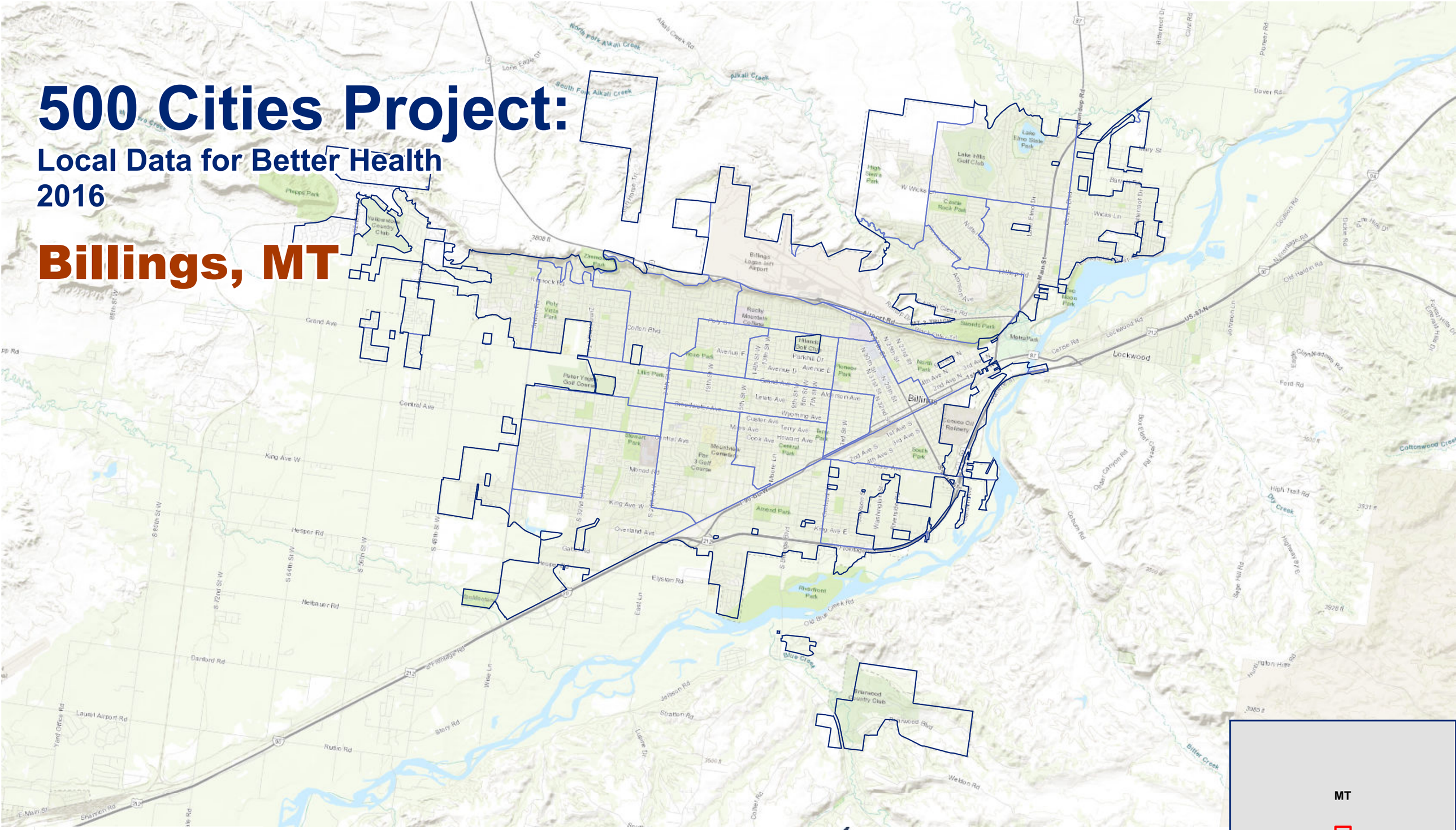
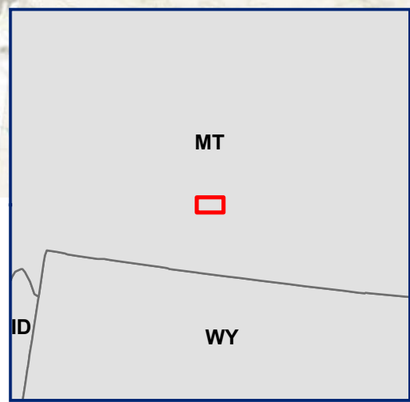
500 Cities Project:

Local Data for Better Health
2016

Billings, MT





500 Cities: Local data for better health

Robert Wood Johnson Foundation

CDC Foundation
Together our impact is greater

Centers for Disease Control and Prevention,
National Center for Chronic Disease Prevention and Health Promotion,
Division of Population Health, Epidemiology and Surveillance Branch
(CDC/NCCDPHP/DPH/ESB)

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September, 2018

Introduction:

The 500 Cities Project – Better Health Through Local Data – is a collaboration between the Robert Wood Johnson Foundation, the CDC Foundation, and the Centers for Disease Control and Prevention (CDC). The purpose of the project is to provide high quality small area estimates for behavioral risk factors that influence health status; for health outcomes; and the use of clinical preventive services. These estimates can be used to identify emerging health problems and to inform development and implementation of effective, targeted public health prevention activities.

Data sources:

The CDC Behavioral Risk Factor Surveillance System 2015, 2016 data. The Census Bureau 2010 census population data, American Community Survey 2011-2015 and 2012-2016 estimates. Esri ArcGIS Online basemaps.

Methodology:

CDC used small area estimation (SAE) methodology called multi-level regression and poststratification (MRP) that links geocoded health surveys and high spatial resolution population demographic and socioeconomic data to produce local level health-related estimates. This approach also accounts for the associations between individual health outcomes, individual characteristics, and spatial contexts and factors at multiple levels (e.g. state, county); predicts individual disease risk and health behaviors in a multi-level modeling framework, and estimates the geographic distributions of population disease burden and health behaviors at city and census tract levels.

Further information on the small area estimation methodology can be obtained from:

- Multilevel Regression and Poststratification for Small-Area Estimation of Population Health Outcomes: A Case Study of Chronic Obstructive Pulmonary Disease Prevalence Using the Behavioral Risk Factor Surveillance System.[PDF-5.53MB]
- Validation of Multilevel Regression and Poststratification Methodology for Small Area Estimation of Health Indicators from the Behavioral Risk Factor Surveillance System.
- Comparison of Methods for Estimating Prevalence of Chronic Diseases and Health Behaviors for Small Geographic Areas: Boston Validation Study, 2013

Limitations:

All data presented in this map book are model-based estimates that reflect the statistically expected prevalence of each measure. These small area estimates tend to have narrow confidence ranges and may underestimate some areas with high prevalence or overestimate some areas with low prevalence. Because the small area model cannot detect effects due to local interventions, these model-based local estimates should not be used to evaluate the effect of local public health programs, policies, or interventions.

For more information please refer to http://www.cdc.gov/500cities/.

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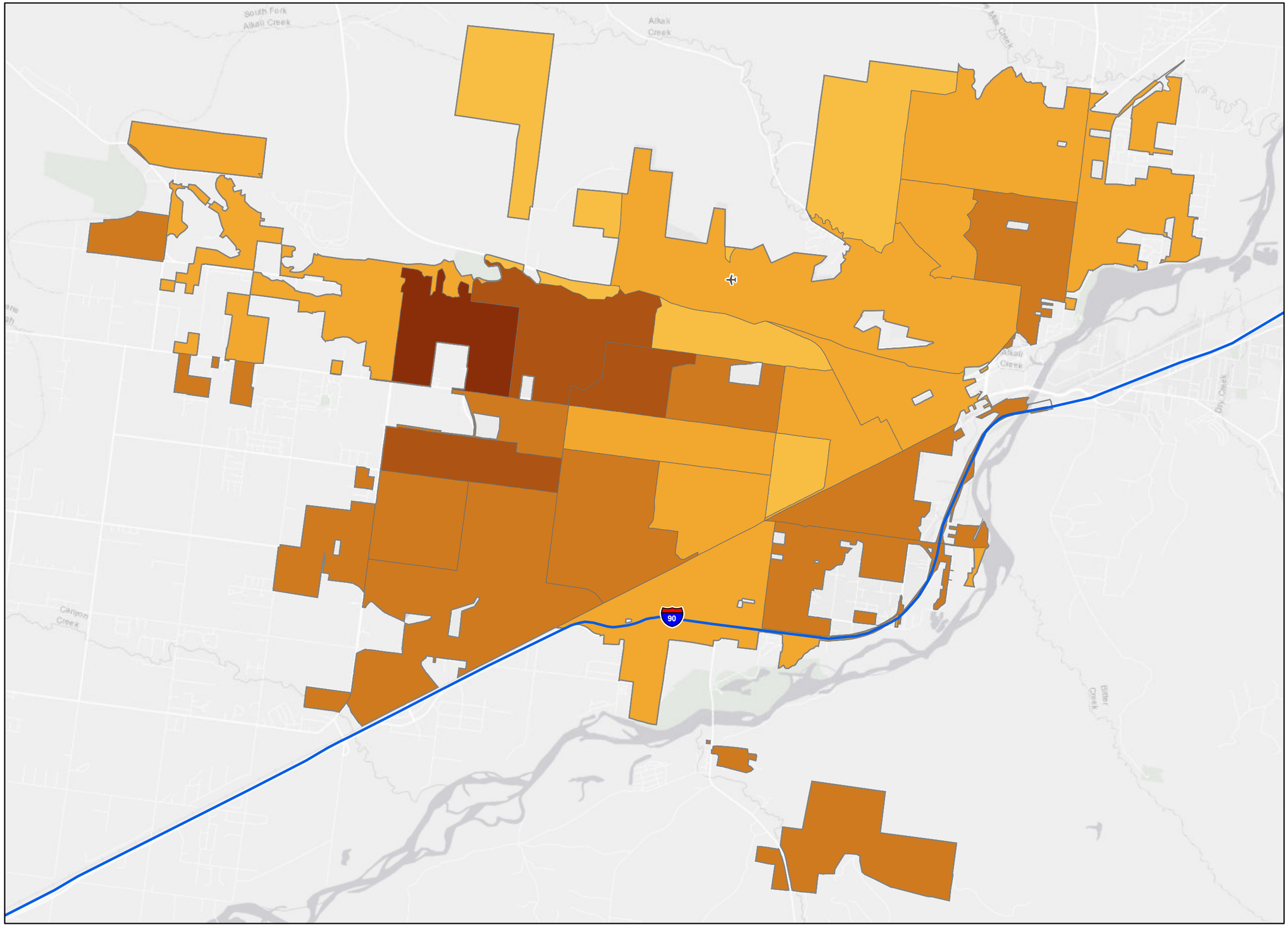
Four of the measures were not included in the 2016 BRFSS, therefore 2015 estimates are presented here. For details on measure definitions, please refer to: https://www.cdc.gov/500cities/measure-definitions.htm.

CDC/NCCDPHP/DPH/ESB September 26, 2018

Measure	Crude (%)			Age-adjusted (%)			State Age-adjusted	US Age-adjusted	Footnotes
	Prevalence	Lower 95% CI	Upper 95% CI	Prevalence	Lower 95% CI	Upper 95% CI	Prevalence (%)	Prevalence (%)	
Billings MT									
Arthritis among adults aged >=18 years	**26.4**	26.1	26.7	**24.5**	24.2	24.8	**24.0**	**23.0**	
Current asthma prevalence among adults aged >=18 years	**9.1**	9.0	9.2	**9.1**	9.0	9.2	**8.4**	**8.8**	
Cancer (excluding skin cancer) among adults aged >=18 years	**7.3**	7.2	7.4	**6.7**	6.6	6.8	**7.1**	**5.9**	
High blood pressure among adults aged >=18 years	**28.8**	28.5	29.1	**26.9**	26.7	27.2	**25.3**	**29.4**	
High cholesterol among adults aged >=18 years who have been screened in the past 5 years	**32.6**	32.3	32.9	**27.3**	27.1	27.5	**26.6**	**31.1**	
Diagnosed diabetes among adults aged >=18 years	**8.8**	8.6	9.0	**8.2**	8.0	8.3	**6.7**	**9.6**	
Chronic kidney disease among adults aged >=18 years	**2.7**	2.7	2.8	**2.6**	2.5	2.6	**2.2**	**2.7**	
Chronic obstructive pulmonary disease among adults aged >=18 years	**6.2**	6.1	6.5	**5.9**	5.7	6.1	**6.5**	**6.0**	
Coronary heart disease among adults aged >=18 years	**6.3**	6.1	6.4	**5.6**	5.5	5.7	**5.1**	**5.8**	
Stroke among adults aged >=18 years	**3.0**	2.9	3.1	**2.8**	2.7	2.8	**2.7**	**2.9**	
Physical health not good for >=14 days among adults aged >=18 years	**11.7**	11.5	12.0	**11.4**	11.1	11.6	**11.2**	**11.5**	
Mental health not good for >=14 days among adults aged >=18 years	**11.6**	11.4	11.9	**11.8**	11.6	12.1	**10.6**	**11.9**	
All teeth lost among adults aged >=65 years	**14.0**	12.6	15.5	**13.9**	12.7	15.3	**14.0**	**15.0**	
Current lack of health insurance among adults aged 18-64 years	**12.1**	11.7	12.6	**12.4**	11.9	12.9	**12.4**	**14.6**	
Visits to doctor for routine checkup within the past year among adults aged >=18 years	**66.1**	65.9	66.3	**65.0**	64.8	65.2	**63.4**	**69.7**	
Visits to dentist or dental clinic among adults aged >=18 years	**66.4**	65.6	67.2	**66.2**	65.5	67.1	**65.3**	**65.3**	
Taking medicine for high blood pressure control among adults aged >=18 years with high blood pressure	**74.1**	73.9	74.4	**54.9**	54.7	55.1	**60.0**	**57.7**	
Cholesterol screening among adults aged >=18 years	**71.9**	71.4	72.3	**71.0**	70.5	71.4	**69.6**	**75.2**	
Mammography use among women aged 50-74 years	**76.1**	75.4	76.8	**72.2**	71.3	72.9	**72.6**	**77.7**	
Papanicolaou smear use among adult women aged 21-65 years	**82.9**	82.3	83.4	**79.3**	78.7	80.0	**80.5**	**80.3**	US value based on states available from BRFSS 2016
Fecal occult blood test, sigmoidoscopy, or colonoscopy among adults aged 50-75 years	**62.7**	61.9	63.5	**62.7**	62.0	63.5	**58.7**	**64.2**	
Up to date on a core set of clinical preventive services (flu shot past year, pneumococcal shot ever, colorectal cancer screening) among men aged >=65 years	**43.4**	41.9	45.0	**43.7**	42.0	45.4	**39.7**	**35.0**	
Up to date on a core set of clinical preventive services (same as men plus mammogram past 2 years) among women aged >=65 years	**36.5**	35.0	38.1	**37.8**	36.4	39.1	**31.8**	**31.5**	
Binge drinking prevalence among adults aged >=18 years	**20.4**	20.2	20.5	**21.2**	21.1	21.4	**20.9**	**18.0**	
Current smoking among adults aged >=18 years	**18.7**	18.1	19.3	**19.2**	18.6	19.9	**19.3**	**16.8**	
No leisure-time physical activity among adults aged >=18 years	**21.3**	20.8	21.9	**20.8**	20.3	21.4	**18.9**	**23.7**	
Obesity among adults aged >=18 years	**29.5**	29.2	29.8	**30.0**	29.6	30.3	**25.5**	**29.5**	
Sleeping less than 7 hours among adults aged >=18 years	**30.4**	30.1	30.7	**31.0**	30.6	31.3	**28.8**	**35.1**	

Health Outcomes

Arthritis among adults aged ≥18 years by census tract, Billings, MT, 2016



Percent (%)

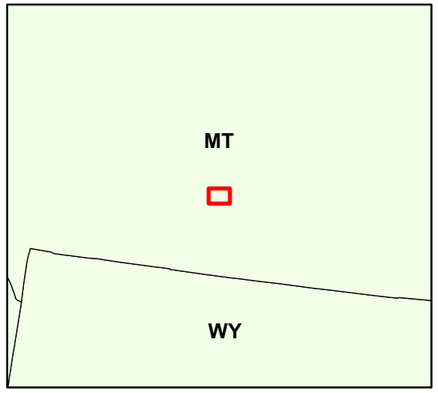
- 19.6 - 22.5
- 22.6 - 25.7
- 25.8 - 29.2
- 29.3 - 33.5
- 33.6 - 40.4
- City boundary

Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

Census tracts with population less than 50 were excluded from the map.

N
W E
0 1.25 2.5
Miles

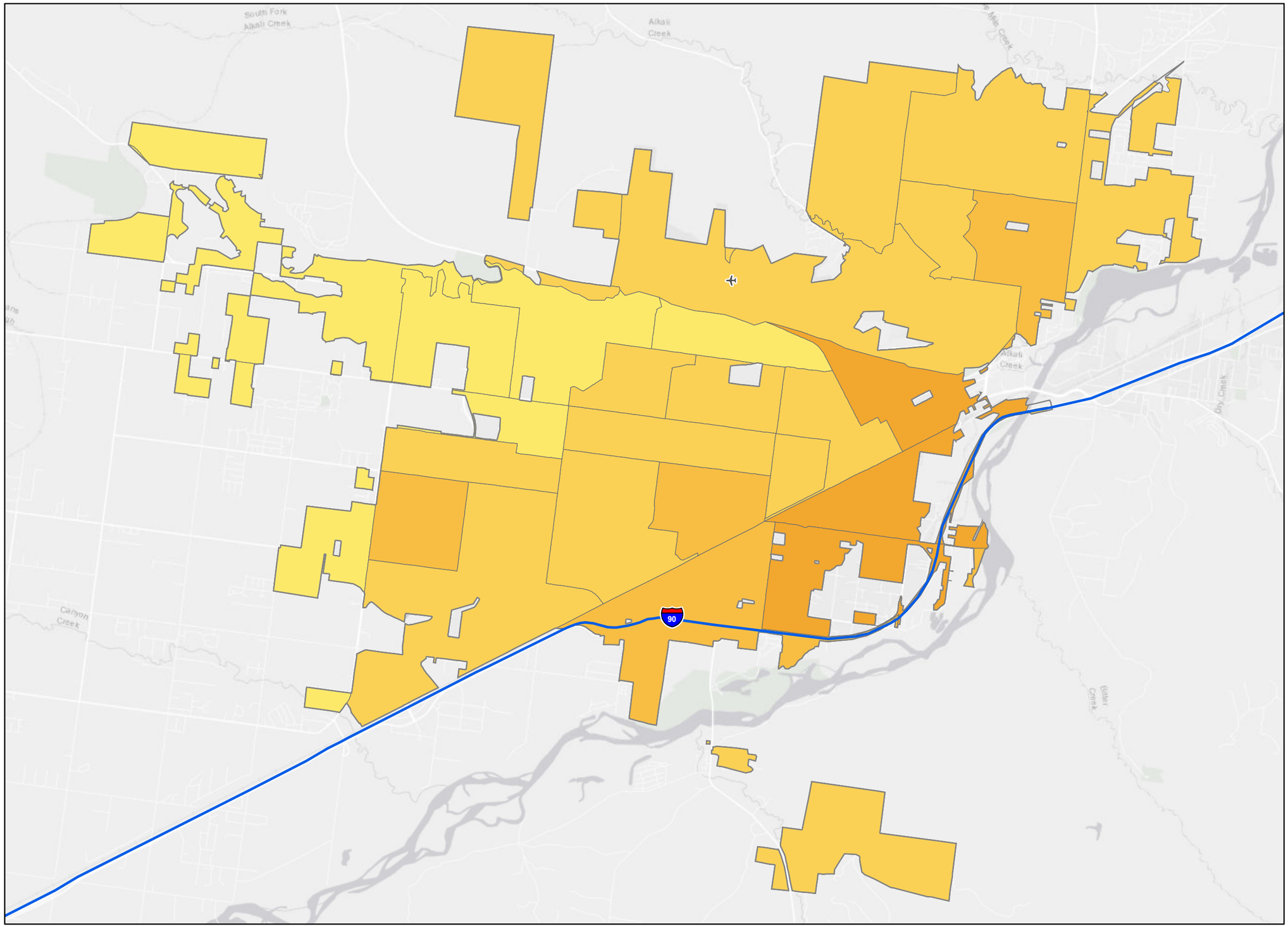
Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



Map created by CDC/NCCDPHP/DPH/ESB-GIS

Date: 8/6/2018

Current asthma prevalence among adults aged ≥18 years by census tract, Billings, MT, 2016



Percent (%)

- 7.7 - 8.5
- 8.6 - 9.3
- 9.4 - 10.2
- 10.3 - 11.2
- City boundary

Classification:
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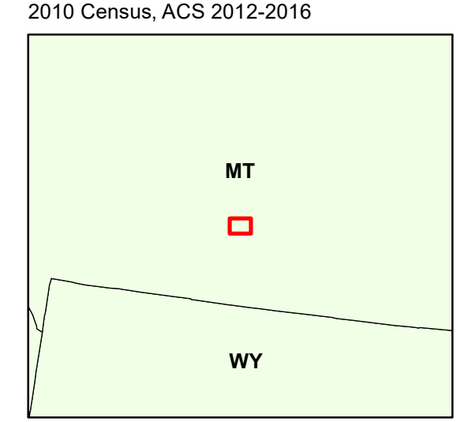
Census tracts with population less than 50 were excluded from the map.

N
W E
0 1.25 2.5
Miles

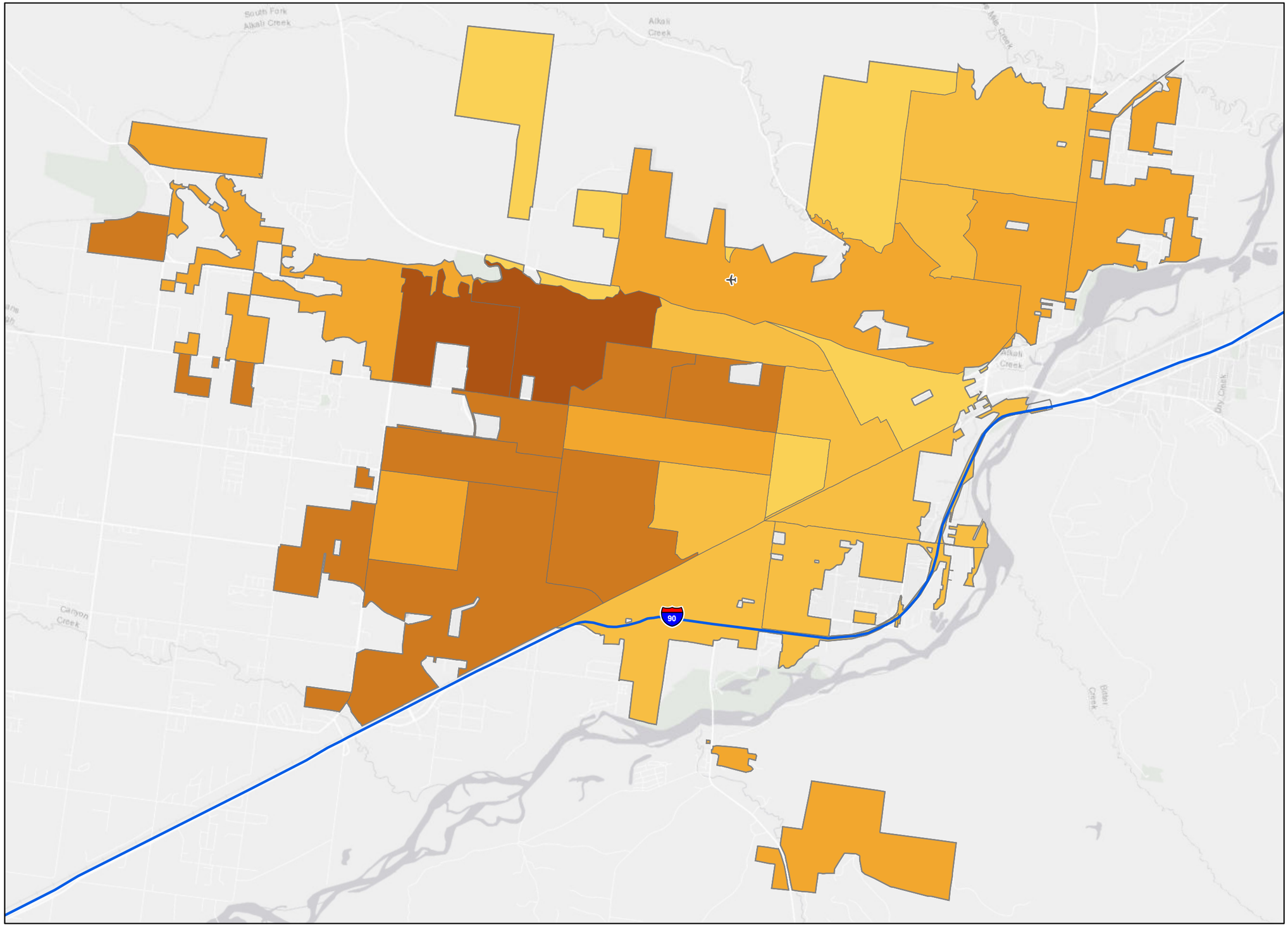
Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



Map created by CDC/NCCDPHP/DPH/ESB-GIS

Date: 8/7/2018

Cancer (excluding skin cancer) among adults aged ≥18 years by census tract, Billings, MT, 2016



Percent (%)

- 4.6 - 5.6
- 5.7 - 6.7
- 6.8 - 7.8
- 7.9 - 9.2
- 9.3 - 11.4
- City boundary

Classification:
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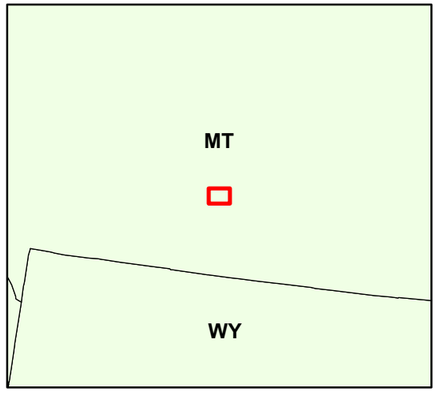
Census tracts with population less than 50 were excluded from the map.

N
W E
0 1.25 2.5
Miles

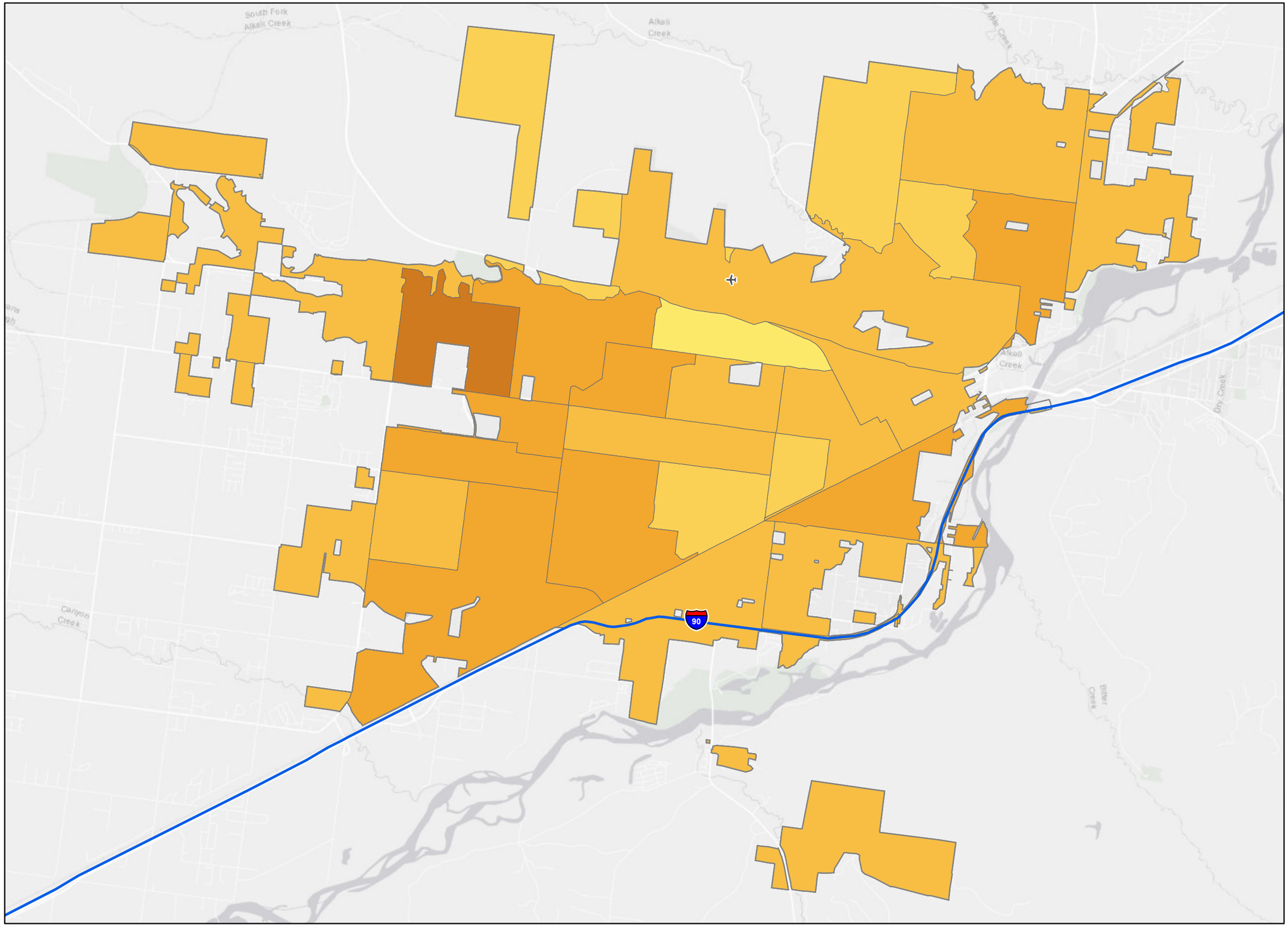
Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



Map created by CDC/NCCDPHP/DPH/ESB-GIS

Date: 8/7/2018

High blood pressure among adults aged ≥18 years by census tract, Billings, MT, 2015



Percent (%)

- 17.3 - 22.6
- 22.7 - 26.5
- 26.6 - 30.0
- 30.1 - 33.8
- 33.9 - 38.4
- City boundary

Classification:
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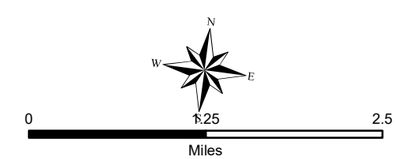
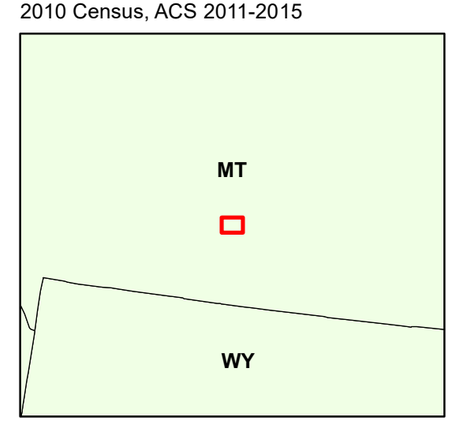
Census tracts with population less than 50 were excluded from the map.



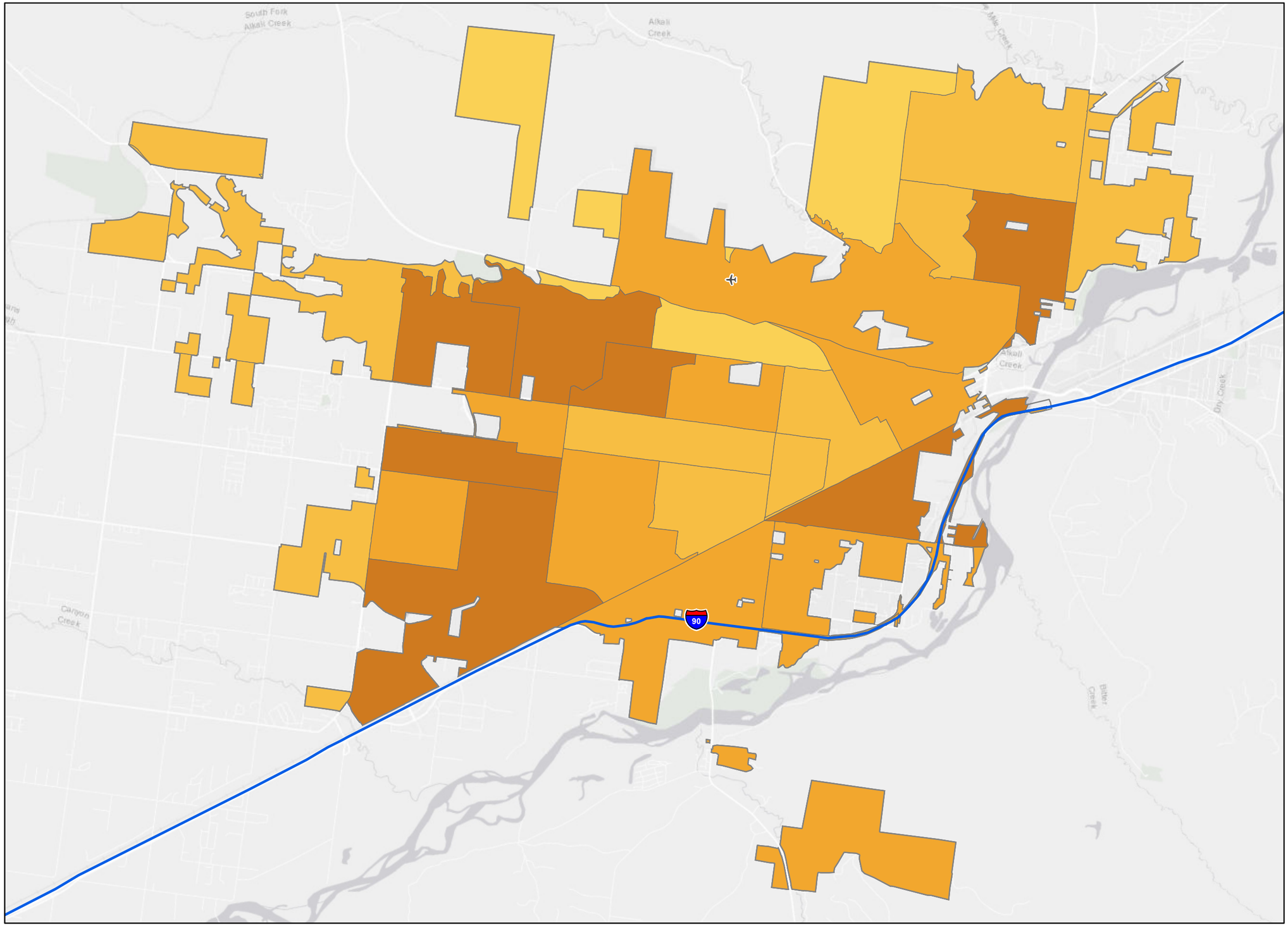
Data sources:
CDC BRFSS 2015, US Census Bureau 2010 Census, ACS 2011-2015



Map created by CDC/NCCDPHP/DPH/ESB-GIS

Date: 6/13/2018

High cholesterol among adults aged ≥18 years who have been screened in the past 5 years by census tract, Billings, MT, 2015



Percent (%)

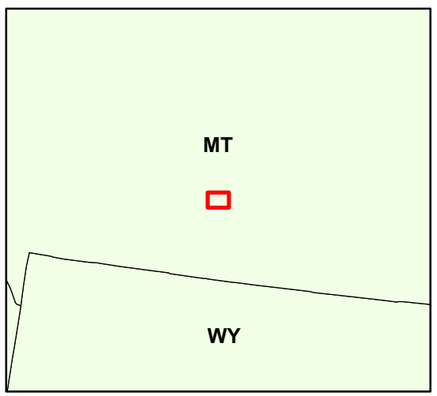
- 24.9 - 28.7
- 28.8 - 31.7
- 31.8 - 34.2
- 34.3 - 36.7
- City boundary

Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

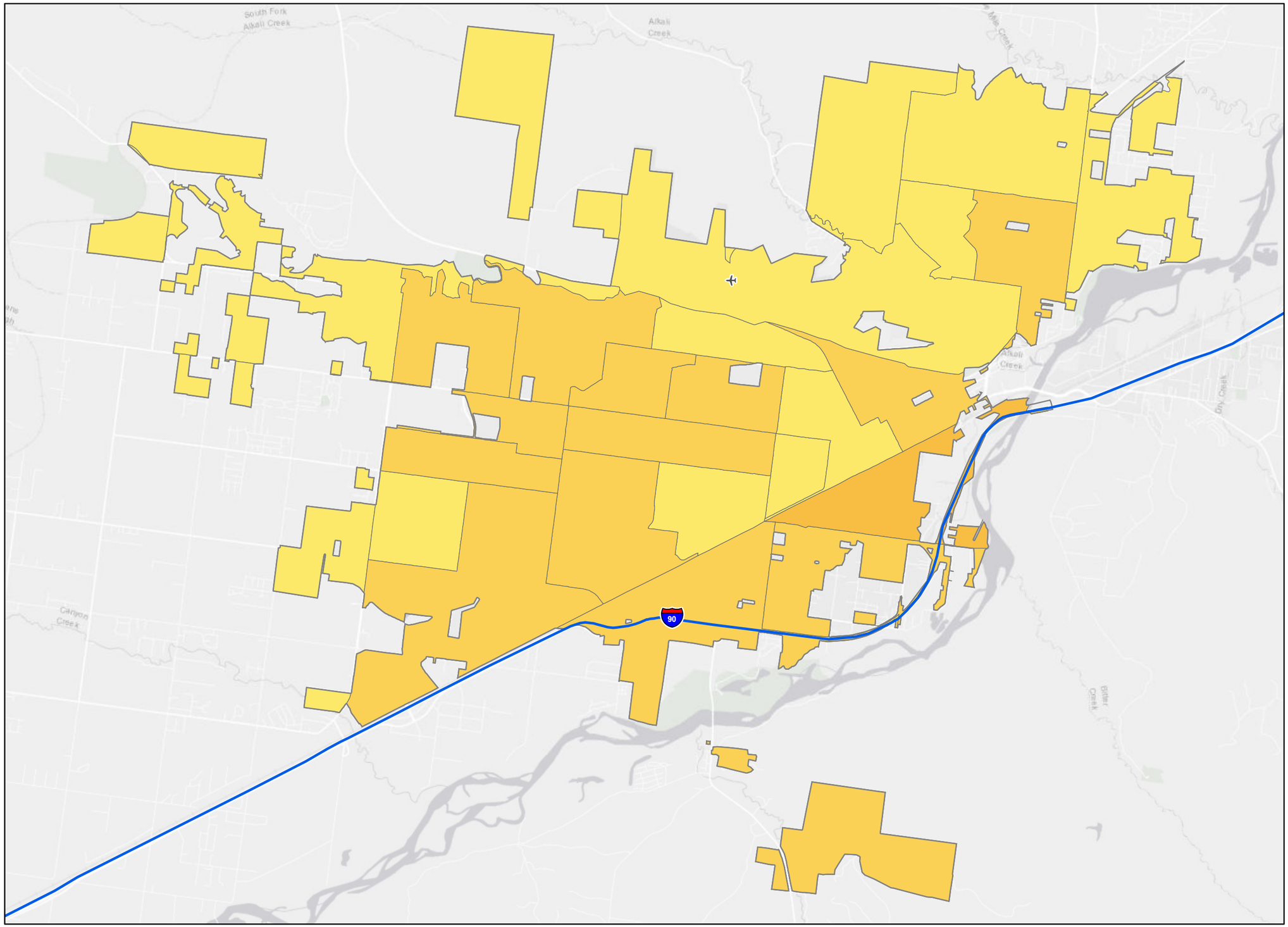
Census tracts with population less than 50 were excluded from the map.

N
W E
0 1.25 2.5
Miles

Data sources:
CDC BRFSS 2015, US Census Bureau 2010 Census, ACS 2011-2015



Diagnosed diabetes among adults aged ≥18 years by census tract, Billings, MT, 2016



Percent (%)

- 5.7 - 7.9
- 8.0 - 9.9
- 10.0 - 12.0
- City boundary

Classification:
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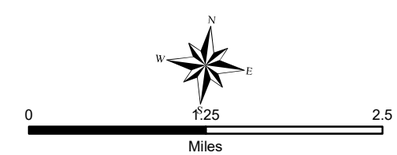
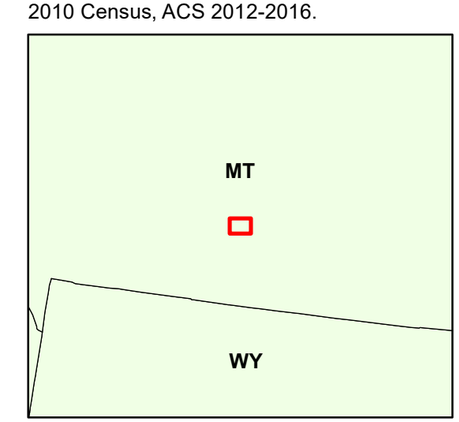
Census tracts with population less than 50 were excluded from the map.



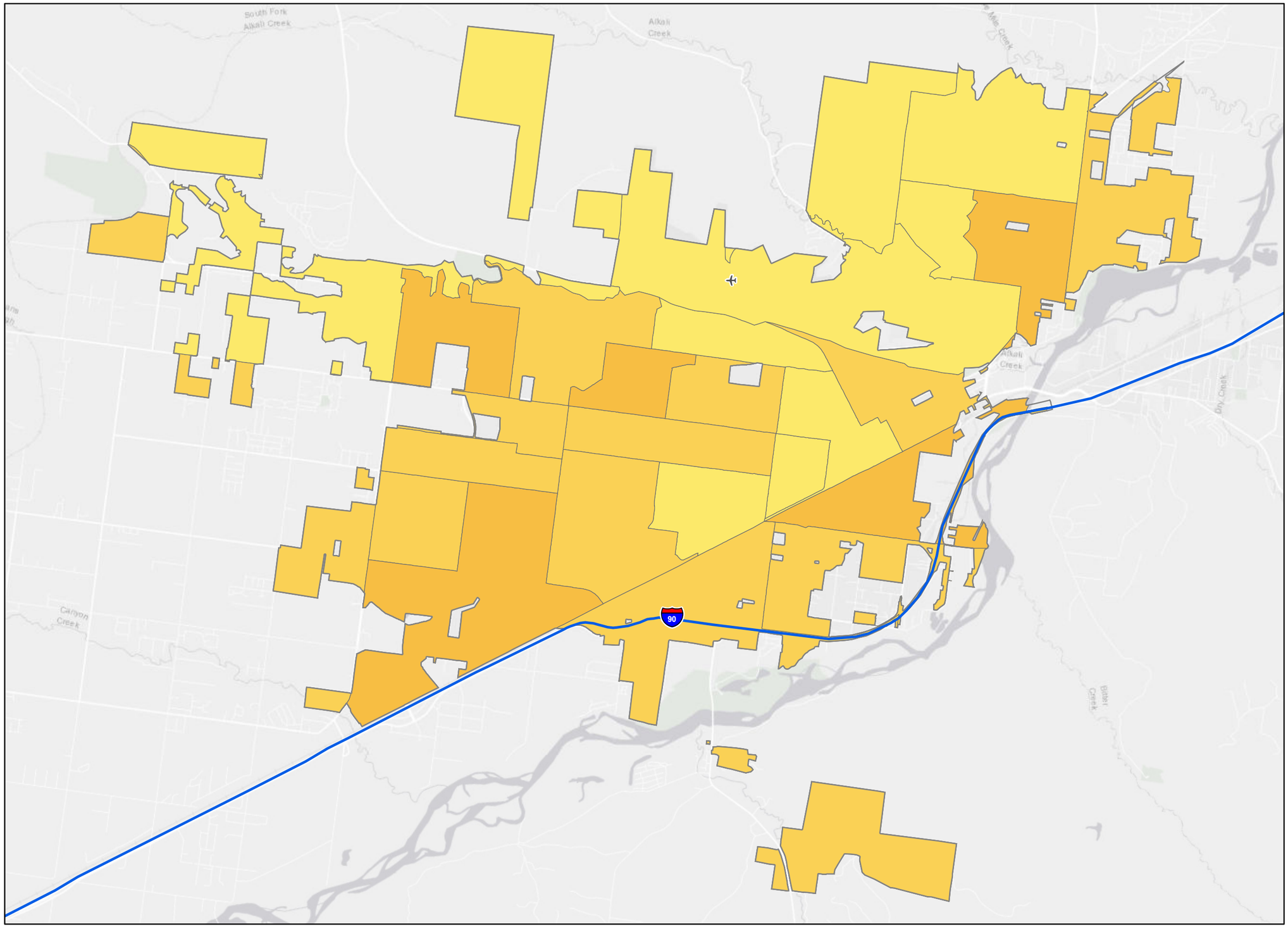
Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016.



Map created by CDC/NCCDPHP/DPH/ESB-GIS

Date: 9/12/2018

Chronic kidney disease among adults aged ≥18 years by census tract, Billings, MT, 2016

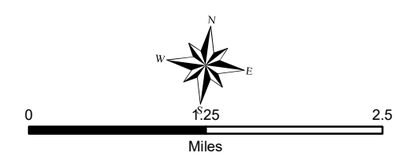


Percent (%)

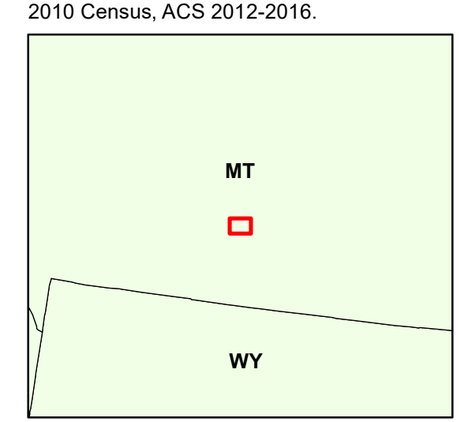
- 1.9 - 2.3
- 2.4 - 2.8
- 2.9 - 3.3
- City boundary

Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

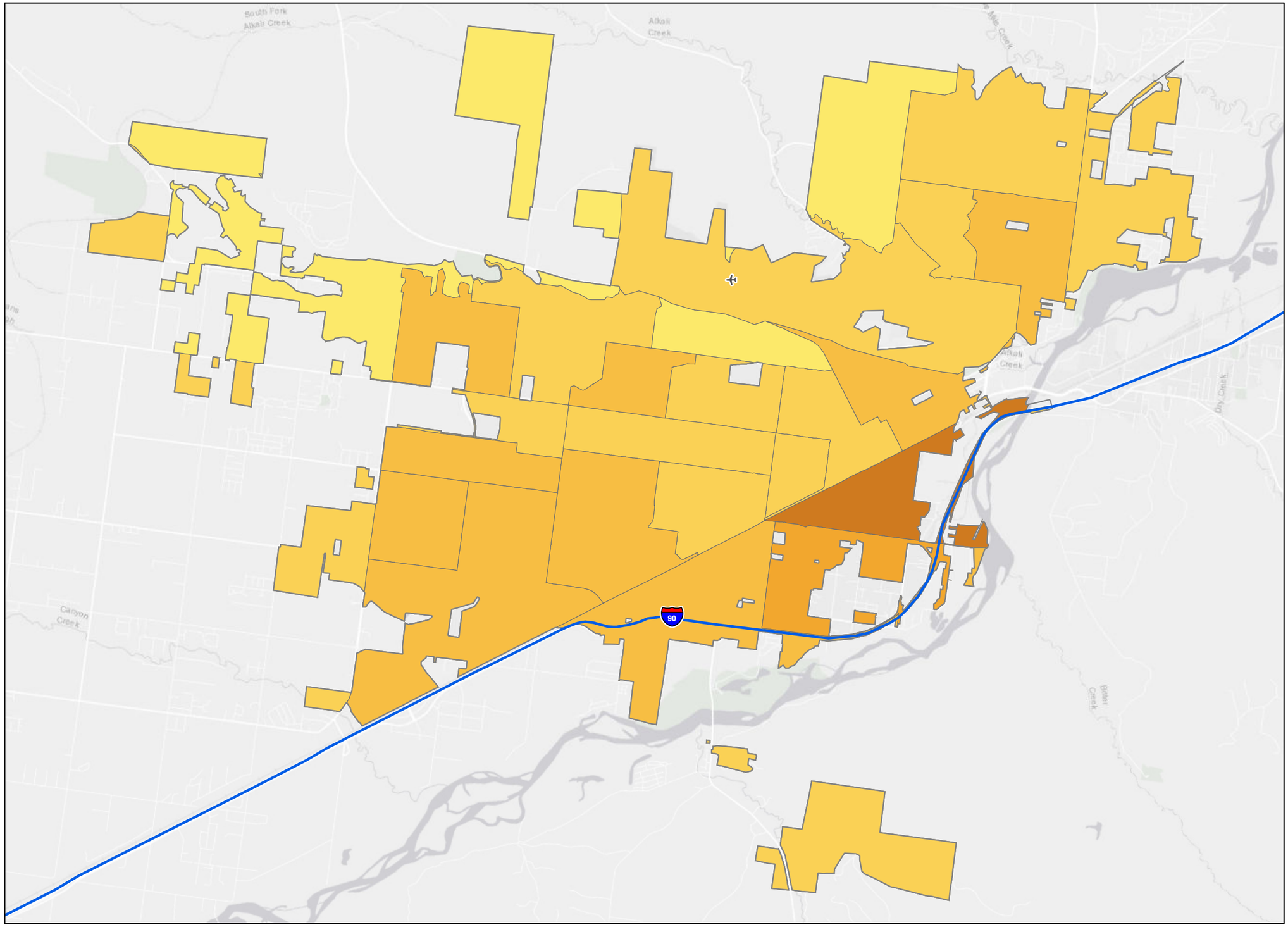
Census tracts with population less than 50 were excluded from the map.



Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016.



Chronic obstructive pulmonary disease among adults aged ≥18 years by census tract, Billings, MT, 2016



Percent (%)

- 4.0 - 5.2
- 5.3 - 6.4
- 6.5 - 7.7
- 7.8 - 9.1
- 9.2 - 10.6
- City boundary

Classification:
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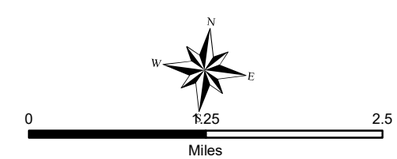
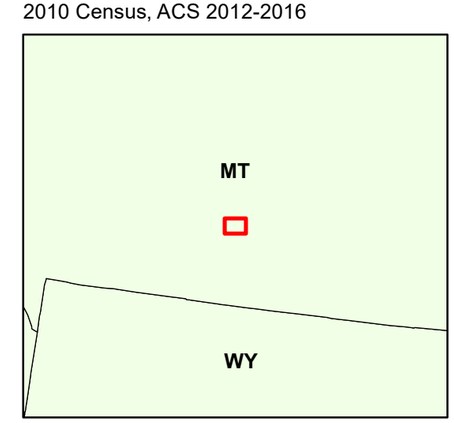
Census tracts with population less than 50 were excluded from the map.



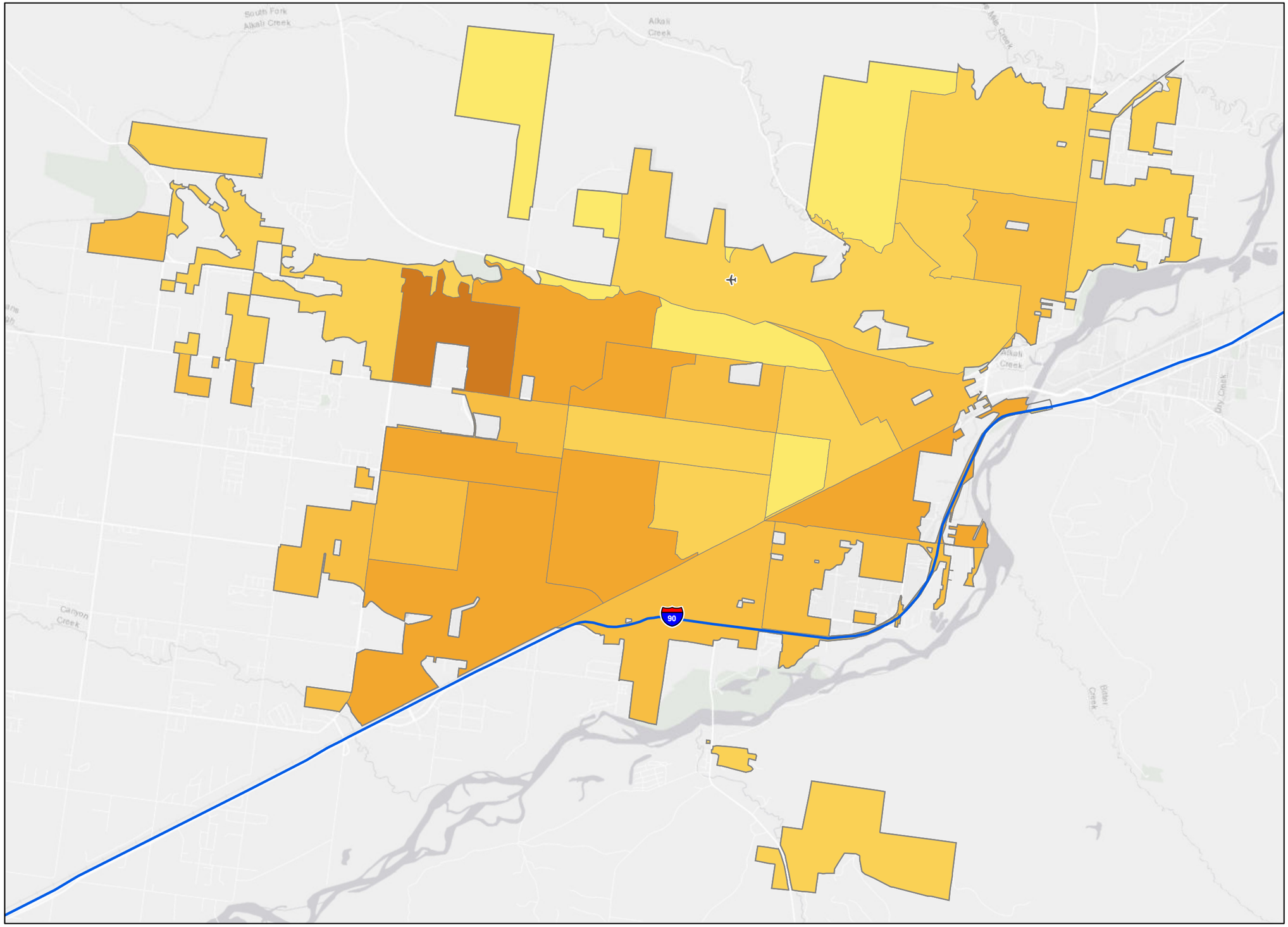
Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



Map created by CDC/NCCDPHP/DPH/ESB-GIS

Date: 8/10/2018

Coronary heart disease among adults aged ≥18 years by census tract, Billings, MT, 2016



Percent (%)

- 3.3 - 4.5
- 4.6 - 5.7
- 5.8 - 6.9
- 7.0 - 8.2
- 8.3 - 9.9
- City boundary

Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

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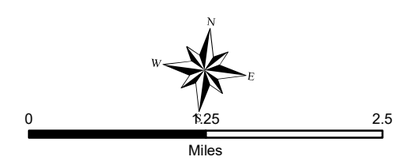
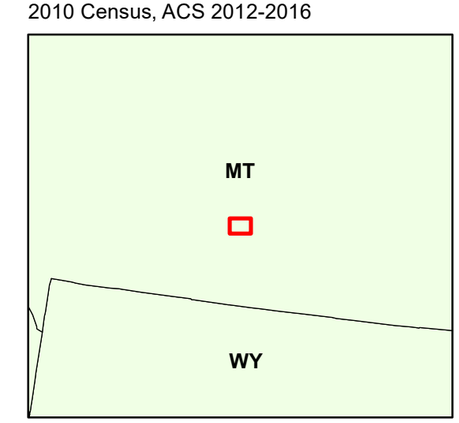


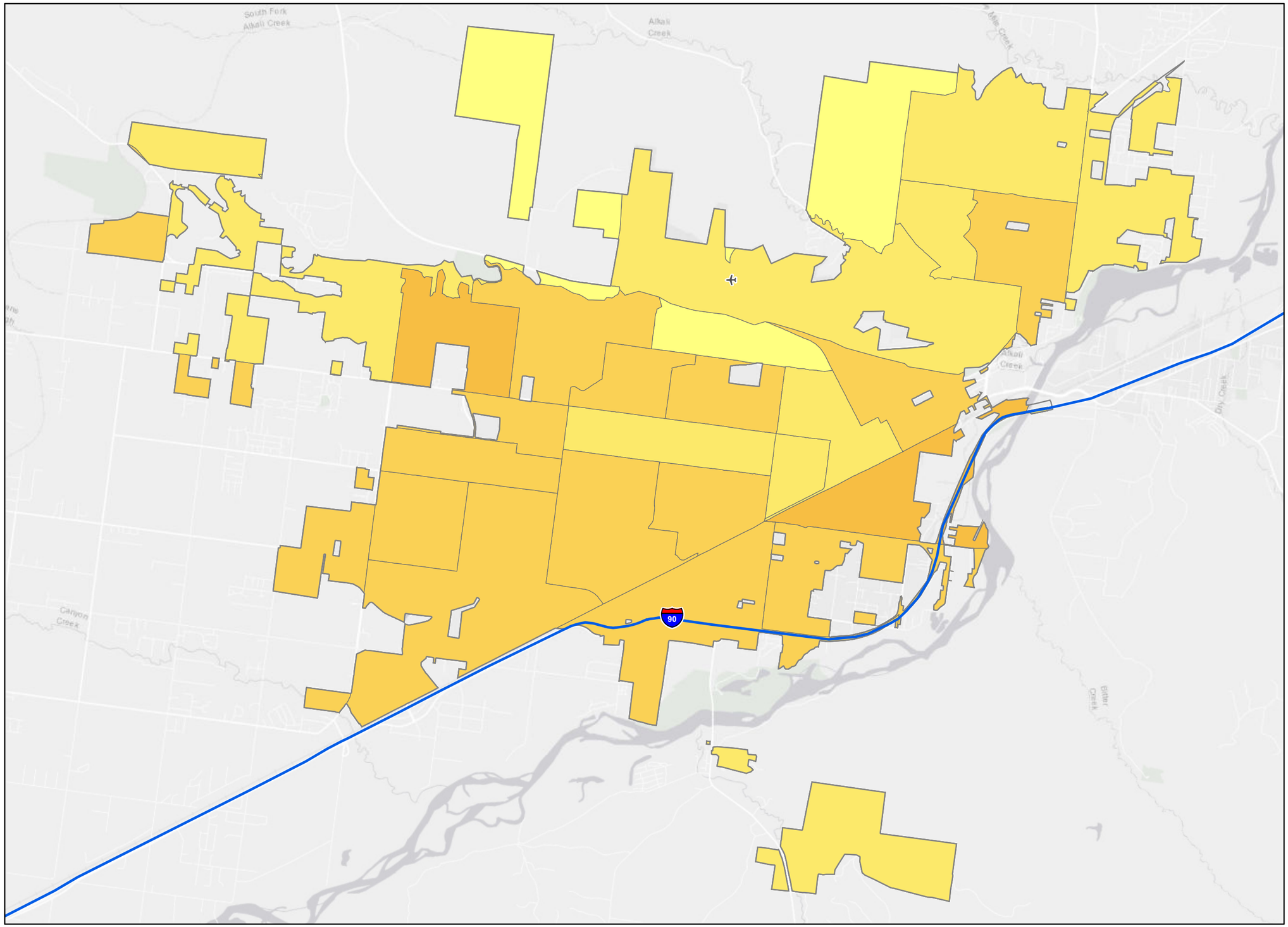
Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



Map created by CDC/NCCDPHP/DPH/ESB-GIS

Date: 8/8/2018

Stroke among adults aged 18 years and older by census tract, Billings, MT, 2016

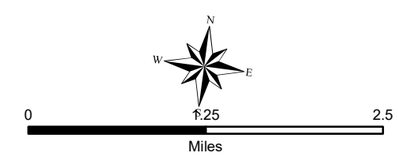


Percent (%)

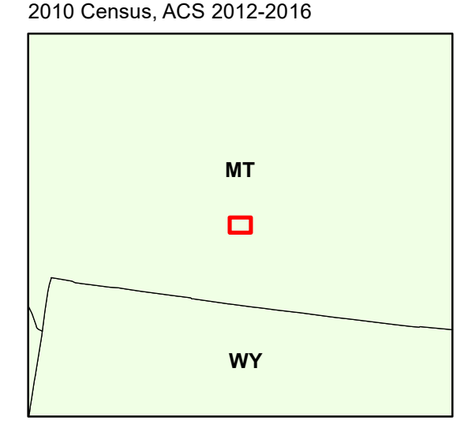
- 0.2 - 2.0
- 2.1 - 2.8
- 2.9 - 3.6
- 3.7 - 4.6
- City boundary

Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

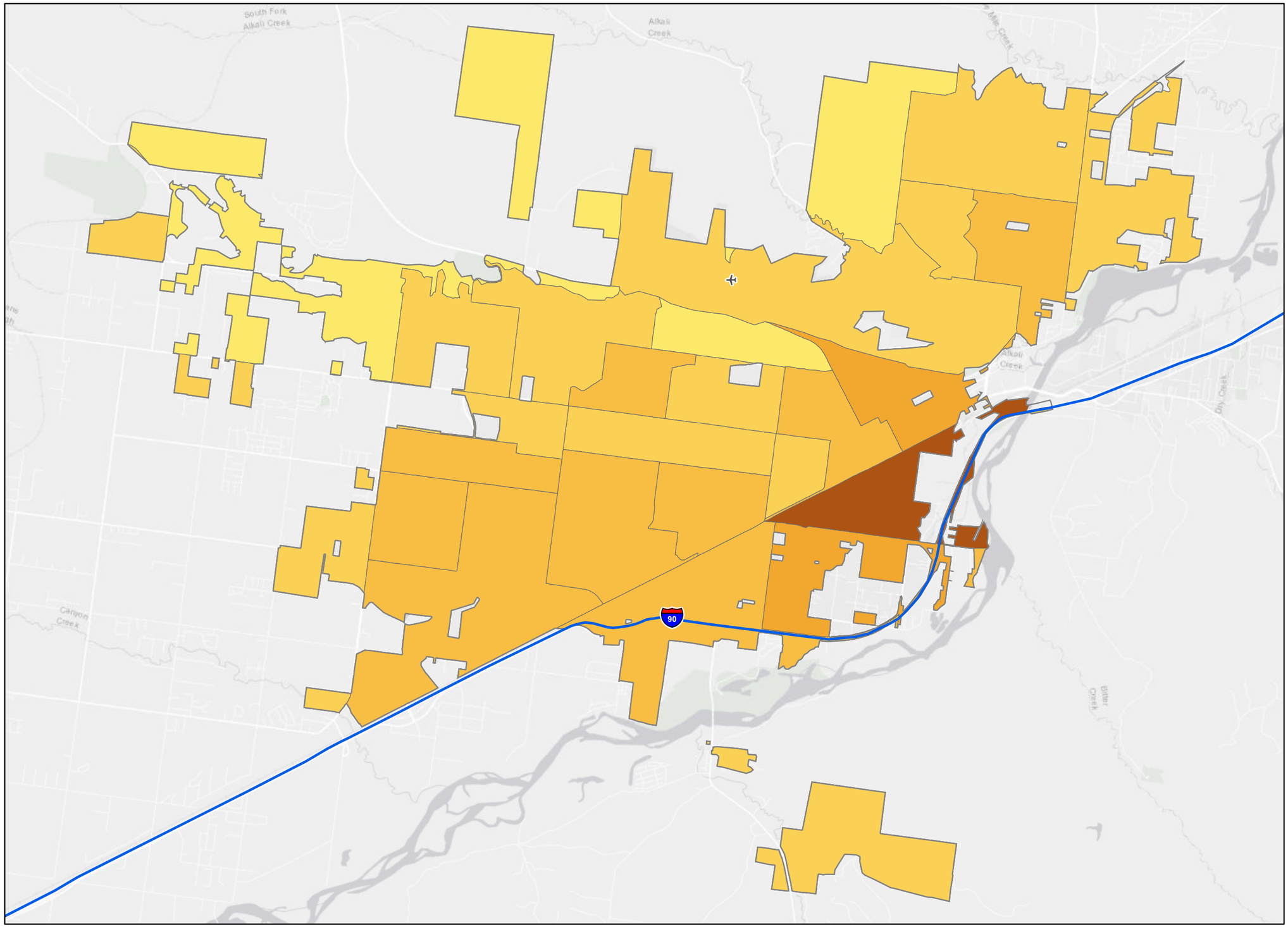
Census tracts with population less than 50 were excluded from the map.



Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



Physical health not good for 14 or more days among adults aged 18 years and older by census tract, Billings, MT, 2016

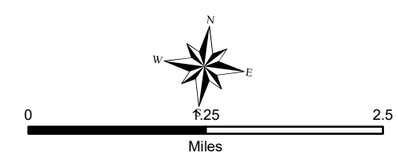


Percent (%)

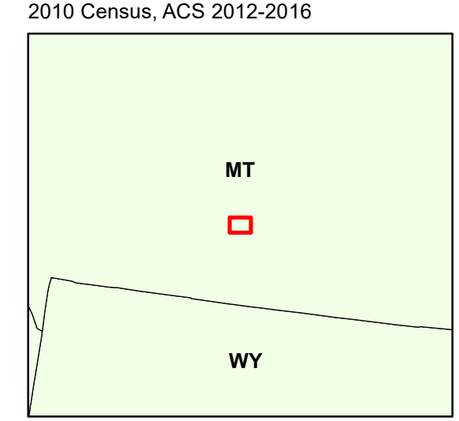
- 7.8 - 9.7
- 9.8 - 11.6
- 11.7 - 13.5
- 13.6 - 15.5
- 17.7 - 19.9
- City boundary

Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

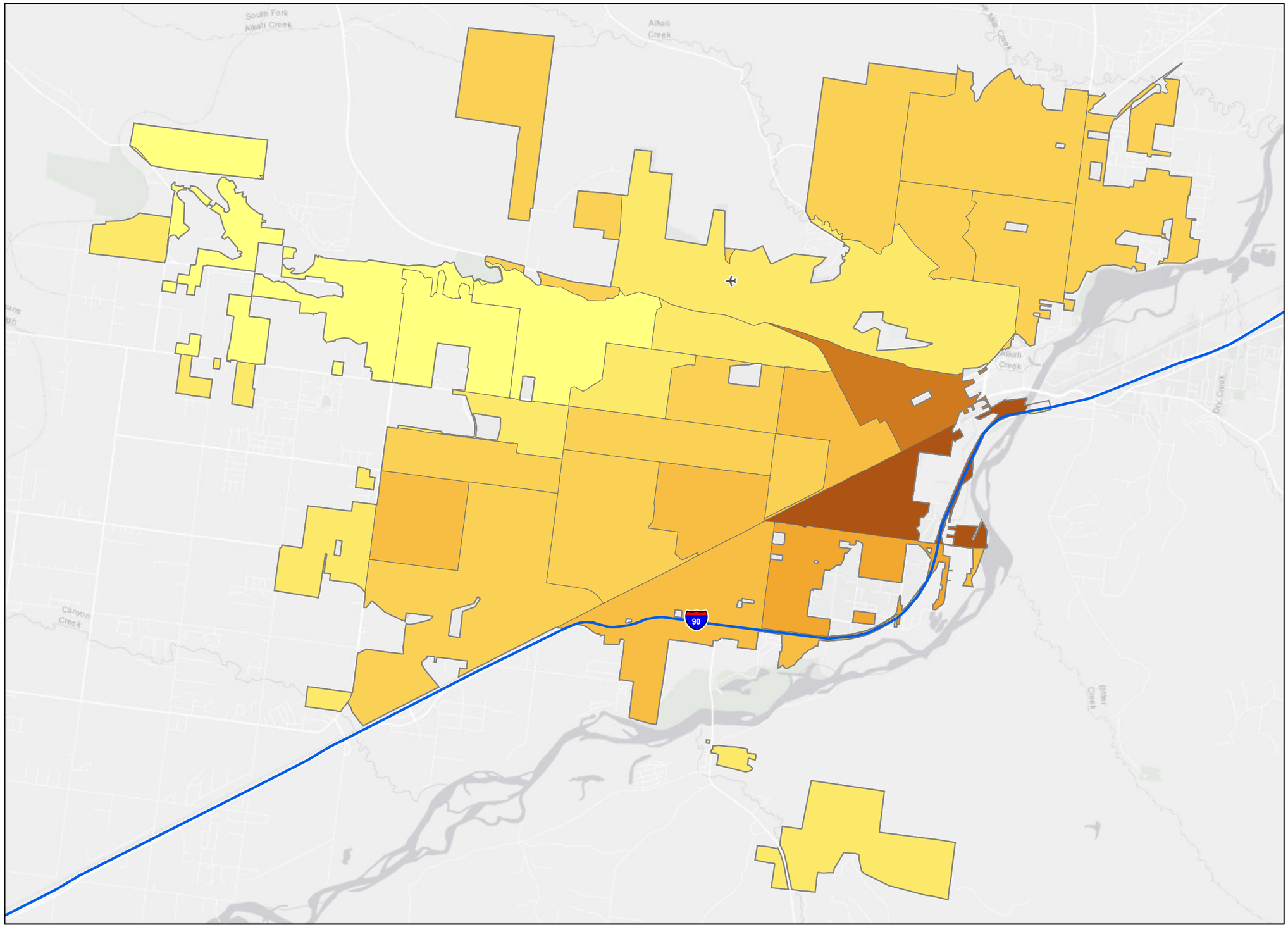
Census tracts with population less than 50 were excluded from the map.



Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



Mental health not good for ≥14 days among adults aged ≥18 years by census tract, Billings, MT, 2016



Percent (%)

- 4.1 - 9.0
- 9.1 - 10.7
- 10.8 - 12.3
- 12.4 - 13.9
- 14.0 - 15.5
- 15.6 - 17.2
- 17.3 - 19.0
- City boundary

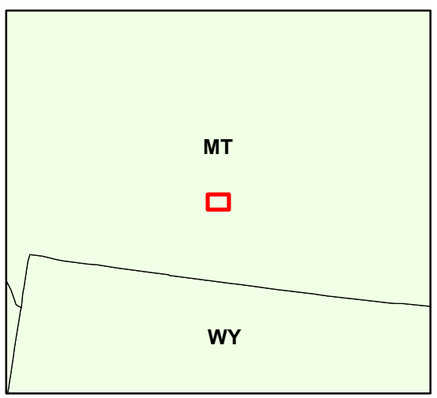
Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

Census tracts with population less than 50 were excluded from the map.

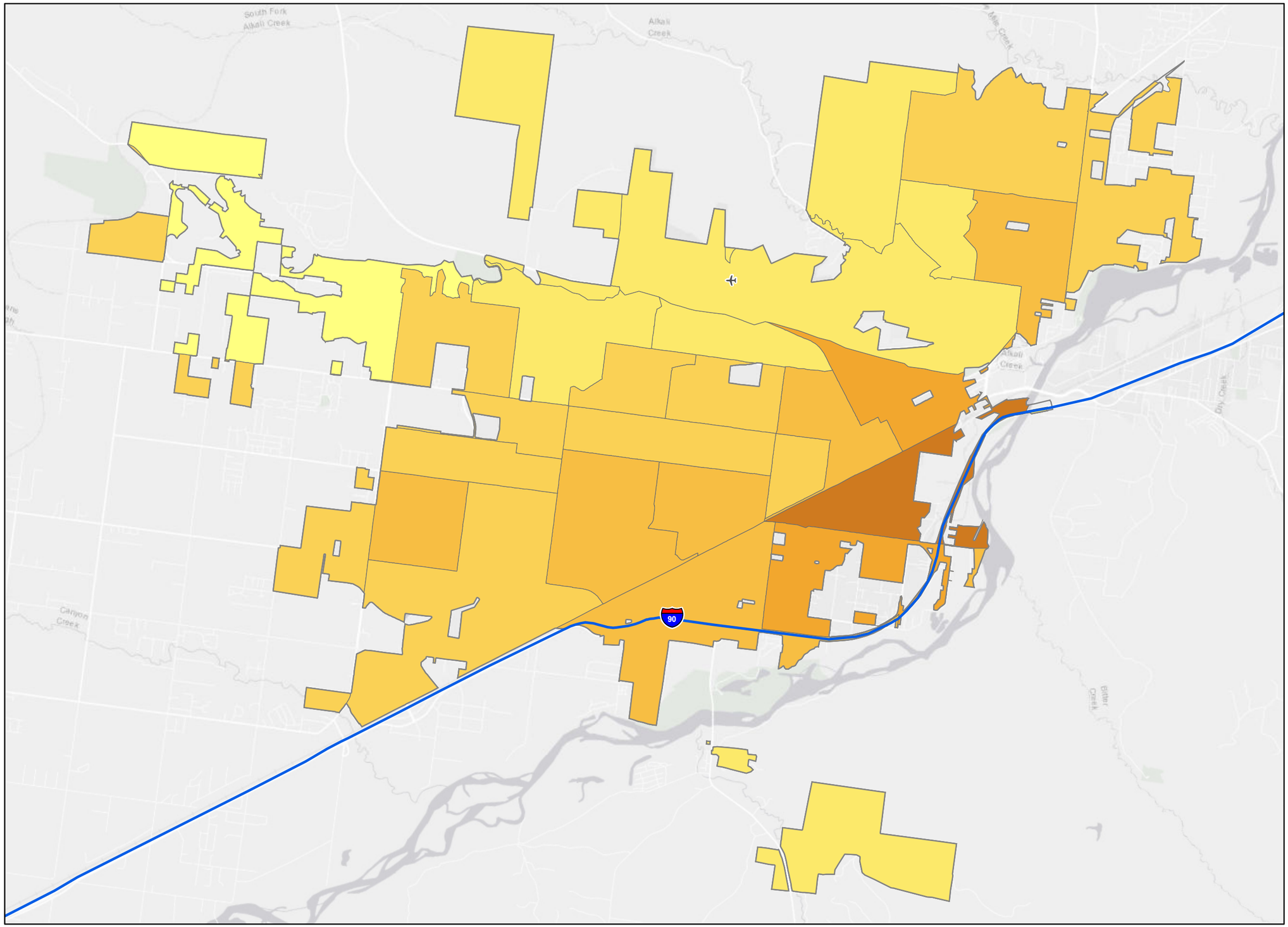
N W E

0 1.25 2.5
Miles

Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



All teeth lost among adults aged >=65 years by census tract, Billings, MT, 2016



Percent (%)

- 2.8 - 8.1
- 8.2 - 11.7
- 11.8 - 15.3
- 15.4 - 19.1
- 19.2 - 23.2
- 23.3 - 27.7
- City boundary

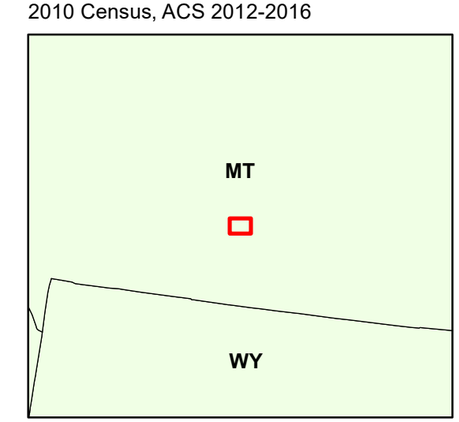
Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

Census tracts with population less than 50 were excluded from the map.

N W E S

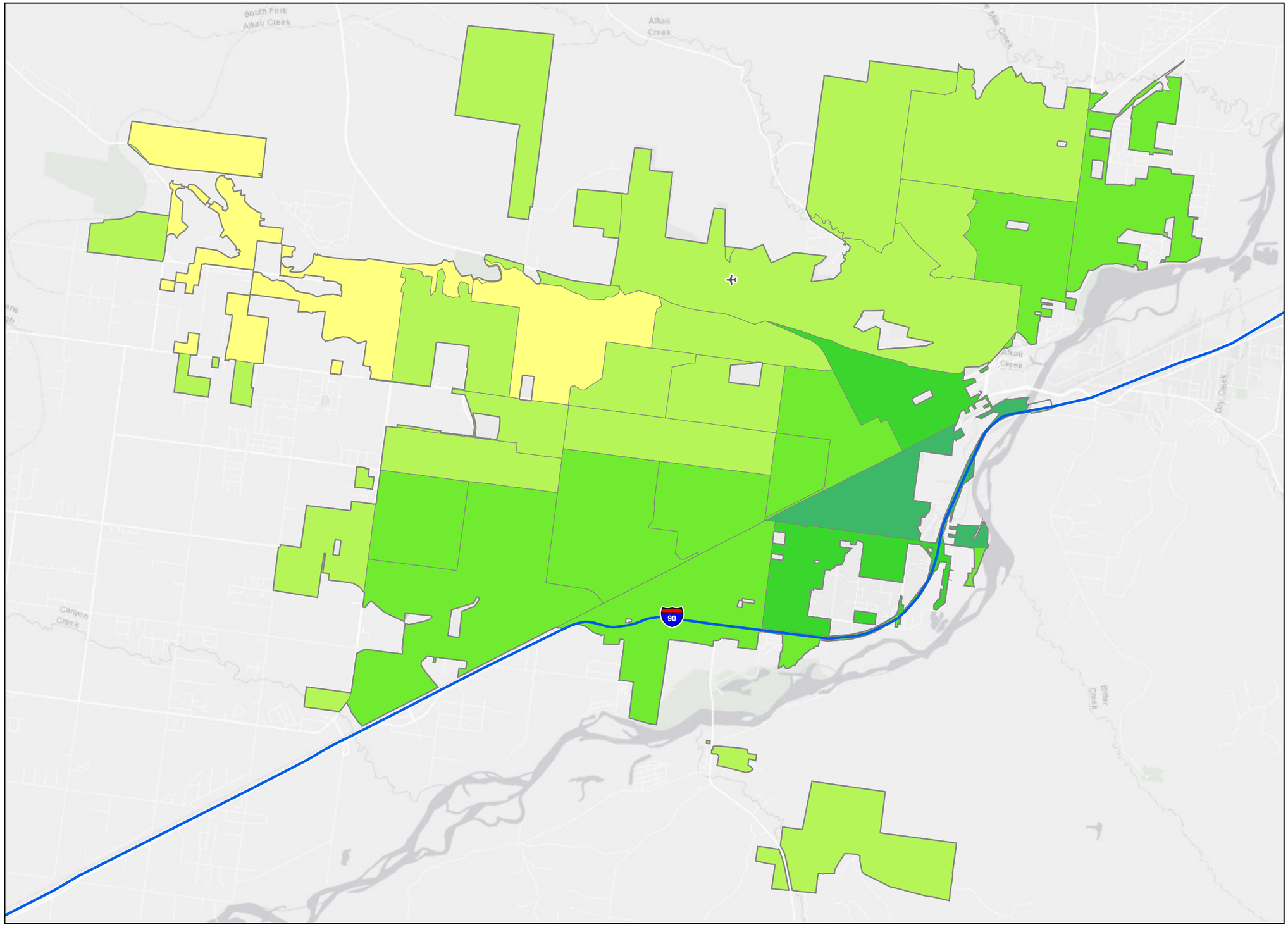
0 1.25 2.5
Miles

Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



Use of Preventive Services

Current lack of health insurance among adults aged 18-64 years by census tract, Billings, MT, 2016

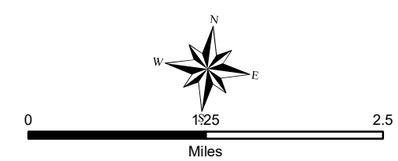


Percent (%)

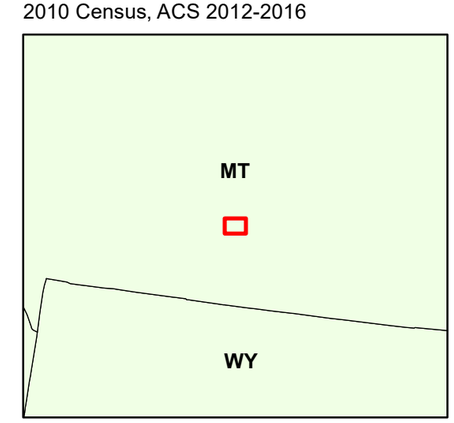
- 2.5 - 8.1
- 8.2 - 11.7
- 11.8 - 15.4
- 15.5 - 19.4
- 19.5 - 23.9
- City boundary

Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

Census tracts with population less than 50 were excluded from the map.



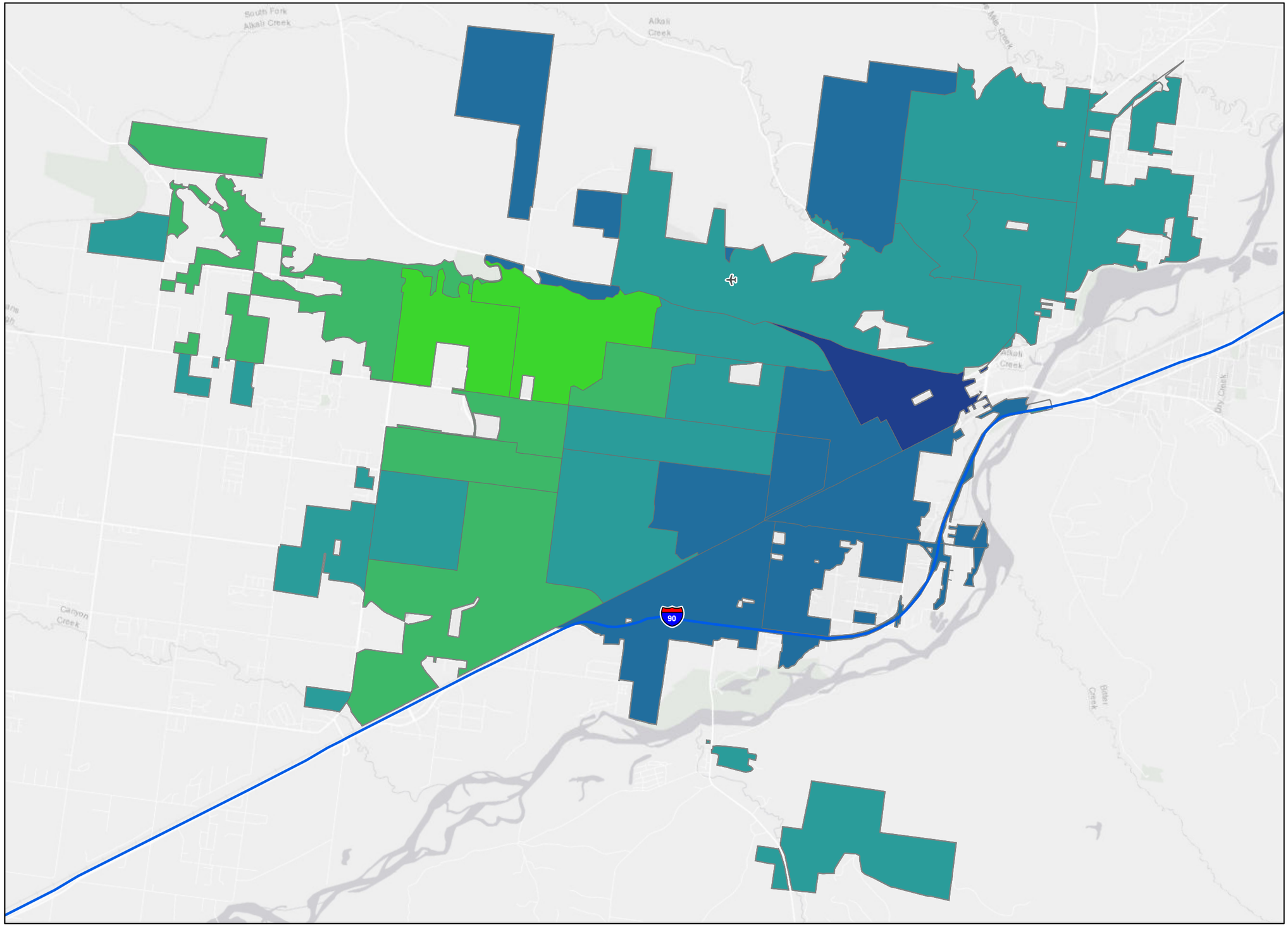
Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



Map created by CDC/NCCDPHP/DPH/ESB-GIS

Date: 8/3/2018

Visits to doctor for routine checkup within the past year among adults aged ≥18 years by census tract, Billings, MT, 2016

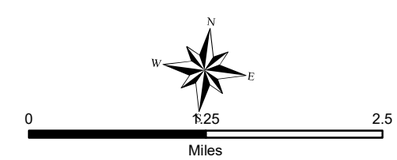


Percent (%)

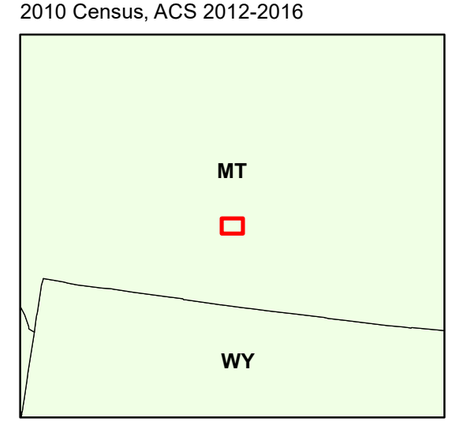
- 57.5 - 61.4
- 61.5 - 64.4
- 64.5 - 67.2
- 67.3 - 70.0
- 70.1 - 73.0
- City boundary

Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

Census tracts with population less than 50 were excluded from the map.



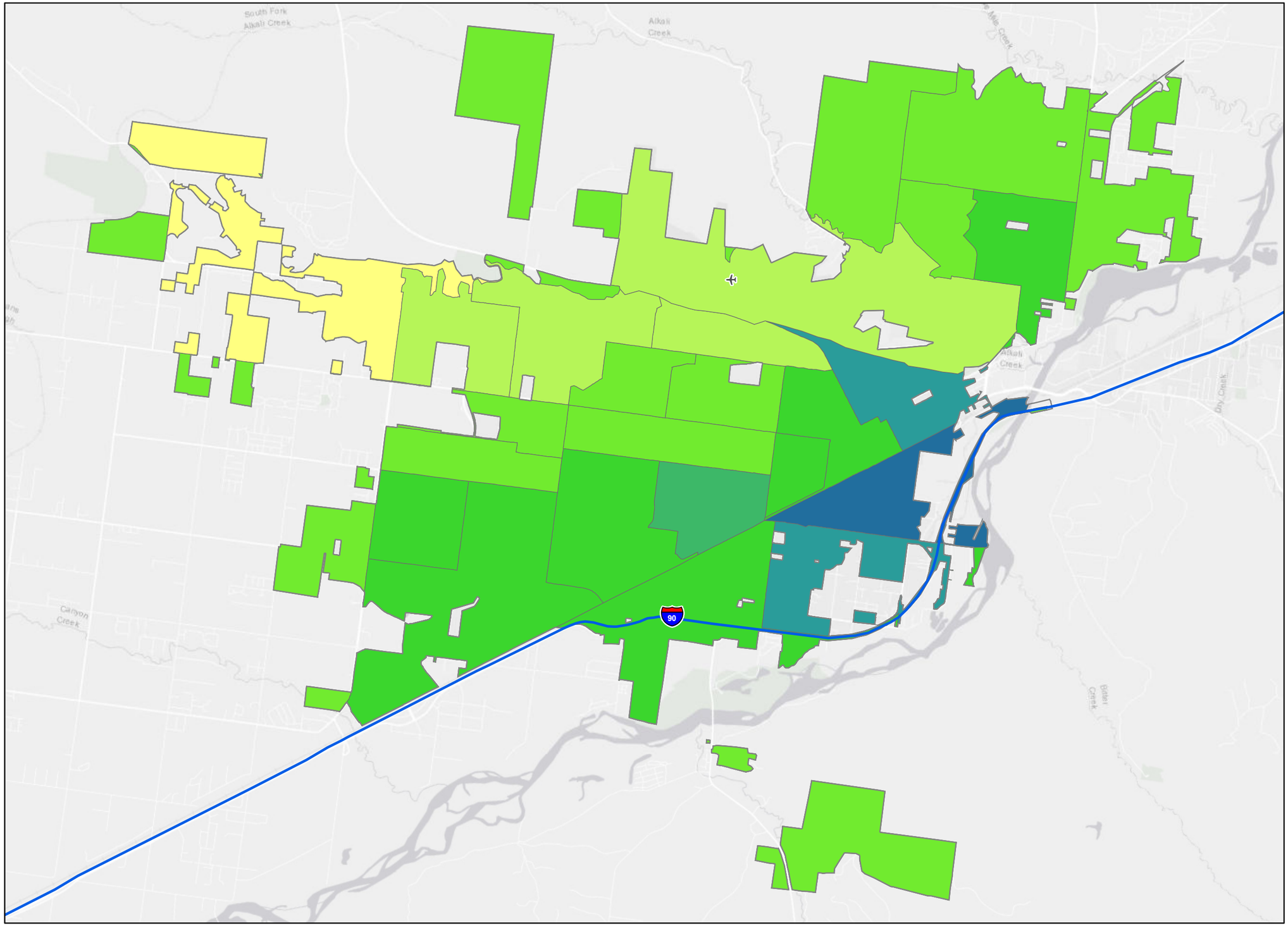
Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



Map created by CDC/NCCDPHP/DPH/ESB-GIS

Date: 8/8/2018

Visits to dentist or dental clinic among adults aged ≥18 years by census tract, Billings, MT, 2016



Percent (%)

- 43.9 - 49.7
- 49.8 - 55.5
- 55.6 - 61.2
- 61.3 - 66.7
- 66.8 - 72.0
- 72.1 - 77.5
- 77.6 - 88.9
- City boundary

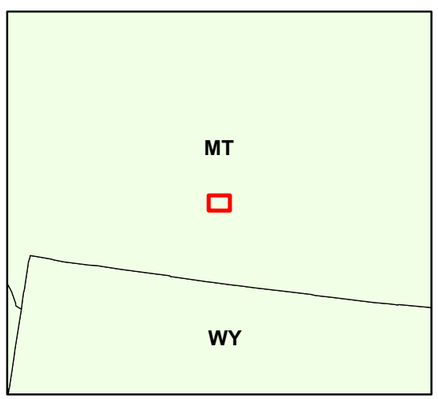
Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

Census tracts with population less than 50 were excluded from the map.

N W E

0 1.25 2.5
Miles

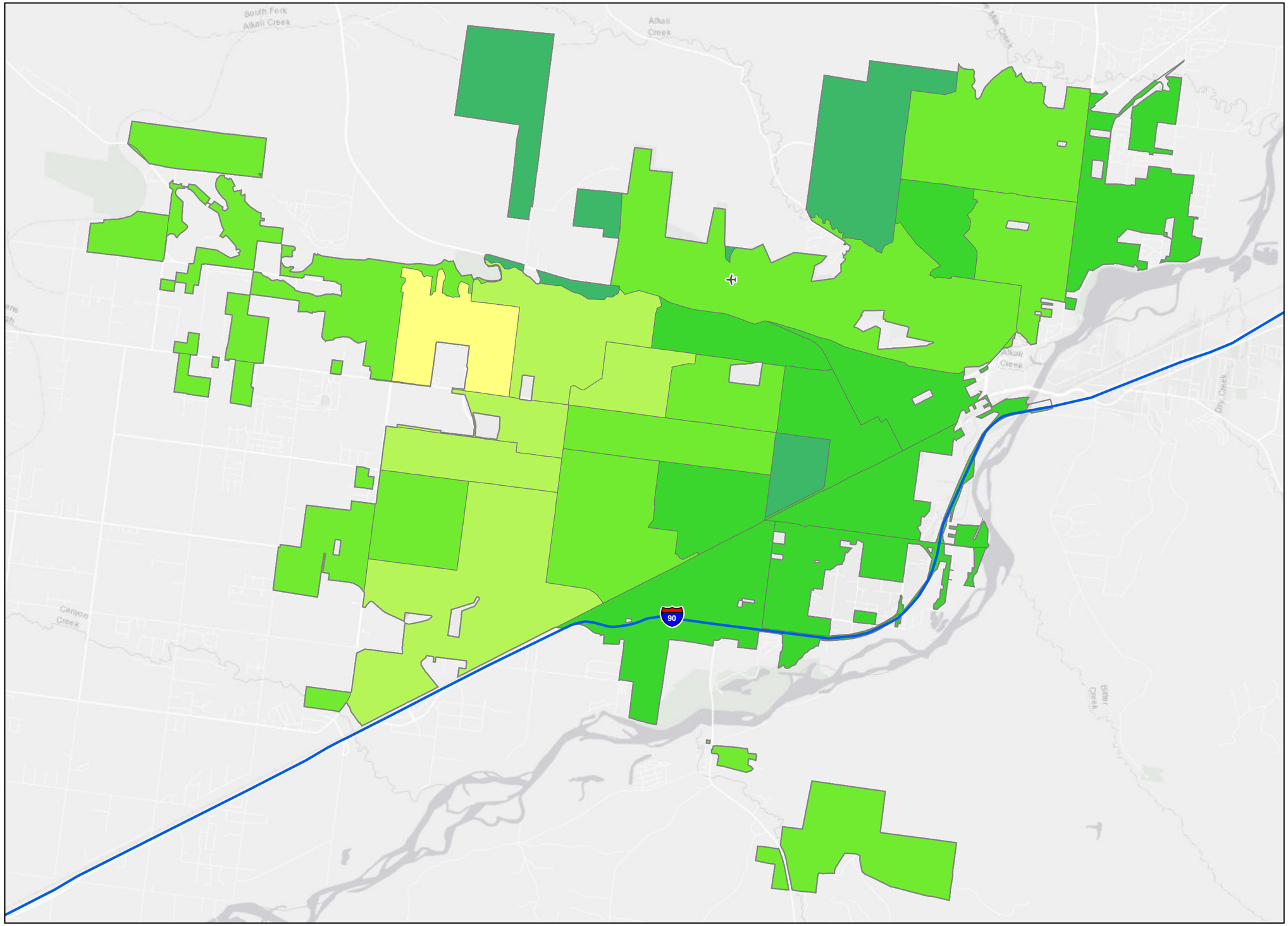
Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



Map created by CDC/NCCDPHP/DPH/ESB-GIS

Date: 8/13/2018

Taking medicine for high blood pressure control among adults aged ≥18 years with high blood pressure by census tract, Billings, MT, 2015



Percent (%)

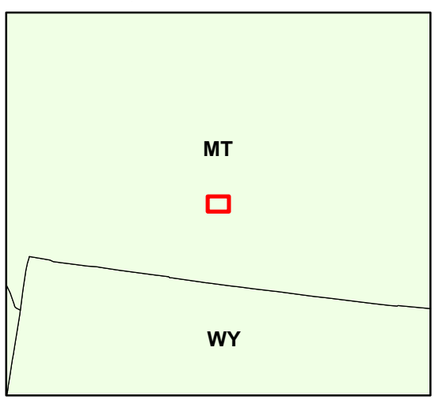
- 64.1 - 68.4
- 68.5 - 72.3
- 72.4 - 76.1
- 76.2 - 80.4
- 80.5 - 93.2
- City boundary

Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

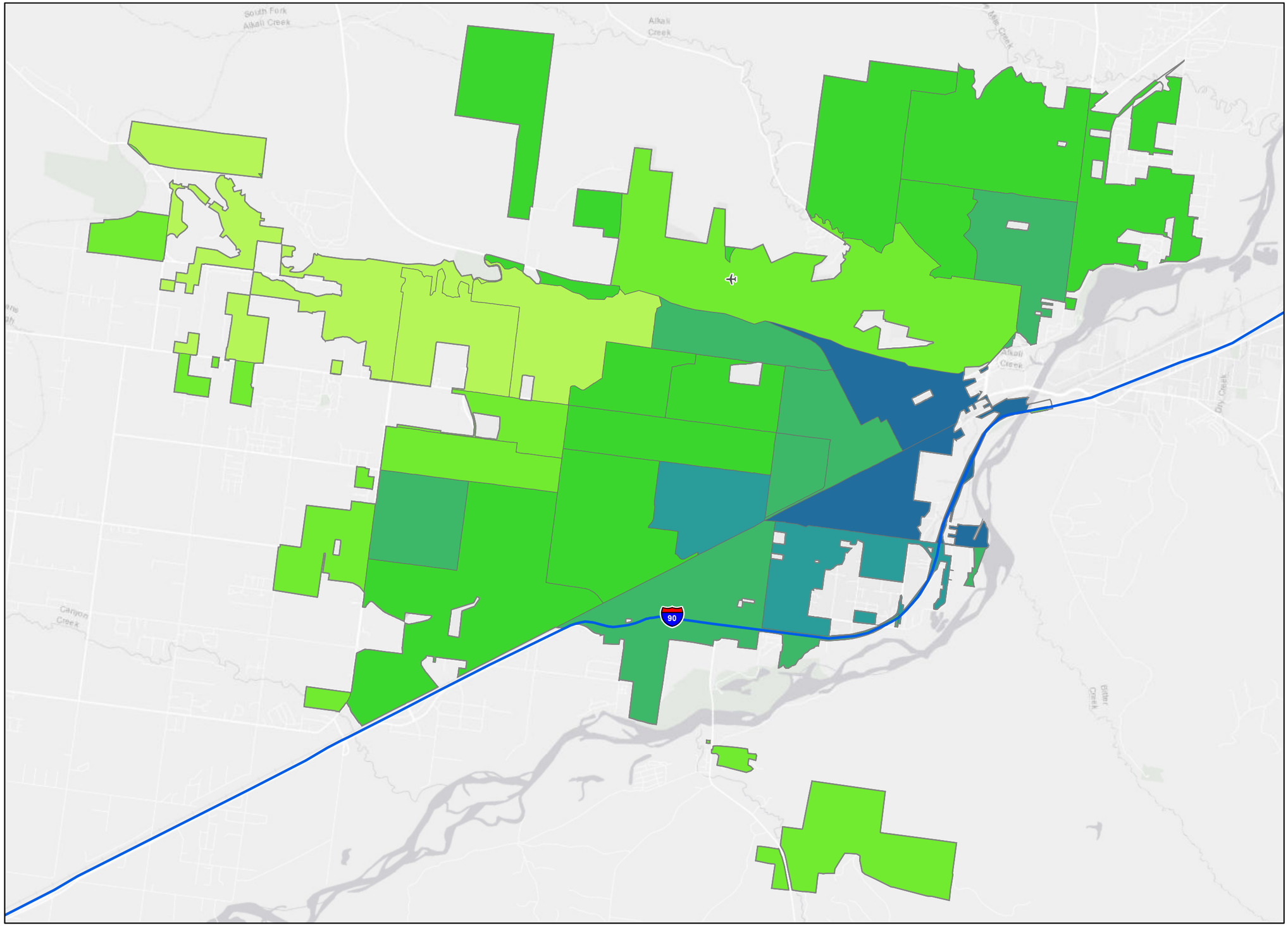
Census tracts with population less than 50 were excluded from the map.

N
W E
0 1.25 2.5
Miles

Data sources:
CDC BRFSS 2015, US Census Bureau 2010 Census, ACS 2011-2015



Cholesterol screening among adults aged ≥18 years by census tract, Billings, MT, 2015



Percent (%)

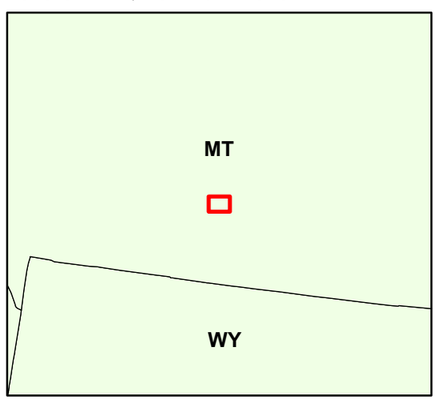
- 56.6 - 62.2
- 62.3 - 66.8
- 66.9 - 70.9
- 71.0 - 74.8
- 74.9 - 78.9
- 79.0 - 83.5
- City boundary

Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

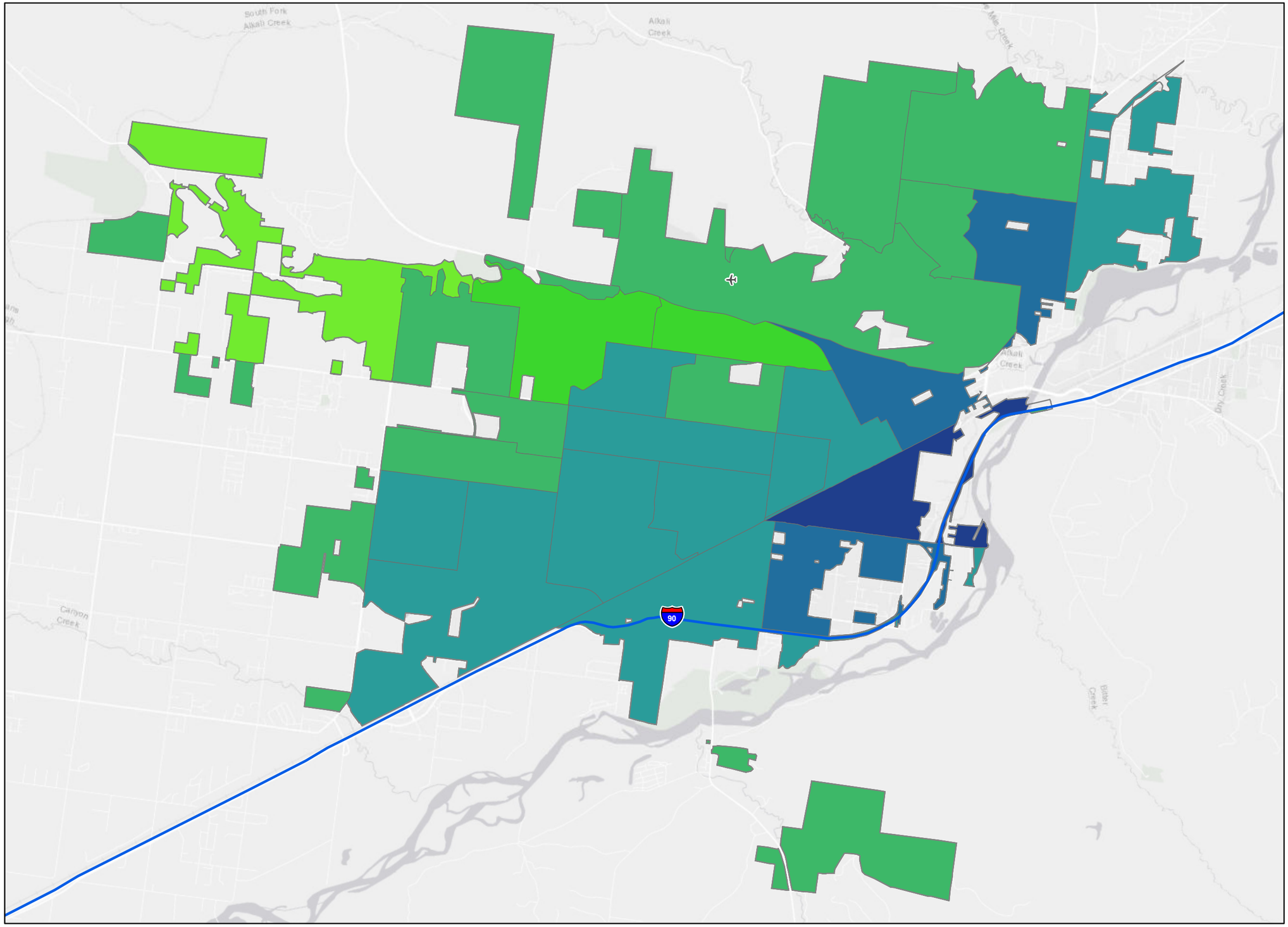
Census tracts with population less than 50 were excluded from the map.

N
W E
0 1.25 2.5
Miles

Data sources:
CDC BRFSS 2015, US Census Bureau 2010 Census, ACS 2011-2015



Mammography use among women aged 50-74 years by census tract, Billings, MT, 2016



Percent (%)

- 61.7 - 65.6
- 65.7 - 68.6
- 68.7 - 71.2
- 71.3 - 73.7
- 73.8 - 76.1
- 76.2 - 78.5
- City boundary

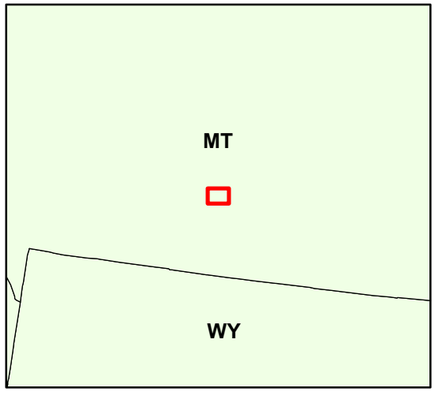
Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

Census tracts with population less than 50 were excluded from the map.

N W E

0 1.25 2.5
Miles

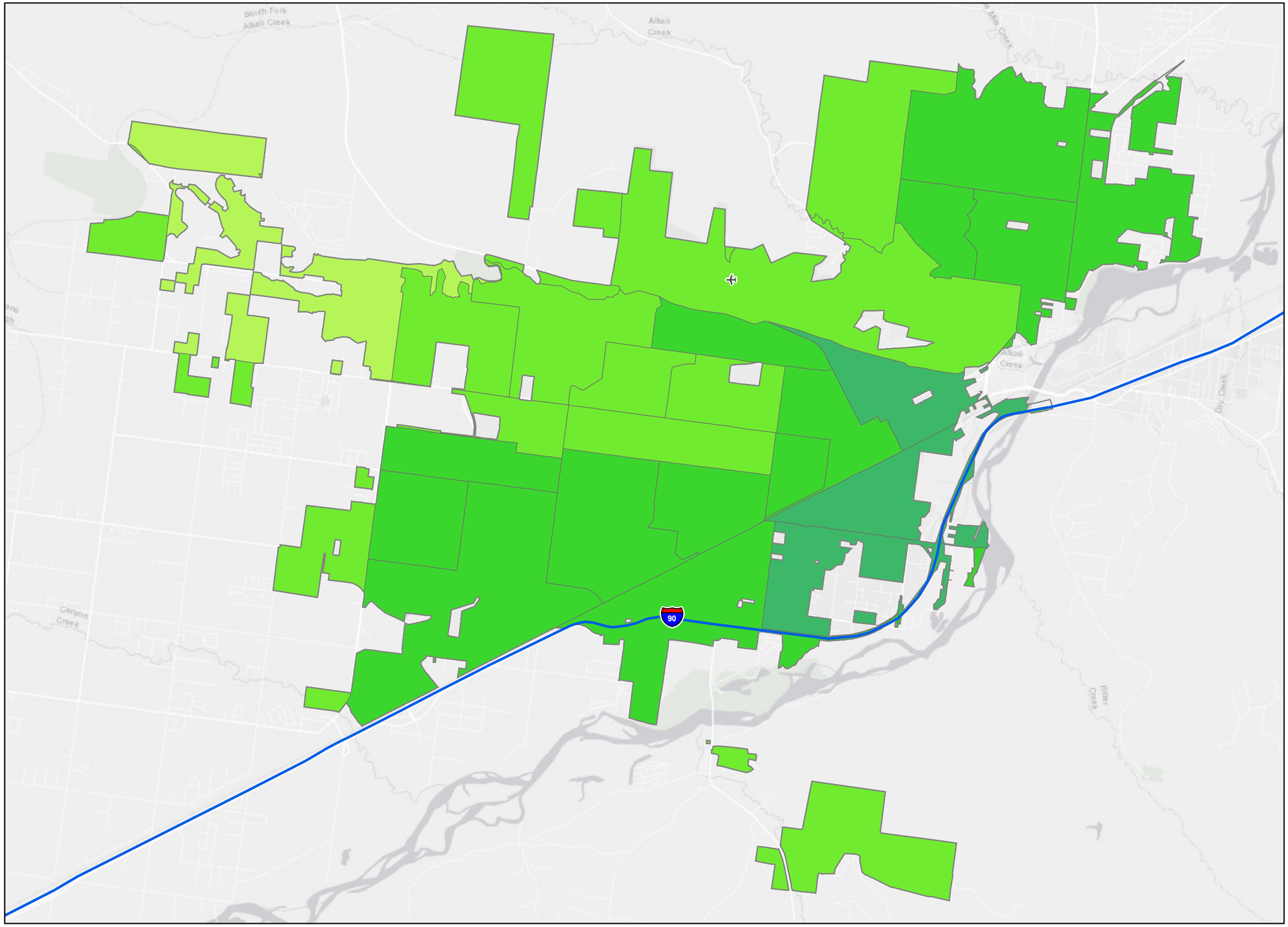
Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016.



Map created by CDC/NCCDPHP/DPH/ESB-GIS

Date: 9/11/2018

Papanicolaou smear use among adult women aged 21-65 years by census tract, Billings, MT, 2016



Percent (%)

- 80.0 - 81.5
- 81.6 - 83.1
- 83.2 - 84.7
- 84.8 - 86.5
- City boundary

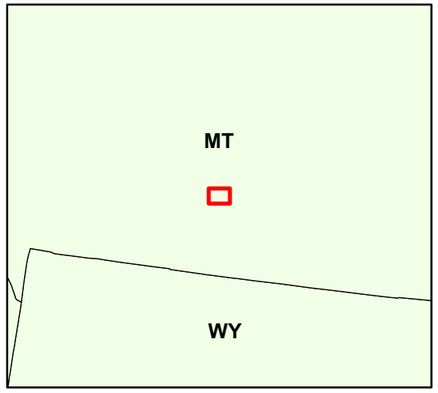
Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

Census tracts with population less than 50 were excluded from the map.

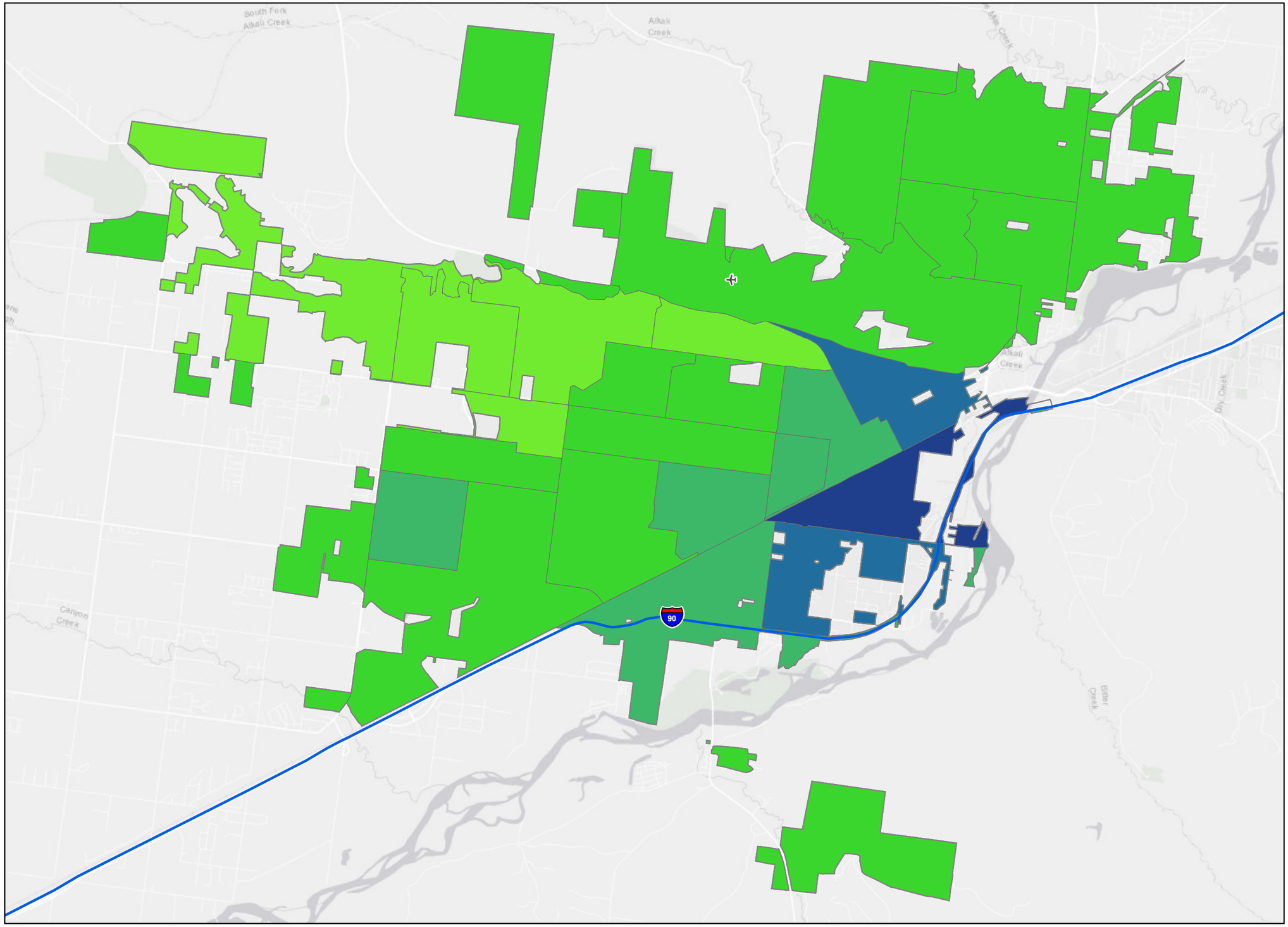
N W E S

0 1.25 2.5
Miles

Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



Fecal occult blood test, sigmoidoscopy, or colonoscopy among adults aged 50-75 years by census tract, Billings, MT, 2016



Percent (%)

- 43.1 - 48.5
- 48.6 - 53.1
- 57.5 - 61.5
- 61.6 - 65.4
- 65.5 - 69.2
- City boundary

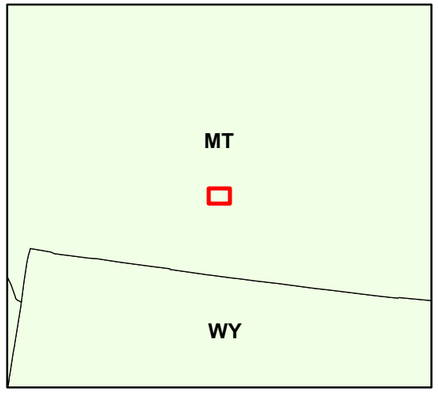
Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

Census tracts with population less than 50 were excluded from the map.

N
W E
S

0 1.25 2.5
Miles

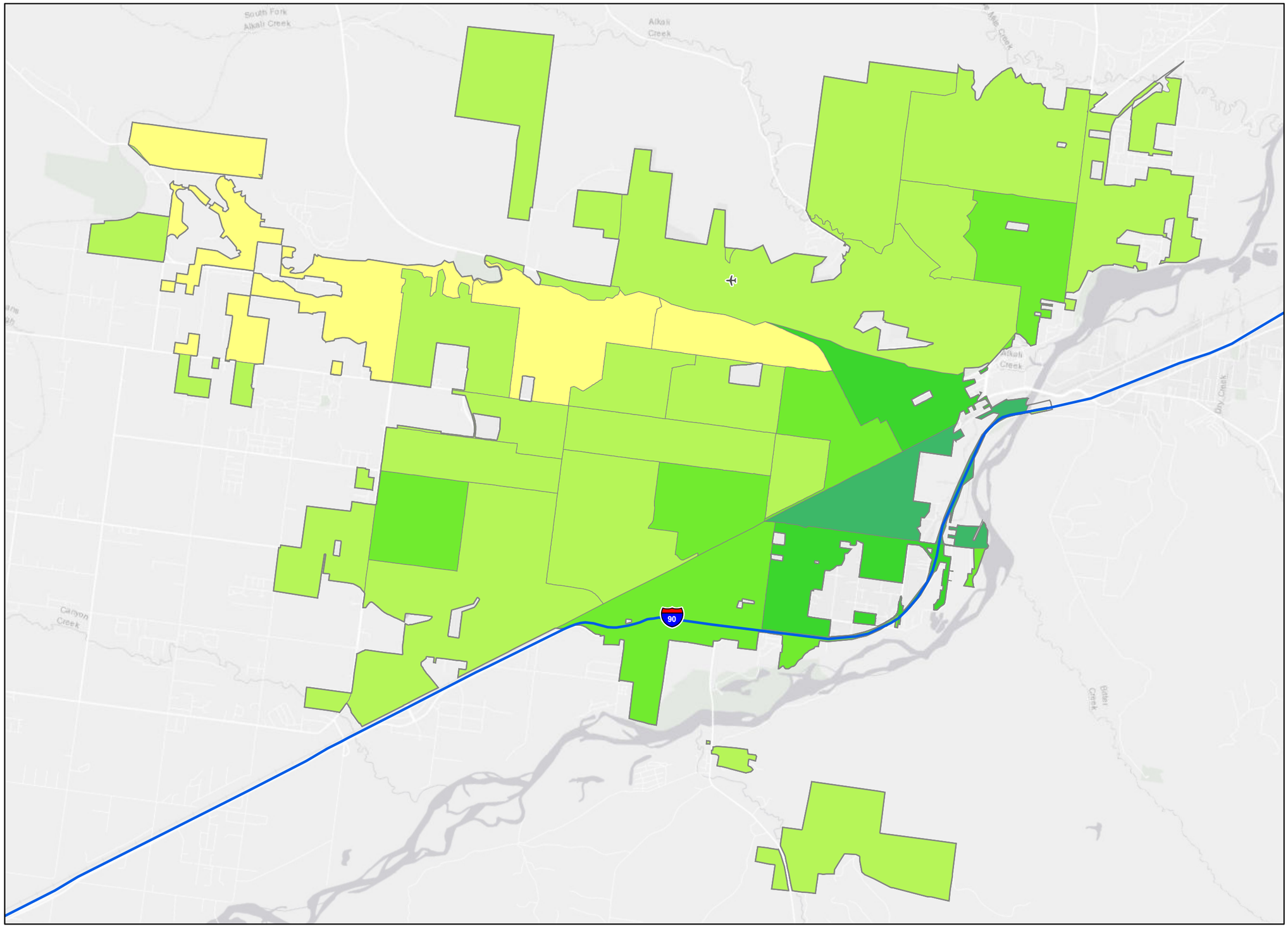
Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



Map created by CDC/NCCDPHP/DPH/ESB-GIS

Date: 9/28/2018

Older adults men aged ≥65 years who are up to date on a core set of clinical preventive services by census tract, Billings, MT, 2016

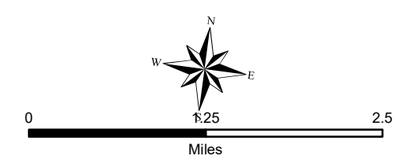


Percent (%)

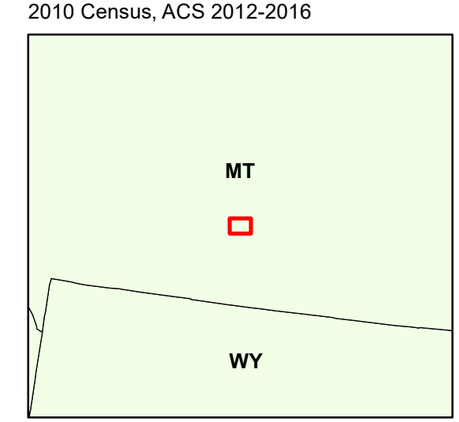
- 31.6 - 34.9
- 35.0 - 38.2
- 38.3 - 41.8
- 41.9 - 46.4
- 46.5 - 58.9
- City boundary

Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

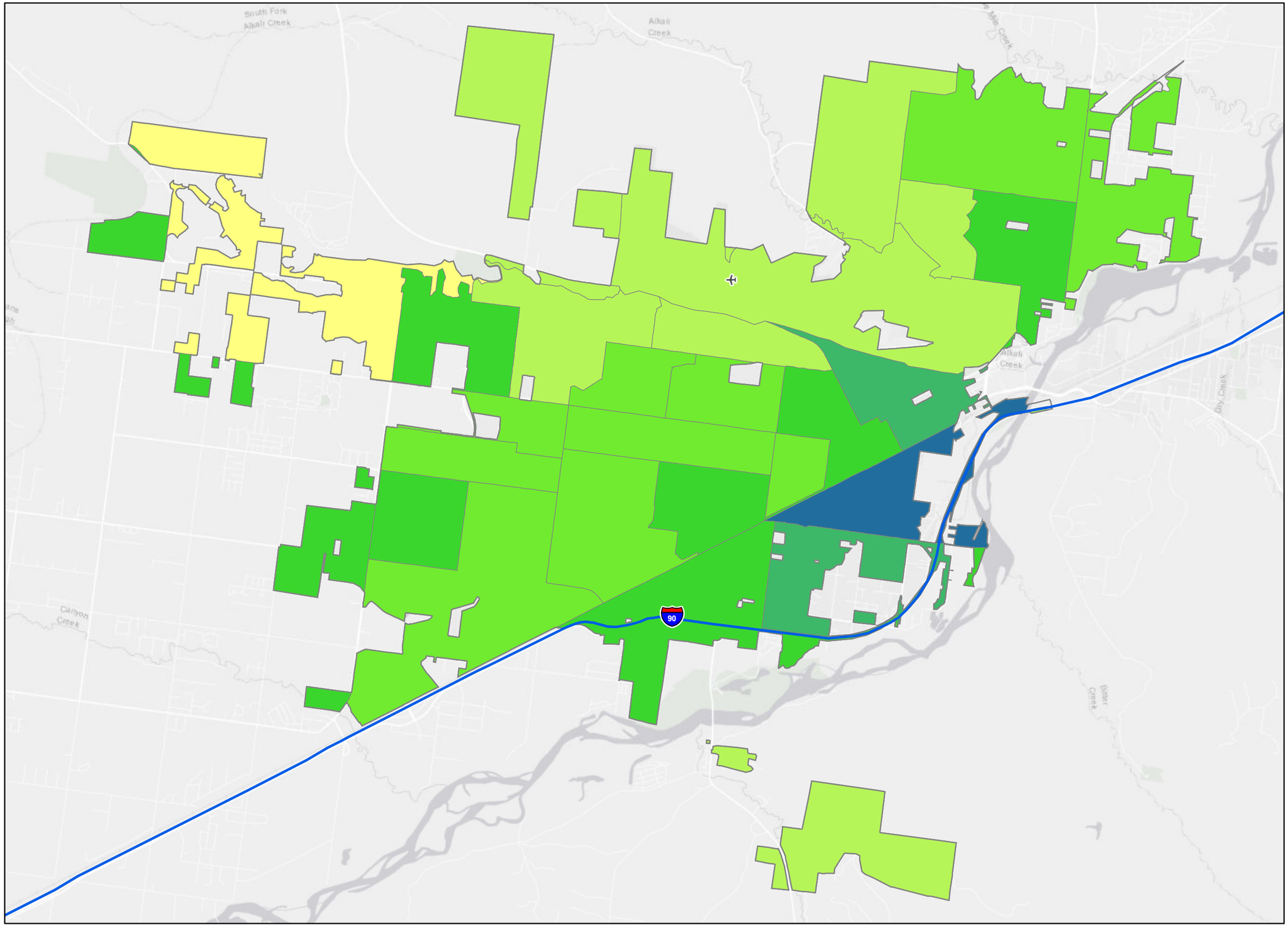
Census tracts with population less than 50 were excluded from the map.



Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



Older adults women aged ≥65 years who are up to date on a core set of clinical preventive services by census tract, Billings, MT, 2016

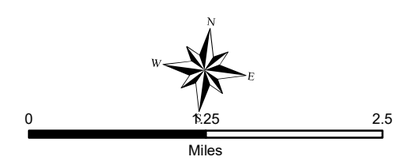


Percent (%)

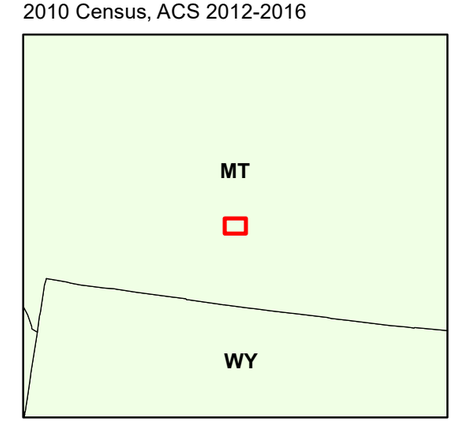
- 23.0 - 26.3
- 29.6 - 32.6
- 32.7 - 35.7
- 35.8 - 39.0
- 39.1 - 43.0
- 43.1 - 55.1
- City boundary

Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

Census tracts with population less than 50 were excluded from the map.



Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016

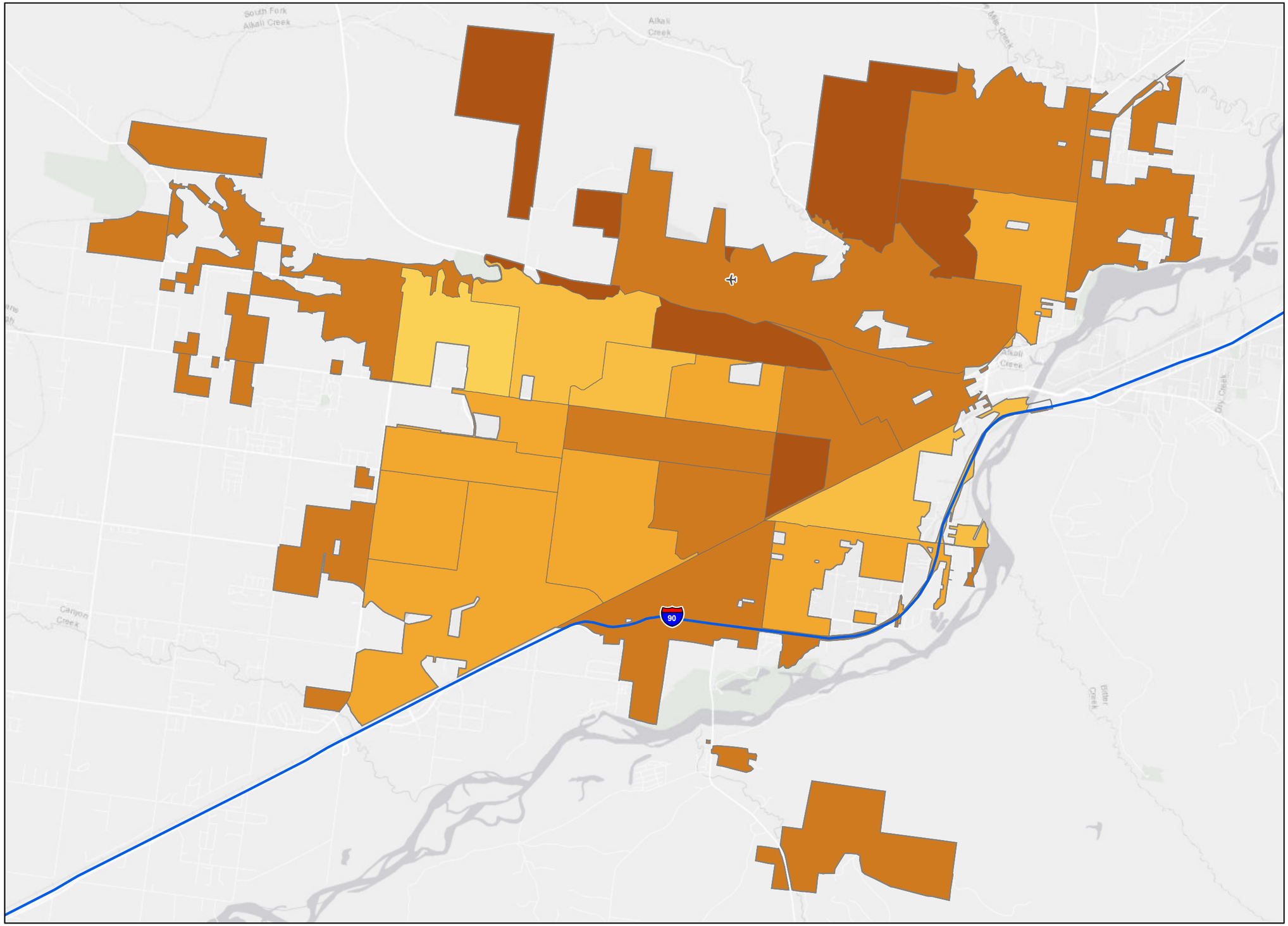


Map created by CDC/NCCDPHP/DPH/ESB-GIS

Date: 8/9/2018

Unhealthy Behaviors

Binge drinking prevalence among adults aged ≥18 years by census tract, Billings, MT, 2016



Percent (%)

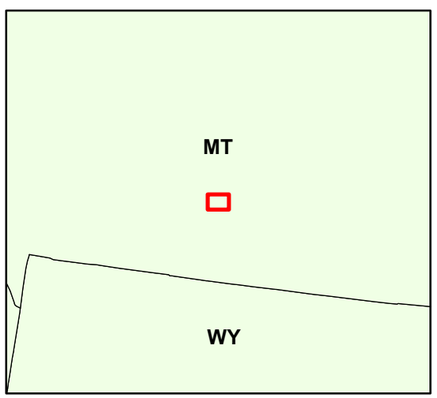
- 14.0 - 16.0
- 16.1 - 18.0
- 18.1 - 20.1
- 20.2 - 22.6
- 22.7 - 25.7
- City boundary

Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

Census tracts with population less than 50 were excluded from the map.

N
W E
0 1.25 2.5
Miles

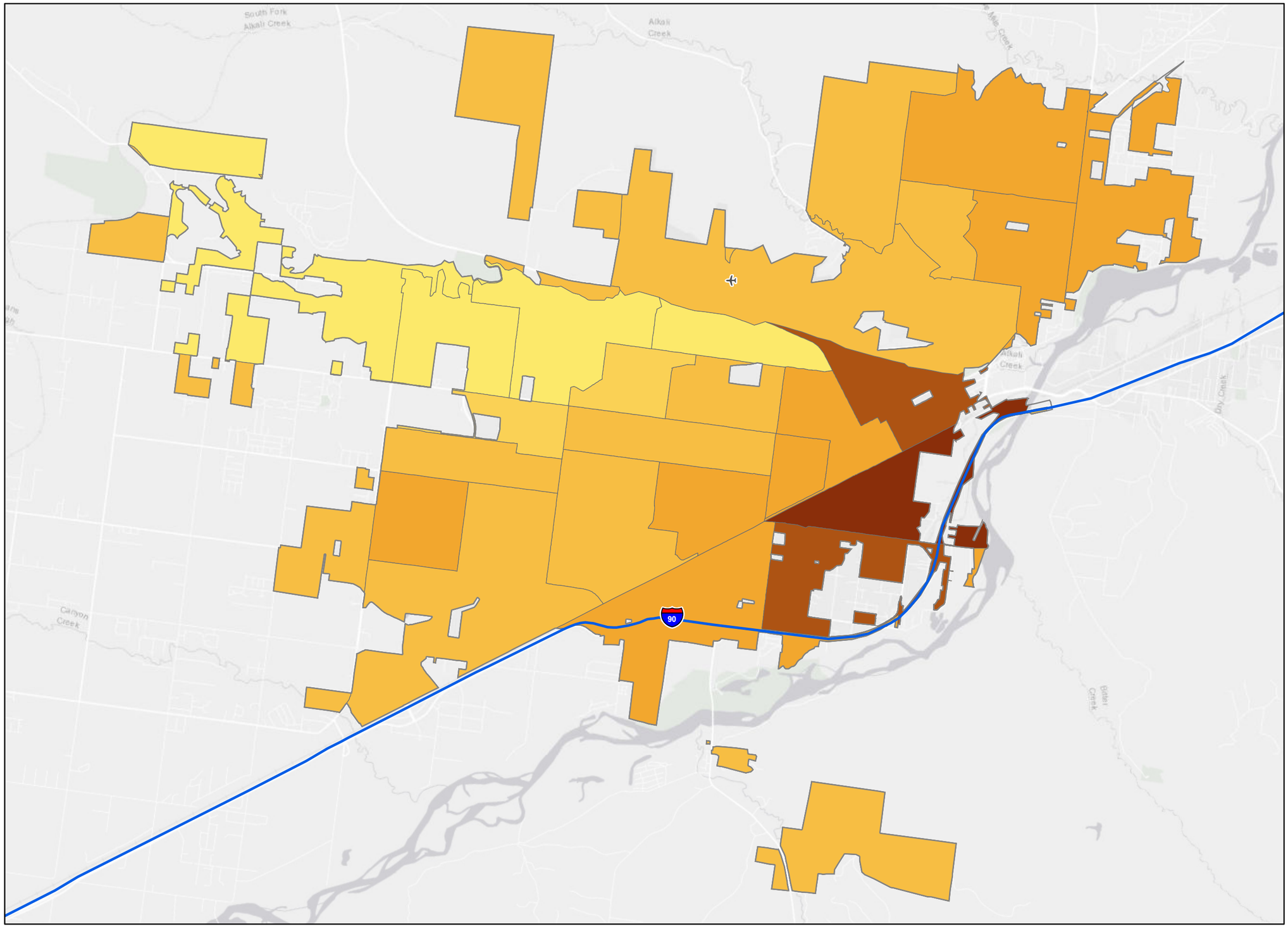
Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



Map created by CDC/NCCDPHP/DPH/ESB-GIS

Date: 8/6/2018

Current smoking among adults aged ≥18 years by census tract, Billings, MT, 2016



Percent (%)

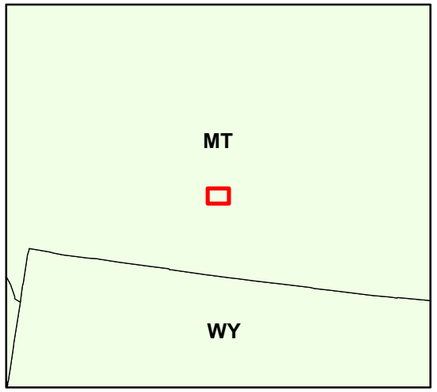
- 11.0 - 13.7
- 13.8 - 16.4
- 16.5 - 19.1
- 19.2 - 22.0
- 25.2 - 28.6
- 28.7 - 33.0
- City boundary

Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

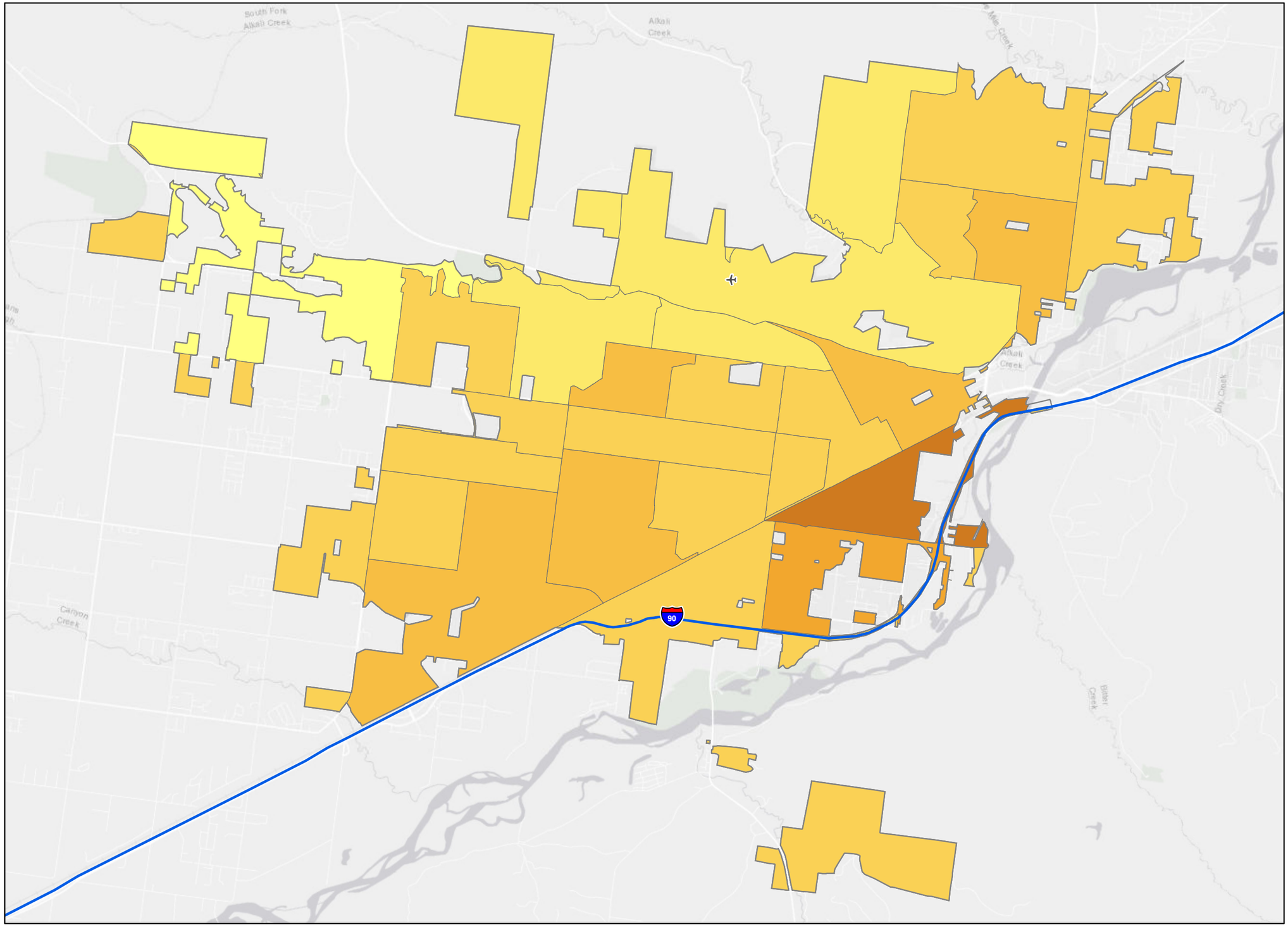
Census tracts with population less than 50 were excluded from the map.

N
W E
0 1.25 2.5
Miles

Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



No leisure-time physical activity among adults aged ≥18 years by census tract, Billings, MT, 2016



Percent (%)

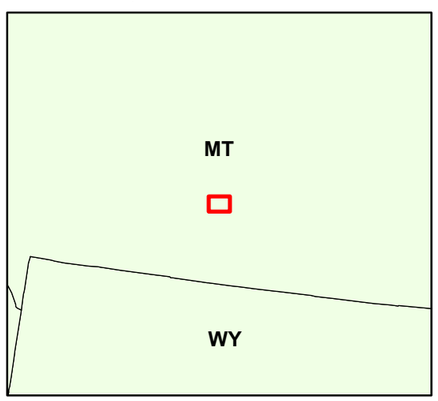
- 7.9 - 14.7
- 14.8 - 18.4
- 18.5 - 22.0
- 22.1 - 25.7
- 25.8 - 29.5
- 29.6 - 33.4
- City boundary

Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

Census tracts with population less than 50 were excluded from the map.

N
W E
0 1.25 2.5
Miles

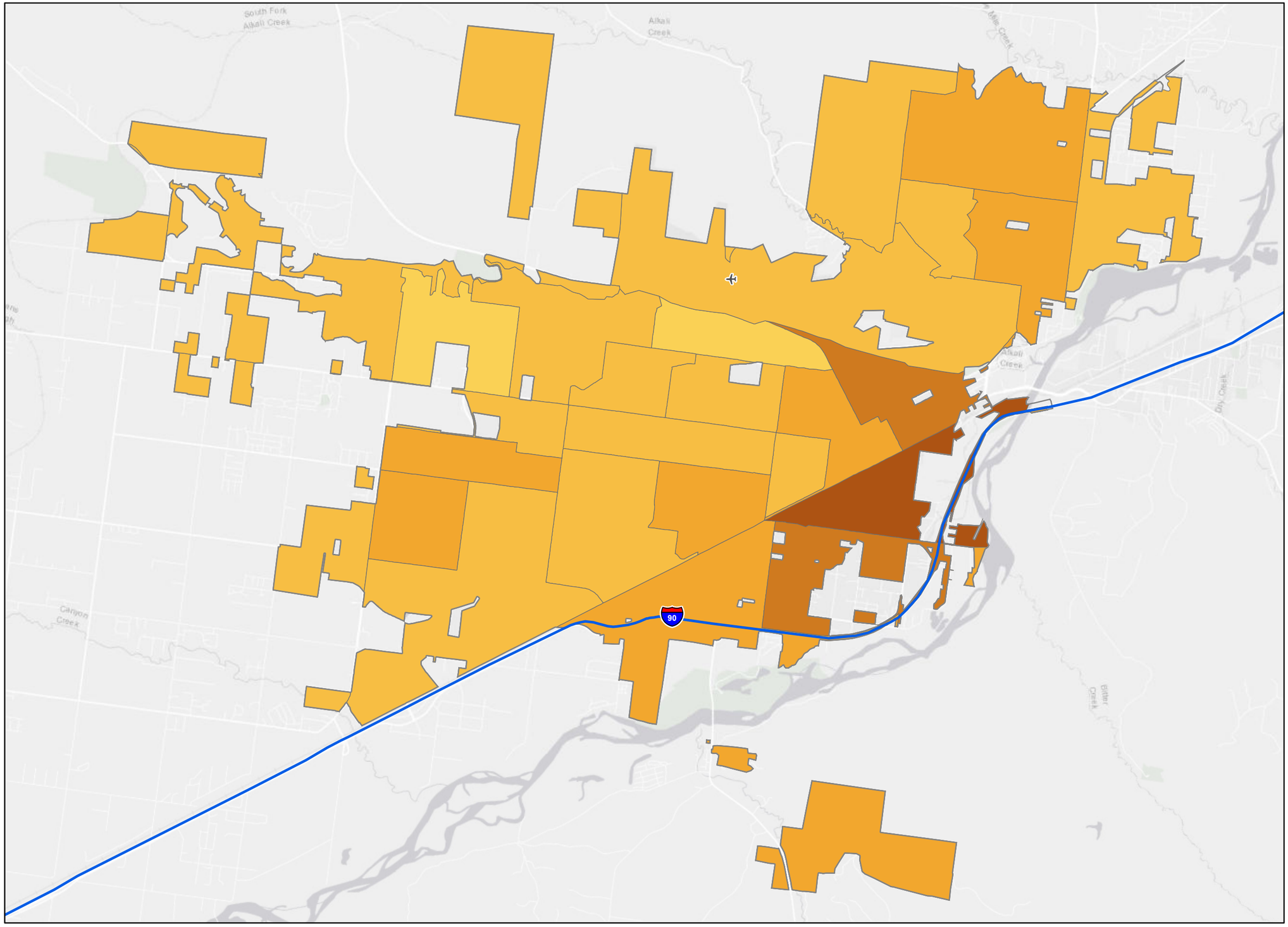
Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016.



Map created by CDC/NCCDPHP/DPH/ESB-GIS

Date: 9/7/2018

Obesity among adults aged 18 years and older by census tract, Billings, MT, 2016

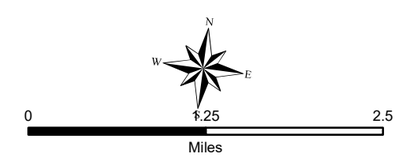


Percent (%)

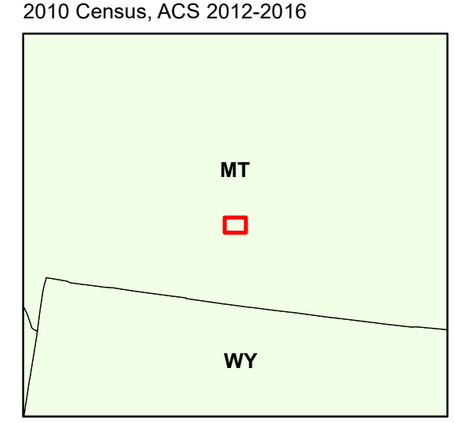
- 22.9 - 26.3
- 26.4 - 29.7
- 29.8 - 33.2
- 33.3 - 37.1
- 37.2 - 41.6
- City boundary

Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

Census tracts with population less than 50 were excluded from the map.



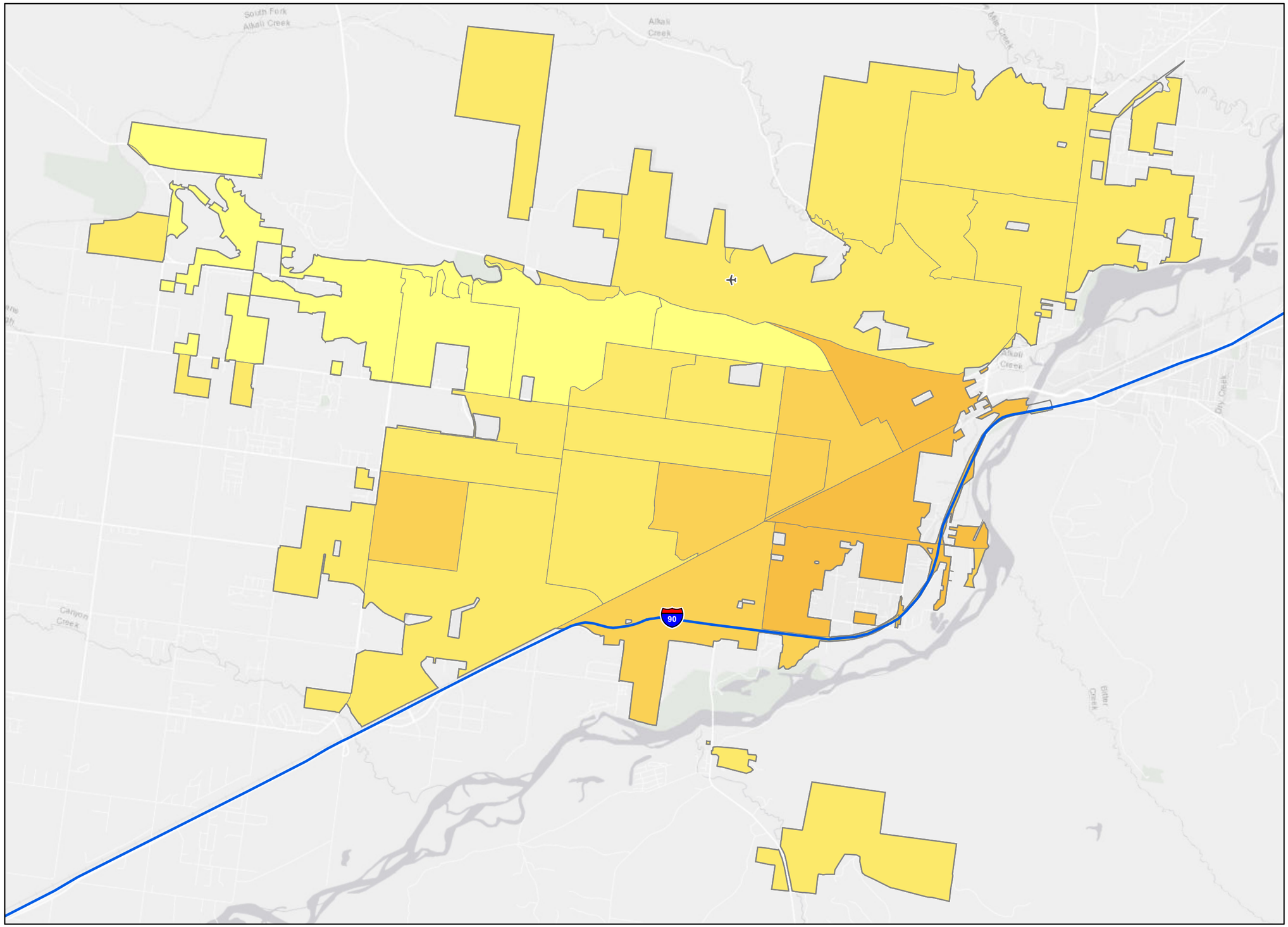
Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016



Map created by CDC/NCCDPHP/DPH/ESB-GIS

Date: 8/13/2018

Sleeping less than 7 hours among adults aged 18 years and older by census tract, Billings, MT, 2016

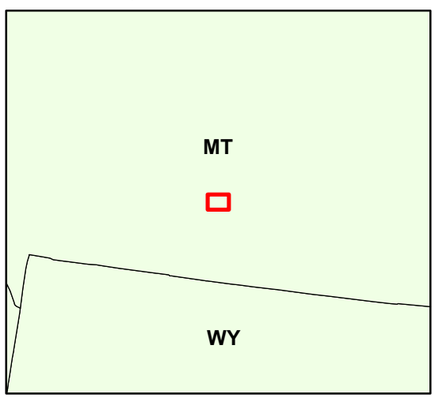


Percent (%)

- 16.1 - 28.1
- 28.2 - 31.1
- 31.2 - 33.8
- 33.9 - 36.3
- City boundary

Classification:
Jenks natural breaks (9 classes) based on data for all 500 cities' census tracts. Legend depicts only those data classes within this map extent.

Census tracts with population less than 50 were excluded from the map.

N
W E
0 1.25 2.5
Miles

Data sources:
CDC BRFSS 2016, US Census Bureau 2010 Census, ACS 2012-2016