CONSIDERATIONS FOR DEFINING RURAL PLACES IN HEALTH POLICIES AND PROGRAMS

Prepared by the
RUPRI Health Panel -

Keith J. Mueller, PhD
Andrew F. Coburn, PhD
Alana Knudson, PhD
Jennifer P. Lundblad, PhD, MBA
A. Clinton MacKinney, MD, MS
Timothy D. McBride, PhD

Guest Authors –
Erin Mobley, PhD
Fred Ullrich, BA
Abigail Barker, PhD

May 2020

Acknowledgements

This report was supported by the Rural Policy Research Institute through a cooperative agreement with the Federal Office of Rural Health Policy (FORHP), Health Resources and Services Administration (HRSA), U.S. Department of Health and Human Services (HHS), under cooperative agreement/grant #U18RH30805. The information, conclusions and opinions expressed in this report are those of the authors and no endorsement by FORHP, HRSA, or HHS is intended or should be inferred.

The Health Panel would like to thank Susan Nardie for editing this document.

Table of Contents

PURPOSE 1
KEY QUESTIONS 1
FRAMING A DEFINITION 6
BRIEF OVERVIEW OF CURRENTLY USED RURAL DEFINITIONS 7
OPTIONS FOR DEFINING RURAL PLACES 11
REFERENCES 13

PURPOSE

Rural definitions used in statute and policy define populations and geographies to direct resources for health care service delivery to underserved peoples. But recent events, including re-tooling of U.S. Census data and shifts in the U.S. economy, have contributed to growing concern about the continued application of historic approaches to defining rural. This paper identifies key questions to ask when creating, modifying, or using a definition; outlines important aspects of framing a rural definition; gives a brief overview of rural definitions currently in use by U.S. Department of Health and Human Services (HHS) programs; and discusses options for creating rural definitions that meet program needs. It updates the Panel's 2007 paper on this subject "Choosing Rural Definitions: Implications for Health Policy"[1].

Definitions of rural are often specific to particular policies and programs, but in general they must be data-driven, based on a relevant framework, align with a heuristic sense of what is rural, use consistent methodology over time, and be timely. Challenges in meeting those criteria include questions of reliability and validity of data, ability to access precise geographic data, and the impact of changes in population mobility and economic activity on rural definitions.

KEY QUESTIONS

Evaluating the definition of rural requires answering three fundamental questions. Each will be discussed in detail below.

1. Why is there a need to reconsider rural definitions?
2. What principles should drive rural definitions?
3. What are contemporary implementation challenges of changing the rural definition for rural health programs and policies?

1. Why is there a need to reconsider rural definitions?

Obtaining reliable counts, or estimates, of rural populations and their characteristics is inherently challenging. The Census Bureau recognizes that remote and rural populations are challenging to count, in part because these populations are widely dispersed and frequently lack traditional addresses,[2] which can lead to undercounting. In addition, the Census Bureau increasingly relies on data collected through sampling techniques (as opposed to a complete "census"); and, data collected in rural locations typically produce smaller samples than those in more populous geographies. As a result, the margin of error in population estimates will likely be larger for rural areas.[3]

For nearly 70 years (since the introduction of "metropolitan areas" by the Bureau of the Budget [now the Office of Management and Budget][4]) mainstream approaches to classifying urban/rural have relied on a combination of population counts from the U.S. Census and measures of geographic economic interdependence based on patterns of commuting for work (also obtained from the U.S. Census). But recent changes in the U.S. economy have called into question the practice of using commuting for work as an indicator of geographic interdependence. Following the Great Recession (2007-2009), both metropolitan and nonmetropolitan counties saw significant declines in employment. By the middle of 2019, employment in nonmetropolitan counties was still below pre-recession levels while employment in metropolitan counties was significantly higher than pre-recession levels.[5] Policy makers are concerned that lagging job growth in nonmetropolitan/rural areas may be permanently changing commuting patterns and that longer commuting for employment by rural residents may render commuting less useful as a proxy for access to services.

For example, in Campbell County, Tennessee, the population increased by 0.8 percent between 2005 and 2010, but wage and salary employment (full-time and part-time jobs) declined by 15.0 percent[6], which affected the percent of local residents commuting to the neighboring urbanized county. People continued to live in the county, but worked elsewhere, which changed the classification of census tracts in the county (using rural-urban commuting areas, [RUCAs]) from rural to urban. But without change in residence, it is unlikely that the need for local healthcare, emergency, and other essential services changed. Commuting is a function of where jobs are located and those patterns change when jobs are lost and created, independent of where services are needed. Campbell County is a single example of a phenomenon occurring in many other counties in the U.S., demonstrating that a different basis for defining rural places in the context of HHS programs is warranted. Between 2010 and 2017 the annual rate of growth in wage and salary employment was 1.8 percent in urban areas, but only 0.5 percent in rural areas. Similarly, the employment-to-population ratio (the number of employed civilians as a percent of the population age 16 and older) was higher in urban areas (60.5 percent) than in rural areas (53.4 percent).[7]

Definitions are the means by which specific places and populations are identified for policy attention. Rural definitions are important because many policies, legislative and regulatory, are intended to benefit rural people and places.

Between 2000 and 2010, the status of 113 counties (5.5 percent of counties designated nonmetropolitan in 2000) changed from nonmetropolitan to metropolitan (based on 2003 and 2013 Urban Influence Code [UIC] designations). But in 30 of those counties, the population actually decreased with losses ranging from less than 1 percent to 38.7 percent. Thirty-eight (38) of the counties changing from nonmetropolitan to metropolitan saw a decline in the number of total active, non-federal MDs.[8].

In addition to conceptual challenges to the assumed relationship between place of employment and use of services, commuting pattern data may not be sufficiently robust to continue making those assessments with high degrees of validity and reliability. Historically, data regarding commuting patterns were collected during the decennial census using the "long form" questionnaire which was administered to a sample (approximately 17 percent[9]) of the population. The sample provided sufficient numbers for reasonable estimates of percent of the workforce commuting across geographic boundaries. But the decennial household census stopped collecting this data after 2000; instead, since 2010 the estimates of commuting patterns have been based on data collected by the Census Bureau's American Community Survey (ACS). While the ACS is conducted on an ongoing basis and therefore produces more timely data, its approach to sampling differs from that previously used (including a smaller annual sample size) and produces larger margins of error in general. Unfortunately, the margins of error are even larger for smaller geographies, smaller populations, and more rural areas.[10] In order to help protect confidentiality, data for smaller geographies or populations are released only as five-year aggregated estimates. But even after aggregating data across five-years, the ACS only samples "approximately 1-in-9 households nationwide."[11] A major concern arising from these methodological changes is that estimates for small populations will be highly unstable over time (only partially resolved by aggregating across time).

Policies and programs specifically designed to benefit rural residents can miss their intended goals when using fixed definitions of rural. Fixed definitions with specific thresholds, create a "cliff effect," in which areas may flip back and forth between rural and urban classification

due to a few persons changing their commuting patterns. Those changes may be due to economic circumstances that are transient (changing jobs to work in a different area, and then again to work closer to the residence). A county may even become "metropolitan" due to a neighboring county gaining a small number of residents. For example, the city of Grand Island is located in Hall County in central Nebraska. In 2012 the population of Grand Island surpassed 50,000 changing the status of Hall County and the three adjacent counties with high commuting flows into Hall County to metropolitan (two of the three counties actually saw population declines between 2000 and 2010). While the science of counting people is quite precise, the methods used to classify their residence have led to counterintuitive labels due to the use of stagnant geographic building blocks and the creation of binary rural/non-rural eligibility categories from information that exists on a continuum.

A final concern about data resources employed for defining rural arises from the growing concern for individual privacy. The Census Bureau is legally mandated to "not make any publication whereby the data furnished by any particular establishment or individual … can be identified." (Title 13 U.S.C. § 9(a)(2)). To meet that requirement, the Census Bureau has long used various disclosure avoidance techniques (methods to disguise data so that specific respondents cannot be identified but results will still be useful). But starting with the 2020 decennial census, the Bureau will start implementing a process known as differential privacy.[12] This new process will add noise (i.e. a percentage of the actual data values will be altered or "perturbed") to the statistical tables that the Census Bureau reports and thereby enhance their ability to avoid respondent disclosure.[13] The Census Bureau asserts that this approach will give them more precise control over the amount of noise that is added to the tables, but there is general concern that meeting the requirements of differential privacy may render public use data unusable or inaccessible,[14] and the inability to support rural-focused analyses may become a structural limitation of this methodology.

While this discussion for how to define rural has been largely esoteric in nature, the outcomes of these largely academic considerations will have a real human impact. Rural residents have a higher median age,[15] a shorter life expectancy,[16] increased rates of chronic health conditions,[17,18] and higher rates of poverty[19] than their urban counterparts. To achieve the goals of greater health equity and reduction of disparities, many Federal and State programs focus attention and resources on rural areas and populations, recognizing them as underserved. Congress has established a Rural and Underserved Populations Task Force in the House Ways and Means Committee[20], the Department of Health and Human Services has identified rural areas as a priority for the Secretary[21], and rural populations are a priority for a number of agencies including the Agency for Healthcare Research and Quality and the National Cancer Institute.[22,23] Non-government entities are engaged in addressing rural needs, including a Rural Task Force in the American Hospital Association[24], and a Rural Task Force supported by the Bipartisan Policy Center[25]. Targeting rural areas for special policy considerations is consistent with the goal of reducing disparities as rural areas contend with health service challenges such as unfavorable patient and payer mixes, aging infrastructure, and diminished access to capital.[26,27,28] While many policies and programs have been implemented to address rural issues, serious problems remain and in some cases have worsened. Definitions that are more need-focused would better target the rural underserved. Definitions are the means by which specific places and populations are identified for policy attention. Therefore, the consequences of relying on measures and boundaries that seem reasonable in one context, such as population flow to places of work, can have unintended consequences of precluding participation by populations and providers who should logically be the target of programs addressing rural needs.

2. What principles should drive rural definitions?

A number of principles should guide the definition of rural people or places:

- the definition should be data-driven and accurate;
- the definition should be based on a framework relevant to the purpose of the definition;
- the definition should be robust over time, but with the ability to adjust for changes; and
- the result should align closely with a heuristic sense of what is and is not rural (i.e., face validity).

Data-driven approaches to policy decisions are preferred to those simply guided by intuition or personal experience, but there is growing concern about the availability and accuracy of data used for rural definitions.[29,30,31] The issues of data reliability and validity outlined above, along with questions of access to data in small areas, are a concern for ensuring that rural definitions are functional and accurate.

The choice of how to define rural should occur in the context of what is desired or intended to be achieved by the policy or program.

Rules for designation of areas such as counties or census tracts as rural should be grounded in a sound conceptual framework that allows them to be tested from different perspectives to ensure accuracy and assess face validity. For example, Christaller's Central Place Theory was used as the framework to develop UICs.[32] When this theory is applied to the question of access to health services, it assumes that a greater degree of economic interdependence between a rural area and a more populated area corresponds to greater access to, and use of, health services across those areas.[33] Although Central Place Theory (and other theories or frameworks) are frequently based on unrealistic assumptions (e.g., Central Place Theory assumes that populations and resources are uniformly distributed), they still provide useful approaches for thinking about rural and urban areas and their attendant goods and services because they provide a framework against which we can evaluate the reality we observe.[34] Current rural definitions operationalized Central Place Theory's economic interdependence by using work commuting patterns. Although this approach seemed valid when UICs were developed, current examples cited in this document show that if the theoretical construct is to be retained, it is necessary to change how interdependence is measured.

Rural definitions should be created so as to maintain their robustness over time, yet have the ability to adjust for changes. For example, a 2013 report from the Office of the Secretary at the United States Department of Agriculture (USDA) noted that as populations and economies fluctuate over time, and shift across and within states, eligibility criteria for grants and programs warrant a second look. In the 2008 Farm Bill, Congress legislated business development program eligibility criteria based on proximity to urban areas or if the area is deemed to be "rural in character," i.e., face validity. Per the legislation, this determination is made by the Under Secretary for Rural Development. The first and only other time the "rural in character" language was used was in the Housing Act of 1949, where the State Director for Rural Development was given the ability to make this decision.[35]

Mark Shucksmith (Newcastle University) explained at a National Academies of Science workshop in 2016 that rural definitions should pass a face validity or "ground-truthing" evaluation. Because there is no objective definition of rural, issues related to scale, boundaries, and availability of data are can create places with counter-intuitive designations (e.g. the Grand Canyon is classified

as a metropolitan area). Shucksmith suggested using a mixed-methods approach (i.e. using both quantitative data – such as population counts – and qualitative data such as that derived from interviews or focus groups) to evaluate the validity of rural definitions, bringing together researchers and stakeholders in the community to explore three dimensions of rural areas: localities, representations, and everyday lives.[36] This type of approach would address concerns related to face validity of rural definitions. This concept was recently discussed in an article by Amanda Kool, a lawyer and consultant from Bracken County, Kentucky, who stated, "Regardless of where you fall on any given chart of numbers, let's acknowledge the shortcomings of those charts and the very real consequences of getting it wrong. And let's work together toward a better means to capture our nation's nuanced rural landscape—one that more closely resembles what we see with our own eyes."[37]

A mixed methods based definition would have the advantage not only of achieving face validity – avoiding "getting it wrong" – but would be much more likely to be robust over time, as it would not rely upon marginal changes in one or two numerical measures causing a binary change in status. It would naturally have the ability to evolve over time as people's concept of rural character and rural-specific need changed. However, the broad application of mixed methods approaches to this problem has the potential for opening the door to numerous appeals for special consideration by areas at the fringes of geographic areas, both spatially and demographically.

3. What are contemporary implementation challenges of changing the rural definition for rural health programs and policies?

Policy makers considering changes to rural definitions will need to consider the logistics and consequences associated with those changes. Issues to consider include how the change may directly impact programs or policies, provisions for extending or changing eligibility criteria, potential unintended consequences, and allowances for special circumstances.

Eligibility for a rural program can change with fluctuations in population levels and commuting patterns, which may be the product of unequal economic growth in urban and rural places, or as a result of shifts in geographic boundaries.[38] Changing population or geographic boundaries can lead to two competing priorities: maintaining eligibility after an entity no longer qualifies, or tightening rules to prevent growth in the number of eligible entities. It can be difficult to rescind eligibility, even if participation criteria are no longer met. In some circumstances, policy goals may justify grandfathering some or all participants regardless of changes in their designation. Alternatively, periodic re-designation of areas may systematically revoke participation to those whose rural status has changed.[39]

To understand potential unintended consequences of a policy change, the key characteristics of rural people, places, or providers central to the policy objective must be understood.

To understand potential unintended consequences of a policy change, the key characteristics of rural people, places, or providers central to the policy objective must be understood. Some of these characteristics may include location in relation to a larger urban center, travel time to the closest hospital or emergency department, supply or availability of providers, or population density. While seemingly straightforward, these characteristics can become complex when considering the unique and diverse nature of rural areas.[40] Allowances for special circumstances or exceptions for

program eligibility, grant requirements, or policy analysis are important to consider, especially when targeting rural people, places, or providers.

Finally, an ongoing challenge that will likely be exacerbated in the future is the reliability of the component data and the appropriateness of the geographic units and conceptual measures. As described above, privacy concerns will alter the nature of the available microdata and small-area statistics. The geographic building blocks are not always appropriately sized to identify rural places in a manner consistent with face validity. Use of population density or commuting data makes implicit assumptions about rural places that may or may not be consistent with the population's need for health services. Since the purpose of a definition is to abstract from reality in a relevant, consistent, and useful way, care must be taken to balance competing goals.

FRAMING A DEFINITION

The U.S. economy has evolved from a predominantly agricultural, rural focus to one dominated by urban-based industrial and service sectors. In comparison to America in the early 20th century, when the Census Bureau reported that approximately 50 percent of Americans were rural residents, rural America today is home to only about 19 percent of Americans.[41] The Census Bureau defines "rural" as any population or territory not in an urban area.[42] In 1950 the U.S. Census Bureau expanded the definition of urban—to account for the increase in suburbanization—by including densely populated areas outside the boundaries of large incorporated municipalities.[43] At the same time, federal agencies, including the Bureau of the Budget (later renamed the Office of Management and Budget [OMB]) and the Census Bureau, established the concept of the standard metropolitan area based largely on county geography to delimit "a functional zone of economic and social integration around a central place."[44] As a result of these changes, the 1950 decennial census was the first to show that most Americans lived in metropolitan counties. [45,46] The U.S. has seen significant growth in urban/metropolitan areas due to an increase in concentrated population centers, and increased urbanization (primarily to suburban areas). Changes in the definition of urban/metropolitan and an increased shift of the population to urban areas has led to the reclassification of many areas from nonmetropolitan to metropolitan.[47] The classification system instituted in 1950—which was based on urban economies, industries, and services—may be insufficient to meet today's health policy needs.

Rural is not simply the converse of urban, and the vastly different areas that are labeled rural should not be treated the same. Indeed, rural America has broad diversity of economies, industries, citizens, and needs.

The methods that policymakers use to define rural areas impact program eligibility and availability of resources for communities, and the choice in definition can result in significantly different populations. Based on 2010 Census data, the Census Bureau counts 59.5 million people living in rural areas, but OMB counts only about 46.2 million people living in rural areas. Historically, definitions have been based on several measurable characteristics:

- geographic boundaries based on existing and widely used typologies, i.e., counties, census blocks or tracts, zip codes (zip code tabulation areas);
- population counts (e.g., minimum population to be classified as urban);
- population density; and
- measures of inter-dependence across geographic boundaries – generally commuting patterns related to employment.

Specific rural definitions are constructed using different combinations of these characteristics, and some are referenced in laws or regulations governing eligibility and funding for HHS programs targeted to rural areas or populations. As discussed in this paper, however, these characteristics may not be the most appropriate for identifying rural places or people, especially in the context of HHS programs that focus on access to essential health care services. Further, maintaining meaningful designations of rural places over time, using any set of characteristics, requires the use of data associated with preferred geographic boundaries. Often the choice of how to define rural areas is driven by data availability, resulting in the use of population counts, density measures, and economic factors (e.g., commuting and employment patterns), typically leading to a dichotomous definition: urban or not urban.[48,49]

While "urban or not urban" is a convenient empirical standard that allows for comparisons across policy arenas, this simple categorization using limited data perspectives can ignore important population and geography characteristics. Rural is not simply the converse of urban, and the vastly different areas that are labeled rural should not be treated the same. Indeed, rural America has broad diversity of economies, industries, citizens, and needs. Population density can vary from densely populated communities of several thousand to sparsely populated and vast geographies. Economic activity varies widely including agriculture, resource extraction, maintaining natural amenities (parks and recreation), tourism, and manufacturing. Definitions for specific programs recognizing the effects of those differences on health care delivery, such as defining areas eligible for assistance securing telehealth services, may vary to accommodate those naturally occurring differences across types of rural places.

Rural areas may be defined in a variety of ways based on different geographic building blocks and theory-based criteria, and may include additional program- or policy-driven criteria. Geographic building blocks represent varying levels of geography and could be by county, ZIP Code Tabulation Area (ZCTA, which is closely aligned with ZIP code), or census tract. Theory-based criteria include economic interdependence (e.g., commuting patterns), distance to an urban area (e.g., road miles), or population characteristics (e.g., population of nearby urban areas). The combined use of geographic measures and theory-based criteria have resulted in a relatively small number of widely-used rural definitions. But the addition of program or policy considerations produces a proliferation of rural designations used within the federal government. A 2013 article in the Washington Post identified 15 different official definitions of the term "rural."[50] Despite variation across the definitions, there are two notable similarities of basic rural definitions. First, rural areas are considered to be those areas that are not urban, which has resulted in a division into urban/rural. Second, rural areas are further described by two dimensions: (1) population size and (2) proximity to an urban area.[51] Definitions may be promulgated by statute or otherwise legislatively connected to specific programs, or they may exist independently, not tied to legislation. A more detailed overview of commonly used rural definitions is provided below.

BRIEF OVERVIEW OF CURRENTLY USED RURAL DEFINITIONS

Government agencies and policymakers have used a wide array of rural definitions designed to help programs and policies meet their goals. For example, the USDA uses a number of rural definitions to determine program eligibility. Many of those definitions are based on specific population thresholds such as "any place with 20,000 or fewer residents," with program-specific thresholds ranging from 2,500 to 50,000 residents. Similarly, program-specific standards for establishing rural location are used by the U.S. Department of Veterans Affairs (population density between 7 and 1,000 people per square mile) and the U.S. Department of Education (any place determined by a state government to be rural).[52] This diversity of rural definitions is generally the result of specific language in legislation. In addition, state agencies and policymakers are free to

create their own standards for rural (e.g., the Texas Legislative Council identified over 45 definitions of rural in statute and State agency rules).[53] Finally, many programs consider multiple degrees of rurality. For example, the CMS Ambulance Fee Schedule allows a bonus payment for service that originates in an area within the lowest 25th percentile of all rural areas arrayed by population density. These are known as "super rural areas."[54]

For Federal purposes, three entities have primarily defined rural areas: the Census Bureau of the U. S. Department of Commerce, the OMB, and the Economic Research Service (ERS) of the USDA. These are the definitions primarily used in the U.S. Department of Health and Human Services, particularly by CMS and the Health Resources and Services Administration (including the Federal Office of Rural Health Policy [FORHP]). Rural and urban definitions reflect multidimensional concepts that can sometimes overlap and lead to confusion, and therefore, it is vital to understand how rural areas are defined.[55]

Rural and urban definitions reflect multidimensional concepts that can sometimes overlap and lead to confusion, and therefore, it is vital to understand how rural areas are defined.

Census Bureau

The Census Bureau defines rural as "any population, housing, or territory not in an urban area."[56] Therefore, to understand rural according to the Census Bureau, one must first understand how urban is defined. The decennial census began designating urban locations based on population levels in 1880. Today, the same basic definitions established in 1950 are in place to define urban—places with a core of census blocks containing at least 1,000 people per square mile, and adjoining blocks containing at least 500 people per square mile are defined as an **urbanized area** if their population is 50,000 or more, or an **urban cluster** (conceptually instituted in 2000) if their population is between 2,500 and 50,000[57]. These places are considered urban, all other census blocks are considered rural.[58] One consequence of this population density approach to classification is that some suburban populations that fail to meet the 500 person density threshold are designated as rural even though they are integrated with urbanized areas or urban clusters (resulting in an overcount in the rural population). There are multiple reasons why an urban area might fail to achieve the necessary population density threshold, including business or retail land use. Starting in 2010, the Census used the National Land Cover Dataset impervious surface layer to better identify nonresidential urban areas.[59] However, it is still conceivable that populations in areas of very low density housing (e.g., ranchettes), or the presence of open spaces such as large parks may not be appropriately attributed to their adjacent urban center. After the 2010 census, there were 3,573 urban areas, of which 486 met the definition of urbanized areas, while 3,087 were considered urban clusters.[60] In 2010 the Census Bureau identifies 19.3 percent of the population living in rural (i.e., not urban) areas[61].

Office of Management and Budget

The OMB created **core-based statistical areas (CBSAs)** to refer collectively to metropolitan and micropolitan areas (based on county, or equivalent, boundaries) using Census urbanized areas and urban clusters as the basis of the definitions.[62,63] Metropolitan statistical areas (MSA) are counties containing at least one urbanized area (population of 50,000 or more) and adjacent counties with a high degree of "social and economic integration with the core as measured by commuting ties." Micropolitan statistical areas are counties that have at least one urban cluster

with a population of at least 10,000 people and adjacent counties with a high degree of "social and economic integration with the core as measured by commuting ties."[64] OMB considers counties not part of an MSA as rural – this means that micropolitan counties are considered rural. A 2010 Census Special Report indicated there were 366 metropolitan areas (where 83.7 percent of the population lived, covering 25.8 percent of land area). Among nonmetropolitan areas, there were 576 micropolitan areas (where 10.0 percent of the population lived, covering 20.9 percent of land area) and 6.3 percent of the U.S. population lived outside of CBSAs (covering 53.3 percent of land area).[65]

Economic Research Service

In 1975, the ERS created the **Rural-Urban Commuting Codes (RUCCs)** after publication of the *Social and Economic Characteristics of the Population in Metro and Nonmetro Counties: 1970-1980*.[66] RUCCs (also referred to as Beale Codes) classify counties based on their OMB classification, population, and metropolitan adjacency. Three categories of metropolitan counties are defined based on the population size of the metropolitan area of which they are a part. Nonmetropolitan counties are first classified by urban-size categories and then by adjacency to one or more metropolitan areas. Adjacent nonmetropolitan counties are those that physically adjoin one or more metropolitan areas and in which a minimum of 2 percent of the employed labor force commutes to the central metropolitan county. Those nonmetropolitan counties that do not meet the prior criteria are considered nonadjacent. Following the 2010 census, RUCCs identified 15 percent of Americans living in nonmetropolitan areas.[67]

In an effort to capture variation in economic opportunities across counties, the ERS developed **Urban Influence Codes (UICs)** in 1996 based on the OMB's CBSA classification system.[68,69] Similar to RUCCs, UICs divide counties, county equivalents, and independent cities into groups based on population and adjacency.[70] UICs identify large and small metropolitan counties based on the metropolitan area of which they are a part. Less populous counties (under 50,000 people) are split into micropolitan and noncore counties and further classified based on their adjacency to metropolitan or micropolitan counties. Data from the 2010 decennial census show there were 1,167 metropolitan counties (containing 85 percent of the population) and 1,976 nonmetropolitan counties (15 percent of the population), of which 641 were considered micropolitan (containing 9 percent of the population) and 1,335 were noncore counties (containing 6 percent of the population).[71]

A county-based designation as metropolitan or nonmetropolitan leads to assumptions about the level of rurality of the entire county, which was problematic for large counties that included sparsely populated, open-country areas. In 1992, Goldsmith and colleagues noted that towns and rural areas located in a large metropolitan county are similar to nonmetropolitan counties regarding access to health services. They demonstrated that the Goldsmith Modification would allow for identification of these areas and increased eligibility for inclusion in Federal rural grant programs.[72] The ERS, in partnership with the Washington, Wyoming, Alaska, Montana, Idaho (WWAMI) Rural Health Research Center and the FORHP, developed **Rural-Urban Commuting Area (RUCA)** codes to measure rurality using demographic and work commuting patterns at the census tract level.[73] According to the FORHP, RUCA codes embody the current Goldsmith Modification.[74] RUCA codes at the census tract level have been supplemented by a ZIP-based version to allow for easier, albeit less precise, application of RUCA codes.[75,76]

RUCAs utilize commuting flow information based on tract-to-tract commuting data originally derived from decennial census estimates but most recently from 2006-2010 ACS five-year estimates. RUCAs divide tracts and/or ZCTAs into 10 categories (3 metropolitan, 3 micropolitan, 3 small town, and 1 rural) based on their population size and primary commuting

flow.[77] Classes of metropolitan, micropolitan, and small town geographies are differentiated based on the level of commuting: commuting within the urbanized area or urban cluster, high commuting (30 percent or more to other cores), and low commuting (10 to 30 percent or more to other cores). In addition to these 10 primary codes, 30 secondary RUCA codes are based on the second-largest commuting flow. The FORHP considers rural census tracts or ZCTAs within metropolitan counties but not designated with a metropolitan RUCA code to be rural. Additionally, there are 132 large area census tracts where RUCAs do not capture distance to services and low population. These large area tracts cover a minimum of 400 square miles and have population density of less than 35 people per square mile; therefore, although these tracts are assigned a metropolitan RUCA, they are considered rural by the FORHP.[78] RUPRI panel analysis of 2010 RUCA data shows that 83.6 percent of the U.S. population lives in metropolitan areas, 8.9 percent in large rural (micropolitan) areas, 4.3 percent in small rural areas, and 3.2 percent in isolated small rural areas. In total, about 16.5 percent of Americans live in rural areas that account for 76 percent of land mass nationally.

Table 1. Commonly Used Rural-Urban Classifications

Name	Geographic Level	Measure	Rural/Nonmetro Population (millions, % of total)
Census Bureau	Census block	Urbanized Areas: contiguously built-up area with population>50,000 and at least 1,000 people/sq. mile and adjoining blocks with at least 500 people/sq. mile Urban Clusters: contiguously built-up area with population 2,500-50,000 and at least 1,000 people/sq. mile and adjoining blocks with at least 500 people/sq. mile Rural: All other census blocks	59.5 (19.3%)[79]
OMB	County	Metropolitan: counties with at least one urbanized area (population≥50,000) and adjacent, economically integrated counties. Micropolitan: counties with at least one urban cluster (population 10,000-49,999) and adjacent, economically integrated counties. Considered "rural." Rural: counties with no urbanized area or cluster and not adjacent to metropolitan or micropolitan county.	46.2 (15.0%)[80]
Rural-Urban Commuting Codes (RUCC)	County	Metropolitan counties: (3 levels) based on OMB classification, subdivided by population of metropolitan area Nonmetropolitan counties: (6 levels) based on OMB classification, subdivided by total urban population and adjacency to metropolitan areas	46.3 (15.0%)[81]
Urban Influence Code (UIC)	County	Metropolitan counties: (2 levels) based on OMB classification, subdivided by population of metropolitan area Nonmetropolitan counties: (10 levels) based on OMB micropolitan and non-core classification, subdivided by micropolitan status, adjacency to metropolitan or micro area, and presence of a town≥2,500 people	46.3 (15.0%)[82]
Rural-Urban Commuting Area (RUCA) Code	Census tract, ZCTA approximation	Major categories based on populations of urbanized areas/clusters similar to those used by OMB and are then differentiated based on primary (10 levels) and secondary (21 levels) commuting flow.	50.9 (16.5%)[83]

		Metropolitan cores: (3 primary levels) core area≥50,000 people Micropolitan cores: (3 primary levels) core area 10,000-49,999 people. Considered "rural." Small town cores: (3 primary levels) core area 2,500-9,999 people. Considered "rural." Rural area: (1 primary level)	
Office of Rural Health Policy, U.S. Department of Health and Human Services	Census tract within OMB Metropolitan Counties	All nonmetropolitan counties (OMB-defined) are considered rural. Census tracts with RUCA codes 4-10 inside metropolitan counties are considered rural. Extremely large census tracts (at least 400 square miles) with low population density (35 or fewer people per square mile) and RUCA codes 2-3 inside metropolitan counties are considered rural.	57.0 (18.0%)[84]
Frontier and Remote (FAR)	½ x ½ kilometer grid cells, aggregated to ZCTAs	Nonmetropolitan areas are categorized into four overlapping FAR levels based on area population, and travel time by car to nearest urban area of varying sizes. FAR 1 is least restrictive and FAR 4 is most restrictive.*	FAR 1 12.2 (4.0%)[85] FAR 4 2.3 (0.75%)

**FAR codes are not calculated for metropolitan areas.*
Adapted from the Economic Research Service workshop: Rationalizing Rural Area Classifications.[86]

In 2012 the ERS, in partnership with (and funded by) the FORHP, created **Frontier and Remote (FAR)** area codes to account for the economic and social challenges of geographically remote areas with low population size. FAR areas are based both on population size and distance (travel time by car) to the closest urbanized area categorized by population size: 2,500-10,000; 10,000-24,999; 25,000-49,999; or 50,000 or more. The 4 levels of FAR codes are intended to reflect availability of high (level 1), intermediate (levels 2 and 3), and low (level 4) order services (e.g., health care, groceries, clothing, and other consumer items). Initially constructed from population counts in ½ x ½ kilometer grid cells, FAR codes have been aggregated to ZCTAs. Data from the 2010 census show that FAR level 1 (the least remote) accounts for 52 percent of the U.S. land mass (12.2 million people; 4 percent of the population), and FAR level 4 (the most remote) encompasses 34 percent of land mass (2.3 million people; 0.75 percent of the population).[87]

There is no single or best definition of rural places and people that serves all purposes. Defining rural should be based on the policy or program purposes and goals. Radical changes in rural definitions can disrupt program continuity and create instability in the research, practice, and policy arenas.

OPTIONS FOR DEFINING RURAL PLACES

There is no single or best definition of rural places and people that serves all purposes. Fundamentally, a rural definition focused on health services should be based on the relationships between where people live and where (and how) health care is delivered. However, population characteristics, job losses and creations, commuting patterns and telecommunication use have all change dramatically in recent years and have likely altered the aforementioned relationships. These changes, and the use of ACS data instead of decennial census data to estimate commuting patterns, creates an opportunity to reconsider how rural is defined for targeted HHS programs. The RURPI Panel recommends that policy makers consider legislative and regulatory definitions of rural that account for demographic change while maintaining focus on programmatic objectives. As new rural

definitions are developed, and current definitions adjusted, the RUPRI Panel further recommends the following suggestions:

- Define rural based on policy or program purposes and goals. Major changes in rural definitions can disrupt program continuity and create instability in research, practice, and policy arenas. Rather, incremental, informed changes to definitions will more likely further the goals of helping rural people and places meet health needs and mitigate potential harms.

- Retain current frameworks for defining rural but consider additional criteria to meet specific program goals and objectives. For example, eligibility for programs designed to meet the needs of rural residents might start with a RUCA code criterion and add program-specific measures of supply or demand to identify a narrower, more appropriate geography.

- Make greater use of the variation available in existing classification systems. RUCA and UIC classifications designate multiple division points along the rural-urban continuum, but many applications of these scales continue to dichotomize locations (i.e., urban or rural). Policies or programs might apply differentially to localities based on their location on the entire scale (e.g., providing incentives to providers in rural areas, but enhancing those incentives for providers practicing in the most rural areas).

- Index rural/urban definition thresholds to population growth to allow the definitions to adapt over time to population changes. As the U.S. population grows, it may be desirable to commensurately adjust, for example, the Census definition for urbanized area (which also informs many of the other classifications, see Table 1). That population threshold (50,000 people) has been used since the 1950's and may no longer be optimal given how the distribution and behaviors of populations has changed. Similarly, commuting thresholds (e.g., currently at 2 percent for RUCCs) could be re-examined to assess their appropriateness given changes in commuting dynamics. As common commuting distances have increased and employment patterns have changed over the years, it may make sense to adjust commuting percentage thresholds.

- Expand FAR code classification for areas that currently fall above the current maximum threshold to allow for the broader application of this classification system. FAR codes (as the name implies) were designed to classify frontier and remote areas and (in their broadest application) classify only 52 percent of U.S. land area and 4.0 percent of the population (see Table 1). Expanding the FAR methodology to include classification of less sparsely populated areas would allow this approach to be more broadly applied to places that are clearly rural in character and circumstance.

- Consider updated measures of interdependence between metropolitan and nonmetropolitan areas. Such an approach might employ enhanced commuting information, such as changes in job availability or commuting for higher wages versus equivalent wages. Alternately, other measures of interdependence might be considered, such as retail spending patterns or healthcare seeking behavior.

- Use non-census data sets (e.g., spending and time use, productivity, or employment data sets from the Bureau of Labor Statistics) to better understand and measure economic interconnectedness. Similarly, data on broadband availability and access to transportation services would inform considerations for social isolation and access to

health information and services. However, due to small sample sizes, concerns remain surrounding timeliness of these data and the ability to examine rural areas. The use of big data (extremely large volumes of structured and unstructured digital information) for informing rural definitions is a growing area of interest, but its practical application for work that increasingly operates on a rural-urban continuum requires additional study.[88]

- Oversample rural populations in Census-based and other federal datasets. Concern about the reliability and validity of the census data used to define rural areas could be mitigated through the use of oversampling techniques. Already used by the Census Bureau to improve understanding of minority and underserved populations in surveys such as the Survey of Income and Program Participation (SIPP) or the American Housing Survey (AHS), oversampling (in this case) would mean obtaining data from rural residents at a higher rate than from urban residents. The resulting increased number of cases used to generate population estimates means that margins of error are smaller (for both population counts and for supporting information such as commuting flows) and that demographers can have higher confidence in their rural/urban designations.

This paper has provided the basis for understanding how current definitions were developed, their effects on designating places as rural (and subcategories of rural), and how definitions could be improved. Despite the lack of a single definition for rural people or places that serves all health policy and program purposes, the rural definitions discussed here have helped address policy objectives and political pressures across Federal agencies over decades. However, current policymakers targeting rural populations should consider the limitations of these definitions. Application of any rural definition may have unintended consequences. Consideration of other demographic, economic, or provider characteristics, and input from outside experts, can help moderate those unexpected results. Ultimately, the choice of how to define rural should occur in the context of what is desired or intended to be achieved by the policy or program in order to best meet rural health needs.

REFERENCES

[1] Coburn, A.F., et al. (2007) Rural Policy Research Institute Rural Health Panel. "Choosing Rural Definitions: Implications for Health Policy." Retrieved September 4, 2019, from http://www.rupri.org/Forms/RuralDefinitionsBrief.pdf.
[2] U.S. Census Bureau (2019). "Counting the Hard to Count in a Census." Retrieved September 5, 2019, from https://www.census.gov/content/dam/Census/library/working-papers/2019/demo/Hard-to-Count-Populations-Brief.pdf.
[3] U.S. Census Bureau (2019). "Understanding and Using American Community Survey Data: What Rural Areas Need to Know." Retrieved January 3, 2019, from https://www.census.gov/content/dam/Census/library/publications/2019/acs/ACS_rural_handbook_2019.pdf.
[4] Office of Management and Budget (1998). "Alternative Approaches to Defining Metropolitan and Nonmetropolitan Areas; Notice." Retrieved January 3, 2020, from https://www.govinfo.gov/content/pkg/FR-1998-12-21/pdf/98-33676.pdf.
[5] United States Department of Agriculture (2019). "Rural America at a Glance, 2019 Edition." Retrieved January 3, 2020, from https://www.ers.usda.gov/webdocs/publications/95341/eib-212.pdf?v=5832.
[6] RUPRI analysis of Bureau of Economic Analysis CAINC4 series data. Data retrieved January 3, 2020, from https://apps.bea.gov/regional/downloadzip.cfm.

[7] United States Department of Agriculture, Economic Research Service (2019). "Rural Employment and Unemployment." Retrieved January 3, 2020, from https://www.ers.usda.gov/topics/rural-economy-population/employment-education/rural-employment-and-unemployment/.
[8] RUPRI Center analysis of 2009 and 2017 Area Health Resource File (AHRF) data obtained from Health Resources & Services Administration (HRSA): https://data.hrsa.gov/topics/health-workforce/ahrf.
[9] U.S. Census Bureau (2019). "2000 Overview" Retrieved February 24, 2020 from https://www.census.gov/history/www/through_the_decades/overview/2000.html.
[10] National Academies of Sciences Engineering and Medicine. *Rationalizing Rural Area Classifications for the Economic Research Service: Workshop Summary.* Washington, DC: The National Academies Press; 2016.
[11] U.S. Census Bureau (2018). "Understanding and Using American Community Survey Data, What All Data Users Need to Know." Retrieved February 24, 2020 from https://www.census.gov/content/dam/Census/library/publications/2018/acs/acs_general_handbook_2018.pdf.
[12] U.S. Census Bureau (2019). "Data Protection and Privacy Program." Retrieved September 5, 2019 from https://www.census.gov/about/policies/privacy/statistical_safeguards.html.
[13] U.S. Census Bureau (2019). "How is a differentially private system different from the Census Bureau's traditional disclosure avoidance techniques?" Retrieved September 5, 2019, from https://ask.census.gov/prweb/PRServletCustom/YACFBFye-rFIz_FoGtyvDRUGg1Uzu5Mn*/!STANDARD?pyActivity=pyMobileSnapStart&ArticleListID=TAX_380_381#.
[14] Ruggles S., et al. (2018) Minnesota Population Center, University of Minnesota. "Implications of Differential Privacy for Census Bureau Data and Scientific Research." Retrieved September 5, 2019 from http://users.hist.umn.edu/~ruggles/Articles/Privacy.pdf.
[15] U.S. Census Bureau (2016). "Measuring America." Retrieved September 5, 2019 from www.census.gov/content/dam/Census/library/visualizations/2016/comm/acs-ruralurban.pdf.
[16] Singh, G.K., Siahpush, M. (2014). Widening rural-urban disparities in life expectancy, U.S., 1969-2009. AJPM, 46(2).
[17] North Carolina Rural Health Research Program (2017). "Rural health snapshot (2017)." Retrieved September 4, 2019, from https://www.shepscenter.unc.edu/wp-content/uploads/dlm_uploads/2017/05/Snapshot2017.pdf.
[18] Rural Health Information Hub (2018). "Chronic disease in rural America." Retrieved September 4, 2019, from https://www.ruralhealthinfo.org/topics/chronic-disease.
[19] USDA Economic Research Service (2018). "Rural Poverty & Well-Being." Retrieved September 4, 2019, from https://www.ers.usda.gov/topics/rural-economy-population/rural-poverty-well-being/.
[20] U.S. House of Representatives, Ways and Means Committee Democrats (2019). "Ways and Means Committee Launches Rural and Underserved Communities Health Task Force." Retrieved January 3, 2020, from https://waysandmeans.house.gov/media-center/press-releases/ways-and-means-committee-launches-rural-and-underserved-communities.
[21] U.S. Department of Health & Human Services. Alex M. Azar II (2019). "Remarks to the National Rural Health Association." Retrieved January 3, 2020, from https://www.hhs.gov/about/leadership/secretary/speeches/2019-speeches/remarks-to-the-national-rural-health-association.html.
[22] Healthcare Research and Quality Act of 1999 (Public Law No: 106-129).
[23] National Cancer Institute (2018). "Funding Opportunity Announcement: Improving the Reach and Quality of Cancer Care in Rural Populations." National Cancer Institute, Division of Cancer Control & Population Sciences. RFA-CA-18-026.
[24] American Hospital Association. (2019). Perspective: Ensuring access in rural America. Retrieved January 3, 2020, from https://www.aha.org/news/perspective/2019-07-19-perspective-ensuring-access-rural-america.
[25] Bipartisan Policy Center (2019). "Rural Health Task Force." Retrieved January 3, 2020, from https://bipartisanpolicy.org/rural-health-task-force/.
[26]American Hospital Association. (2019). "Rural Report: Challenges Facing Rural Communities and the Roadmap to Ensure Local Access to High-quality, Affordable Care." Retrieved September 4, 2019, from https://www.aha.org/system/files/2019-02/rural-report-2019.pdf.
[27] USDA Economic Research Service (2019). "Rural Poverty and Well-Being." Retrieved September 4, 2019, from https://www.ers.usda.gov/topics/rural-economy-population/rural-poverty-well-being/.
[28] Rural Health Information Hub (2019). "Topic Guide: Social Determinants of Health for Rural People." Retrieved July 19, 2019, from https://www.ruralhealthinfo.org/topics/social-determinants-of-health.
[29] Coburn, A.F., et al. (2007) Rural Policy Research Institute Rural Health Panel. "Choosing Rural Definitions: Implications for Health Policy." Retrieved September 4, 2019, from http://www.rupri.org/Forms/RuralDefinitionsBrief.pdf.
[30] Hewitt, M. (1989) Health Program, Office of Technology Assessment, Congress of the United States. "Defining 'Rural' Areas: Impact on Health Care Policy and Research." Retrieved September 4, 2019, from https://govinfo.library.unt.edu/ota/Ota_2/DATA/1989/8912.PDF
[31] O'Hare, W. P. (2017) Carsey Research, University of New Hampshire, Carsey School of Public Policy. "2020 Census Faces Challenges in Rural America." Retrieved September 4, 2019 from https://carsey.unh.edu/publication/2020-census.
[32] Baer, L. D., et al. (1997). "What is rural? A focus on urban influence codes." Geography of Rural Health 13(4): 329-333.

[33] Christaller, Walter (I966). *Central Places in Southern Germany*. Englewood Cliffs, N.J.: Prentice-Hall.
[34] Baer, L. D., et al. (1997). "What is rural? A focus on urban influence codes." Geography of Rural Health 13(4): 329-333.
[35] U.S. Department of Agriculture (2013) Office of the Secretary, United States Department of Agriculture. "Report on the Definition of 'Rural'." Retrieved September 4, 2019 from https://www.rd.usda.gov/files/RDRuralDefinitionReportFeb2013.pdf.
[36] National Academies of Sciences Engineering and Medicine. *Rationalizing Rural Area Classifications for the Economic Research Service: Workshop Summary.* Washington, DC: The National Academies Press; 2016.
[37] Kool A. (2019) "Speak your piece: Who you callin' metropolitan?"; Retrieved July 24, 2019 , from https://www.dailyyonder.com/speak-piece-callin-metropolitan/2019/05/14/31612/.
[38] Coburn, A.F., et al. (2007) Rural Policy Research Institute Rural Health Panel. "Choosing Rural Definitions: Implications for Health Policy." Retrieved September 4, 2019, from http://www.rupri.org/Forms/RuralDefinitionsBrief.pdf.
[39] Mueller, K. J., et al. (2018). "Assessing the Unintended Consequences of Health Policy on Rural Populations and Places." Retrieved September 4, 2019, from http://www.rupri.org/wp-content/uploads/Evaluating-the-Impact-of-Policy-Changes-on-Rural-Populations-1.pdf.
[40] Mueller, K. J., et al. (2018). "Assessing the Unintended Consequences of Health Policy on Rural Populations and Places." Retrieved September 4, 2019, from http://www.rupri.org/wp-content/uploads/Evaluating-the-Impact-of-Policy-Changes-on-Rural-Populations-1.pdf.
[41] U.S. Census Bureau (1995). "Table 4. Population: 1790 to 1990." Retrieved October 10, 2019, from https://www.census.gov/population/censusdata/table-4.pdf.
[42] U.S. Census Bureau (2019). "How Does the U.S. Census Bureau Define 'Rural'?". Retrieved April 23, 2019, from https://gis-portal.data.census.gov/arcgis/apps/MapSeries/index.html?appid=7a41374f6b03456e9d138cb014711e01.
[43] U.S. Census Bureau (2016). "A Century of Delineating a Changing Landscape: The Census Bureau's Urban and Rural Classification, 1910 to 2010." Retrieved October 10, 2019 from https://www2.census.gov/geo/pdfs/reference/ua/Century_of_Defining_Urban.pdf.
[44] U.S. Census Bureau (1997). "Classification of Metropolitan Areas." Retrieved October 10, 2019, from https://www2.census.gov/geo/pdfs/reference/GARM/Ch13GARM.pdf.
[45] Johnson, K., et al. (2018). "The Impact of Metropolitan Reclassification on Population Change in Rural and Urban America, 1970 to 2016". 2018 Annual Meeting of the Rural Sociological Society, Portland, Oregon.
[46] U.S. Census Bureau (2019). "How Does the U.S. Census Bureau Define 'Rural'?". Retrieved April 23, 2019, from https://gis-portal.data.census.gov/arcgis/apps/MapSeries/index.html?appid=7a41374f6b03456e9d138cb014711e01.
[47] Johnson, K., et al. (2018). The Impact of Metropolitan Reclassification on Population Change in Rural and Urban America, 1970 to 2016. 2018 Annual Meeting of the Rural Sociological Society, Portland, Oregon.
[48] Miller, M. K. and A. E. Luloff (1981). "Who Is Rural? A Typological Approach to the Examination of Rurality." Rural Sociology 46(4): 608-625.
[49] Hart, L. G., et al. (2005). "Rural Definitions for Health Policy and Research." American Journal of Public Health 95(7): 1149-1155.
[50] Washington Post (2013). The federal definition of 'rural' — times 15." Retrieved October 9, 2019 from https://www.washingtonpost.com/politics/the-federal-definition-of-rural--times-15/2013/06/08/a39e46a8-cd4a-11e2-ac03-178510c9cc0a_story.html.
[51] National Academies of Sciences Engineering and Medicine. *Rationalizing Rural Area Classifications for the Economic Research Service: Workshop Summary.* Washington, DC: The National Academies Press; 2016.
[52] Washington Post (2013). The federal definition of 'rural' — times 15." Retrieved October 9, 2019 from https://www.washingtonpost.com/politics/the-federal-definition-of-rural--times-15/2013/06/08/a39e46a8-cd4a-11e2-ac03-178510c9cc0a_story.html.
[53] Texas Legislative Council. (2018) "Definitions of 'Rural' in Texas Statutes and the Texas Administrative Code as of April 2018." Accessed October 9, 2019, from https://tlc.texas.gov/docs/policy/Def_Rural_Statutes.pdf.
[54] Centers for Medicare & Medicaid Services. (2019). "Ambulance Fee Schedule Public Use Files." Retrieved October 9, 2019, from https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AmbulanceFeeSchedule/afspuf.html.
[55] USDA Economic Research Service (2019). "What is Rural?" Retrieved May 29, 2019, from https://www.ers.usda.gov/topics/rural-economy-population/rural-classifications/what-is-rural/.
[56] U.S. Census Bureau (2019). "How Does the U.S. Census Bureau Define 'Rural'?". Retrieved April 23, 2019, from https://gis-portal.data.census.gov/arcgis/apps/MapSeries/index.html?appid=7a41374f6b03456e9d138cb014711e01.
[57] U.S. Census Bureau (2016). "Defining Rural at the U.S. Census Bureau." Retrieved February 24, 2020 from https://www2.census.gov/geo/pdfs/reference/ua/Defining_Rural.pdf.
[58] U.S. Census Bureau. "History: Urban and Rural Areas." Retrieved June 13, 2019, from https://www.census.gov/history/www/programs/geography/urban_and_rural_areas.html.
[59] National Academies of Sciences Engineering and Medicine. *Rationalizing Rural Area Classifications for the Economic Research Service: Workshop Summary.* Washington, DC: The National Academies Press; 2016.

[60] U.S. Census Bureau (2019). "How Does the U.S. Census Bureau Define 'Rural'?". Retrieved April 23, 2019, from https://gis-portal.data.census.gov/arcgis/apps/MapSeries/index.html?appid=7a41374f6b03456e9d138cb014711e01.
[61] U.S. Census Bureau (2019). "2010 Census Urban and Rural Classification and Urban Area Criteria." Retrieved January 3, 2020, from https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural/2010-urban-rural.html.
[62] U.S. Census Bureau (2019). "Housing Patterns: Core-Based Statistical Areas." Retrieved May 28, 2019, from https://www.census.gov/topics/housing/housing-patterns/about/core-based-statistical-areas.html.
[63] U.S. Census Bureau (2012). "2010 Census Special Reports, Patterns of Metropolitan and Micropolitan Population Change: 2000 to 2010." Retrieved September 4, 2019 from https://www.census.gov/content/dam/Census/library/publications/2012/dec/c2010sr-01.pdf.
[64] U.S. Census Bureau (2019). "Housing Patterns: Core-Based Statistical Areas." Retrieved May 28, 2019, from https://www.census.gov/topics/housing/housing-patterns/about/core-based-statistical-areas.html.
[65] U.S. Census Bureau (2012). "2010 Census Special Reports, Patterns of Metropolitan and Micropolitan Population Change: 2000 to 2010." Retrieved September 4, 2019 from https://www.census.gov/content/dam/Census/library/publications/2012/dec/c2010sr-01.pdf.
[66] McGranahan, D. A., et al. (1986) USDA, Economic Research Service. "Rural Development Research Report 58, Social and Economic Characteristics of the Population in Metro and Nonmetro Counties, 1970-80." Retrieved September 4, 2019 from https://naldc.nal.usda.gov/download/CAT10847914/PDF.
[67] USDA Economic Research Service (2019). "Rural Urban Commuting Code: Documentation." Retrieved May 27, 2019, from https://www.ers.usda.gov/data-products/rural-urban-continuum-codes/documentation/.
[68] USDA Economic Research Service (2019). "Urban Influence Codes: Documentation." Retrieved April 23, 2019, from https://www.ers.usda.gov/data-products/urban-influence-codes/documentation/.
[69] Ghelfi, L. M. and T. S. Parker (1997). "A County-Level Measure of Urban Influence." Rural Development Perspectives 12(2): 32-41.
[70] USDA Economic Research Service (2019). "Urban Influence Codes: Documentation." Retrieved April 23, 2019, from https://www.ers.usda.gov/data-products/urban-influence-codes/documentation/.
[71] USDAEconomic Research Service (2019). "Urban Influence Codes: Documentation." Retrieved April 23, 2019, from https://www.ers.usda.gov/data-products/urban-influence-codes/documentation/.
[72] Goldsmith, H. F., Puskin, D. S., Stiles, D. J. (1993) Federal Office of Rural Health Policy, Health Resources and Services Administration. "Improving the Operational Definition of 'Rural Areas' for Federal Programs."Retrieved April 23, 2019 from https://www.ruralhealthinfo.org/pdf/improving-the-operational-definition-of-rural-areas.pdf.
[73] WWAMI Rural Health Research Center (2019). "About Us." Washington, Wyoming, Alaska, Montana, Idaho (WWAMI) Rural Health Research Center. Retrieved July 18, 2019, from http://depts.washington.edu/uwruca/ruca-about.php.
[74] Request for Public Comment on Use of Rural Urban Commuting Areas (RUCAs), 72 Fed. Reg. 85 (May 3, 2007). Federal Register: The Daily Journal of the United States. Thursday, May 3, 2007.
[75] Hart, L. G., et al. (2005). "Rural Definitions for Health Policy and Research." American Journal of Public Health 95(7): 1149-1155.
[76] USDA Economic Research Service (2019). "Rural Urban Commuting Area: Documentation." Retrieved May 27, 2019, from https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes/documentation/.
[77] USDA Economic Research Service (2019). "Rural Urban Commuting Area: Documentation." Retrieved May 27, 2019, from https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes/documentation/.
[78] Federal Office of Rural Health Policy (2018) Health Resources and Services Administration. "Defining the Rural Population." Retrieved May 29, 2019, from https://www.hrsa.gov/rural-health/about-us/definition/index.html.
[79] U.S. Census Bureau (2019). "2010 Census Urban and Rural Classification and Urban Area Criteria." Retrieved January 3, 2020, from https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural/2010-urban-rural.html.
[80] Federal Office of Rural Health Policy (2018) Health Resources and Services Administration. "Defining Rural Population." Retrieved January 3, 2020, from https://www.hrsa.gov/rural-health/about-us/definition/index.html.
[81] USDA Economic Research Service (2019). "Rural-Urban Continuum Codes: Documentation." Retrieved January 3, 2010, from https://www.ers.usda.gov/data-products/rural-urban-continuum-codes/documentation/.
[82] USDA Economic Research Service (2019). "Urban Influence Codes: Documentation." Retrieved January 3, 2010, from https://www.ers.usda.gov/data-products/urban-influence-codes/documentation/.
[83] USDA Economic Research Service (2019). "Rural-Urban Commuting Area Codes: Documentation." Retrieved January 3, 2010, from https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes/.
[84] Federal Office of Rural Health Policy (2018) Health Resources and Services Administration. "Defining Rural Population." Retrieved January 3, 2020, from https://www.hrsa.gov/rural-health/about-us/definition/index.html.
[85] USDA Economic Research Service (2019). "Frontier and Remote Area Codes: Documentation." Retrieved January 3, 2010, from https://www.ers.usda.gov/data-products/frontier-and-remote-area-codes/documentation/.

[86] National Academies of Sciences Engineering and Medicine. *Rationalizing Rural Area Classifications for the Economic Research Service: Workshop Summary.* Washington, DC: The National Academies Press; 2016.
[87] USDA Economic Research Service (2019). "Frontier and Remote Area Codes: Documentation." Retrieved May 28, 2019, from https://www.ers.usda.gov/data-products/frontier-and-remote-area-codes/documentation/.
[88] National Academies of Sciences Engineering and Medicine. *Rationalizing Rural Area Classifications for the Economic Research Service: Workshop Summary.* Washington, DC: The National Academies Press; 2016.

About the Authors

The RUPRI Health Panel is led by Keith J. Mueller, PhD. He can be contacted at (319) 384-3832, or by email keith-mueller@uiowa.edu.

Andrew F. Coburn, PhD, is research professor emeritus of public health and senior fellow in the Maine Rural Health Research Center, Muskie School of Public Service, University of Southern Maine. His rural research and publications focus on health financing and delivery system reform, insurance and health access, rural telehealth use, rural long term services and supports, and Medicaid policy. He is a member of the Medicare Rural Hospital Flexibility Monitoring Team Project in which he and his colleagues at USM and at the Universities of North Carolina-Chapel Hill and Minnesota are assisting states and Critical Access Hospitals around the country improve their financial, quality, and population health capacity and performance.

Alana D. Knudson, PhD, is a project area director in the Public Health Research Department at NORC at the University of Chicago and is based in NORC's Bethesda, Maryland office. She also serves as the co-director of the Walsh Center for Rural Health Analysis. Dr. Knudson's expertise includes rural health research, public health systems research, health services research, and evaluation projects.

Jennifer P. Lundblad, PhD, MBA, is president and CEO of Stratis Health, an independent nonprofit quality improvement organization based in Bloomington, Minnesota, that leads collaboration and innovation in healthcare quality and patient safety. Dr. Lundblad has an extensive background in leadership, organization development, and program management in both nonprofit and education settings.

A. Clinton MacKinney, MD, MS, is a clinical associate professor in the Department of Health Management and Policy, College of Public Health, University of Iowa. He is also a board-certified family physician. He is the deputy director of the RUPRI Center for Rural Health Policy Analysis.

Timothy D. McBride, PhD, is a professor at the Brown School, at Washington University in St. Louis. He also serves as one of the principal analysts in the RUPRI Center for Rural Health Policy Analysis, and serves in many state and federal roles, including serving as chair of the state of Missouri's MOHealthNET Oversight Committee, which oversees the state's Medicaid program.

Keith J. Mueller, PhD, is the Rural Health Panel chair. Dr. Mueller is the head of the Department of Health Management and Policy in the University of Iowa, College of Public Health, where he is also the Gerhard Hartman professor and the director of RUPRI and its Center for Rural Health Policy Analysis.

About the Rural Policy Research Institute

The Rural Policy Research Institute (RUPRI) provides unbiased analysis and information on the challenges, needs, and opportunities facing rural America. RUPRI's aim is to spur public dialogue and help policymakers understand the rural impacts of public policies and programs. RUPRI is housed within the College of Public Health at the University of Iowa. RUPRI's reach is national and international and is one of the world's preeminent sources of expertise and perspective on policies impacting rural places and people. Read more at www.rupri.org.