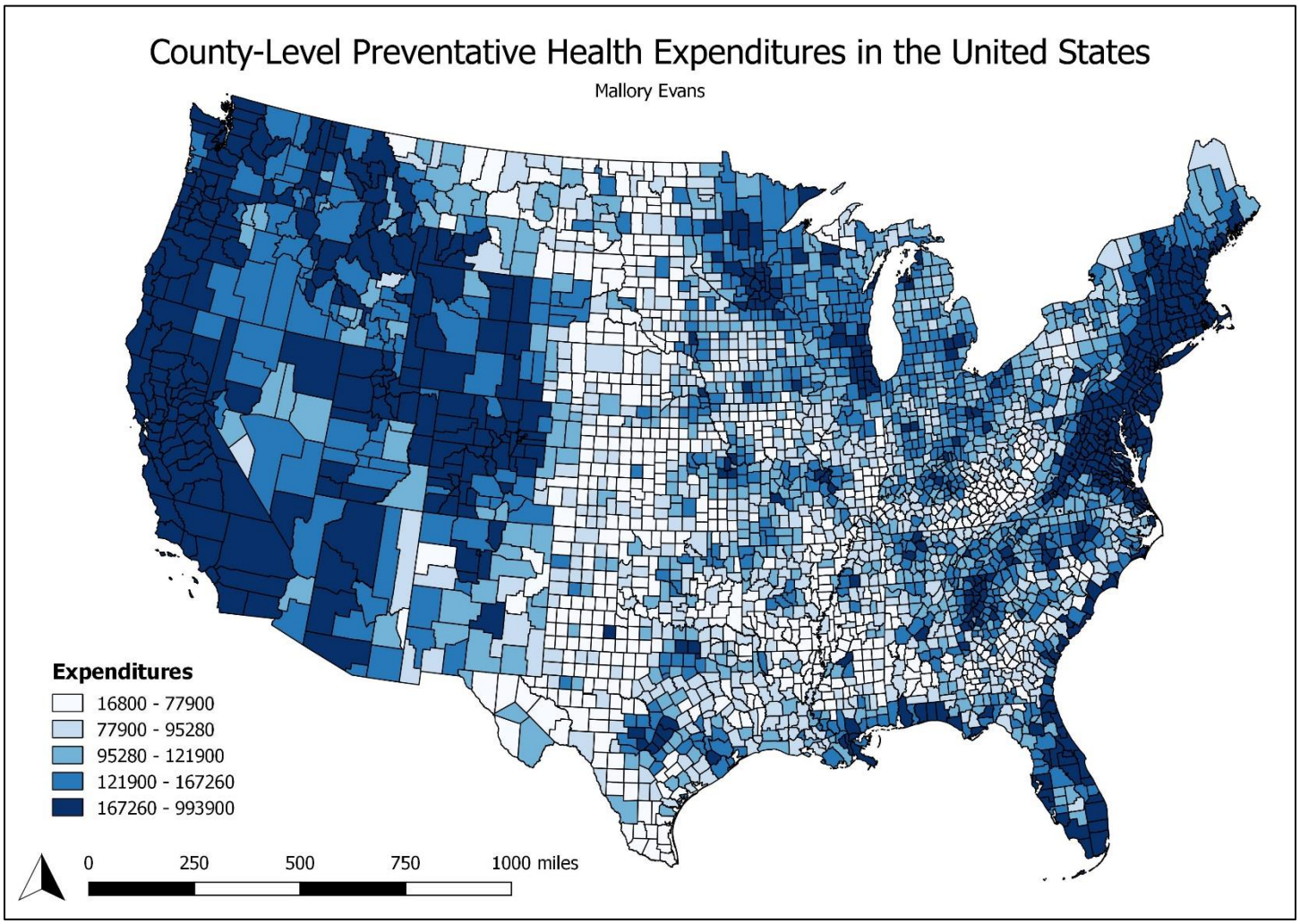
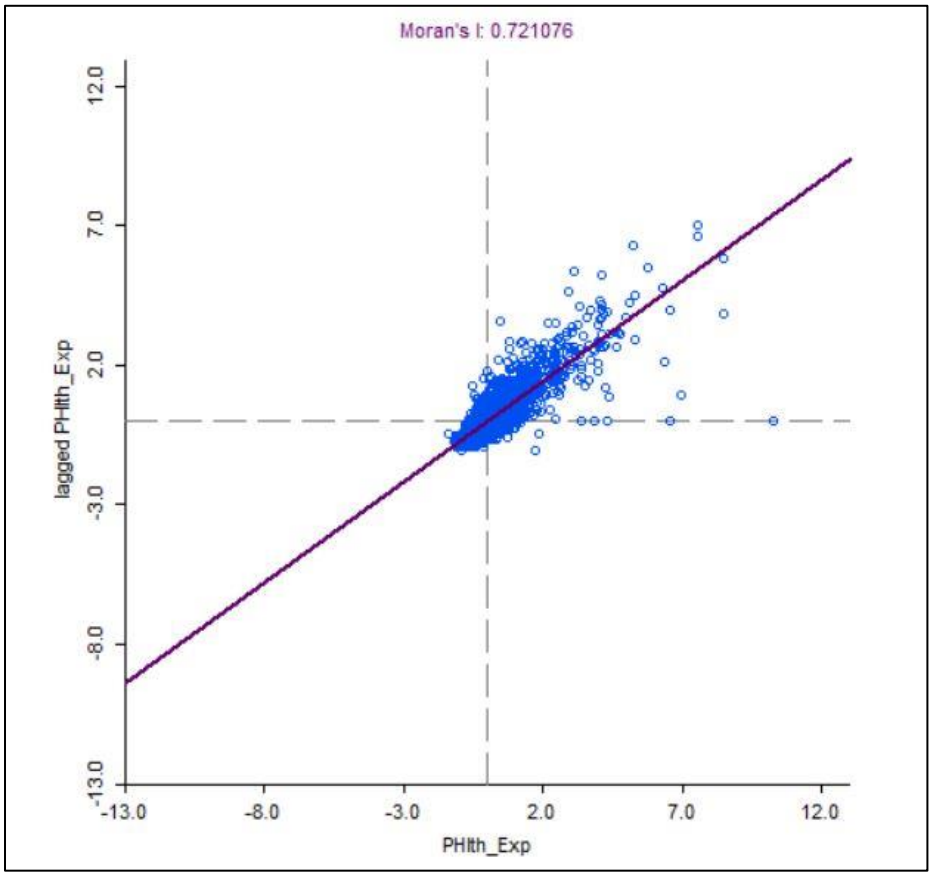
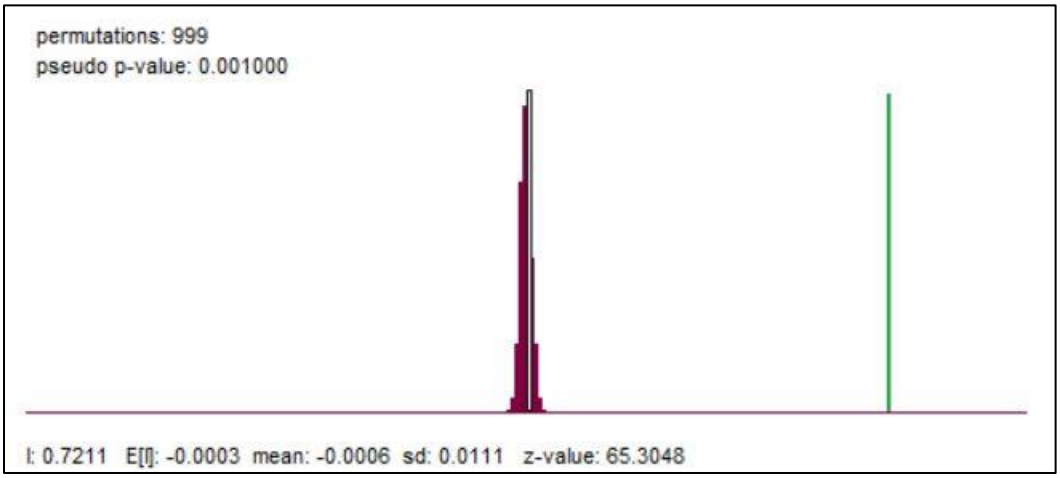
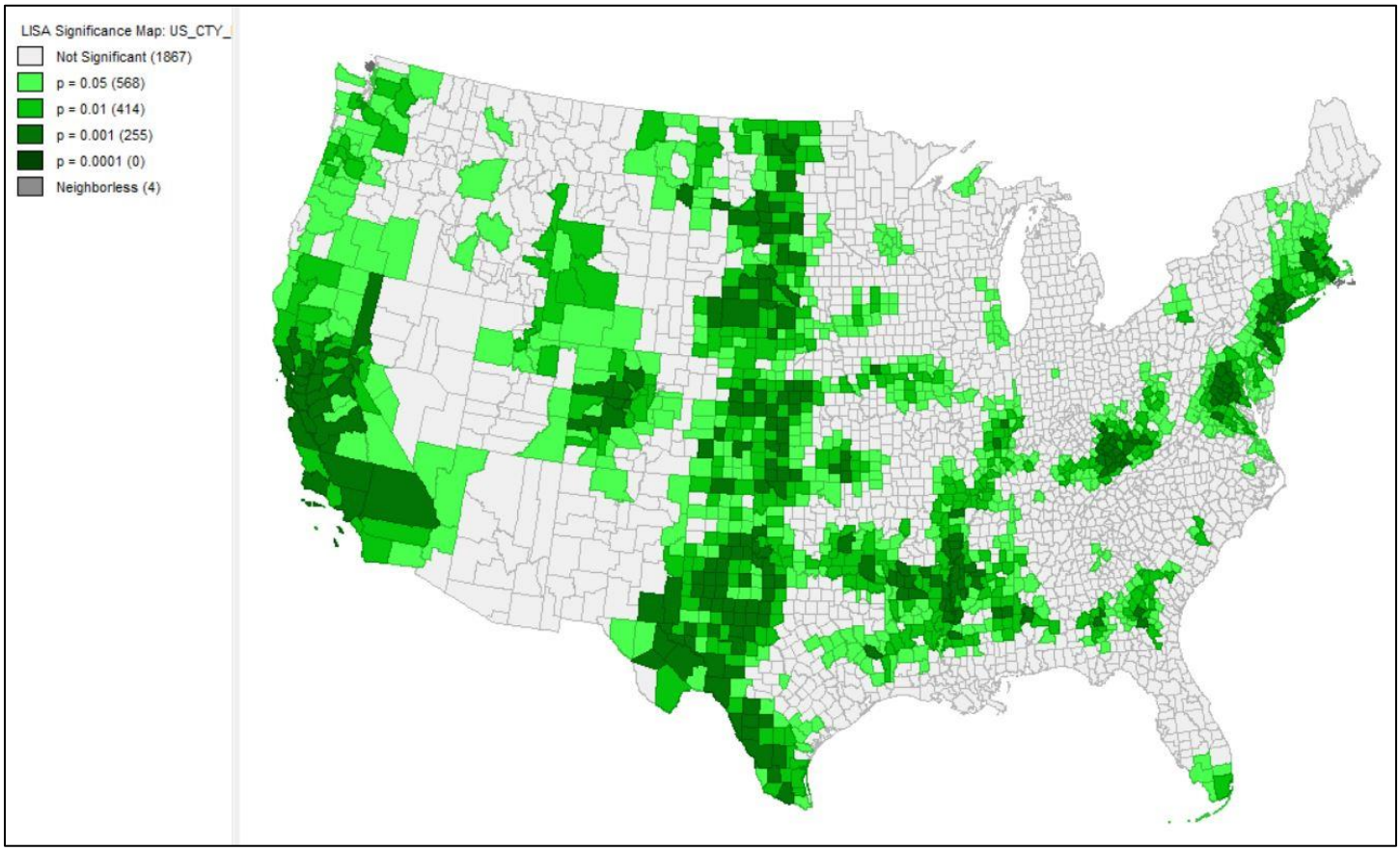
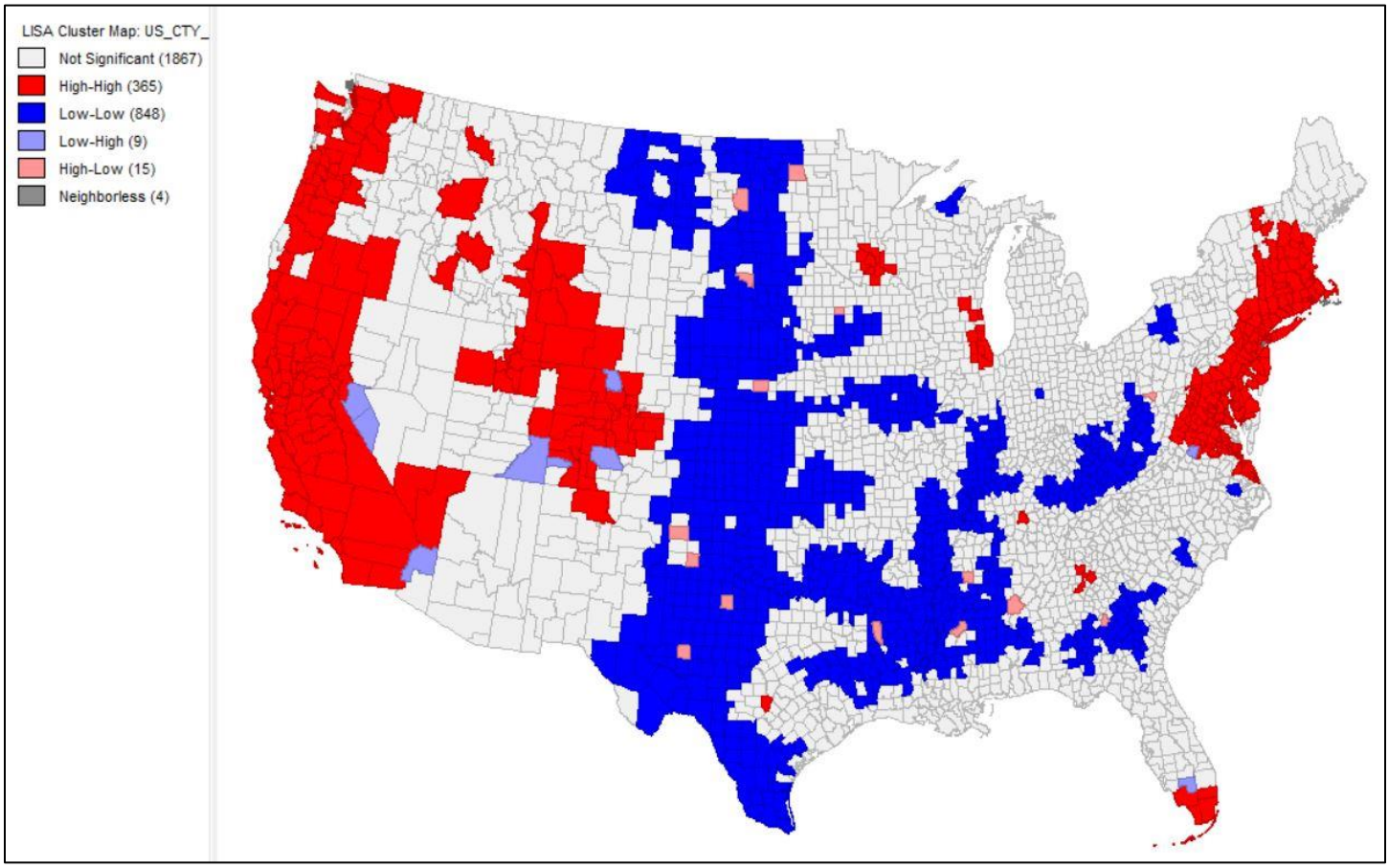


County-level preventative health expenditures in the United States are not randomly distributed, and show definitive clustering of areas of both high and low expenditures. There is a strong, positive relationship of spatial dependence between local and neighborhood expenditures, and the relationship is statistically significant. Significant spatial autocorrelation exists in both the error and lag residuals from running an OLS regression of the effects of poverty, BA degree, rurality, and race on preventative health expenditures. Including a spatial lag term in the model did not significantly help reduce residual clustering, however. After running a geographically weighted regression model to examine the spatially varying effect of the percent of the population with a BA degree on preventative health expenditures (while controlling for the percent of the population that is poor, rural, and white), the output and map show that spatial non-stationarity exists. The effect of the percent of the population with a BA degree varies across space, with weaker effects in the blue and white areas (like throughout the Midwest), and stronger effects in the red areas (like on the East and West coasts). Lastly, examining the results and map of local R^2 values, they indicate that the specified model fits best in the Western United States and along the East Coast, with about 79-100% of the variance accounted for. The model fits more poorly in the Midwest, with only about 40-68% of the variance accounted for. (See further maps and figures below.)


Moran's I: 0.721076
lagged PHlth_Exp
PHlth_Exp
12.0
7.0
2.0
-3.0
-8.0
-13.0
-13.0
-8.0
-3.0
2.0
7.0
12.0


permutations: 999
pseudo p-value: 0.001000
I: 0.7211 E[I]: -0.0003 mean: -0.0006 sd: 0.0111 z-value: 65.3048


LISA Significance Map: US_CTY_
Not Significant (1867)
p = 0.05 (568)
p = 0.01 (414)
p = 0.001 (255)
p = 0.0001 (0)
Neighborless (4)


LISA Cluster Map: US_CTY_
Not Significant (1867)
High-High (365)
Low-Low (848)
Low-High (9)
High-Low (15)
Neighborless (4)

```
SUMMARY OF OUTPUT: ORDINARY LEAST SQUARES ESTIMATION
Data set            :  US_CTY_PreventativeHealthExp
Dependent Variable  :   PHlth_Exp  Number of Observations: 3108
Mean dependent var  :      132089  Number of Variables   :    5
S.D. dependent var  :       83910  Degrees of Freedom    : 3103

R-squared           :    0.467266  F-statistic           :     680.417
Adjusted R-squared  :    0.466579  Prob(F-statistic)     :           0
Sum squared residual:1.16579e+013  Log likelihood        :    -38668.4
Sigma-square        :3.75696e+009  Akaike info criterion :     77346.8
S.E. of regression  :     61294.1  Schwarz criterion     :       77377
Sigma-square ML     :3.75092e+009
S.E of regression ML:     61244.7
```

Variable	Coefficient	Std.Error	t-Statistic	Probability
CONSTANT	-26201	6919.22	-3.7867	0.00016
PCT_RUR	112.569	44.3398	2.53878	0.01117
PCT_POV	2544.15	248.755	10.2275	0.00000
PCT_BA	8165.32	200.268	40.772	0.00000
PCT_WH	305.499	58.0591	5.26187	0.00000

REGRESSION DIAGNOSTICS

MULTICOLLINEARITY CONDITION NUMBER 15.362766

TEST ON NORMALITY OF ERRORS

TEST	DF	VALUE	PROB
Jarque-Bera	2	24952.9476	0.00000

DIAGNOSTICS FOR HETEROSKEDASTICITY
RANDOM COEFFICIENTS

TEST	DF	VALUE	PROB
Breusch-Pagan test	4	3022.4545	0.00000
Koenker-Bassett test	4	397.4008	0.00000

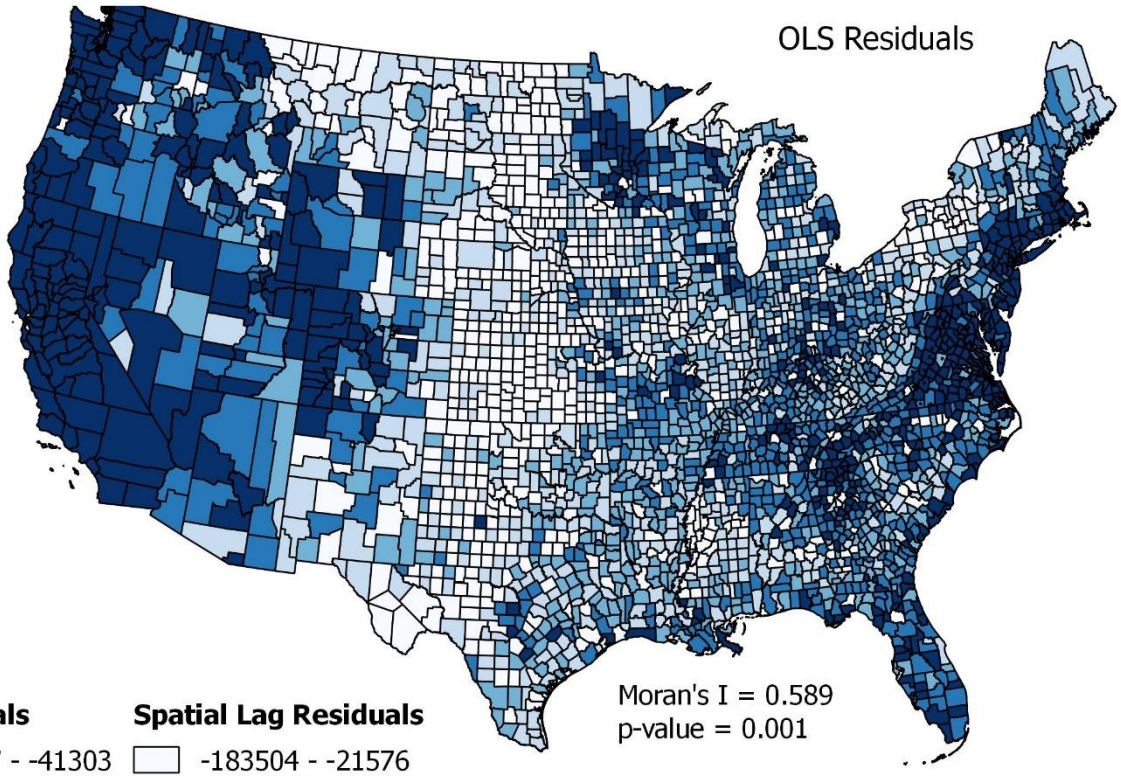
DIAGNOSTICS FOR SPATIAL DEPENDENCE
FOR WEIGHT MATRIX : US_CTY_PreventativeHealthExp2
(row-standardized weights)

TEST	MI/DF	VALUE	PROB
Moran's I (error)	0.5892	55.0005	0.00000
Lagrange Multiplier (lag)	1	2953.4979	0.00000
Robust LM (lag)	1	389.1359	0.00000
Lagrange Multiplier (error)	1	3000.8541	0.00000
Robust LM (error)	1	436.4920	0.00000
Lagrange Multiplier (SARMA)	2	3389.9899	0.00000

```
SUMMARY OF OUTPUT: SPATIAL LAG MODEL - MAXIMUM LIKELIHOOD ESTIMATION
Data set            : US_CTY_PreventativeHealthExp
Spatial Weight      : US_CTY_PreventativeHealthExp2
Dependent Variable  :   PHlth_Exp  Number of Observations: 3108
Mean dependent var  :      132089  Number of Variables   :    6
S.D. dependent var  :       83910  Degrees of Freedom    : 3102
Lag coeff.   (Rho)  :    0.712862

R-squared           :    0.792282  Log likelihood        :      -37389
Sq. Correlation     : -            Akaike info criterion :     74789.9
Sigma-square        :1.46252e+009  Schwarz criterion     :     74826.2
S.E of regression   :     38242.9

------------------------------------------------------------------------------
       Variable       Coefficient     Std.Error       z-value    Probability
------------------------------------------------------------------------------
       W_PHlth_Exp      0.712862      0.0107593        66.2553     0.00000
          CONSTANT      -56541.5        4329.18       -13.0606     0.00000
           PCT_RUR       172.649        27.7243        6.22735     0.00000
           PCT_POV       923.566        157.255        5.87306     0.00000
            PCT_BA       4891.77         139.49        35.0689     0.00000
            PCT_WH       149.135         37.022        4.02828     0.00006
------------------------------------------------------------------------------

REGRESSION DIAGNOSTICS
DIAGNOSTICS FOR HETEROSKEDASTICITY
RANDOM COEFFICIENTS
TEST                                    DF      VALUE        PROB
Breusch-Pagan test                      4      5461.3623     0.00000

DIAGNOSTICS FOR SPATIAL DEPENDENCE
SPATIAL LAG DEPENDENCE FOR WEIGHT MATRIX : US_CTY_PreventativeHealthExp2
TEST                                    DF      VALUE        PROB
Likelihood Ratio Test                   1      2558.8818     0.00000
```

Residuals Comparison: OLS vs Spatial Lag Results

Mallory Evans

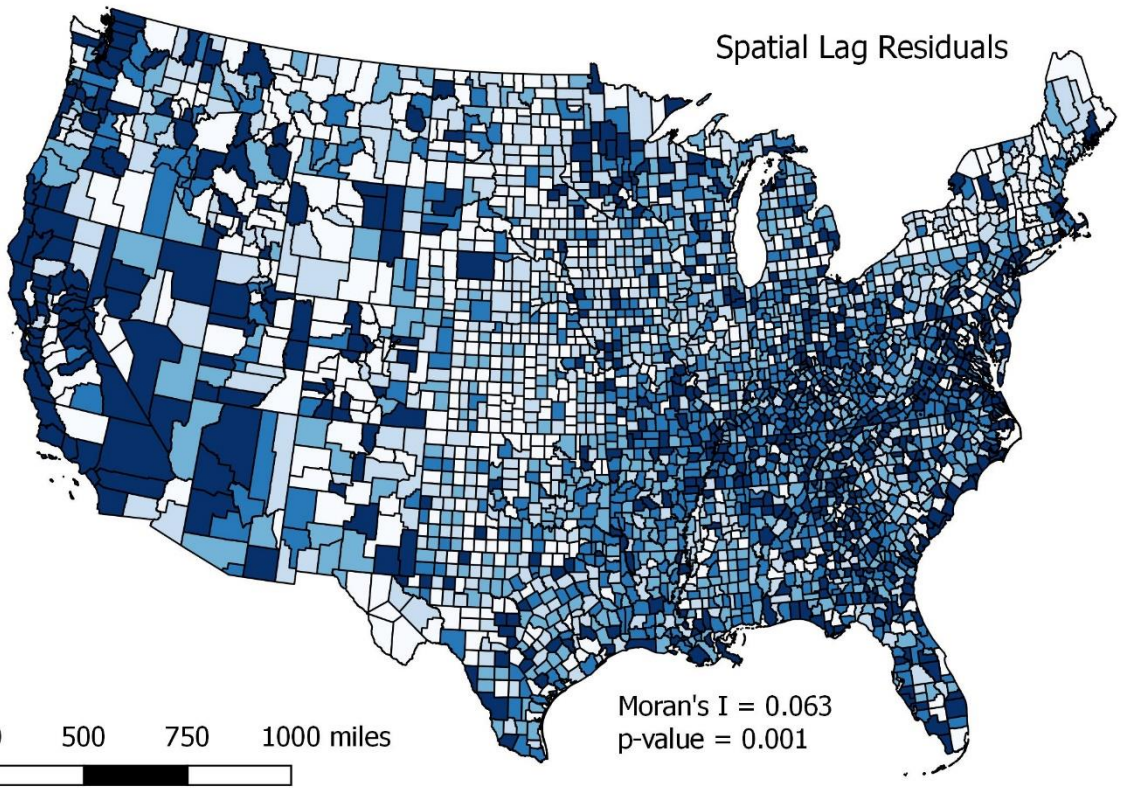


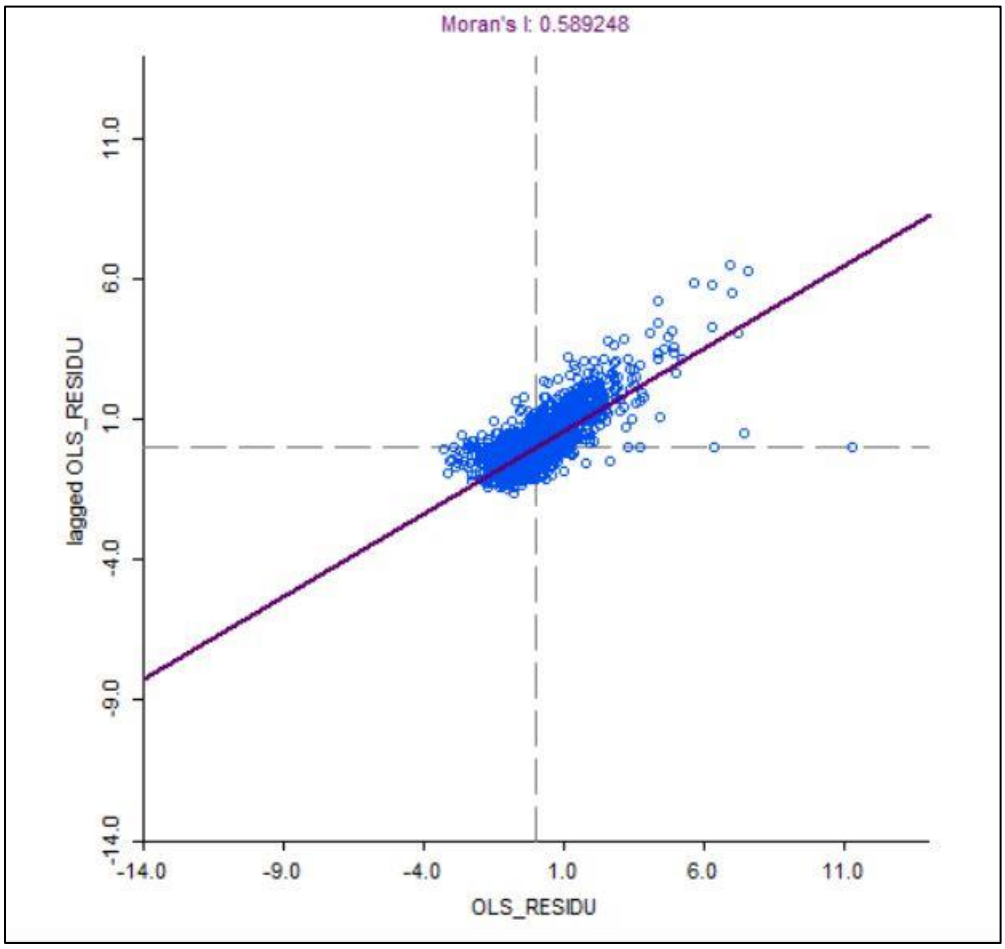
OLS Residuals

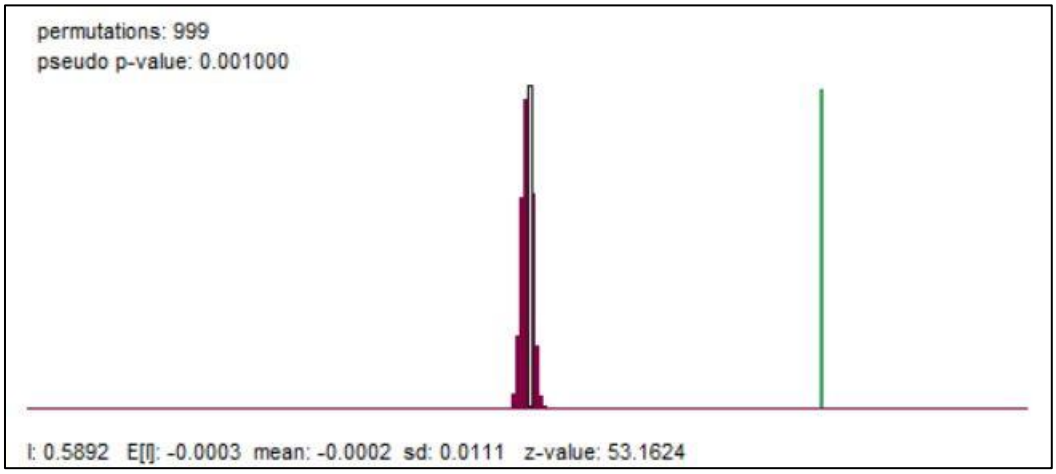
- -202767 - -41303
- -41303 - -15470
- -15470 - 4659
- 4659 - 30345
- 30345 - 691711

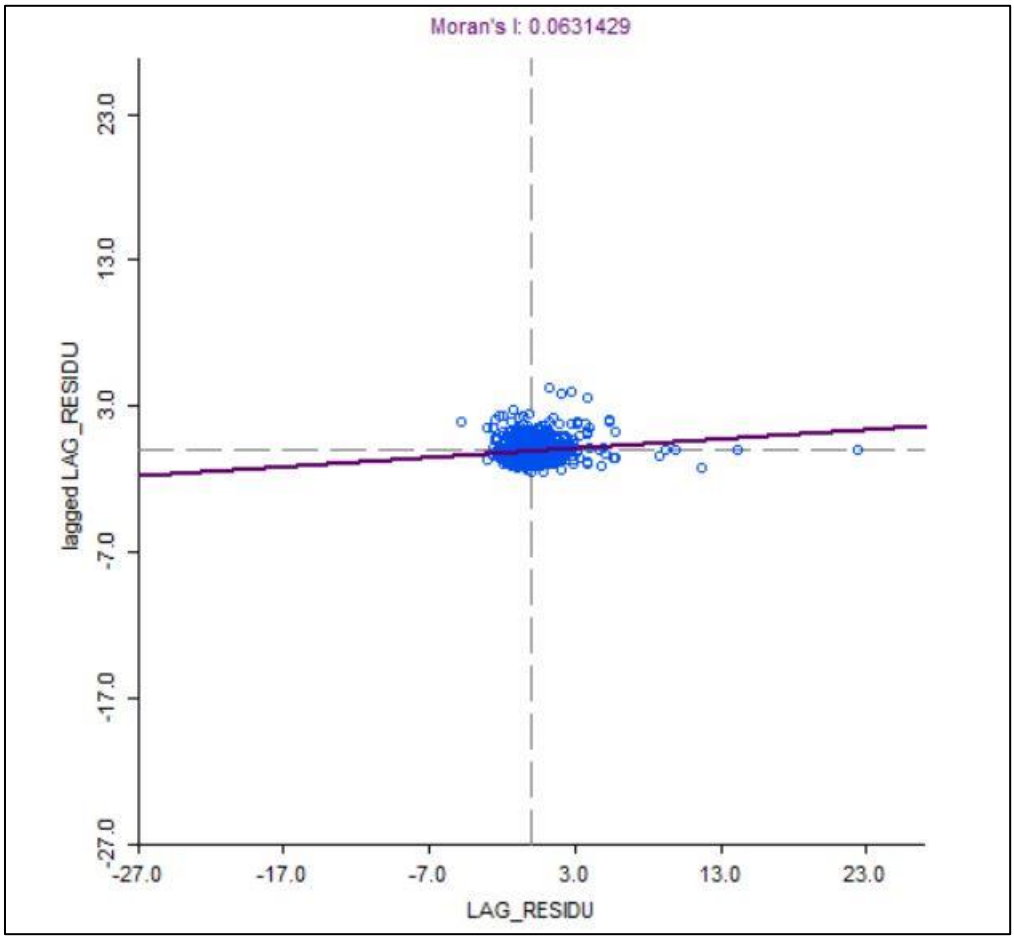
Spatial Lag Residuals

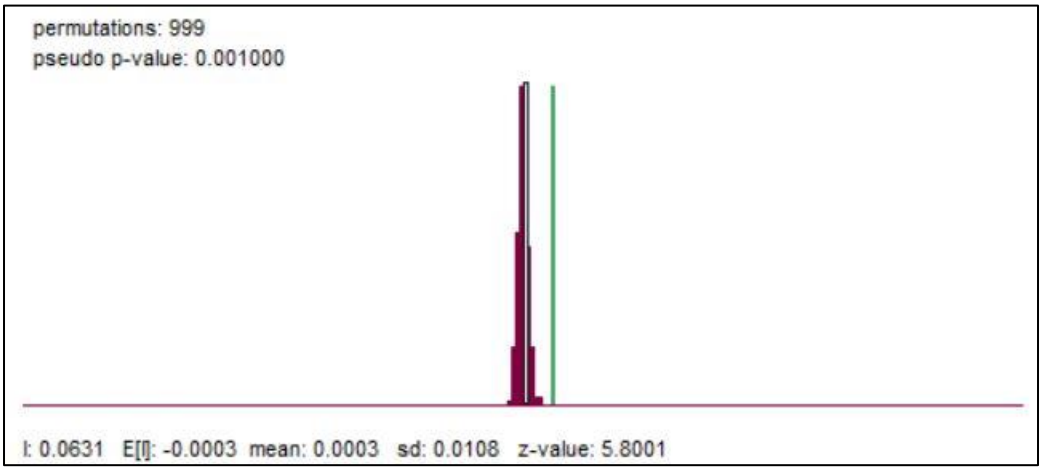
- -183504 - -21576
- -21576 - -6669
- -6669 - 4129
- 4129 - 16444
- 16444 - 857741




Moran's I: 0.589248
lagged OLS_RESIDU
OLS_RESIDU
11.0
6.0
1.0
-4.0
-9.0
-14.0
-14.0
-9.0
-4.0
1.0
6.0
11.0


permutations: 999
pseudo p-value: 0.001000
I: 0.5892 E[I]: -0.0003 mean: -0.0002 sd: 0.0111 z-value: 53.1624


Moran's I: 0.0631429
lagged LAG_RESIDU
23.0
13.0
3.0
-7.0
-17.0
-27.0
-27.0
-17.0
-7.0
3.0
13.0
23.0
LAG_RESIDU


permutations: 999
pseudo p-value: 0.001000
I: 0.0631 E[I]: -0.0003 mean: 0.0003 sd: 0.0108 z-value: 5.8001

Spatially Varying GWR (Local) Regression Results:
Model Fit and % BA Degree Effect Predicting Preventative Health Expenditures

Mallory Evans