At Risk In Appalachia Minimum Viable Product (MVP) and Recommendations Summary

Eyes Up Appalachia was invited to be a problem sponsor for The Ohio State Rapid Innovation for Public Impact class run out of the Battelle Center for Science, Engineering and Public Policy of the John Glenn College of Public Affairs. The problem posed: **"How might we predict potential populations/target areas of human trafficking victims in order to help Eyes Up Appalachia focus awareness/prevention efforts in the most needed areas of Appalachian Ohio."** David Corliss, PhD, our mentor, and I were assigned 5 students to address this problem from departments such as Engineering, Political Science and Public Policy, including a mix of undergrad and graduate students. These students were Eli Baker, Haelie Egbert, Sarah Handau, Edina Kovacs, and Maddie Young – who ultimately became team ARIA – or At Risk In Appalachia!

The team quickly identified a large part of the problem:

To address this issue, Team ARIA conducted over 40 interviews throughout the semester with up- and downstream beneficiaries to understand the problem, identify the vulnerabilities, then identify data sources and finally map them. This process was completed using a "Design Thinking" philosophy, which runs each idea through a process that empathizes with the situation to best define the problem, ideate and test those ideas/prototypes, create a minimum viable product – then start over to test it and continue to improve. Through various iterations and pivots, the team coalesced on the concept of a heat map that integrated the following risk factors which make someone more vulnerable to trafficking or lead to situations that do:
- Gini Coefficient
- Poverty Rate
- Foreclosure Rate Change per Year
- Child Abuse Report Rate
- Missing Child Report Rate
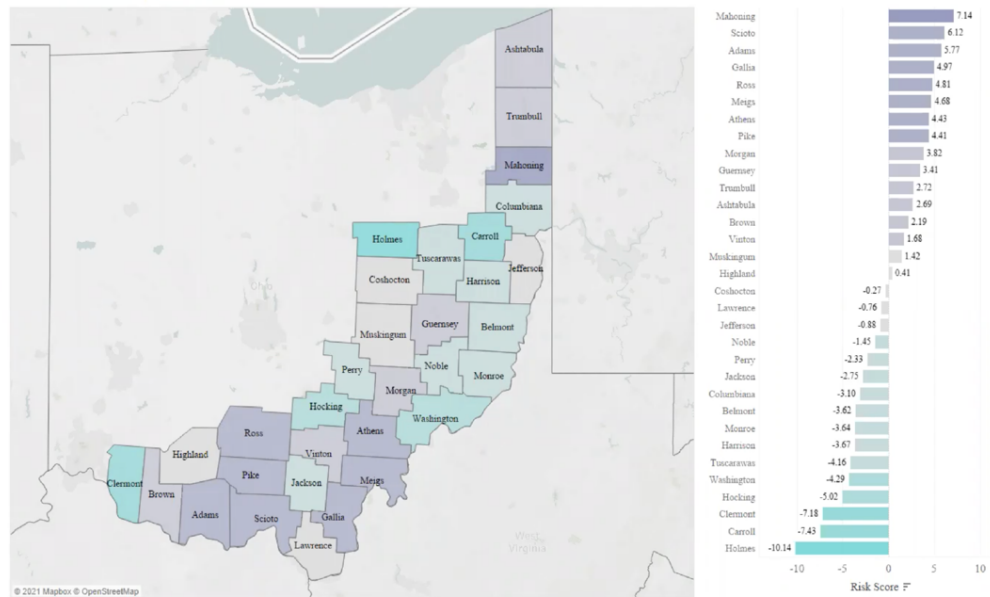- Overdose Death Rate
- Rate of EMT Visit for Suspected OD

- Domestic Violence Incidence Rate
- Domestic Violence Caseload Rate
- % of People Holding a Bachelor's Degree or Higher
- High School Graduation Rate

To make these different public databases compatible, the standard deviation from the mean was calculated for each which was then used to calculate a risk score. (more detail and the formula used is available in the Full Report) This was all exported to Tableau which created an interactive dashboard which allowed the user to see the resulting maps. The cumulative outcome, with county rankings, can be seen below.

Appalachian Ohio Sex Trafficking Risk Scores

Description:
Shows the Risk Score of Appaclahian Counties in terms of number of standard deviations from the mean.

The bar graph shows a second visualization in decreasing order.

County	Risk Score
Mahoning	7.14
Scioto	6.12
Adams	5.77
Gallia	4.97
Ross	4.81
Meigs	4.68
Athens	4.43
Pike	4.41
Morgan	3.82
Guernsey	3.41
Trumbull	2.72
Ashtabula	2.69
Brown	2.19
Vinton	1.68
Muskingum	1.42
Highland	0.41
Coshocton	-0.27
Lawrence	-0.76
Jefferson	-0.88
Noble	-1.45
Perry	-2.33
Jackson	-2.75
Columbiana	-3.10
Belmont	-3.62
Monroe	-3.64
Harrison	-3.67
Tuscarawas	-4.16
Washington	-4.29
Hocking	-5.02
Clermont	-7.18
Carroll	-7.43
Holmes	-10.14

For more specific information please review the MP4 attachment that goes into detail on the dashboard and view the summary maps at Appendix A to this report.

The results track with much of what I have seen in my work in Appalachian Ohio so far. The standout was Mahoning County. We looked at that more in detail and found that missing children stats is where they pushed ahead of the rest and, with further research, found that was a result of foster and other placements from surrounding counties and subsequent runaways.

The minimum viable product that was produced was run by several stakeholders for additional input, but it still needs further refinement. However, it is an excellent start! Because the database is not sustainable by the students, we will work with the snapshots in the appendices to begin focusing our efforts for Eyes Up Appalachia. As we use the data and continue to work

with the vulnerabilities in the area, we can continue the process the students started and make other revisions/iterations as we learn more about the population, datasets, etc.

I invite you all to forward any thoughts, comments, questions, or suggestions to me at christi.bartmanb@me.com as we continue to think through this effort.

But ARIA did not stop there. They felt that for this dashboard to be sustainable, it will need to be updated, at least annually, as new data comes in or new datasets are added. Therefore, the dashboard should be implemented on a state level to ensure continuity. This could be done through providing more funds to a nonprofit able to incorporate this type of data work in their organization, or by expanding the budget for already existing government programs like the Ohio Governor's Human Trafficking Task Force. Also, because of time constraints, it only contains those vulnerabilities associated with sex trafficking, not labor. This could be expanded in future iterations to include labor and domestic servitude. Additional granularity within counties would also be a strong improvement.

While human trafficking numbers for Appalachian Ohio are scarce, a push for a better recording system in this area could allow for direct comparison of the vulnerabilities to the rate of human trafficking. (Same for the state) This provides the opportunity to discuss causation and correlation, statistically, and can create a more robust information database. Over time, this allows for the ability to track whether specific government programs or targeted resources have had an effect on lowering the rate of human trafficking. In its current form, the dashboard only provides individuals with an understanding of the level of proposed at risk vulnerabilities within counties. Providing the direct relation of these vulnerabilities to the rate of human trafficking will be critical in maintaining confidence in the application of the dashboard data.

More recommendations on application on this dashboard can be found in the Full Report. Ultimately this will take Eyes Up Appalachia and the State of Ohio from a reactionary approach to addressing human trafficking to a preventative one.
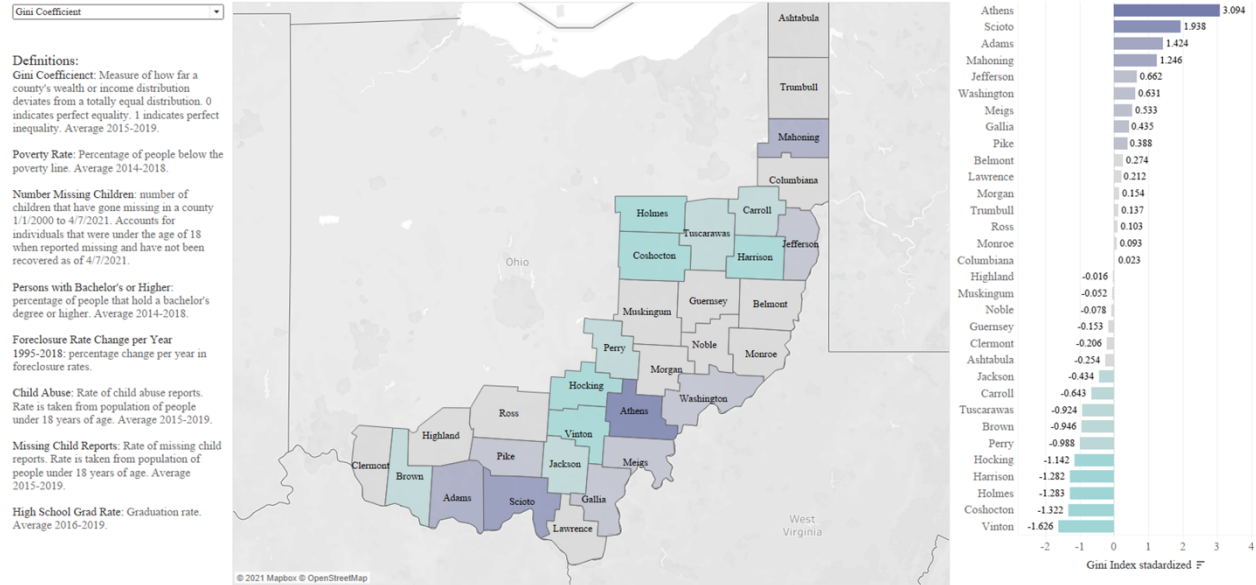

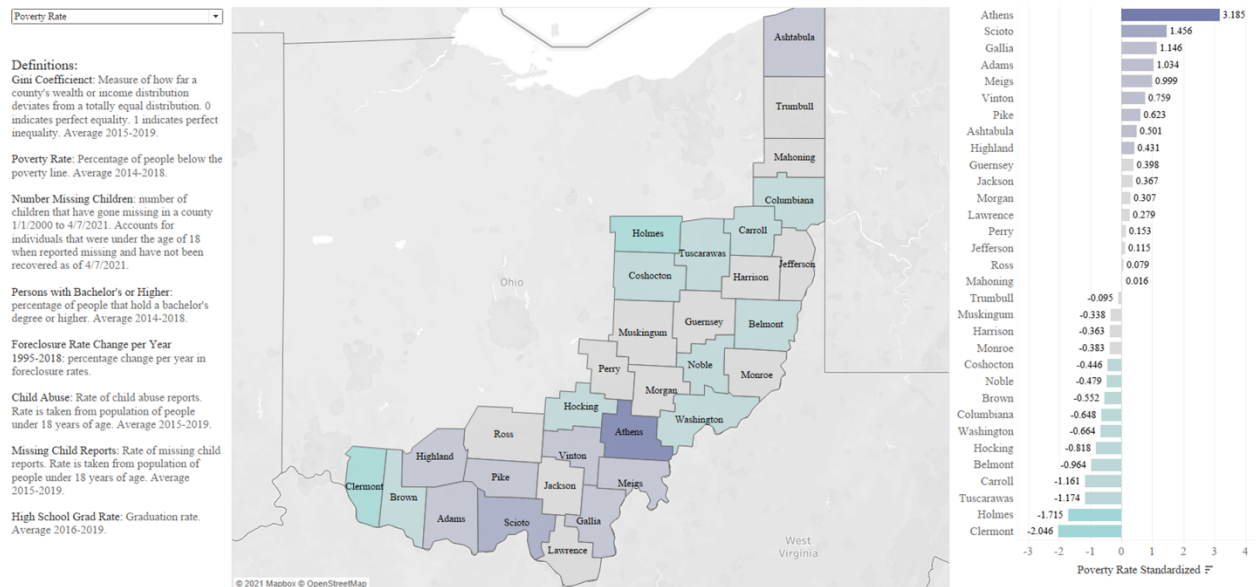Customer Beneficiary Discovery
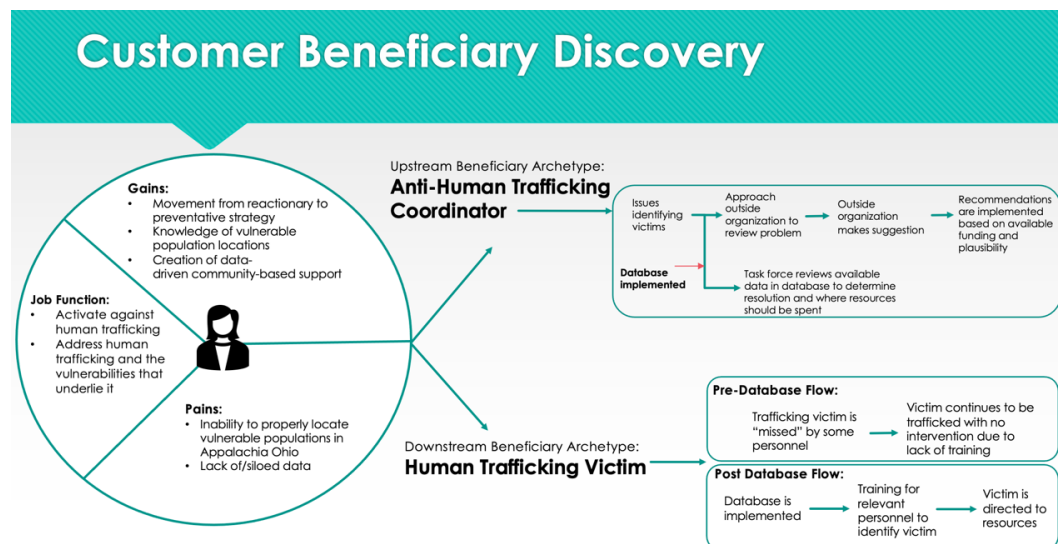
SOCIO-ECONOMIC FACTORS

Gini Coefficient

Heat Map of Various Vulnerabilities of Sex Trafficking in Appalachian Ohio

Poverty Rate

Heat Map of Various Vulnerabilities of Sex Trafficking in Appalachian Ohio

Foreclosure Rate

Heat Map of Various Vulnerabilities of Sex Trafficking in Appalachian Ohio

Persons with Bachelor's or Higher

Heat Map of Various Vulnerabilities of Sex Trafficking in Appalachian Ohio

High School Grad Rate

Heat Map of Various Vulnerabilities of Sex Trafficking in Appalachian Ohio

High School Grad Rate

Definitions:

Gini Coefficienct: Measure of how far a county's wealth or income distribution deviates from a totally equal distribution. 0 indicates perfect equality. 1 indicates perfect inequality. Average 2015-2019.

Poverty Rate: Percentage of people below the poverty line. Average 2014-2018.

Number Missing Children: number of children that have gone missing in a county 1/1/2000 to 4/7/2021. Accounts for individuals that were under the age of 18 when reported missing and have not been recovered as of 4/7/2021.
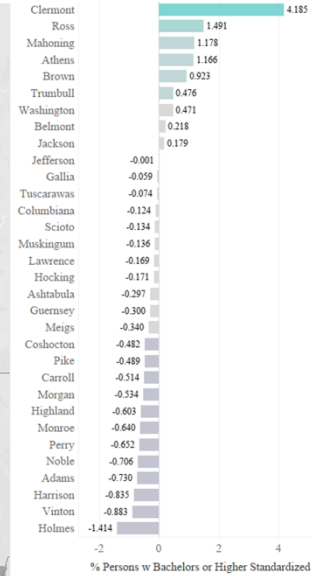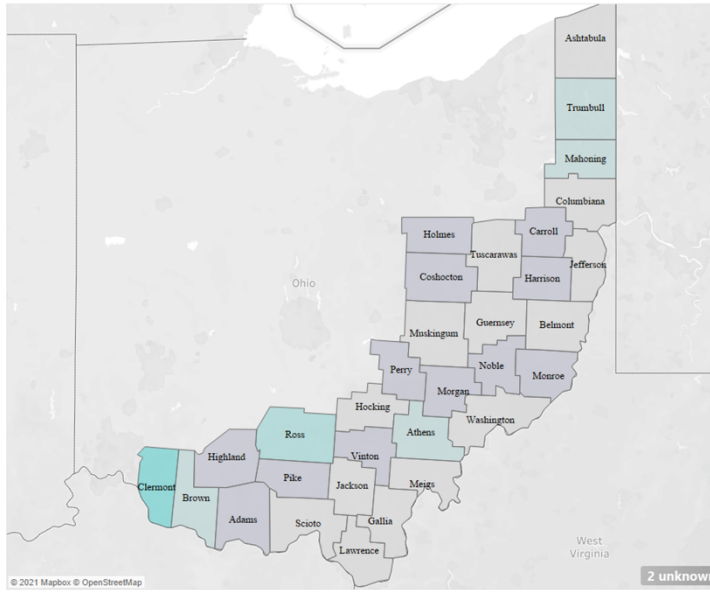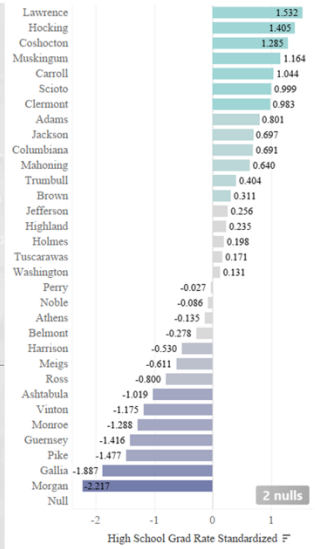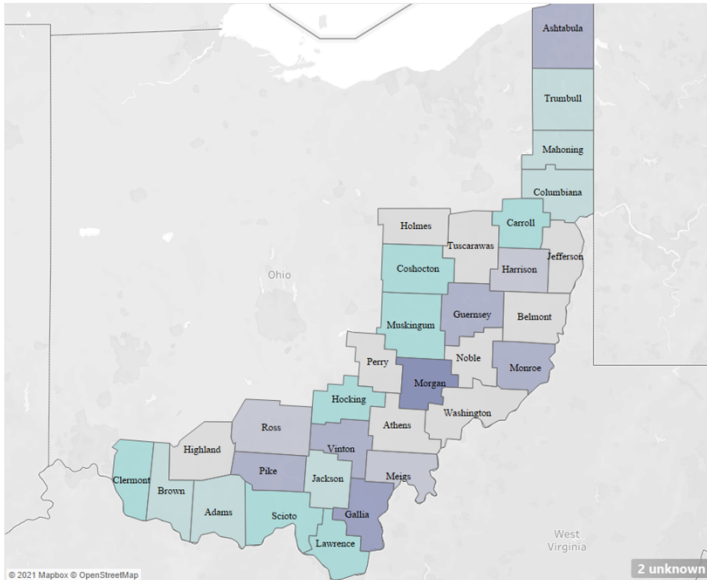
Persons with Bachelor's or Higher: percentage of people that hold a bachelor's degree or higher. Average 2014-2018.

Foreclosure Rate Change per Year 1995-2018: percentage change per year in foreclosure rates.

Child Abuse: Rate of child abuse reports. Rate is taken from population of people under 18 years of age. Average 2015-2019.

Missing Child Reports: Rate of missing child reports. Rate is taken from population of people under 18 years of age. Average 2015-2019.

High School Grad Rate: Graduation rate. Average 2016-2019.

County	Value
Lawrence	1.532
Hocking	1.405
Coshocton	1.285
Muskingum	1.164
Carroll	1.044
Scioto	0.999
Clermont	0.983
Adams	0.801
Jackson	0.697
Columbiana	0.691
Mahoning	0.640
Trumbull	0.404
Brown	0.311
Jefferson	0.256
Highland	0.235
Holmes	0.198
Tuscarawas	0.171
Washington	0.131
Perry	-0.027
Noble	-0.086
Athens	-0.135
Belmont	-0.278
Harrison	-0.530
Meigs	-0.611
Ross	-0.800
Ashtabula	-1.019
Vinton	-1.175
Monroe	-1.288
Guernsey	-1.416
Pike	-1.477
Gallia	-1.887
Morgan	-2.217
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High School Grad Rate Standardized F

SUBSTANCE USE FACTORS

OD Death Rate

Heat Map of Substance Abuse Vulnerabilities of Sex Trafficking in Appalachian Ohio

EMT Visits for Suspected OD

Heat Map of Substance Abuse Vulnerabilities of Sex Trafficking in Appalachian Ohio
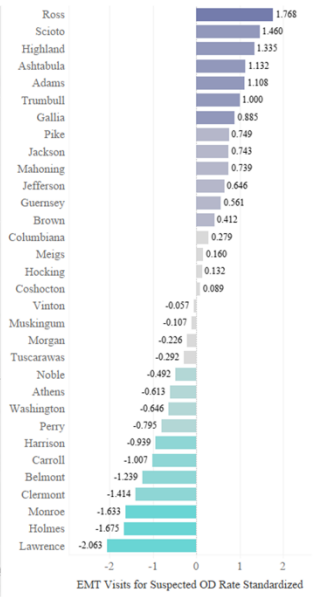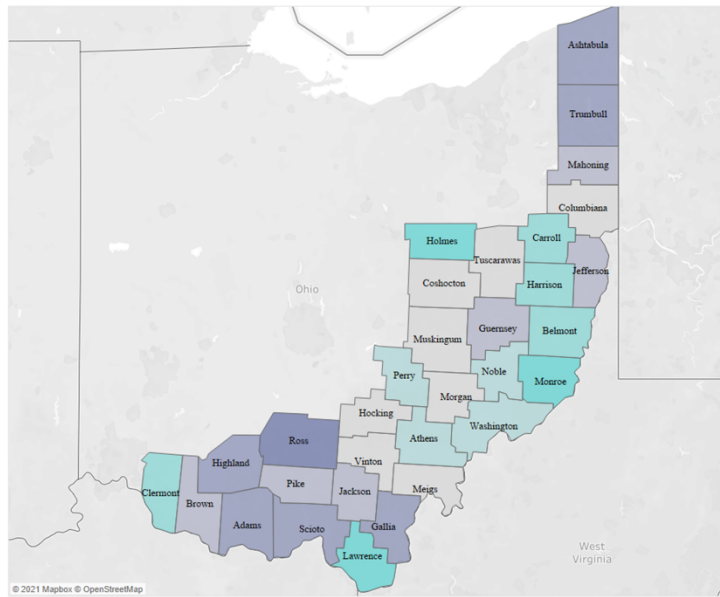
DOMESTIC VIOLENCE/JUVENILE FACTORS

DV Caseload

Heat Map of Domestic Violence Vulnerabilities of Sex Trafficking in Appalachian Ohio

○ DV Incidents
◉ DV Caseload

Definitions:

DV Incidents: Rate of domestic violence incidents reported by county agencies. Average 2015-2019.

DV Caseload: Rate of domestic violence cases that went through the county courts. Average 2015-2018.

County	DV Caseload Rate Standardized
Brown	2.309
Clermont	1.991
Adams	1.973
Mahoning	1.805
Vinton	1.540
Scioto	1.131
Pike	0.414
Jefferson	0.358
Lawrence	0.346
Carroll	0.302
Muskingum	0.152
Monroe	0.139
Belmont	0.034
Morgan	-0.085
Harrison	-0.128
Perry	-0.222
Ross	-0.407
Guernsey	-0.422
Columbiana	-0.453
Tuscarawas	-0.498
Meigs	-0.504
Gallia	-0.630
Hocking	-0.662
Washington	-0.774
Highland	-0.779
Noble	-0.843
Athens	-0.858
Coshocton	-0.874
Jackson	-0.909
Trumbull	-0.933
Ashtabula	-1.016
Holmes	-1.498

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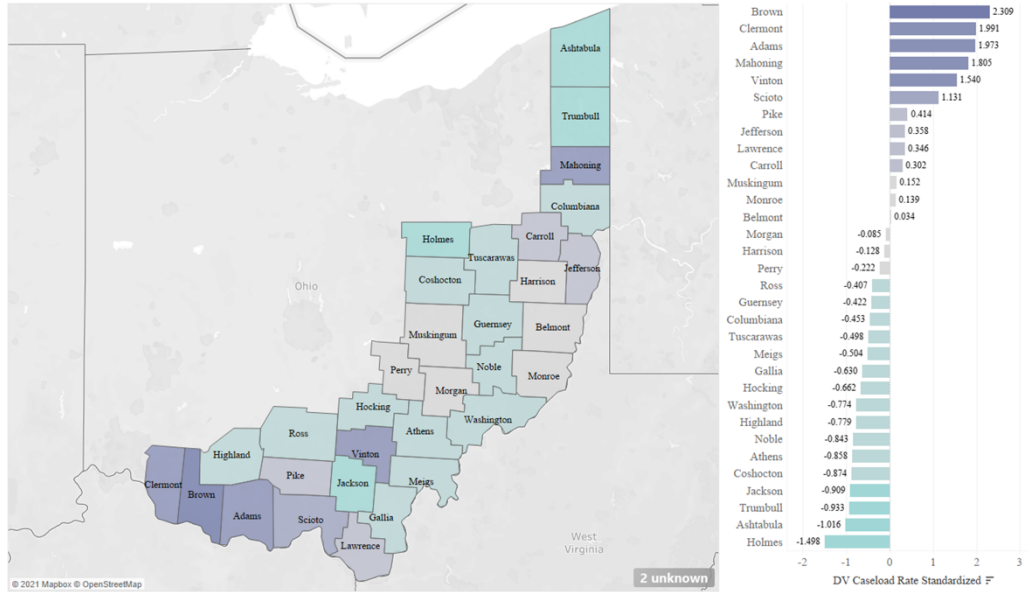
DV Incident Rate

Heat Map of Domestic Violence Vulnerabilities of Sex Trafficking in Appalachian Ohio

◉ DV Incidents
○ DV Caseload

Definitions:

DV Incidents: Rate of domestic violence incidents reported by county agencies. Average 2015-2019.

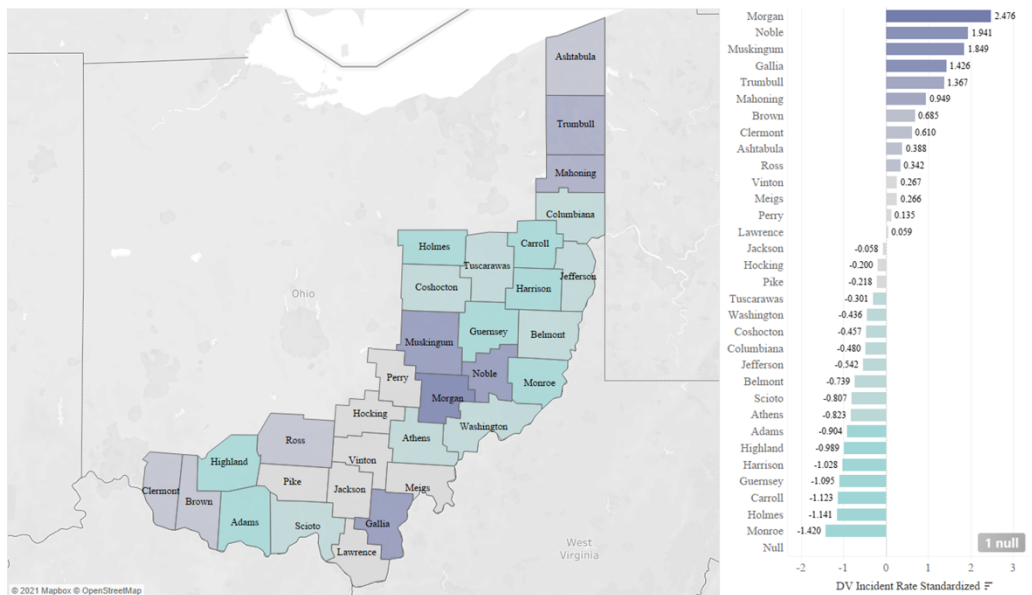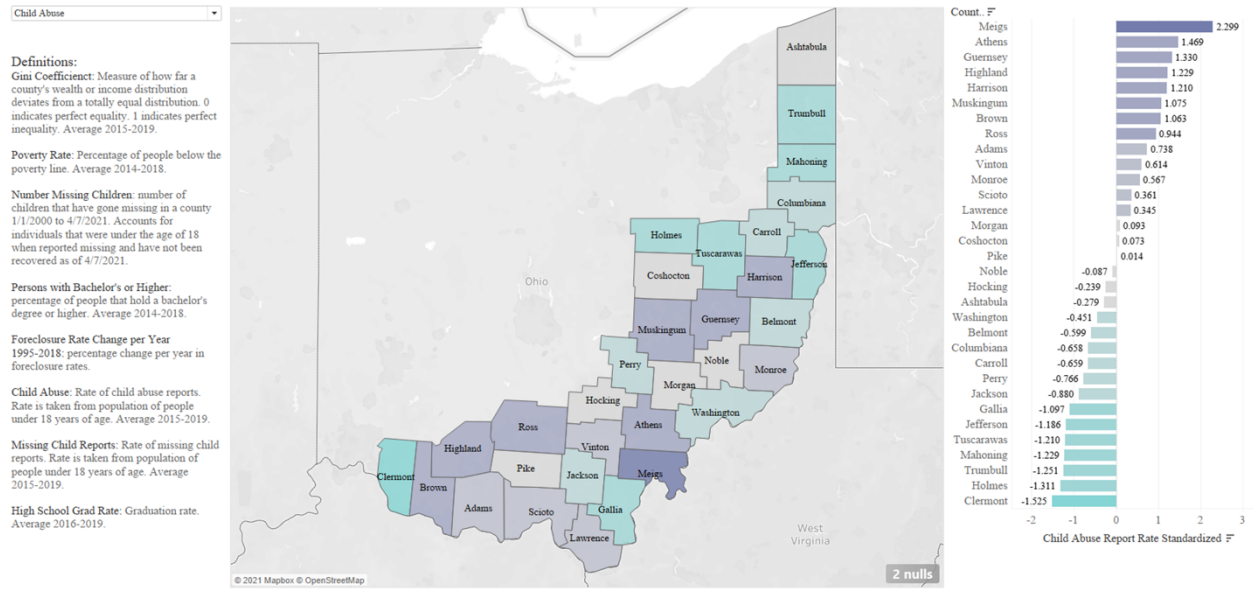DV Caseload: Rate of domestic violence cases that went through the county courts. Average 2015-2018.

County	DV Incident Rate Standardized
Morgan	2.476
Noble	1.941
Muskingum	1.849
Gallia	1.426
Trumbull	1.367
Mahoning	0.949
Brown	0.685
Clermont	0.610
Ashtabula	0.388
Ross	0.342
Vinton	0.267
Meigs	0.266
Perry	0.135
Lawrence	0.059
Jackson	-0.058
Hocking	-0.200
Pike	-0.218
Tuscarawas	-0.301
Washington	-0.436
Coshocton	-0.457
Columbiana	-0.480
Jefferson	-0.542
Belmont	-0.739
Scioto	-0.807
Athens	-0.823
Adams	-0.904
Highland	-0.989
Harrison	-1.028
Guernsey	-1.095
Carroll	-1.123
Holmes	-1.141
Monroe	-1.420
Null	

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Child Abuse Rate

Heat Map of Various Vulnerabilities of Sex Trafficking in Appalachian Ohio

Number of Missing Children

Heat Map of Various Vulnerabilities of Sex Trafficking in Appalachian Ohio