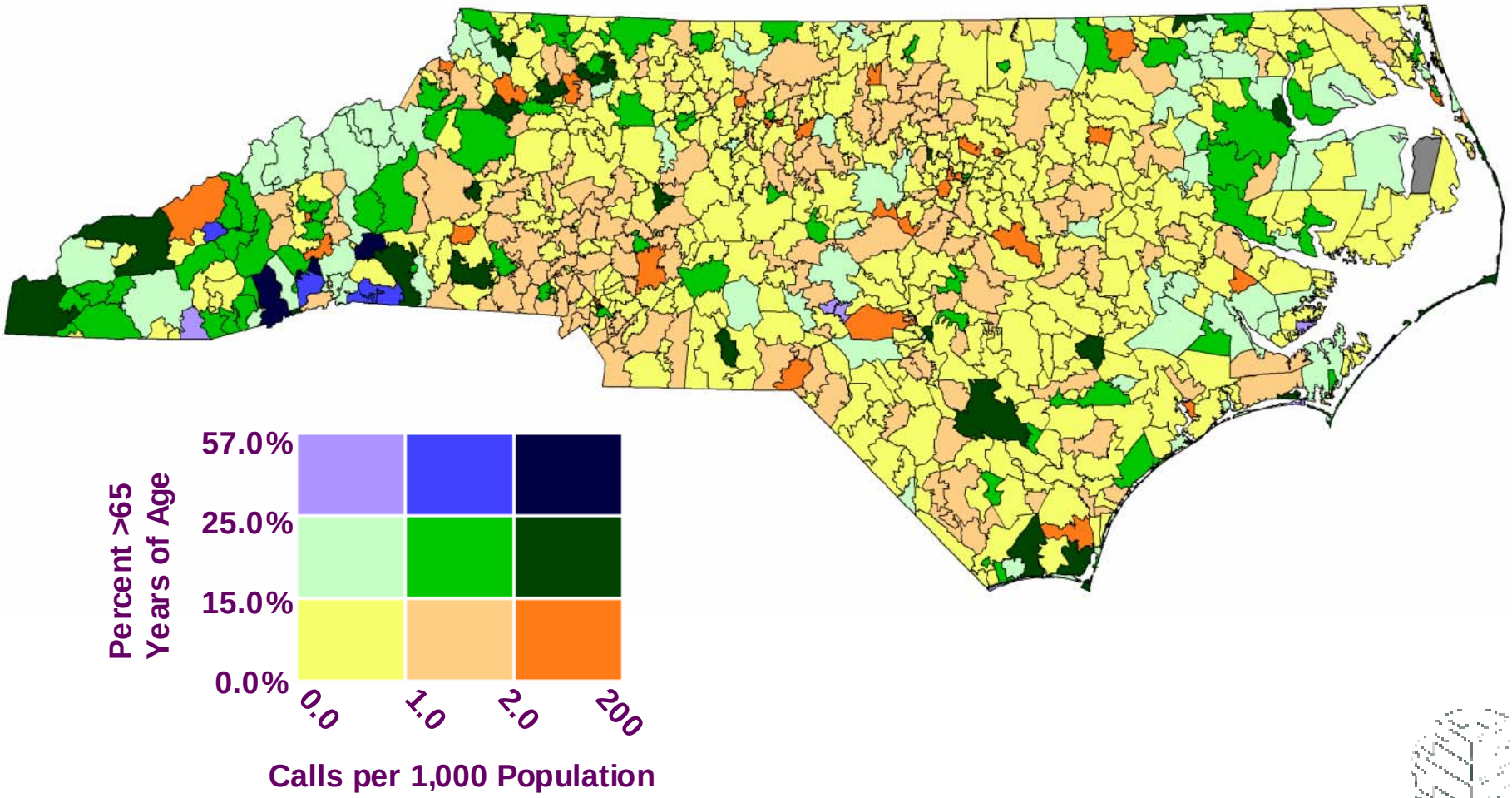
	0 to 1	≥1
Appalachian	60 48.80%	63 51.20%
Non-Appalachian	298 57.90%	214 41.60%

p=0.0585

Poison Calls per 1,000 Population



Calls Involving Poisonings with Prescription Drugs By ZIP Code and Percent Population >65 Years of Age



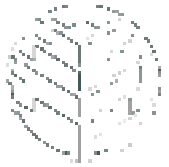
Prescription Drugs – Age >65

ZIP Code as unit of analysis

Percent >65 Years of Age	0 to <1	1 to <2	≥2
≥25%	8 50.0%	3 18.8%	5 31.3%
15-24.99%	79 46.2%	68 39.8%	24 14.0%
0-14.99%	271 60.5%	149 33.3%	28 6.3%

p=0.0001

Poison Calls per 1,000 Population



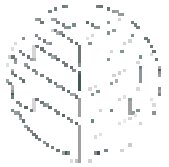
Prescription Drugs – Age >65

ZIP Code as unit of analysis

	0 to 1	≥1
Urban	37 51.40%	35 48.60%
Rural	321 57.00%	242 87.40%

p=0.36

Poison Calls per
1,000 Population



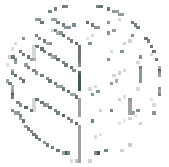
Prescription Drugs – Age >65

ZIP Code as unit of analysis

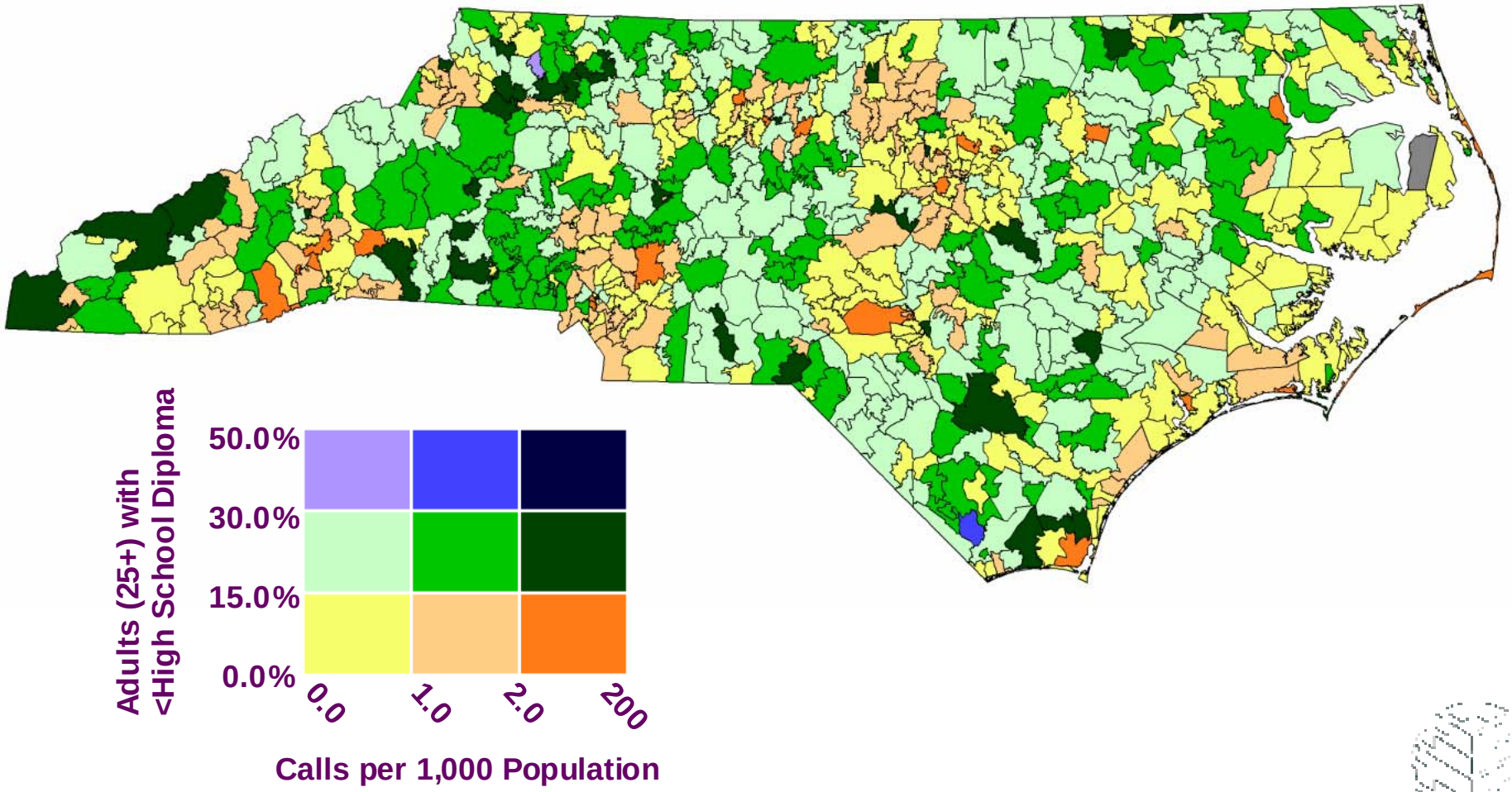
	0 to 1	≥1
Appalachian	58 47.20%	65 52.90%
Non-Appalachian	300 58.60%	212 41.40%

p=0.0216

Poison Calls per 1,000 Population



Calls Involving Poisonings with Prescription Drugs By ZIP Code and Educational Attainment



Prescription Drugs - Education

ZIP Code as unit of analysis

Percent <High School Diploma	0 to <1	1 to <2	≥2
≥30%	1 50.0%	1 50.0%	0 0.0%
15-29.99%	220 57.6%	130 34.0%	32 8.4%
0-14.99%	137 54.6%	89 35.5%	25 10.0%

p=0.89

Poison Calls per 1,000 Population

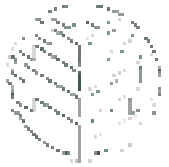
Prescription Drugs - Education

ZIP Code as unit of analysis

	0 to 1	≥1
Urban	39 54.20%	33 45.80%
Rural	319 56.70%	244 43.30%

p=0.69

Poison Calls per
1,000 Population



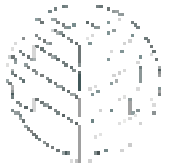
Prescription Drugs - Education

ZIP Code as unit of analysis

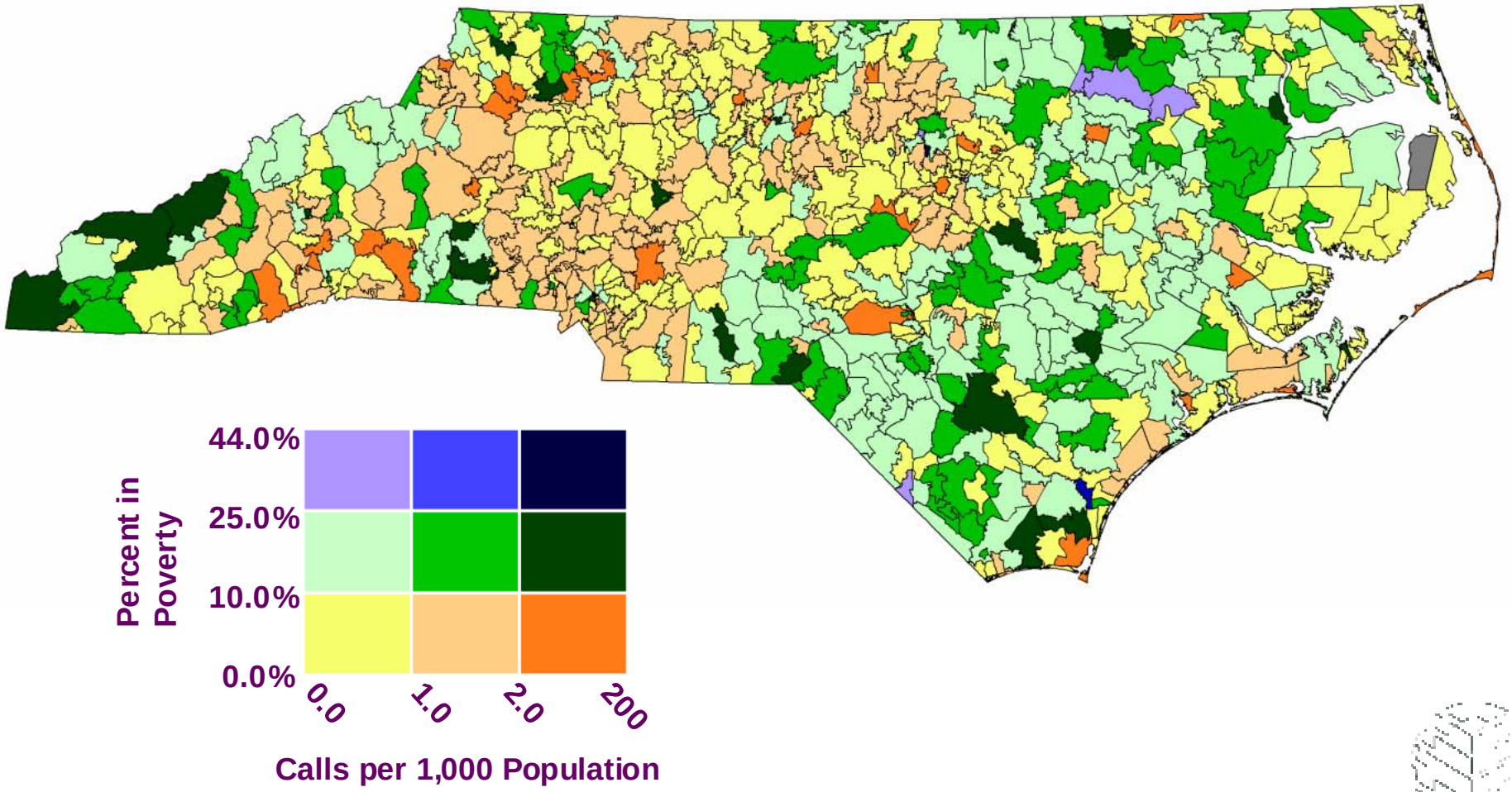
	0 to 1	≥1
Appalachian	58 47.20%	65 52.90%
Non-Appalachian	300 58.60%	212 41.40%

p=0.0216

Poison Calls per 1,000 Population



Calls Involving Poisonings with Prescription Drugs By ZIP Code and Percent Population Living in Poverty



Prescription Drugs - Poverty

ZIP Code as unit of analysis

Percent in Poverty	0 to <1	1 to <2	≥2
≥25%	8 61.5%	1 7.7%	4 30.8%
10-24.99%	159 59.6%	86 32.2%	22 8.2%
0-9.99%	170 47.4%	155 43.2%	34 9.5%

p=0.0007

Poison Calls per 1,000 Population

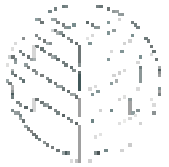
Prescription Drugs - Poverty

ZIP Code as unit of analysis

	0 to 1	≥1
Urban	39 54.20%	33 45.80%
Rural	294 52.20%	269 47.80%

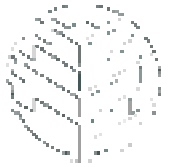
p=0.76

Poison Calls per
1,000 Population



Calls Involving Herbicides & Pesticides

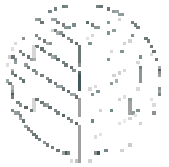
- Pyrethroids
- Other Insecticides
- Organophosphates
- Rodenticides
- Diquat/Paraquat
- Fungicides



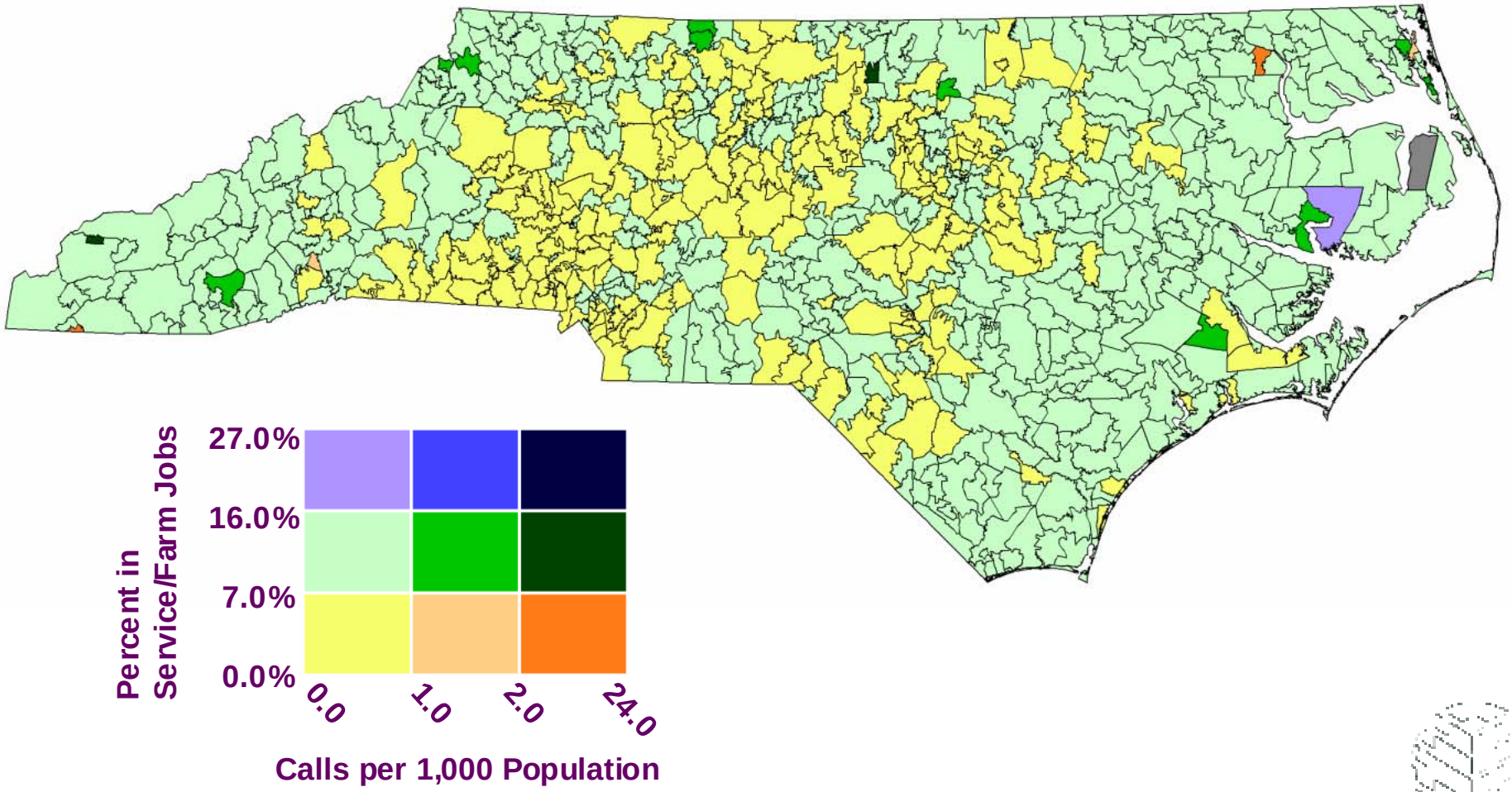
Calls Involving Herbicides & Pesticides

Demographic Characteristics

- Percent working in service/farm jobs
- Percent working age (>15 and <65)
- Percent population with less than a high school diploma
- Percent population living in poverty



Calls Involving Poisonings with Herbicides & Pesticides By ZIP Code and Percent Working in Service/Farm Jobs



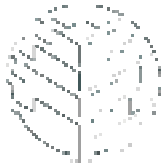
Herbicides & Pesticides – Service/Farm

ZIP Code as unit of analysis

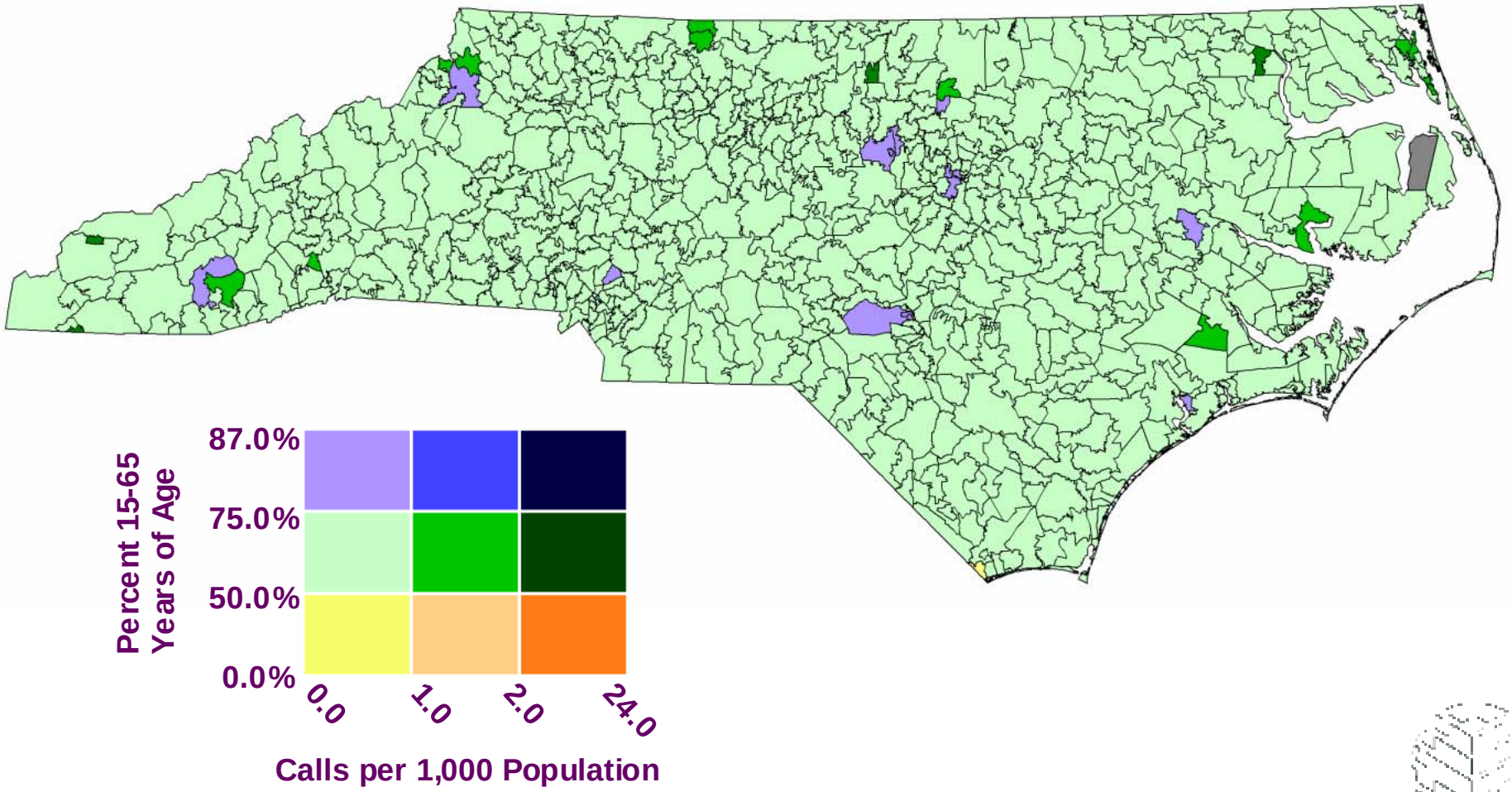
Percent Working In Farm & Service Jobs	0 to <1	1 to <2	≥2
≥15%	1 50.0%	0 0.0%	1 50.0%
7-15.99%	263 95.3%	11 4.0%	2 0.7%
0-6.99%	214 97.7%	3 1.4%	2 0.9%

(p=0.0110)

Poison Calls per 1,000 Population



Calls Involving Poisonings with Herbicides & Pesticides By ZIP Code and Population of Working Age (15-65)

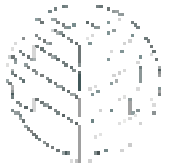


Herbicides & Pesticides – Working Age

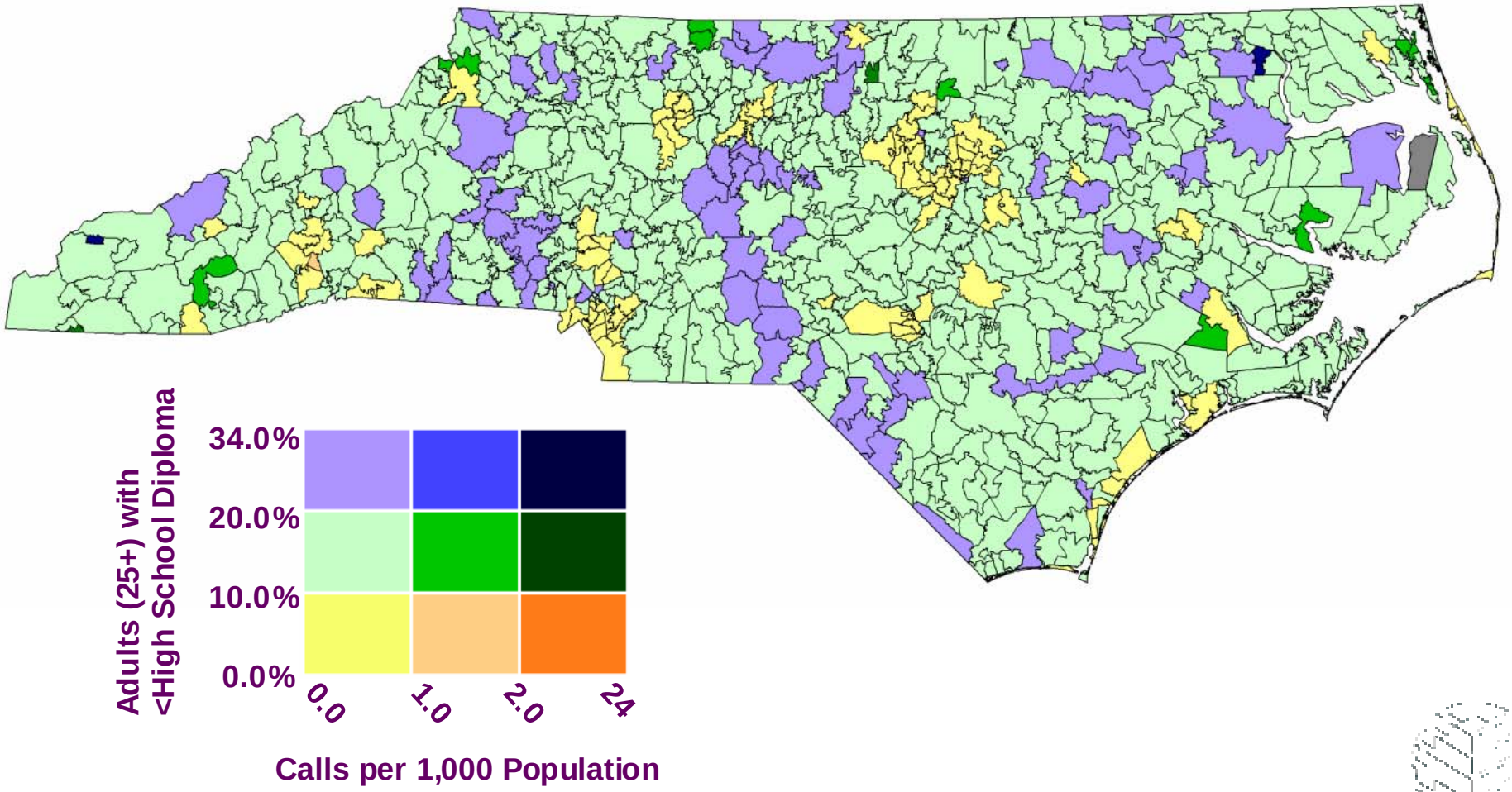
ZIP Code as unit of analysis

Percent Between 15 & 65 Years of Age	0 to <1	1 to <2	≥2
≥75%	15 100.0%	0 0.0%	0 0.0%
50-74.99%	461 96.0%	14 2.9%	5 1.0%
0-49.99%	2 100.0%	0 0.0%	0 0.0%

Poison Calls per 1,000 Population



Calls Involving Poisonings with Herbicides & Pesticides By ZIP Code and Educational Attainment



Herbicides & Pesticides - Education

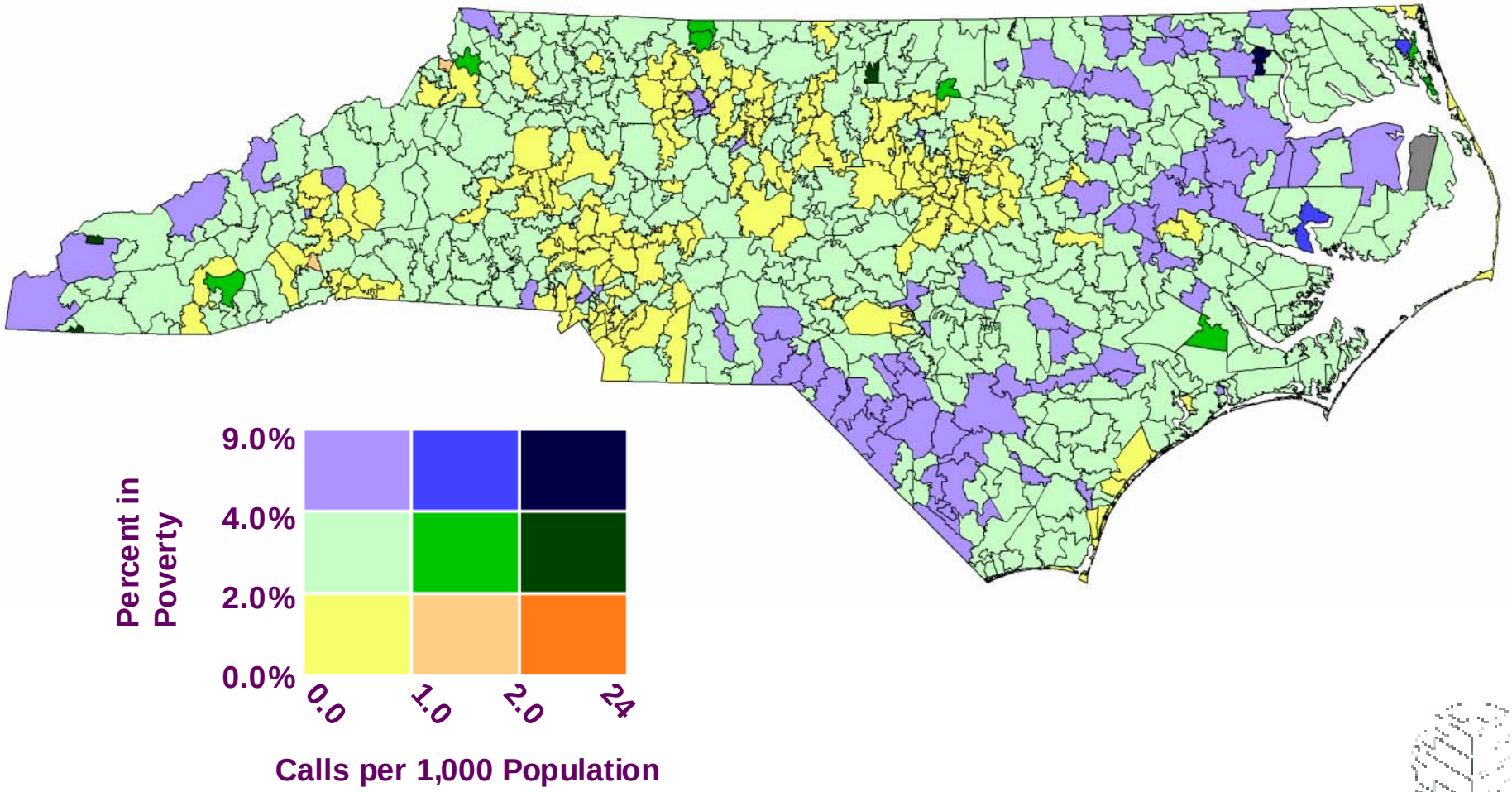
ZIP Code as unit of analysis

Percent <High School Diploma	0 to <1	1 to <2	≥2
≥20%	87 96.7%	0 50.0%	3 3.3%
10-19.99%	287 95.0%	13 4.3%	2 0.7%
0-9.99%	104 99.0%	1 1.0%	0 0.0%

p=0.0178

Poison Calls per 1,000 Population

Calls Involving Poisonings with Herbicides & Pesticides By ZIP Code and Percent Population Living in Poverty



Herbicides & Pesticides - Poverty

ZIP Code as unit of analysis

Percent in Poverty	0 to <1	1 to <2	≥2
≥4%	80 96.4%	2 2.4%	1 1.2%
2-3.99%	229 95.0%	9 3.7%	3 1.2%
0-1.99%	169 97.7%	3 1.7%	1 0.6%

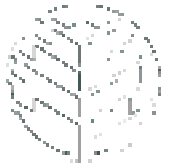
p=0.71

Poison Calls per 1,000 Population

Conclusions

Household Cleaners

- Lower rate with higher young population
- No urban concentration
  Maybe rural?
- No pattern by poverty or education



Conclusions

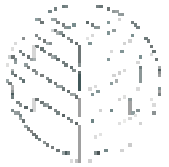
Prescription Drugs

- Higher frequency with increasing young population
- No increase with increasing elderly population
- Higher frequency with rising poverty
- Appalachian effect?

Conclusions

Herbicides & Pesticides

- Rural phenomenon
- Sporadic
- Difficult to draw occupational conclusions



Limitations

Represents calls, not events

Only calls with ZIP Codes

Variable population densities by ZIP Code

Implied ascription of aggregate characteristics

Uncertainty of poison ID

Next Steps

Drill down to census geography or other unit in “hot” ZIPs

“Matching” with ED & inpatient discharge data

Thank You