Assessing the Comparative Impact of USDA Frontier and Remote Area (FAR) Codes

June 30, 2015
Topics

- **Frontier Definitions**: A brief overview of two definitions.
- **National Level Comparison**: Assessing the differences between the two definitions at a national level.
- **State Level Comparison**: Assessing the differences between the two definitions at a state level.
- **Local Level Comparison**: Exploring what the two definitions mean at the local community level.
- **Limitations of the Definitions**: Examining the limitations of the two definitions for health service development purposes.
- **Frontier Definitions for Health Service Development**: Identifying what is needed in a frontier definition to support health service development.
Introduction: Comparing Definitions of Frontier

• **USDA FAR Codes:**
  – On April 15, 2015 the United States Department of Agriculture – Economic Research Service released a dataset of Zip Code areas in the nation which met the Frontier and Remote (FAR) definitions established by that agency.
  – This listing of FAR Zip Codes was based upon Census 2010 information and represents the most up-to-date listing of locations which have FAR designations.

• **CMS Super Rural:**
  – The FAR listing permits a direct comparison with another Federal definition of frontier and remote locations – the Super Rural definition used by the Centers for Medicare and Medicaid Services (CMS) for enhanced ambulance service reimbursement.
  – This definition uses a different methodology and is also established at the Zip Code level.

• **Using Frontier Definitions for Health System Development:**
  – The comparison of these two definitions provides insight into the type of frontier definition that is most useful for health systems development in frontier areas.
Overview of FAR Methodology

- The FAR methodology starts by excluding Census defined Urban Areas.

- It then measures the distance to the edge of these urban locations from the remaining locations, broken into the smallest possible geographic unit: ½ x ½ kilometer grid cells.

- The methodology aggregates the grid results to larger geographic units.
  - Any larger geographic unit may be classified as FAR by examining the grid-cell populations that fall in that unit.
  - If 50 percent or more of an area’s population is located in grid cells designated as FAR, then the area is classified as FAR.
  - In its most recent aggregation release, grid results are aggregated at the Zip Code Area level.

- Four different FAR levels are identified based upon population size of the Urban Area and travel time to the edge of the Urban Area.
½ x ½ kilometer grid cells

• Current FAR codes use 1x1 kilometer grid cells

• For each of the ~25 million grid cells covering the entire U.S., the following information was added:
  
  • Urbanized Areas
  • Complete roads network
  • 2010 population, downcast to the grid network from census blocks using areal interpolation; used for aggregation to ZIP codes

• Distance measures were calculated based on the roads network: travel time by car to the edge of the nearest Urbanized Area
FAR Levels for Analysis

- **Level 1**--FAR areas consist of rural areas and urban areas up to 50,000 people that are 60 minutes or more from an urban area of 50,000 or more people.
- **Level 2**--FAR areas consist of rural areas and urban areas up to 25,000 people that are: 45 minutes or more from an urban area of 25,000-49,999 people; and 60 minutes or more from an urban area of 50,000 or more people.
- **Level 3**--FAR areas consist of rural areas and urban areas up to 10,000 people that are: 30 minutes or more from an urban area of 10,000-24,999; 45 minutes or more from an urban area of 25,000-49,999 people; and 60 minutes or more from an urban area of 50,000 or more people.
- **Level 4**--FAR areas consist of rural areas that are: 15 minutes or more from an urban area of 2,500-9,999 people; 30 minutes or more from an urban area of 10,000-24,999 people; 45 minutes or more from an urban area of 25,000-49,999 people; and 60 minutes or more from an urban area of 50,000 or more people.

- FAR Level 1 is the closest analogue to previous Frontier definitions.
The CMS Super Rural methodology starts by excluding urban areas. An urban area is defined as a Metropolitan Statistical Area (MSA), modified to recognize rural census tracts in MSAs.

Zip Code areas outside of urban areas are ranked by population density. The lowest quartile of these Zip Code areas are deemed Super Rural for purposes of the CMS Ambulance Fee Schedule.

The top three quartile Zip Code areas are considered Rural.

The base rate for ambulance services is increased by 22.6% for pick-ups in Super Rural Zip Code areas.

CMS has proposed modification of its urban definition. This is not expected to affect Super Rural Zip Code areas.
# National Summary of Zip Codes Designated CMS Super Rural and FAR Level 1

## Total Zip Codes Designated Under Different Definitions

<table>
<thead>
<tr>
<th></th>
<th>Zip Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAR Level 1 Zip Codes</td>
<td>5,320</td>
</tr>
<tr>
<td>CMS - Super Rural Zip Codes</td>
<td>7,835</td>
</tr>
</tbody>
</table>

## Comparison of FAR Level 1 and CMS Super Rural

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zip Codes Designated Under Both Definitions</td>
<td>3,700</td>
</tr>
<tr>
<td>Zip Codes Designated FAR Level 1 Only</td>
<td>1,620</td>
</tr>
<tr>
<td>Zip Codes Designated CMS-Super Rural Only</td>
<td>4,135</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentage</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>52.8% CMS Super Rural Zip Codes Not FAR Level One</td>
<td></td>
</tr>
<tr>
<td>30.5% FAR Level 1 Zip Codes Not Super Rural</td>
<td></td>
</tr>
</tbody>
</table>
National Level Comparison of CMS Super Rural and FAR Level 1

- Under the FAR methodology 5,320 unique Zip Code locations nationwide are identified as FAR Level 1.
  - This compares with 7,835 locations identified as Super-Rural by CMS.
  - FAR identifies more than 2,500 fewer locations than does Super Rural.
- There are also substantial differences between the locations identified by Super-Rural definition and the FAR Level 1 definition.
  - More than 50% (4,135) of the Zip Codes considered Super-Rural are not recognized by FAR Level 1.
  - Similarly, almost a third (1,620) of the locations identified as FAR Level 1 are not recognized by the CMS Super Rural methodology.
Differences between CMS Super Rural and FAR Level 1

• The sets of locations designated under the FAR Level 1 methodology and the CMS Super Rural methodology are fairly disjunct.

• This suggests that the approaches are identifying somewhat different things.

• A graphical picture of these differences can be seen on the following maps.
Comparison of FAR Level 1 and CMS Super-Rural Hawaii

Legend
US Zip Codes
- Not Designated
- Both
- FAR Only
- CMS-SR Only
State-Level Comparisons of Super Rural and FAR Level 1

- Across the 50 states, there is a substantial difference in locations identified under the different methodologies.
  - 12 states have a net gain of locations designated under the FAR Level 1 methodology when compared to the CMS Super Rural methodology.
  - In contrast, 34 states have a net loss of locations designated under the FAR Level 1 methodology when compared to the CMS Super Rural methodology. The scale of this loss is substantial for many states, exceeding 100 locations for more than 14 states.
  - The net state comparative impact is summarized on the following tables.
## Zip Codes Designated as Super Rural and FAR Level 1
### Totals by State with Net Gain

<table>
<thead>
<tr>
<th>STATE</th>
<th>DESIGNATED BY BOTH DEFINITIONS</th>
<th>DESIGNATED CMS-SUPER RURAL ONLY</th>
<th>DESIGNATED FAR LEVEL 1 ONLY</th>
<th>NET CHANGE WITH FAR LEVEL 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>KY</td>
<td>9</td>
<td>13</td>
<td>256</td>
<td>243</td>
</tr>
<tr>
<td>MI</td>
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<td>VT</td>
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<tr>
<td>MS</td>
<td>57</td>
<td>60</td>
<td>103</td>
<td>43</td>
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<tr>
<td>NH</td>
<td>12</td>
<td>5</td>
<td>46</td>
<td>41</td>
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<tr>
<td>PA</td>
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<td>47</td>
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</tr>
<tr>
<td>OH</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
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### Zip Codes Designated as Super Rural and FAR Level 1 -- Totals by State with Net Loss

<table>
<thead>
<tr>
<th>STATE</th>
<th>DESIGNATED BY BOTH DEFINITIONS</th>
<th>DESIGNATED CMS-SUPER RURAL ONLY</th>
<th>DESIGNATED FAR LEVEL 1 ONLY</th>
<th>NET CHANGE WITH FAR LEVEL 1</th>
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<tbody>
<tr>
<td>TX</td>
<td>125</td>
<td>487</td>
<td>25</td>
<td>(462)</td>
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<tr>
<td>NE</td>
<td>219</td>
<td>202</td>
<td>19</td>
<td>(183)</td>
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<tr>
<td>IA</td>
<td>143</td>
<td>261</td>
<td>92</td>
<td>(169)</td>
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<tr>
<td>NM</td>
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<td>AZ</td>
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<td>KS</td>
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<tr>
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<tr>
<td>SD</td>
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<td>162</td>
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<tr>
<td>AL</td>
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<td>(92)</td>
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<tr>
<td>GA</td>
<td>8</td>
<td>110</td>
<td>20</td>
<td>(90)</td>
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</tbody>
</table>
### Zip Codes Designated as Super Rural and FAR Level 1 -- Totals by State with Net Loss (con't)

<table>
<thead>
<tr>
<th>State</th>
<th>Designated</th>
<th>Total Net Loss State</th>
<th>Total Net Loss Zip Codes</th>
<th>Net Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>WA</td>
<td>58</td>
<td>117</td>
<td>31</td>
<td>(86)</td>
</tr>
<tr>
<td>OK</td>
<td>140</td>
<td>119</td>
<td>36</td>
<td>(83)</td>
</tr>
<tr>
<td>OR</td>
<td>104</td>
<td>88</td>
<td>19</td>
<td>(69)</td>
</tr>
<tr>
<td>CA</td>
<td>93</td>
<td>133</td>
<td>65</td>
<td>(68)</td>
</tr>
<tr>
<td>WY</td>
<td>116</td>
<td>55</td>
<td>0</td>
<td>(55)</td>
</tr>
<tr>
<td>AK</td>
<td>166</td>
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<td>LA</td>
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<td>WV</td>
<td>39</td>
<td>72</td>
<td>23</td>
<td>(49)</td>
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<tr>
<td>WI</td>
<td>68</td>
<td>71</td>
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<td>(43)</td>
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<tr>
<td>IL</td>
<td>41</td>
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<td>(42)</td>
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<td>(32)</td>
</tr>
<tr>
<td>NV</td>
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<td>33</td>
<td>2</td>
<td>(31)</td>
</tr>
<tr>
<td>VA</td>
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<td>(31)</td>
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<tr>
<td>ME</td>
<td>96</td>
<td>75</td>
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<td>(28)</td>
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<tr>
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<td>1</td>
<td>(12)</td>
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<tr>
<td>SC</td>
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<td>12</td>
<td>1</td>
<td>(11)</td>
</tr>
<tr>
<td>NY</td>
<td>5</td>
<td>54</td>
<td>51</td>
<td>(3)</td>
</tr>
</tbody>
</table>
Assessing Local Impact of Super Rural and FAR Level 1 Designations

• In addition to net state gains/losses under the two designation schemes, there is, to a certain extent, a shift of designated locations within each state.

• To help states assess the specific local impact within their borders two tools have been prepared and are available through links on the NOSORH website.
  
  – Individual state listings of Zip Codes designated under the two methodologies are available. These are in Excel spreadsheet format and can be downloaded for further analysis offline.

  – An interactive map has been prepared to permit graphic analysis of designations within each state. The map can be zoomed down to the Zip Code level to permit examination of the status of specific locations.
Examining Specific Local Differences of Super Rural and FAR Level 1 Designations

- Any frontier/remote area designation methodology will have limits as an indicator of where rural health services require special effort.

- It is useful to look at specific local cases identified or ignored under the two schemes to highlight their usefulness for rural health service development.

- Three communities in New Mexico are reviewed for analysis purposes.
• Clovis, New Mexico is the largest city on the Eastern Plains of New Mexico.
  – The city has a population of more than \textbf{37,000} and is part of the larger Clovis-Portales Combined Statistical Area, a \textbf{Micropolitan} area.
  – The city has a population density of \textbf{1,459} people per square mile.

• Clovis is adjacent to Cannon Air Force Base, which has housed tactical fighter squadrons and is currently the home of a Special Operations Group (SOG).
  – The Cannon SOG includes operations with the CV-22 Osprey tiltrotor aircraft and the MQ-1B Predator, a remotely operated ‘drone’ craft.
  – It is the operational base for some remotely operated missions.

• Clovis has a multi-story downtown, including the 10-story Hotel Clovis building.
  – It is also home to the Norman Petty Studio. \textit{Buddy Holly and the Crickets} came here from Lubbock, Texas to record their first hits.
• Clovis is home to Plains Regional Medical Center (PRMC), a general hospital with 106 licensed beds.
  – PRMC houses multi-specialty services including hematology, neurology, pulmonology, cardiology, orthopedics, nephrology, urology and a radiation oncology center.

• All the Zip Code areas in Clovis and the adjacent Cannon Air Force Base are considered as FAR Level 1 locations.
  – They are not identified by CMS as Super-Rural.
Clovis, New Mexico - Cannon AFB - Visually
Lemitar, New Mexico - Overview

- Lemitar, New Mexico has a population of just over 300 and is a Census Designated Place.
  - It is an agricultural/ranching community 8 miles North of Socorro, New Mexico, the nearest town of any significant size.
  - It is a major source of chile production in New Mexico.
  - It is not contained in either a Metropolitan or Micropolitan area.
- Lemitar is 70 miles from Presbyterian Hospital in Albuquerque, the nearest general hospital with multi-specialty care.
  - Socorro has a Critical Access Hospital, primary care providers but no significant specialty medical care. The nearest specialty medical services are in Albuquerque.
  - Patient transport, required for many medical situations, requires travel to Albuquerque.
• Both Lemitar and Socorro are considered as Super-Rural locations by CMS.

• Neither community is considered as FAR Level 1.
Lemitar, New Mexico - Visually
Farmington, New Mexico had an estimated 2013 population of 45,426 people.

- Farmington has a population density of 1,710 people per square mile.
- Farmington and surrounding San Juan County makes up one of the four Metropolitan Statistical Areas (MSA's) in New Mexico.
- San Juan County is one of the geographically largest counties in the United States covering 5,538 square miles.

Farmington is the center of the energy extraction industry in the Four Corners Area and San Juan Basin.

- It is one of a handful of border towns providing commercial services to the Navajo Nation and its 300,048 residents.
- The Navajo Nation population is largely dispersed and has fewer commercial service hubs rivaling the offerings in border towns.
Farmington is home to San Juan Regional Medical Center, a 194 bed general hospital with associated long term care and rehabilitation services.

- The community offers a broad range of medical specialties including hematology, neurology, pulmonology, cardiology, gastroenterology, orthopedics, nephrology, urology and oncology.

All of the Zip Codes in Farmington and in San Juan County are designated as Super-Rural under the CMS methodology.

- None of the Zip Codes are designated as Far Level 1.
Farmington, NM - Visually
Implications for Health Service Development

• For frontier/remote area health service development we need a frontier definition which:
  – Identifies areas/communities with limited local health services.
  – Identifies areas at a substantial distance from specialty and comprehensive inpatient services – the ‘next level of care’.

• Both the FAR Level 1 and CMS Super Rural methodologies have limitations for health services development purposes.
  – Both have false positives – areas designated which are not remote from next levels of care –
  – Both have false negatives – remote areas with limited services which are overlooked in the designation process.
Why FAR Level 1 and CMS Super Rural Have Limited Health Services Usefulness

• After exclusion of urban locations, both methodologies rely on a single factor analysis:
  – CMS Super Rural looks exclusively at population density.
  – USDA FAR Level 1 looks exclusively at distance from Urban Areas.

• Neither approach looks at the actual health services available in the local community.

• Neither approach looks at the actual health services available in the remote community.

• Both approaches make assumptions about the health services availability in the local communities and in the remote community – assumptions tied to urban/rural status or to population density.
Importance of Health Services Availability Data

• Other frontier designation approaches, particularly the 1986 HRSA Regional Program Guidance Memorandum 86-10 and the Office for the Advancement of Telehealth 2006 definition, require assessment of health service availability.

• In addition, both take into consideration community population size – a consideration that would likely eliminate the ‘false positives’ of Clovis and Farmington.

• Both approaches establish a reconsideration mechanism – recognizing that false positives and false negatives occur, and that locally originated data can help remedy any problems.
What is Needed in a Frontier Designation for Health Service Development

- A health service development specific frontier designation would identify:
  - Smaller communities and areas of dispersed population with limited local health services.
  - Smaller communities and areas which are substantially remote from the ‘next level of care’ – including general inpatient services, specialty services, and comprehensive ancillary services such as laboratory and radiology.

- Approaches like USDA-FAR and CMS-Super Rural which examine distance and population density can be used as a first pass for identifying candidate areas, but a final determination must include service availability information.
  - While some of this information is available in national datasets, some of the data will need to be gathered and compiled locally to assure completeness and accuracy.
  - This is a natural role for SORHS and PCOs, which already participate in cooperative State-Federal designation activities with HRSA related to HPSAs and MUA/Ps.
Several modifications of the current FAR methodology could make it more useful tool for rural health systems development.

- **Distance From:** In aggregations of grids, measure from the population center or a service site in a service area with limited local health availability.
- **Distance To:** At the grid level and in aggregations, measure to the location of a defined health system target, such as ‘next level of care’.
- **Service Area Definitions:** Allow definition of service areas using selection of contiguous grids, with a maximum population size and market rationality criteria.

These analysis could be done as a supplement to its core analysis – similar to the supplement used in assessing ‘food deserts’.

- Food deserts are areas with limited local food availability which are remote from sources of fresh fruit, vegetables, and other healthful whole foods.

The identical analysis could be used to identify ‘health service deserts’ which are areas with limited local health service availability and which are remote from comprehensive sources of health care.

Identification of ‘health deserts’ in remote areas would provide an excellent ‘first pass’ tool for SORHS and others working to identify remote community with special health care needs.
Frontier Definition Resources - 1

• **DHHS-CMS: Ambulance Fee Schedule Overview and Dataset**
  [http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AmbulanceFeeSchedule/](http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AmbulanceFeeSchedule/)

• **USDA-ERS: FAR Codes Overview and Dataset**

• **Rural Assistance Center: Introduction to Frontier**
  [https://www.raconline.org/topics/frontier](https://www.raconline.org/topics/frontier)

• **National Center for Frontier Communities: Alternative Frontier Definitions**
  [http://frontierus.org/maps/](http://frontierus.org/maps/)
As an adjunct to the presentation an interactive online map has been developed contrasting CMS-Super Rural and USDA-FAR Level 1.

http://tinyurl.com/FAR-SUPER-RURAL

To activate it from the base map where you land:

– Zoom in to a State level or lower until color overlays appear.
– Click on the Legend Title on the left panel to see meaning of colors.
– Click on any Zip Code area on the map to get a pop-up describing the designation.