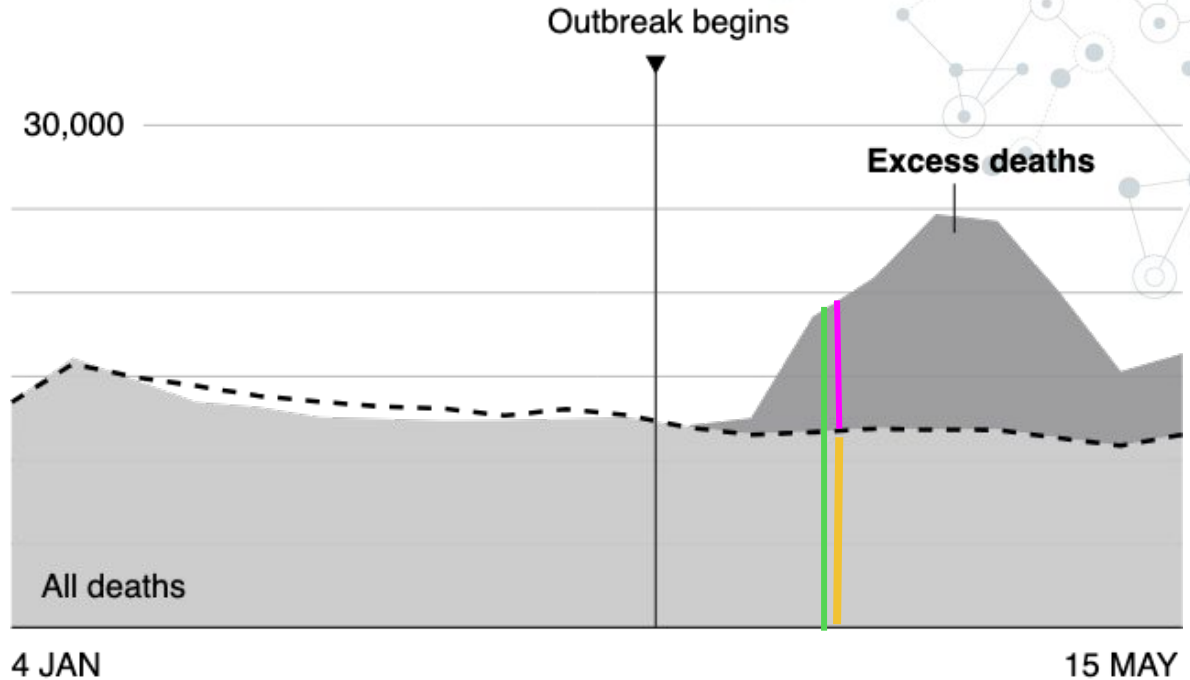# Relationship Between Excess Deaths and Other Variables During the Early Stages of the COVID-19 Pandemic

Final Presentation
Linette Kingston

Excess Deaths

deaths occurring beyond the expected number of deaths for an area during the same time frame

Outbreak begins

30,000

Excess deaths
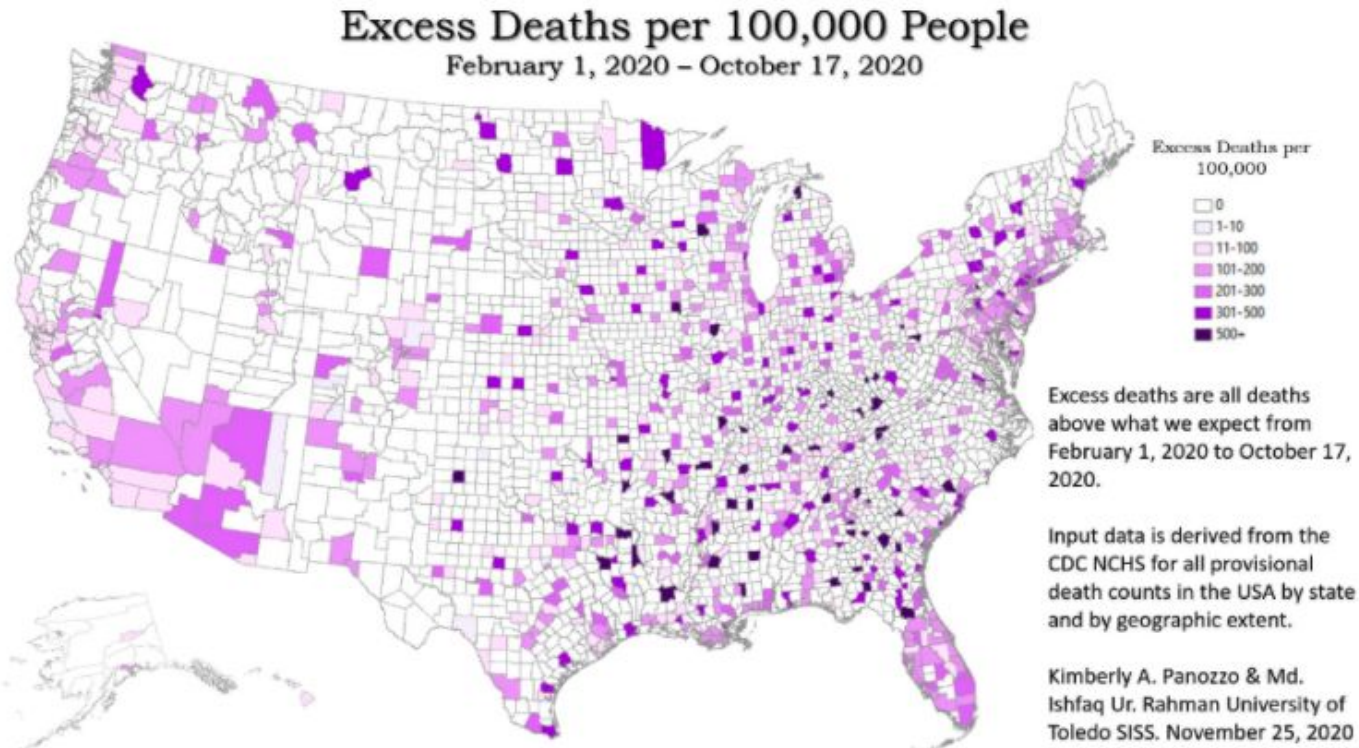
All deaths

4 JAN

15 MAY

actual deaths — predicted deaths = excess deaths

Excess Deaths Due to COVID-19 Pandemic

- Includes deaths directly associated with COVID-19 and deaths due to other causes

- Pro:
  - likely to better represent impact of pandemic, considering underreporting of COVID-19 in early pandemic stages

Panozzo and Rahman (2020)

Excess Deaths per 100,000 People
February 1, 2020 – October 17, 2020

Excess Deaths per 100,000

- ☐ 0
- ☐ 1-10
- ☐ 11-100
- ☐ 101-200
- ☐ 201-300
- ☐ 301-500
- ☐ 500+

Excess deaths are all deaths above what we expect from February 1, 2020 to October 17, 2020.

Input data is derived from the CDC NCHS for all provisional death counts in the USA by state and by geographic extent.

Kimberly A. Panozzo & Md. Ishfaq Ur. Rahman University of Toledo SISS. November 25, 2020

Aim

To understand

1). which variables describing community characteristics (infrastructure, health care system, built environment) elucidate COVID-19 excess deaths

2). Along with the impact of location (state/MSA)

Multilevel Modeling

Through multilevel modeling
- Counties, states
- Counties, metropolitan statistical areas (MSA)

Fixed Effects
- Assume that location has an effect (esp policy-wise) on the outcome

Data Sources

- 2021 County Health Rankings

  - 2015-2019 American Community Survey

  - 2018 Small Area Health Insurance Estimates

  - 2018 Area Health Resource Files

- Google Street View dataset constructed by Nguyen et al. (2021)

- COVID-19 Excess Deaths data constructed by Panozzo and Rahman (2020)

Selected Variables

Healthcare	Uninsured adults Primary care physicians
Built Environment	Prop of crosswalks Prop of greenery Prop of single lane roads
Infrastructure	Broadband access home ownership

Refining Variables

	Variable	VIF
8	primary_phys	6.525921
1	prop_crosswalk	7.699991
4	prop_sidewalk	8.792378
7	uninsured_adults	9.601898
2	prop_not_single_family_house	9.625016
5	prop_dilapidated_building	12.139320
3	prop_single_lane	74.508150
9	home_ownership	102.328984
6	broadband	113.835857
0	prop_green	171.289371

	Variable	VIF
3	mental_hlth	2.368950
4	HIV_prev	2.514517
0	prop_crosswalk	3.012217
2	uninsured_adults	3.242040
1	prop_not_single_family_house	3.628056

Selected Variables

Healthcare	Uninsured adults
	Mental health providers
	HIV prevalence
Built Environment	Prop of crosswalks
	Prop of areas not composed of single family houses

Multilevel Models

Model #1: Counties, States

```python
# counties, state model
smf.glm('excess_deaths ~ prop_crosswalk + prop_not_single_family_house + uninsured_adults + mental_hlth + C(state) + HIV_prev',
        gsv_deaths_hlth, family=families.Poisson()).fit().summary()
```

Generalized Linear Model Regression Results

Dep. Variable:	excess_deaths	**No. Observations:**	547
Model:	GLM	**Df Residuals:**	511
Model Family:	Poisson	**Df Model:**	35
Link Function:	log	**Scale:**	1.0000
Method:	IRLS	**Log-Likelihood:**	-1.1459e+05
Date:	Tue, 07 Dec 2021	**Deviance:**	2.2771e+05
Time:	23:39:09	**Pearson chi2:**	3.19e+05
No. Iterations:	27		
Covariance Type:	nonrobust		

(AL)

	coef	std err	z	P>|z|	[0.025	0.975]
Intercept	2.3481	0.026	90.326	0.000	2.297	2.399
C(state)[T.AR]	1.0079	0.029	34.427	0.000	0.951	1.065
C(state)[T.AZ]	3.6179	0.026	140.625	0.000	3.568	3.668
C(state)[T.CA]	1.8488	0.027	69.759	0.000	1.797	1.901
C(state)[T.CO]	1.0692	0.029	37.152	0.000	1.013	1.126
C(state)[T.CT]	2.8777	0.030	97.264	0.000	2.820	2.936
C(state)[T.DC]	-1.5575	0.037	-41.990	0.000	-1.630	-1.485
C(state)[T.DE]	2.4265	0.043	56.454	0.000	2.342	2.511
C(state)[T.FL]	1.1984	0.023	52.112	0.000	1.153	1.243
C(state)[T.GA]	-0.2216	0.025	-8.776	0.000	-0.271	-0.172
C(state)[T.HI]	3.4409	0.044	77.915	0.000	3.354	3.527
C(state)[T.IA]	1.5128	0.040	38.258	0.000	1.435	1.590
C(state)[T.ID]	0.8681	0.048	18.275	0.000	0.775	0.961
C(state)[T.IL]	2.3793	0.024	97.289	0.000	2.331	2.427
C(state)[T.IN]	1.4913	0.026	58.330	0.000	1.441	1.541
C(state)[T.KS]	1.0089	0.033	30.276	0.000	0.944	1.074
C(state)[T.KY]	3.4942	0.030	116.297	0.000	3.435	3.553
C(state)[T.LA]	0.6902	0.033	20.800	0.000	0.625	0.755
C(state)[T.MA]	3.3479	0.030	113.362	0.000	3.290	3.406
C(state)[T.MD]	2.4188	0.026	92.109	0.000	2.367	2.470
C(state)[T.ME]	0.3419	0.072	4.751	0.000	0.201	0.483
C(state)[T.MI]	1.9589	0.026	76.122	0.000	1.908	2.009
C(state)[T.MN]	0.9092	0.042	21.862	0.000	0.828	0.991

	coef	std err	z	P>|z|	[0.025	0.975]
C(state)[T.MO]	0.3842	0.030	12.663	0.000	0.325	0.444
C(state)[T.MS]	-0.4940	0.032	-15.652	0.000	-0.556	-0.432
C(state)[T.MT]	1.8280	0.053	34.666	0.000	1.725	1.931
C(state)[T.NE]	1.8201	0.046	39.948	0.000	1.731	1.909
C(state)[T.NH]	-25.3099	1.88e+04	-0.001	0.999	-3.68e+04	3.68e+04
C(state)[T.NJ]	2.0593	0.026	78.494	0.000	2.008	2.111
C(state)[T.NM]	-22.7720	2.13e+04	-0.001	0.999	-4.18e+04	4.18e+04
C(state)[T.NV]	1.1792	0.030	39.670	0.000	1.121	1.238
prop_crosswalk	68.7239	0.259	265.367	0.000	68.216	69.231
prop_not_single_family_house	-6.3300	0.036	-173.868	0.000	-6.401	-6.259
uninsured_adults	12.7812	0.087	146.452	0.000	12.610	12.952
mental_hlth	-44.7222	2.622	-17.057	0.000	-49.861	-39.583
HIV_prev	0.0007	1.57e-05	46.466	0.000	0.001	0.001

Model #2: Counties, MSAs

```python
# fixed effects county, MSA
smf.glm("excess_deaths ~ prop_crosswalk + prop_not_single_family_house + uninsured_adults + mental_hlth + C(MSA_short) + HIV_prev",
        gsv_hlth_MSA, family=families.Poisson()).fit().summary()
```

Generalized Linear Model Regression Results

Dep. Variable:	excess_deaths	No. Observations:	251
Model:	GLM	Df Residuals:	104
Model Family:	Poisson	Df Model:	146
Link Function:	log	Scale:	1.0000
Method:	IRLS	Log-Likelihood:	-22307.
Date:	Tue, 07 Dec 2021	Deviance:	43431.
Time:	23:45:51	Pearson chi2:	5.26e+04
No. Iterations:	30		
Covariance Type:	nonrobust		

Model #2: Counties, MSAs

	coef	std err	z	P>|z|	[0.025	0.975]
Intercept	2.1487	0.066	32.575	0.000	2.019	2.278
C(MSA_short)[T.Alexandria, LA]	-57.1772	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Ann Arbor, MI]	2.1427	0.065	33.005	0.000	2.015	2.270
C(MSA_short)[T.Athens-Clarke County, GA]	0.7921	0.059	13.530	0.000	0.677	0.907
C(MSA_short)[T.Atlanta-Sandy Springs-Alpharetta, GA]	-0.3293	0.049	-6.658	0.000	-0.426	-0.232
C(MSA_short)[T.Auburn-Opelika, AL]	1.4317	0.083	17.164	0.000	1.268	1.595
C(MSA_short)[T.Augusta-Richmond County, GA-SC]	-28.4967	6.66e+04	-0.000	1.000	-1.31e+05	1.3e+05
C(MSA_short)[T.Baltimore-Columbia-Towson, MD]	2.6840	0.058	46.238	0.000	2.570	2.798
C(MSA_short)[T.Barnstable Town, MA]	-0.2312	0.149	-1.556	0.120	-0.522	0.060
C(MSA_short)[T.Baton Rouge, LA]	-28.7028	6.43e+04	-0.000	1.000	-1.26e+05	1.26e+05
C(MSA_short)[T.Birmingham-Hoover, AL]	-28.0719	8.14e+04	-0.000	1.000	-1.6e+05	1.59e+05
C(MSA_short)[T.Bloomington, IL]	2.1864	0.104	20.954	0.000	1.982	2.391
C(MSA_short)[T.Bloomington, IN]	-28.0013	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Boise City, ID]	-26.9343	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Boston-Cambridge-Newton, MA-NH]	2.6281	0.072	36.519	0.000	2.487	2.769
C(MSA_short)[T.Boulder, CO]	1.1341	0.077	14.793	0.000	0.984	1.284
C(MSA_short)[T.Cape Girardeau, MO-IL]	-28.6128	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Carbondale-Marion, IL]	1.6253	0.091	17.813	0.000	1.446	1.804
C(MSA_short)[T.Carson City, NV]	-0.8239	0.080	-10.334	0.000	-0.980	-0.668
C(MSA_short)[T.Cedar Rapids, IA]	3.0230	0.077	39.455	0.000	2.873	3.173
C(MSA_short)[T.Champaign-Urbana, IL]	-25.8273	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Chattanooga, TN-GA]	-28.7771	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Chicago-Naperville-Elgin, IL-IN-WI]	2.6960	0.052	51.706	0.000	2.594	2.798
C(MSA_short)[T.Cincinnati, OH-KY-IN]	1.5817	0.084	18.814	0.000	1.417	1.746
C(MSA_short)[T.Coeur d'Alene, ID]	1.1656	0.083	14.110	0.000	1.004	1.328
C(MSA_short)[T.Columbia, MO]	2.0140	0.061	33.063	0.000	1.895	2.133
C(MSA_short)[T.Columbus, GA-AL]	0.5203	0.056	9.250	0.000	0.410	0.631
C(MSA_short)[T.Columbus, IN]	1.6323	0.086	19.033	0.000	1.464	1.800
C(MSA_short)[T.Crestview-Fort Walton Beach-Destin, FL]	-28.8647	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Cumberland, MD-WV]	2.4460	0.094	25.979	0.000	2.261	2.631
C(MSA_short)[T.Daphne-Fairhope-Foley, AL]	-28.7242	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Davenport-Moline-Rock Island, IA-IL]	0.8694	0.100	8.667	0.000	0.673	1.066
C(MSA_short)[T.Decatur, IL]	2.9599	0.091	32.477	0.000	2.781	3.139
C(MSA_short)[T.Deltona-Daytona Beach-Ormond Beach, FL]	1.7231	0.055	31.460	0.000	1.616	1.830
C(MSA_short)[T.Denver-Aurora-Lakewood, CO]	0.3755	0.057	6.565	0.000	0.263	0.488
C(MSA_short)[T.Des Moines-West Des Moines, IA]	-26.5474	6.68e+04	-0.000	1.000	-1.31e+05	1.31e+05
C(MSA_short)[T.Detroit-Warren-Dearborn, MI]	3.1835	0.056	56.831	0.000	3.074	3.293
C(MSA_short)[T.Dubuque, IA]	2.8574	0.101	28.231	0.000	2.659	3.056
C(MSA_short)[T.Elkhart-Goshen, IN]	0.9775	0.075	13.077	0.000	0.831	1.124
C(MSA_short)[T.Evansville, IN-KY]	2.7378	0.059	46.108	0.000	2.621	2.854
C(MSA_short)[T.Fargo, ND-MN]	-25.8817	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Fayetteville-Springdale-Rogers, AR]	2.2596	0.062	36.467	0.000	2.138	2.381
C(MSA_short)[T.Flagstaff, AZ]	2.1308	0.075	28.553	0.000	1.985	2.277
C(MSA_short)[T.Florence-Muscle Shoals, AL]	-28.1660	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Fort Wayne, IN]	3.3480	0.058	57.727	0.000	3.234	3.462
C(MSA_short)[T.Gainesville, FL]	-29.1197	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Gainesville, GA]	1.4806	0.057	26.143	0.000	1.370	1.592
C(MSA_short)[T.Grand Rapids-Kentwood, MI]	-28.0794	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Great Falls, MT]	2.7201	0.097	28.180	0.000	2.531	2.909
C(MSA_short)[T.Gulfport-Biloxi, MS]	-29.0128	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05

C(MSA_short)[T.Hammond, LA]	0.8295	0.097	8.569	0.000	0.640	1.019
C(MSA_short)[T.Hanford-Corcoran, CA]	3.4010	0.100	33.903	0.000	3.204	3.598
C(MSA_short)[T.Hartford-East Hartford-Middletown, CT]	2.0477	0.062	32.824	0.000	1.925	2.170
C(MSA_short)[T.Hattiesburg, MS]	0.5699	0.056	10.119	0.000	0.460	0.680
C(MSA_short)[T.Homosassa Springs, FL]	0.5960	0.086	6.899	0.000	0.427	0.765
C(MSA_short)[T.Hot Springs, AR]	2.6251	0.070	37.610	0.000	2.488	2.762
C(MSA_short)[T.Huntsville, AL]	-27.4609	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Idaho Falls, ID]	2.2433	0.081	27.593	0.000	2.084	2.403
C(MSA_short)[T.Indianapolis-Carmel-Anderson, IN]	1.1909	0.085	13.964	0.000	1.024	1.358
C(MSA_short)[T.Jackson, MI]	0.9359	0.086	10.850	0.000	0.767	1.105
C(MSA_short)[T.Jackson, MS]	-28.8840	7.98e+04	-0.000	1.000	-1.56e+05	1.56e+05
C(MSA_short)[T.Jacksonville, FL]	1.7579	0.049	35.851	0.000	1.662	1.854
C(MSA_short)[T.Jefferson City, MO]	2.0751	0.079	26.117	0.000	1.919	2.231
C(MSA_short)[T.Jonesboro, AR]	3.2944	0.061	53.702	0.000	3.174	3.415
C(MSA_short)[T.Joplin, MO]	1.5826	0.059	26.785	0.000	1.467	1.698
C(MSA_short)[T.Kankakee, IL]	2.7547	0.090	30.574	0.000	2.578	2.931
C(MSA_short)[T.Kansas City, MO-KS]	1.3495	0.055	24.703	0.000	1.242	1.457
C(MSA_short)[T.Lafayette, LA]	2.1144	0.059	35.607	0.000	1.998	2.231
C(MSA_short)[T.Lafayette-West Lafayette, IN]	1.6040	0.077	20.826	0.000	1.453	1.755
C(MSA_short)[T.Lake Charles, LA]	1.5275	0.074	20.662	0.000	1.383	1.672
C(MSA_short)[T.Lansing-East Lansing, MI]	1.5067	0.065	23.065	0.000	1.379	1.635
C(MSA_short)[T.Las Vegas-Henderson-Paradise, NV]	3.1630	0.058	54.934	0.000	3.050	3.276
C(MSA_short)[T.Lawrence, KS]	-27.7497	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Lewiston, ID-WA]	2.3362	0.124	18.813	0.000	2.093	2.580
C(MSA_short)[T.Lewiston-Auburn, ME]	0.8474	0.086	9.803	0.000	0.678	1.017
C(MSA_short)[T.Lexington-Fayette, KY]	3.6880	0.058	63.987	0.000	3.575	3.801

Model #2: Counties, MSAs

C(MSA_short)[T.Washington-Arlington-Alexandria, DC-VA-MD-WV]	-1.1932	0.074	-16.033	0.000	-1.339	-1.047
C(MSA_short)[T.Waterloo-Cedar Falls, IA]	2.9097	0.083	35.252	0.000	2.748	3.072
C(MSA_short)[T.Wichita, KS]	-26.2714	8.23e+04	-0.000	1.000	-1.61e+05	1.61e+05
C(MSA_short)[T.Worcester, MA-CT]	2.3621	0.067	35.279	0.000	2.231	2.493
C(MSA_short)[T.Yuma, AZ]	4.5872	0.075	61.467	0.000	4.441	4.733
prop_crosswalk	60.6365	0.503	120.459	0.000	59.650	61.623
prop_not_single_family_house	-7.3584	0.072	-101.742	0.000	-7.500	-7.217
uninsured_adults	13.4363	0.250	53.640	0.000	12.945	13.927
mental_hlth	228.2574	5.268	43.329	0.000	217.932	238.583
HIV_prev	0.0009	2.18e-05	39.814	0.000	0.001	0.001

Comparison

County/MSA

County/State

prop_crosswalk	60.6365	0.503	120.459	0.000	59.650	61.623
prop_not_single_family_house	-7.3584	0.072	-101.742	0.000	-7.500	-7.217
uninsured_adults	13.4363	0.250	53.640	0.000	12.945	13.927
mental_hlth	228.2574	5.268	43.329	0.000	217.932	238.583
HIV_prev	0.0009	2.18e-05	39.814	0.000	0.001	0.001
prop_crosswalk	68.7239	0.259	265.367	0.000	68.216	69.231
prop_not_single_family_house	-6.3300	0.036	-173.868	0.000	-6.401	-6.259
uninsured_adults	12.7812	0.087	146.452	0.000	12.610	12.952
mental_hlth	-44.7222	2.622	-17.057	0.000	-49.861	-39.583
HIV_prev	0.0007	1.57e-05	46.466	0.000	0.001	0.001

Limitations

- Coefficient estimates for non-location variables are the same across study area
- Potential unaccounted spatial autocorrelation
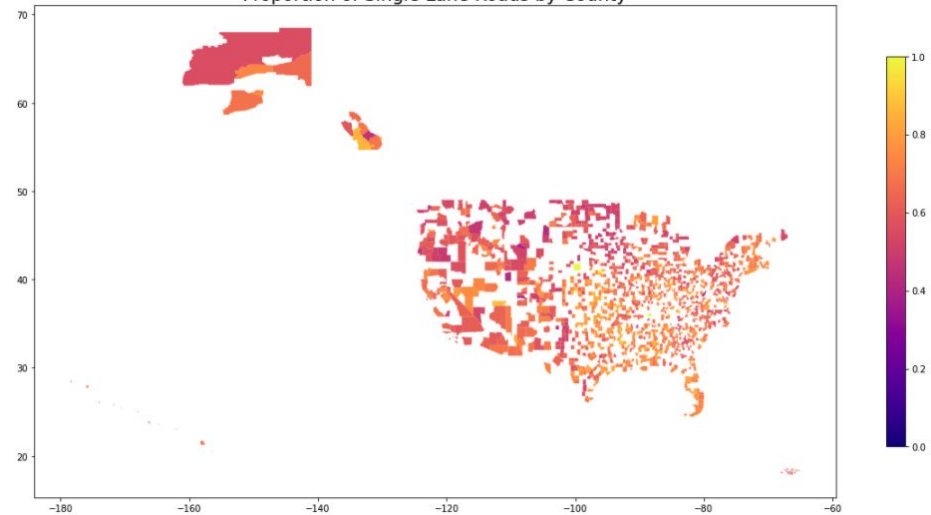 - Can be impacted by another location's policies

Next Steps

- Map coefficients from county/state model
- Sort through county/MSA results
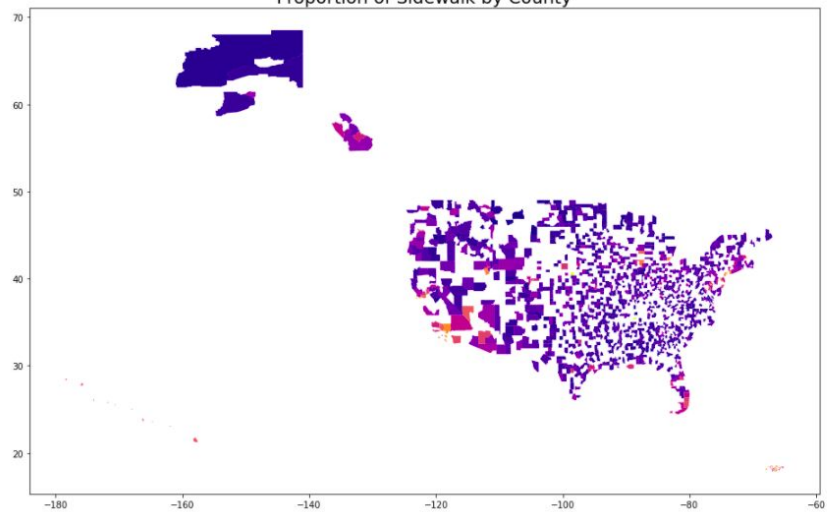- Identify potential state policies of interest

Proportion of Greenery by County
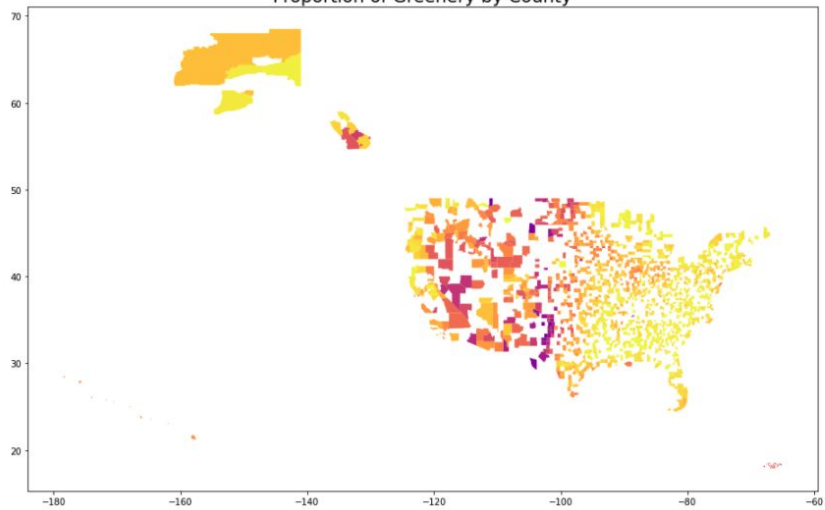
Proportion of Single Lane Roads by County

Proportion of Sidewalk by County

Additional MSA Slides

C(MSA_short)[T.Lawrence, KS]	-27.7497	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Lewiston, ID-WA]	2.3362	0.124	18.813	0.000	2.093	2.580
C(MSA_short)[T.Lewiston-Auburn, ME]	0.8474	0.086	9.803	0.000	0.678	1.017
C(MSA_short)[T.Lexington-Fayette, KY]	3.6880	0.058	63.987	0.000	3.575	3.801
C(MSA_short)[T.Lincoln, NE]	2.6240	0.069	38.010	0.000	2.489	2.759
C(MSA_short)[T.Little Rock-North Little Rock-Conway, AR]	-26.5770	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Los Angeles-Long Beach-Anaheim, CA]	3.1620	0.055	57.224	0.000	3.054	3.270
C(MSA_short)[T.Louisville/Jefferson County, KY-IN]	1.6187	0.080	20.303	0.000	1.462	1.775
C(MSA_short)[T.Manhattan, KS]	-26.7078	5.93e+04	-0.000	1.000	-1.16e+05	1.16e+05
C(MSA_short)[T.Miami-Fort Lauderdale-Pompano Beach, FL]	1.7733	0.044	40.321	0.000	1.687	1.859
C(MSA_short)[T.Michigan City-La Porte, IN]	1.1524	0.108	10.640	0.000	0.940	1.365
C(MSA_short)[T.Minneapolis-St. Paul-Bloomington, MN-WI]	-1.0987	0.237	-4.644	0.000	-1.562	-0.635
C(MSA_short)[T.Mobile, AL]	2.2894	0.052	43.876	0.000	2.187	2.392
C(MSA_short)[T.Monroe, LA]	-28.0815	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Montgomery, AL]	-0.9920	0.247	-4.014	0.000	-1.476	-0.508
C(MSA_short)[T.Napa, CA]	-0.8695	0.133	-6.534	0.000	-1.130	-0.609
C(MSA_short)[T.New Haven-Milford, CT]	2.7079	0.061	44.268	0.000	2.588	2.828
C(MSA_short)[T.New Orleans-Metairie, LA]	-28.6766	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.New York-Newark-Jersey City, NY-NJ-PA]	2.5169	0.052	48.178	0.000	2.415	2.619
C(MSA_short)[T.North Port-Sarasota-Bradenton, FL]	1.1090	0.059	18.652	0.000	0.992	1.226
C(MSA_short)[T.Norwich-New London, CT]	-28.2272	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Ocean City, NJ]	-27.7716	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05

	coef	std err	z	P>|z|	[0.025	0.975]
C(MSA_short)[T.Omaha-Council Bluffs, NE-IA]	0.7967	0.243	3.279	0.001	0.320	1.273
C(MSA_short)[T.Orlando-Kissimmee-Sanford, FL]	1.1302	0.049	23.169	0.000	1.035	1.226
C(MSA_short)[T.Owensboro, KY]	2.2339	0.083	26.829	0.000	2.071	2.397
C(MSA_short)[T.Oxnard-Thousand Oaks-Ventura, CA]	1.4027	0.070	19.947	0.000	1.265	1.541
C(MSA_short)[T.Pensacola-Ferry Pass-Brent, FL]	2.2018	0.052	42.157	0.000	2.099	2.304
C(MSA_short)[T.Peoria, IL]	-27.1231	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Philadelphia-Camden-Wilmington, PA-NJ-DE-MD]	1.8377	0.060	30.629	0.000	1.720	1.955
C(MSA_short)[T.Phoenix-Mesa-Chandler, AZ]	4.3116	0.054	79.694	0.000	4.206	4.418
C(MSA_short)[T.Pine Bluff, AR]	0.8450	0.089	9.463	0.000	0.670	1.020
C(MSA_short)[T.Pittsfield, MA]	-0.6410	0.130	-4.920	0.000	-0.896	-0.386
C(MSA_short)[T.Port St. Lucie, FL]	0.8643	0.072	11.995	0.000	0.723	1.006
C(MSA_short)[T.Portland-South Portland, ME]	-28.1782	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Providence-Warwick, RI-MA]	1.6985	0.082	20.721	0.000	1.538	1.859
C(MSA_short)[T.Pueblo, CO]	2.4730	0.084	29.597	0.000	2.309	2.637
C(MSA_short)[T.Redding, CA]	1.3669	0.082	16.595	0.000	1.205	1.528
C(MSA_short)[T.Riverside-San Bernardino-Ontario, CA]	4.8071	0.062	78.053	0.000	4.686	4.928
C(MSA_short)[T.Rochester, MN]	2.6920	0.069	38.781	0.000	2.556	2.828
C(MSA_short)[T.Rome, GA]	1.4823	0.062	23.907	0.000	1.361	1.604
C(MSA_short)[T.Sacramento-Roseville-Folsom, CA]	1.5020	0.062	24.175	0.000	1.380	1.624
C(MSA_short)[T.Salinas, CA]	1.4640	0.084	17.400	0.000	1.299	1.629
C(MSA_short)[T.Salisbury, MD-DE]	0.8782	0.090	9.798	0.000	0.703	1.054

C(MSA_short)[T.San Diego-Chula Vista-Carlsbad, CA]	3.0369	0.057	53.383	0.000	2.925	3.148
C(MSA_short)[T.San Francisco-Oakland-Berkeley, CA]	-0.7739	0.075	-10.302	0.000	-0.921	-0.627
C(MSA_short)[T.Santa Maria-Santa Barbara, CA]	0.2139	0.077	2.781	0.005	0.063	0.365
C(MSA_short)[T.Santa Rosa-Petaluma, CA]	1.0341	0.071	14.647	0.000	0.896	1.173
C(MSA_short)[T.Sebring-Avon Park, FL]	0.7276	0.073	10.015	0.000	0.585	0.870
C(MSA_short)[T.Sierra Vista-Douglas, AZ]	-25.9445	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Springfield, IL]	-27.0567	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Springfield, MA]	1.3091	0.075	17.471	0.000	1.162	1.456
C(MSA_short)[T.Springfield, MO]	-28.1479	6.7e+04	-0.000	1.000	-1.31e+05	1.31e+05
C(MSA_short)[T.St. Joseph, MO-KS]	1.0618	0.084	12.612	0.000	0.897	1.227
C(MSA_short)[T.St. Louis, MO-IL]	0.7382	0.094	7.874	0.000	0.554	0.922
C(MSA_short)[T.Tallahassee, FL]	-28.6188	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.Tampa-St. Petersburg-Clearwater, FL]	0.9015	0.049	18.223	0.000	0.805	0.998
C(MSA_short)[T.Terre Haute, IN]	1.9670	0.071	27.880	0.000	1.829	2.105
C(MSA_short)[T.Texarkana, TX-AR]	-27.8888	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05
C(MSA_short)[T.The Villages, FL]	1.8679	0.071	26.451	0.000	1.730	2.006
C(MSA_short)[T.Topeka, KS]	2.1610	0.077	28.199	0.000	2.011	2.311
C(MSA_short)[T.Tucson, AZ]	5.1364	0.058	88.340	0.000	5.022	5.250
C(MSA_short)[T.Tuscaloosa, AL]	0.9870	0.062	15.914	0.000	0.865	1.109
C(MSA_short)[T.Urban Honolulu, HI]	3.3762	0.071	47.711	0.000	3.238	3.515
C(MSA_short)[T.Vallejo, CA]	-0.5165	0.112	-4.618	0.000	-0.736	-0.297
C(MSA_short)[T.Warner Robins, GA]	-29.3356	1.16e+05	-0.000	1.000	-2.28e+05	2.28e+05