**Supporting Table 1: Comparison of rural-urban classification indexes: United States, Midwest, and Wisconsin.** Rural-Urban classification indexes in use in current cancer research and the amount and percentage of total land area, number of geographical units, and population that each index allocates to urban and rural codes. Indexes include: Urban Rural Classification of Urban Areas and Urban Clusters (UACE), Frontier and Remote Area Codes (FAR), Rural-Urban Commuting Area (RUCA), ZIP Code Tabulation Area Rural-Urban Commuting Area (RUCA(z)), Rural-Urban Continuum Codes (RUCC), Urban Influence Codes (UIC), National Center for Health Statistics (NCHS) Urban-Rural Classification Scheme for Counties, Core Based Statistical Areas (CBSA), and Index of Relative Rurality (IRR). RUCA codes are divided into rural and urban groupings based on 2 separate processes, represented as option 1 and option 2 for each the census-tract and ZCTA-based codes. The year in parentheses indicates the version of the index that was used. Midwest states include North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, Missouri, Wisconsin, Illinois, Michigan, Indiana, and Ohio.

**Supporting Table 1: Comparison of rural-urban classification indexes: United States, Midwest, and Wisconsin.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Land Area (square miles)** | **Geographical Units** | **Total Population** |  |
| **Urban** | **Rural** | **Urban** | **Rural** | **Urban** | **Rural** |
| **Index** | **Geographical Unit** | **Urban Codes** | **Rural Codes** | **Region** | **Square Miles** | **% of Total** | **Square Miles** | **% of Total** | **Count** | **% of Total** | **Count** | **% of Total** | **Total** | **% of Total** | **Total** | **% of Total** | **Papers** |
| **UACE (2010)** | **Census Blocks** | **Urban AreaUrban Cluster** | **None** | **USA** | 106,386 | 3.0% | 3,425,519  | 97.0% |   |   |   |   | 249,253,271 | 80.7% | 59,492,267 | 19.3% | **Johnson 20161****Pruitt 20152****Virani 20113** |
| **Midwest** | 23,013 | 3.1% | 727,510  | 96.9% |   |   |   |   | 50,771,646 | 75.9% | 16,155,355 | 24.1% |
| **Wisconsin** | 1,879 | 3.5% | 52,279  | 96.5% |   |   |   |   | 3,989,638 | 70.2% | 1,697,348 | 29.9% |
| **FAR(2010)** | **ZIP/****0.5^2****km grid** | **None** | **1-4** | **USA** | 1,725,471 | 48.0% | 1,868,901  | 52.0% | 25,008  | 82.4% | 5,329  | 17.6% | 296,083,828 | 96.1% | 12,156,019 | 3.9% | **Pruitt 20152** |
| **Midwest** | 419,503 | 54.7% | 347,517 | 45.3% | 7175 | 76.8% | 2172 | 23.2% | 62,923,209 | 94.1% | 3,955,309 | 5.9% |
| **Wisconsin** | 43,892 | 78.2% | 12,214  | 21.8% | 629  | 86.8% | 96  | 13.2% | 5,497,147 | 96.8% | 182,725 | 3.2% |
| **RUCA(2010)(option 1)** | **Census****Tract** | **1-3** | **4-10** | **USA** | 847,792 | 24.0% | 2,683,986  | 76.0% | 59,389  | 81.3% | 13,390  | 18.3% | 257,810,493 | 83.5% | 50,935,045 | 16.5% | **Onega 20174****Cetnar 20135****White 20116** |
| **Midwest** | 170,061 | 22.7% | 580,432 | 77.3% | 12604 | 74.1% | 4409 | 25.9% | 50,817,496 | 75.9% | 16,109,505 | 24.1% |
| **Wisconsin** | 15,689 | 29.0% | 38,469  | 71.0% | 971  | 68.9% | 423  | 30.0% | 4,045,911 | 71.1% | 1,641,075 | 28.9% |
| **RUCA(2010)(option 2)** | **Census****Tract** | **1.0, 1.1, 2.0, 2.1, 3.0, 4.1, 5.1, 7.1, 8.1, and 10.1** | **Others** | **USA** | 921,261 | 26.1% | 2,610,517  | 73.9% | 60,026  | 82.5% | 12,753  | 17.5% | 260,671,526 | 84.4% | 48,074,012 | 15.6% | **Bradley 20207****Yaghjyan 2019** |
| **Midwest** | 184,952 | 24.6% | 565,542 | 75.4% | 12743 | 74.9% | 4270 | 25.1% | 51,408,846 | 76.8% | 15,518,155 | 23.2% |
| **Wisconsin** | 16,483 | 30.4% | 37,675  | 69.6% | 987  | 70.8% | 407  | 29.2% | 4,124,850 | 72.5% | 1,562,136 | 27.5% |
| **RUCA(z)(2013)(option 1)** | **ZCTA** | **1-3** | **4-10** | **USA** |   |   |   |   | 24,497  | 59.7% | 16,553  | 40.3% |   |   |   |   | **Hung 20208****Onega 2019****Kinney 20169** |
| **Midwest** |   |   |   |   | 5362 | 47.1% | 6031 | 52.9% |   |   |   |   |
| **Wisconsin** |   |   |   |   | 408  | 45.6% | 487  | 54.4% |   |   |   |   |
| **RUCA(z)(2013)(option 2)** | **ZCTA** | **1.0, 1.1, 2.0, 2.1, 3.0, 4.1, 5.1, 7.1, 8.1, and 10.1** | **Others** | **USA** |   |   |   |   | 28,277  | 68.9% | 12,773  | 31.1% |   |   |   |   | **Rogers 202010****Freeman 201911Markossian 201612** |
| **Midwest** |   |   |   |   | 6496 | 57.0% | 4897 | 43.0% |   |   |   |   |
| **Wisconsin** |   |   |   |   | 521  | 58.2% | 374  | 41.8% |   |   |   |   |
| **RUCC(2013)** | **County** | **1-3** | **4-9** | **USA** | 978,308  | 27.7% | 2,553,597  | 72.3% | 1,167  | 37.1% | 1,976  | 62.9% | 262,452,132 | 85.1% | 43,293,406 | 15.0% | **Gosain 201913****Zahnd 201814****Blake 201715** |
| **Midwest** | 182,601 | 24.3% | 567,922 | 75.7% | 302 | 28.6% | 753 | 71.4% | 51,690,737 | 77.2% | 15,236,264 | 22.8% |
| **Wisconsin** | 16,821  | 31.1% | 37,337  | 68.9% | 26  | 36.1% | 46  | 63.9% | 4,178,924 | 73.5% | 1,508,062 | 26.5% |
| **UIC****(2013)** | **County** | **1-2** | **3-12** | **USA** | 978,308  | 27.7% | 2,553,597  | 72.3% | 1,167  | 37.1% | 1,976  | 62.9% | 262,452,132 | 85.0% | 46,293,406 | 15.0% | **Mobley 201916****Cole 201317****Baldwin 201318** |
| **Midwest** | 182,601 | 24.3% | 567,922 | 75.7% | 302 | 28.6% | 753 | 71.4% | 51,690,737 | 77.2% | 15,236,264 | 22.8% |
| **Wisconsin** | 16,821  | 31.1% | 37,337  | 68.9% | 26  | 36.1% | 46  | 63.9% | 4,178,924 | 73.5% | 1,508,062 | 26.5% |
| **NCHS URCSC(2013)** | **County** | **1-4** | **5-6** | **USA** | 978,308  | 27.7% | 2,553,597  | 72.3% | 1,167  | 37.1% | 1,976  | 62.9% | 262,452,132 | 85.0% | 46,293,406 | 15.0% | **Garcia 201919****Callaghan 201820** |
| **Midwest** | 182,601 | 24.3% | 567,922 | 75.7% | 302 | 28.6% | 753 | 71.4% | 51,690,737 | 77.2% | 15,236,264 | 22.8% |
| **Wisconsin** | 16,821  | 31.1% | 37,337  | 68.9% | 26  | 36.1% | 46  | 63.9% | 4,178,924 | 73.5% | 1,508,062 | 26.5% |
| **CBSA(2013)** | **County** | **Metro Statistical AreaMicro Statistical Area** | **Non-core** | **USA** | 1,674,010  | 47.4% | 1,857,895  | 52.6% | 1,808  | 57.5% | 1,335  | 42.5% | 289,606,345 | 93.8% | 19,139,193 | 6.2% | **Yaghjyan 2019****Tran 201921****Hashibe 201822** |
| **Midwest** | 343,220 | 45.7% | 407,302 | 54.3% | 534 | 50.6% | 521 | 49.4% | 60,583,984 | 90.5% | 6,343,017 | 9.5% |
| **Wisconsin** | 27,836  | 51.4% | 26,321  | 48.6% | 40  | 55.6% | 32  | 44.4% | 4,957,944 | 87.2% | 729,042 | 12.8% |
| **IRR(2010)** | **County** | **Set: < 0.5000** | **Set: >= 0.5000** | **USA** | 877,936  | 24.9% | 2,652,796  | 75.1% | 1,162  | 37.0% | 1,979  | 63.0% | 273,069,268 | 88.5% | 35,521,346 | 11.5% | **Cohen 201723****Waldorf 2015** |
| **Midwest** | 179,070  | 23.9% | 571,452  | 76.1% | 309  | 29.3% | 746  | 70.7% | 55,588,772 | 83.1% | 11,338,229 | 16.9% |
| **Wisconsin** | 18,579  | 34.3% | 35,579  | 65.7% | 29  | 40.3% | 43  | 59.7% | 4,631,271 | 81.4% | 1,055,715 | 18.6% |

**Supporting Table 2: Agreement between binary and ternary rural-urban indexes across census tracts, land area, and population for the United States and University of Wisconsin – Health Pancreatic Cancer Registry Patients.** Count and percent agreement of census tracts, land area (square miles), population, and Registry patients across Rural-Urban Continuum Codes (RUCC), Urban Influence Codes (UIC), National Center for Health Statistics (NCHS) Urban-Rural Classification Scheme for Counties, Index of Relative Rurality (IRR), Rural-Urban Commuting Area (RUCA), and ZIP Code Tabulation Area Rural-Urban Commuting Area (RUCA(z)) when those indexes are treated as binary and ternary rural-urban variables. The Index of Relative Rurality was missing data for 0.1% of the US Population and Registry Patients.

**Supporting Table *2*: Agreement between binary and ternary rural-urban indexes across census tracts, land area, and population for the United States and University of Wisconsin – Health Pancreatic Cancer Registry Patients.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Land Area (square miles)** | **Census Tracts** | **Population** | **Registry Patients\*** |
| **Variable Type** | **Indexes Included** | **Agreement andDisagreement** | **Rural - Urban Category** | **Count** | **Percent** | **% agree- ordisagreement** | **Count** | **Percent** | **% agree- ordisagreement** | **Count** | **Percent** | **% agree- ordisagreement** | **Count** | **Percent** | **% agree- ordisagreement** |
| **Binary** | **RUCC, UIC, NCHS, IRR, RUCA** | **Agree** | **Metropolitan** |  535,871  | 15.2% | 78.7%  |  57,051  | 78.4% | 88.3%  | 247,994,082  | 80.3% | 88.8%  | 908 | 59.0% | 73.4%  |
| **Non-metropolitan** | 2,242,865  | 63.5% |  7,242  | 10.0% | 26,248,722  | 8.5% | 222 | 14.4% |
| **Disagree** | **Metropolitan &** **Non-metropolitan** | 751,869 | 21.3% | 21.3% | 8,448 | 11.6% | 11.6% | 34,347,840 | 11.1% | 11.1% | 408 | 26.5% | 26.5% |
| **Binary** | **RUCC & RUCA** | **Agree** | **Metropolitan** | 676,901  | 19.2% | 86.6%  |  58,050  | 79.8% | 94.5%  | 252,306,164  | 81.7% | 94.9%  | 920 | 59.8% | 91.0%  |
| **Non-Metropolitan** | 2,382,706  | 67.5% |  10,742  | 14.8% | 40,789,077  | 13.2% | 480 | 31.2% |
| **Disagree** | **Metropolitan &** **Non-metropolitan** | 472,171  | 13.4% | 13.4% |  3,987  | 5.5% | 5.5% | 15,650,297  | 5.1% | 5.1% | 138 | 9.0% | 9.0% |
| **Ternary** | **RUCC, UIC, NCHS, IRR, RUCA** | **Agree** | **Metropolitan** | 535,871  | 15.2% | 41.3%  | 57,051  | 78.4% | 81.8%  | 247,994,082  | 80.3% | 83.4%  | 908 | 59.0% | 60.4%  |
| **Micropolitan** | 250,702  | 7.1% | 2,104  | 2.9% | 8,722,475  | 2.8% | 21 | 1.4% |
| **Rural/Noncore** | 672,911  | 19.1% | 399  | 0.5% | 886,289  | 0.3% | 1 | 0.1% |
| **Disagree****(1 level)** | **Metropolitan & Micropolitan** | 353,001  | 10.0% | 47.3%  | 5,610  | 7.7% | 14.2%  | 24,208,656  | 7.8% | 13.2%  | 244 | 15.9% | 28.8%  |
| **Micropolitan & Rural/Noncore** | 1,319,251  | 37.4% | 4,739  | 6.5% | 16,639,958  | 5.4% | 200 | 13.0% |
| **Disagree****(2 levels)** | **Metropolitan & Rural/Noncore** | 186,851  | 5.3% | 5.3% | 1,421  | 2.0% | 2.0% | 4,639,840  | 1.5% | 1.5% | 28 | 1.8% | 1.8% |
| **Disagree****(all levels)** | **Metropolitan, Micropolitan, & Rural/Noncore** | 212,017  | 6.0% | 6.0% | 1,417  | 1.9% | 1.9% | 5,499,314  | 1.8% | 1.8% | 136 | 8.8% | 8.8% |
| **Ternary** | **RUCC & RUCA** | **Agree** | **Metropolitan** | 676,901  | 19.2% | 54.1%  | 58,050  | 79.8% | 88.3%  | 252,306,164  | 88.4% | 88.8%  | 920 | 59.8% | 74.9%  |
| **Micropolitan** | 405,347  | 11.5% | 5,071  | 7.0% | 405,347  | 0.1% | 184 | 12.0% |
| **Rural/Noncore** | 827,415  | 23.4% | 1,177  | 1.6% | 827,415  | 0.3% | 49 | 3.2% |
| **Disagree****(1 level)** | **Metropolitan & Micropolitan** | 201,571  | 5.7% | 38.3%  | 2,484  | 3.4% | 9.6%  | 10,777,424  | 3.8% | 9.5%  | 87 | 5.7% | 21.7%  |
| **Micropolitan & Rural/Noncore** | 1,149,944  | 32.6% | 4,494  | 6.2% | 16,270,060  | 5.7% | 247 | 16.0% |
| **Disagree****(2 levels)** | **Metropolitan & Rural/Noncore** | 270,599  | 7.7% | 7.7% | 1,503  | 2.1% | 2.1% | 4,872,873  | 1.7% | 1.7% | 51 | 3.3% | 3.3% |

\* RUCA(z) was used in place of RUCA for the Registry Patients since patient ZIP codes were available in the registry and census tracts were not.

**United States**

**Wisconsin**

 

**B**

**A**

**C**

**D**

**Geographical Units**

**Supporting Figure 1: Comparison of rural-urban indexes by land area and geographical unit distributions.** Geographical unit is measured at the county-level for Rural-Urban Continuum Codes (RUCC), Urban Influence Codes (UIC), National Center for Health Statistics (NCHS) Urban-Rural Classification Scheme for Counties, and Index of Relative Rurality (IRR), census-tract level for Rural-Urban Commuting Area (RUCA), and ZIP Code Tabulation Area (ZCTA) level for ZCTA Rural-Urban Commuting Area (RUCA(z)) for the United States (A) and Wisconsin (B). Land area distributions are shown for the United States (C) and Wisconsin (D). Each index is standardized such that the ‘Rural-Urban Interface’ line lies between those values that the index has designated as urban (left of line) and rural (right of line). Center points indicate the median of the index, boxes indicate the inter-quartile range, and spikes indicate the upper- and lower-adjacent values (1.5 times the inter-quartile range).

\* RUCA(z) is based on 2013 ZCTAs. Land Area data is not available at the ZCTA-level for 2013, so those distributions are excluded from the figure.

**Land Area**

**Supporting Figure 2: Geographical unit distributions over time across the United States, Wisconsin, and University of Wisconsin – Health Pancreatic Cancer Registry Patients.** Geographical unit is measured at the county-level for Rural-Urban Continuum Codes (RUCC), Urban Influence Codes (UIC), National Center for Health Statistics (NCHS) Urban-Rural Classification Scheme for Counties, and Index of Relative Rurality (IRR), census tract level for Rural-Urban Commuting Area (RUCA), and ZIP Code Tabulation Area (ZCTA) level for ZCTA Rural-Urban Commuting Area (RUCA(z)). Center points indicate the median of the index, boxes indicate the inter-quartile range, and spikes indicate the upper- and lower-adjacent values (1.5 times the inter-quartile range). Changes in the RUCC and UIC ranges are a result of changes in their respective methodologies.

**United States**

**Wisconsin**

**Registry Patients**

  

**Rural-Urban**

**Continuum Code**

  

**Urban Influence Codes**

  

**National Center for Health Statistics**

  

**Index of Relative Rurality**

  

**Rural-Urban Commuting Area**

**Rural-Urban Commuting Area (ZCTA)**

**Supporting Figure 2: Geographical unit distributions over time across the United States, Wisconsin, and University of Wisconsin – Health Pancreatic Cancer Registry Patients.**