



# **Reducing geographic disparities: Can local breast cancer data identify where to target screening?**

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# The burden of breast cancer in Missouri

**882 deaths per year**



764 white women (22.7 / 100,000)      111 Black women (32.4 / 100,000)

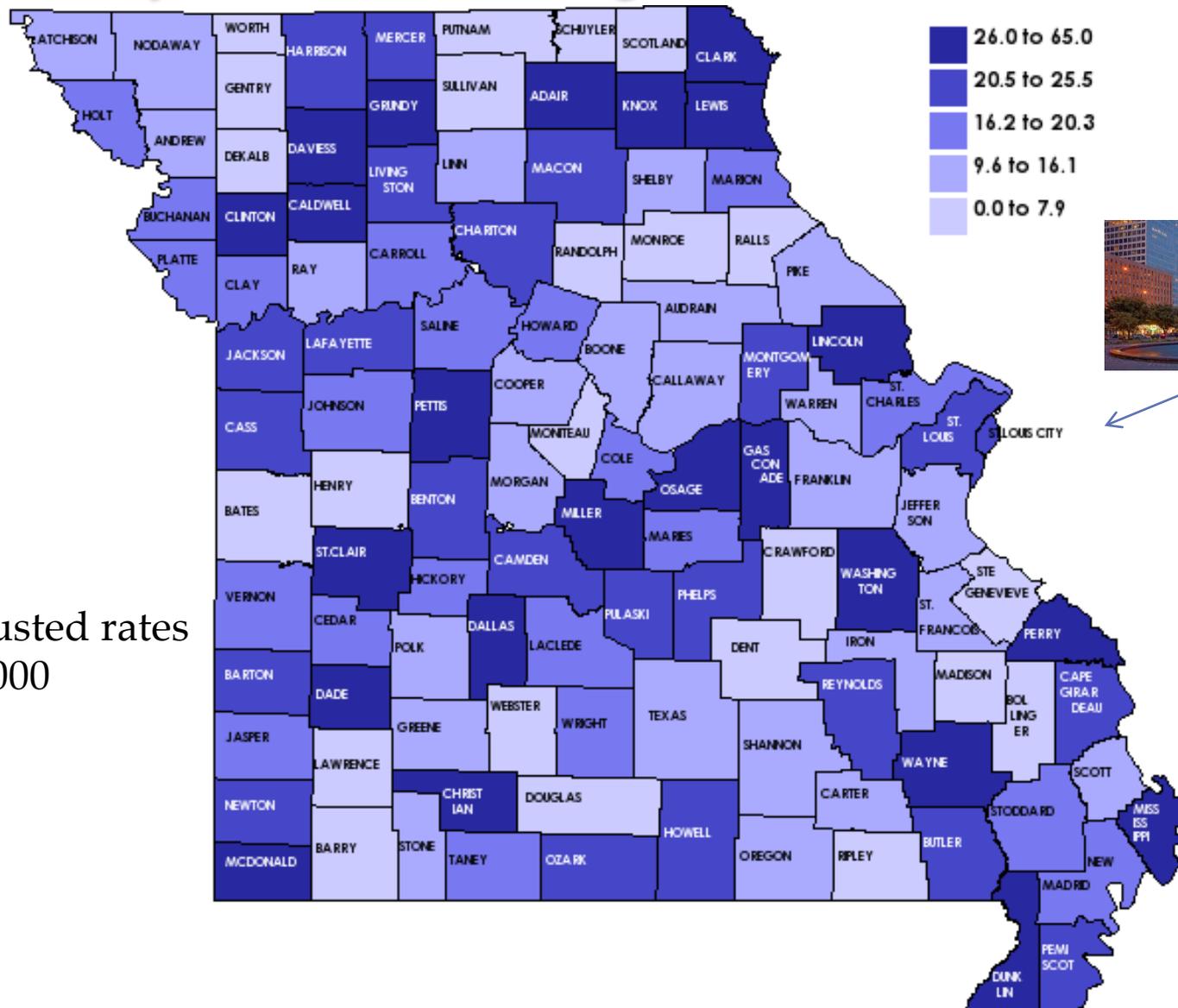
**5,428 new cases (in situ & invasive) per year**



4,761 white women (150.8 / 100,000)      593 Black women (170.1 / 100,000)



# Important geographic variability in breast cancer mortality rate, women aged 45-64, 2008-2011.





# Study purpose: Where to increase screening?





# Data sources

- 2008-2011 Missouri Cancer Registry – breast cancer incidence
- 2010 American Community Survey – social determinants
- Location of FDA-accredited mammography facilities
- Location of Show-Me-Healthy-Women program



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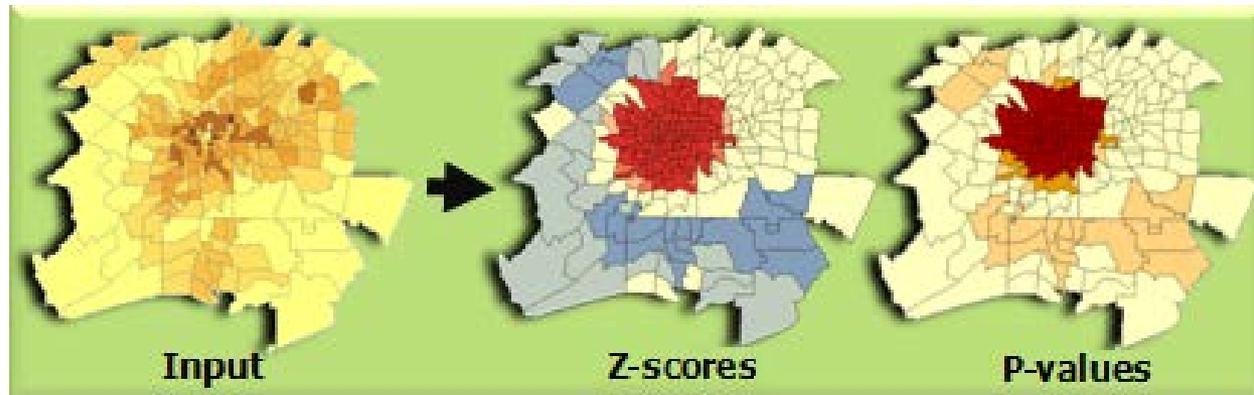


# Study population

Missouri women aged 40-64 diagnosed with primary breast cancer (in situ or invasive)



# Statistical analysis



Getis-Ord  $G_i^*$  test for spatial autocorrelation

**Table 1. Stage distribution of breast cancers, 2008-2011.**

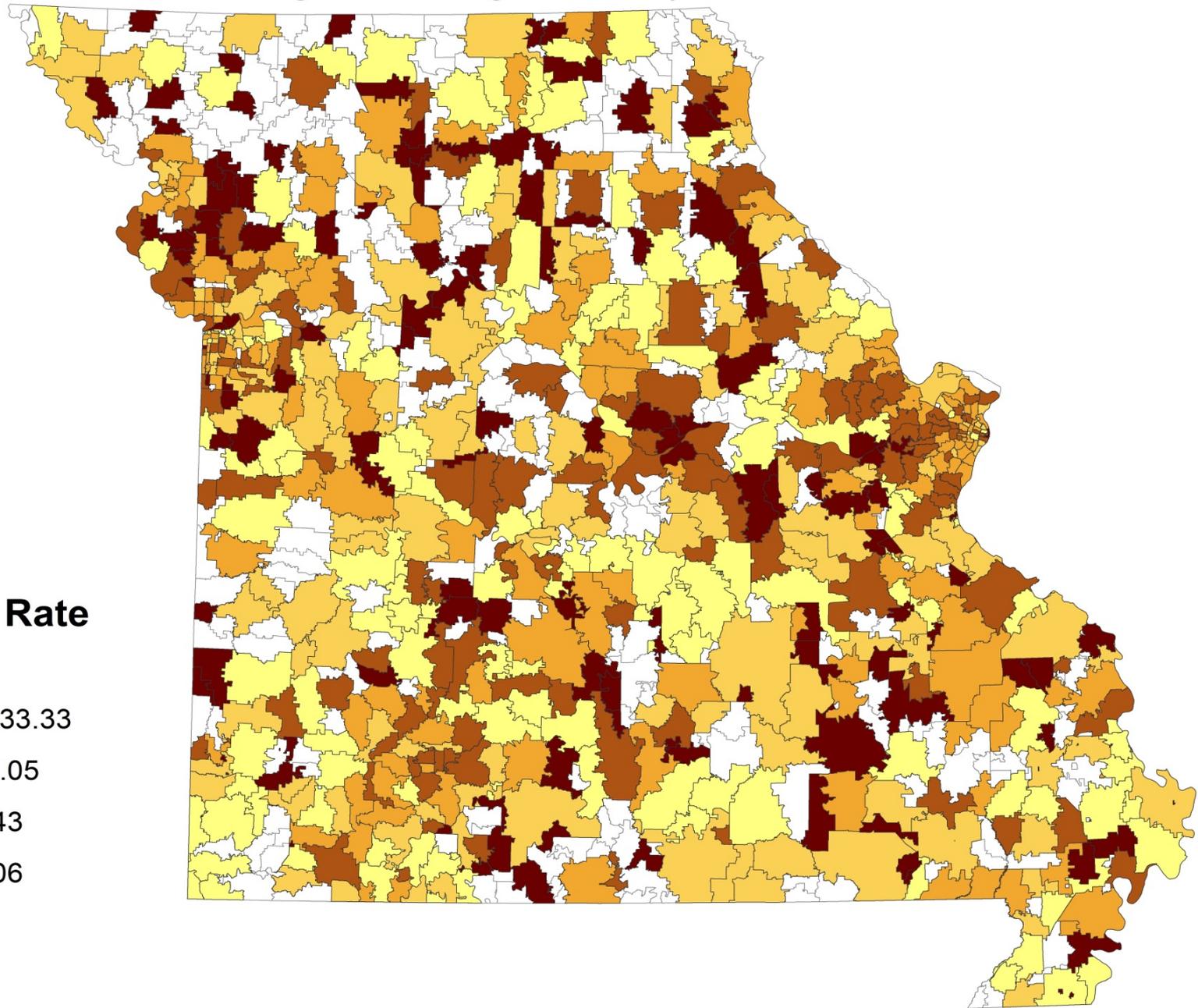
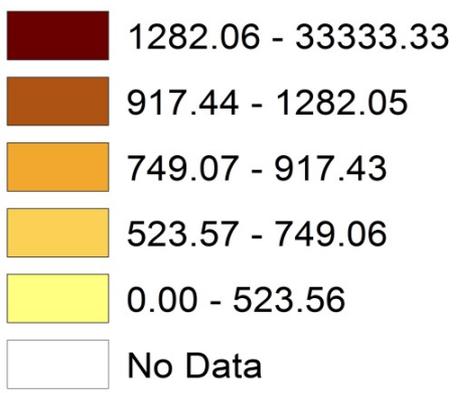
<b>Stage</b>	<b>Frequency</b>	<b>(%)</b>
<b>In situ</b>	1,865	19.3
<b>Localized</b>	4,610	47.3
<b>Regional</b>	2,703	27.8
<b>Distant</b>	483	5.0
<b>Unknown</b>	78	0.8
<b>TOTAL</b>	<b>9,739</b>	<b>100.0</b>

**Table 2. Racial distribution of breast cancers, 2008-2011.**

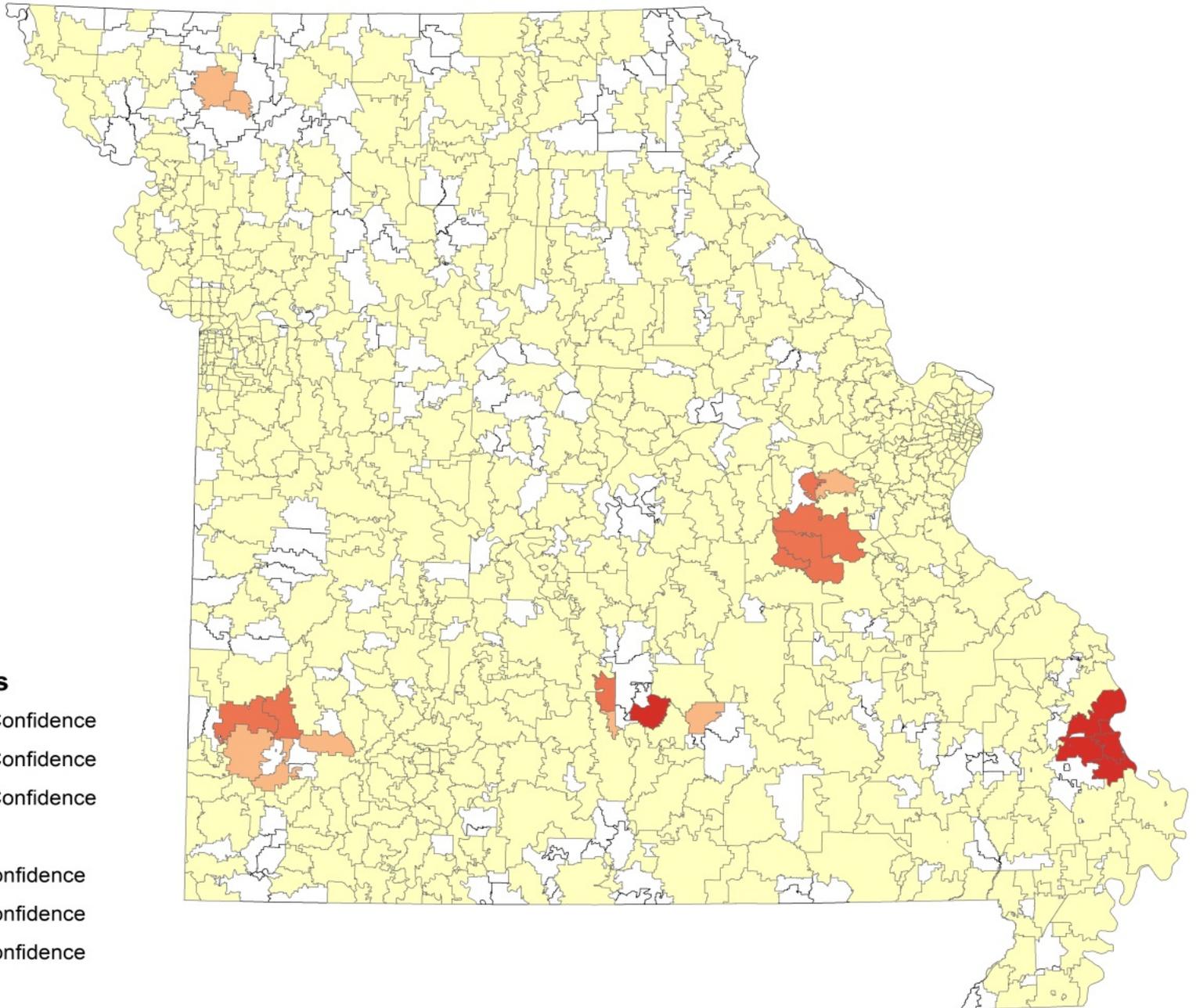
<b>Race</b>	<b>Frequency</b>	<b>(%)</b>
<b>White</b>	8,371	86.0
<b>Black</b>	1,199	12.3
<b>Asian/Pacific Islander</b>	103	1.1
<b>Am. Indian/Alaskan Native</b>	6	0.1
<b>Other, unspecified</b>	41	0.4
<b>Unknown</b>	19	0.2

# Early Stage Breast Cancer Rates by Quintile Among Women Aged 40-64 years

## Breast Cancer Rate (per 100,000)



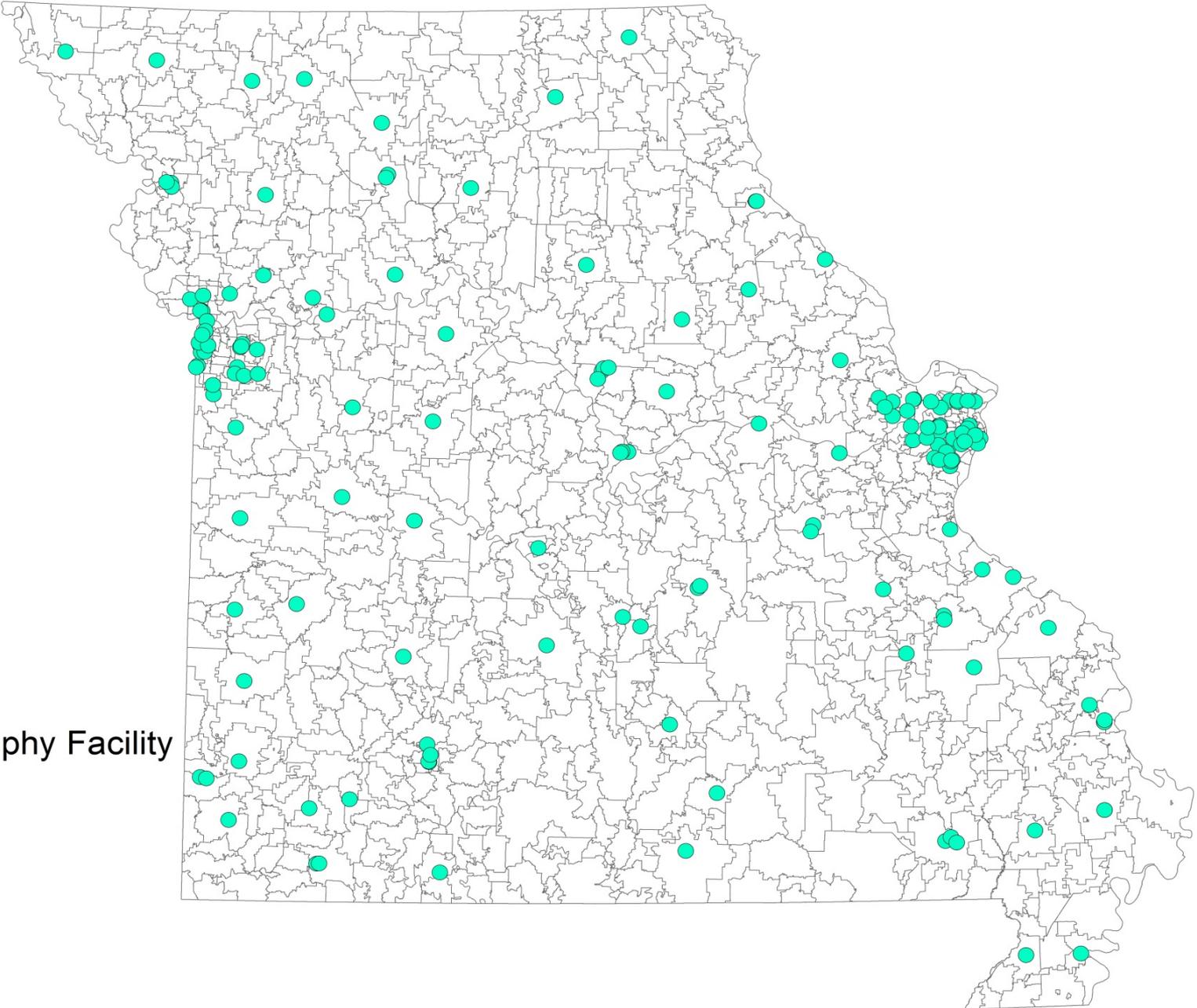
# Early Stage Breast Cancer Rates - Hot Spot Analysis



## Hot and Cold Spots

- Cold Spot - 99% Confidence
- Cold Spot - 95% Confidence
- Cold Spot - 90% Confidence
- Not Significant
- Hot Spot - 90% Confidence
- Hot Spot - 95% Confidence
- Hot Spot - 99% Confidence
- No Data

# Location of Mammography Facilities

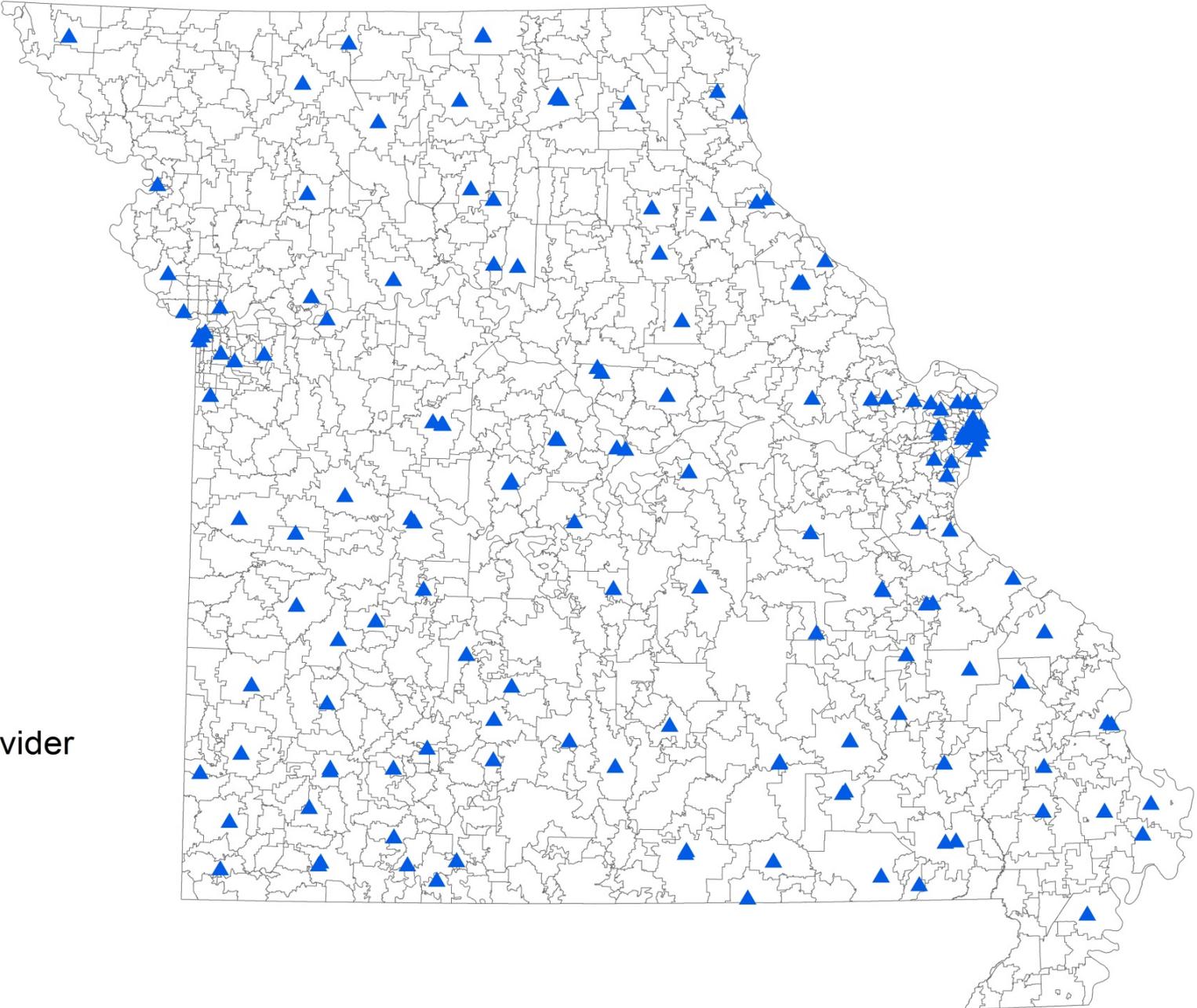


## Legend

 Mammography Facility

 Zip Codes

# Location of SMHW Providers

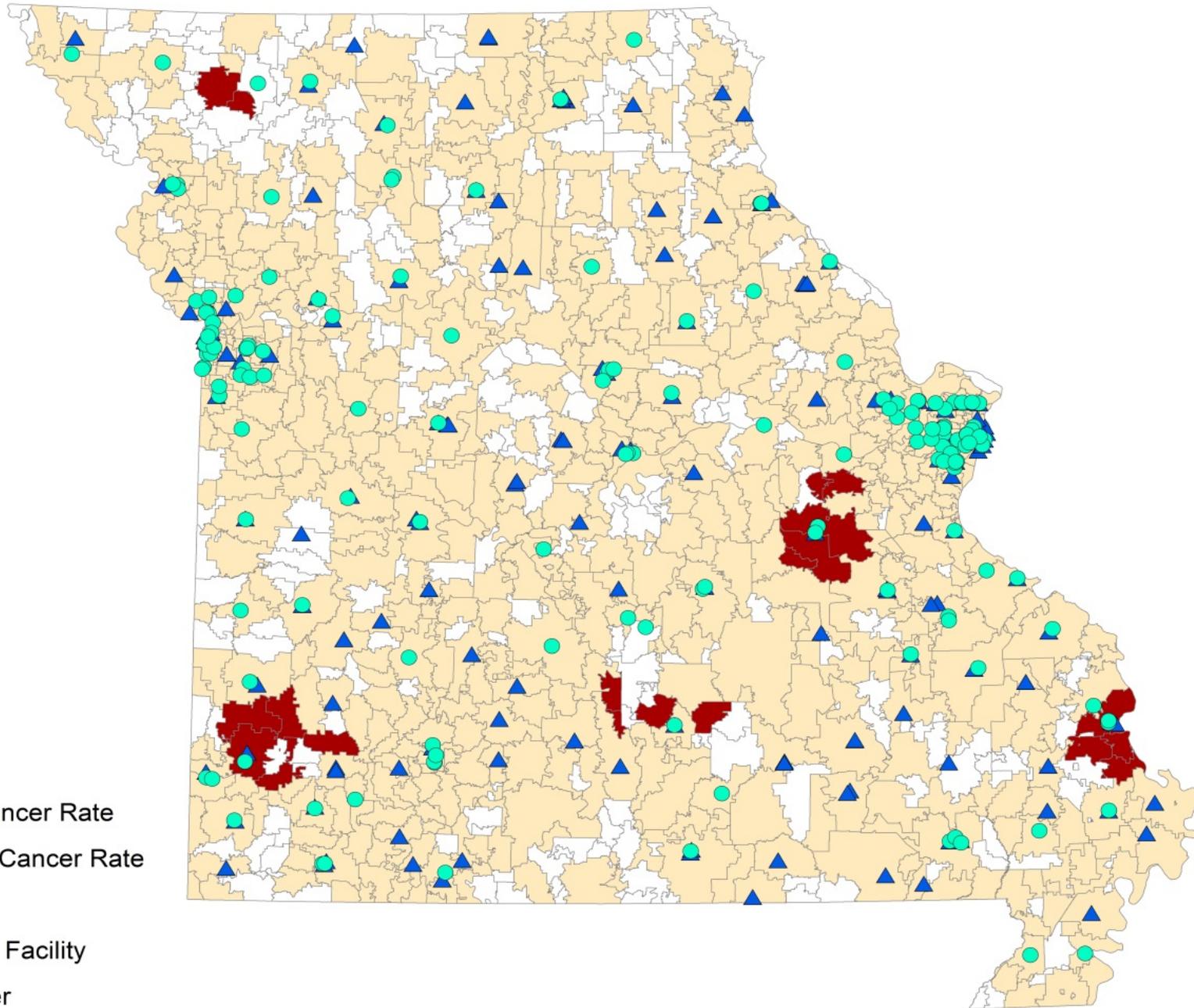


## Legend

▲ SMHW Provider

□ Zip Codes

# Early Stage Breast Cancer

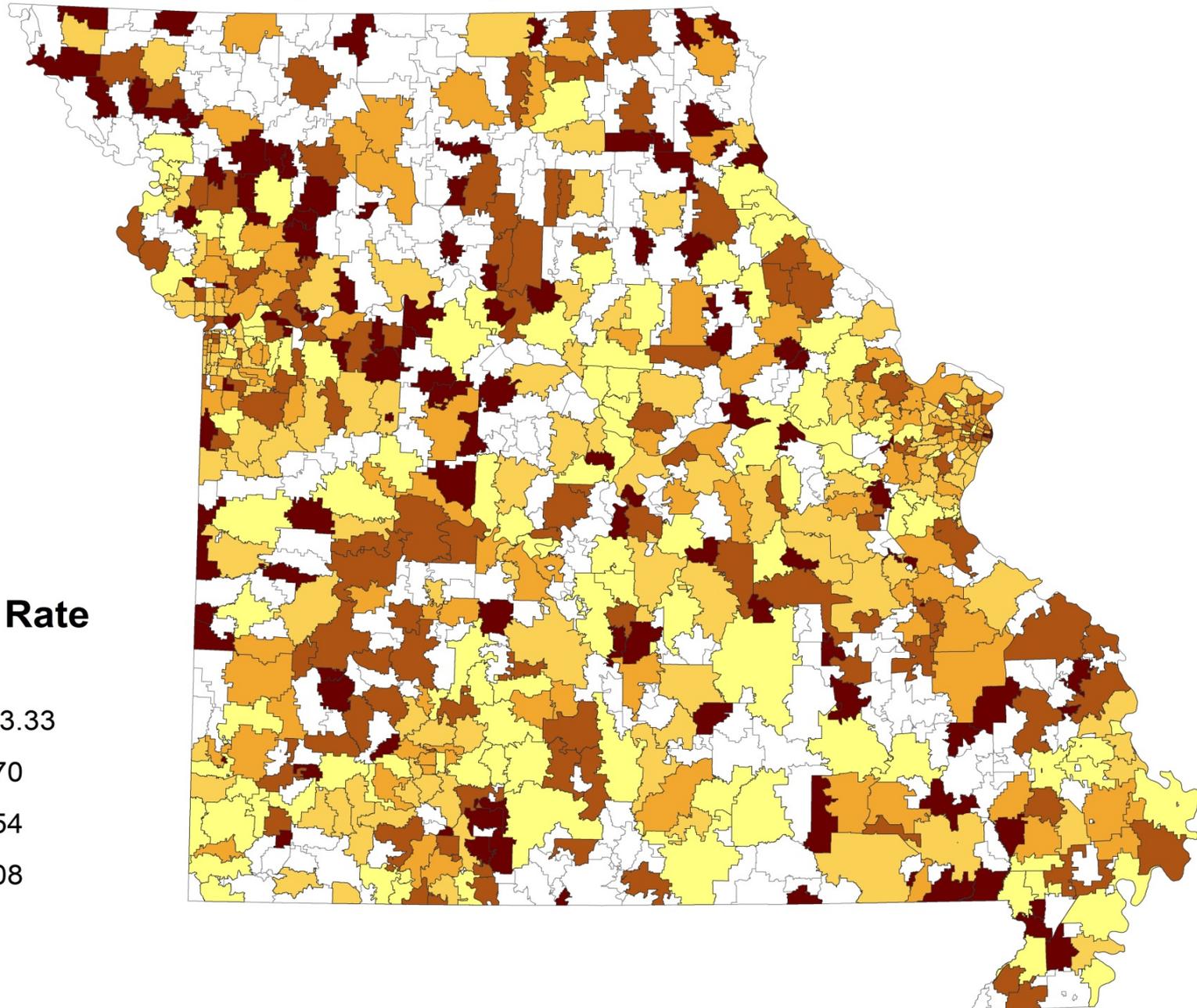
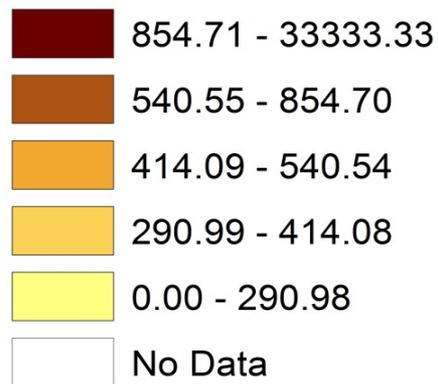


## Legend

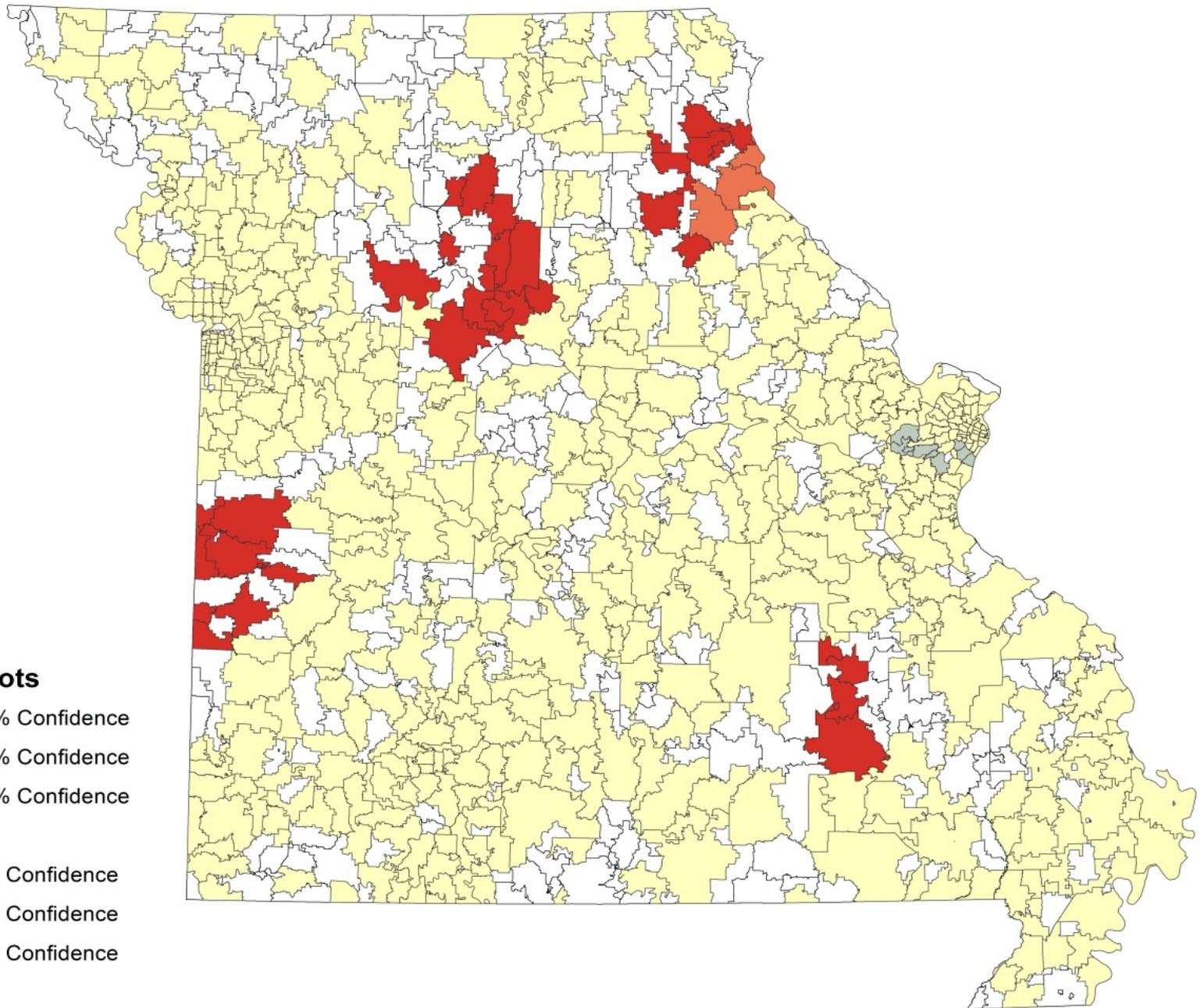
-  High Breast Cancer Rate
-  Normal Breast Cancer Rate
-  No Data
-  Mammography Facility
-  SMHW Provider

# Late Stage Breast Cancer Rates by Quintile Among Women Aged 40-64 years

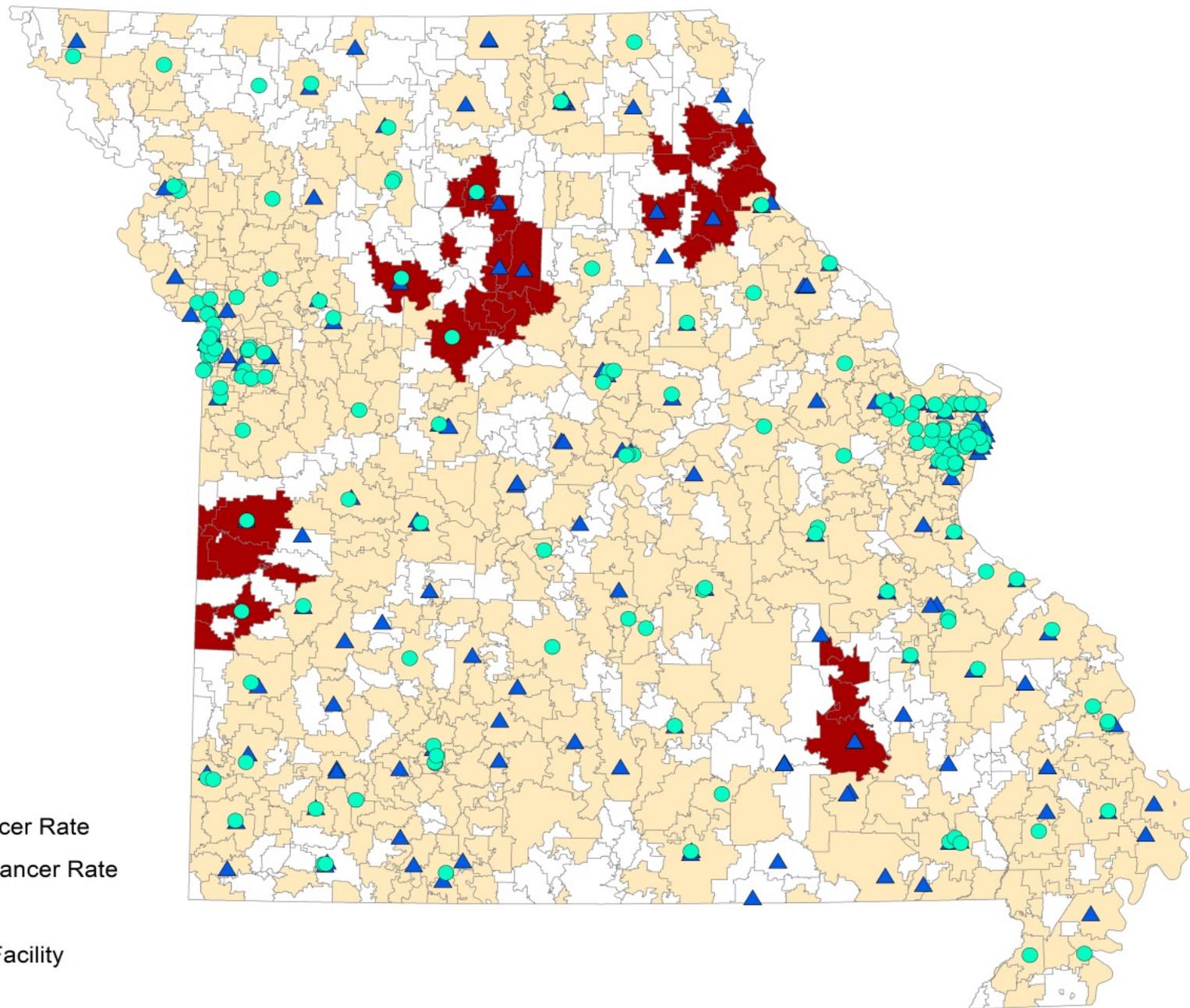
## Breast Cancer Rate (per 100,000)



# Late Stage Breast Cancer Rates - Hot Spot Analysis



# Late Stage Breast Cancer



## Legend

-  High Breast Cancer Rate
-  Normal Breast Cancer Rate
-  No Data
-  Mammography Facility
-  SMHW Provider



**Table 3a. Characteristics of zip codes with statistically higher early-stage and late-stage breast cancer rates versus other Missouri zip codes.**

<b>Characteristic</b>	<b>High early-stage breast cancer rates (n=16)</b>	<b>High late-stage breast cancer rates (n=39)</b>	<b>Remaining Missouri zip codes (n=974)</b>	
	Mean (SD)	Mean (SD)	Mean (SD)	P value
Poverty rate	17.4 (8.9)	15.8 (8.2)	16.8 (11.2)	0.815
Population graduated HS or GED (%)	40.7 (14.7)	44.9 (10.6)	39.6 (12.4)	<b>0.031</b>
% without a car	5.3 (3.9)	4.5 (3.6)	5.9 (6.0)	0.342
% African Americans	2.0 (5.0)	1.9 (2.8)	4.8 (14.1)	0.326
% in urban area	68.8 (39.5)	89.9 (24.1)	75.5 (38.8)	<b>0.053</b>
% owner-occupied housing	76.4 (13.7)	78.2 (9.7)	75.5 (15.3)	0.544



**Table 3b. Characteristics of zip codes with statistically higher early-stage and late-stage breast cancer rates versus other Missouri zip codes.**

<b>Characteristic</b>	<b>High early-stage breast cancer rates (n=16)</b>	<b>High late-stage breast cancer rates (n=39)</b>	<b>Remaining Missouri zip codes (n=974)</b>	
	Mean (SD)	Mean (SD)	Mean (SD)	P value
<b>% female-headed households</b>	9.0 (6.2)	8.6 (6.1)	10.0 (7.8)	0.463
<b>% unemployment</b>	7.3 (4.4)	9.0 (8.5)	9.2 (7.8)	0.612
<b>Distance to nearest mammography facility (miles)</b>	9.3 (4.7)	17.1 (9.1)	12.1 (7.7)	<b>&lt;0.001</b>
<b>Distance to nearest SMHW provider (miles)</b>	9.2 (5.2)	11.0 (6.7)	11.0 (7.1)	0.594



# Implications

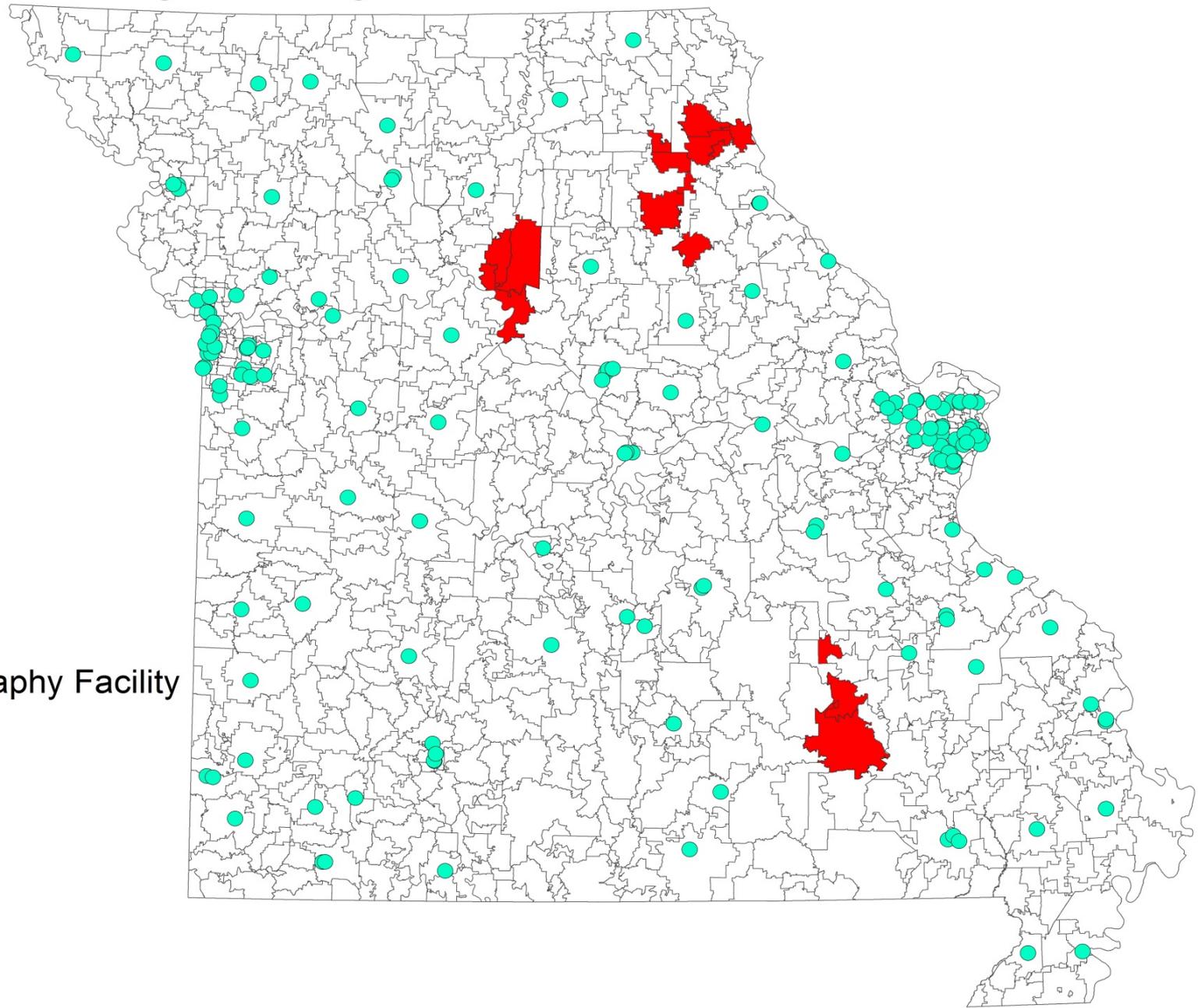
Geotarget: Increase breast cancer screening in 39 zip codes with high late-stage breast cancer rates (especially 17 with required travel >30 miles)



# Distance to Nearest Mammography Facility Among High Late Stage Breast Cancer ZIP Codes

## Legend

-  Mammography Facility
-  >30 miles
-  <30 miles



# Implications

Reduce distance to nearest mammography facility





# Limitations

- Late-stage breast cancer may also be increased because of local use of advanced clinical approaches to detect metastases
- Travel patterns of mobile mammography vans not available
- The use of zip codes



# Conclusions

Local breast cancer data can be used to identify areas of reduced screening, especially in conjunction with other data sources