



Rural-Urban Differences in Continuity of Care among Medicare Beneficiaries

Matthew Toth, MSW; Caroleen Quach, MSPH; G. Mark Holmes, PhD

BACKGROUND

In response to the Affordable Care Act and other reforms in the health care market, new models of care are being tested and implemented across the country. Care and payment models such as patient-centered medical homes, Accountable Care Organizations (ACOs), and bundled payments depend on linkages between different types of health care providers

to ensure continuity of care. To address concerns that health care in rural areas may be more fractured and thus a difficult place for these models to succeed, we measured continuity of care using detailed data on a sample of Medicare beneficiaries from 2000-2009. Although continuity of care is a multifaceted concept, here we define it as the degree to which a patient's care is concentrated among few providers.

KEY FINDINGS

- Overall, the continuity of care index (COCI) for Medicare beneficiaries age 65 and over was slightly higher for rural residents. In particular, rural residents were more likely than urban residents (20% vs. 15%) to visit only one provider per year for outpatient care.
- The difference between rural and urban appears to be concentrated among beneficiaries with many visits; continuity was nearly equal among those with seven or fewer visits, but among those with at least 15 visits, there was a marked difference (e.g., average COCI for urban of 0.30 vs. average COCI for isolated rural of 0.37).
- The assumption that health care in rural areas has different continuity (either higher or lower) than in urban areas, may be unfounded or at least over-stated and oversimplified. For example, the differences were more pronounced at high levels of utilization. More research is needed on the extent to which continuity of care varies across patient characteristics (e.g., multiple comorbidities) and the degree to which it is associated with individual-level outcomes among rural Medicare beneficiaries.

METHODS

We measured continuity of care in the outpatient setting using the Bice-Boxerman Continuity of Care Index (COCI).¹ The COCI is a widely used, validated measure of the dispersion and concentration of care across all providers seen by a patient.² Values range from nearly 0 (where the beneficiary sees multiple physicians once) to 1 (where the beneficiary sees only one provider). Thus, higher values denote higher continuity of care among fewer providers. It is important to note that higher values are not necessarily optimal; for beneficiaries with complex health needs, it may be appropriate to see multiple specialists and thus have lower continuity of care. One drawback of the index is that it has no intuitive interpretation (that is, it is not a percent or proportion); based on one study, a difference of 0.05 is the minimum clinically meaningful difference.

Because rurality is a nuanced concept, we defined rurality based on three alternative definitions: 1) the U.S. Office of Management and Budget (OMB) Metropolitan Statistical Areas (metropolitan and nonmetropolitan with nonmetro further divided into micropolitan and noncore-

based areas); 2) ZIP Code approximations to Rural-Urban Commuting Area (RUCA) codes classified into four groups: Urban, Large Rural, Small Rural, Isolated;³ and 3) the Office of Rural Health Policy definition [all nonmetropolitan and metropolitan with a (ZIP-approximated) RUCA of 4-10].⁴ Using data from the 2000-2009 Medicare Current Beneficiary Surveys (MCBS), we analyzed office-based provider, Federally Qualified Health Center, and Rural Health Clinic outpatient claims to calculate the COCI. MCBS sampling weights are used to make the sample comparable to

the U.S. elderly population for approximately 12,000 Medicare beneficiaries a year; beneficiaries are followed for four years in the survey. The data include detailed Medicare claims information in addition to survey results and the beneficiary residence.

RESULTS

Table 1 presents the distribution of the COCI across multiple dimensions and definitions of rurality. The first two columns present the average and standard deviations for the COCI. Columns three and four decompose this average: the third column contains the percent of beneficiaries who see only one provider in the year and, thus, have a COCI equal to 1.0, and the fourth is the average COCI among those who see more than one provider. Overall, COCI is approximately 10% higher in rural areas; for example, the average COCI for Medicare beneficiaries living in Urban RUCAs is 0.409 compared to 0.451 to 0.456 in Small and Isolated RUCAs. Thus, rural beneficiaries are likely to have more of their care provided by the same provider(s) than urban beneficiaries.

The preponderance of the difference in continuity of care can be attributed to the group of patients who see only one provider in a given year (approximately 20% in rural areas vs. 15% in urban areas). Among those seeing at least two providers, the average continuity index does not vary across urban and rural areas.

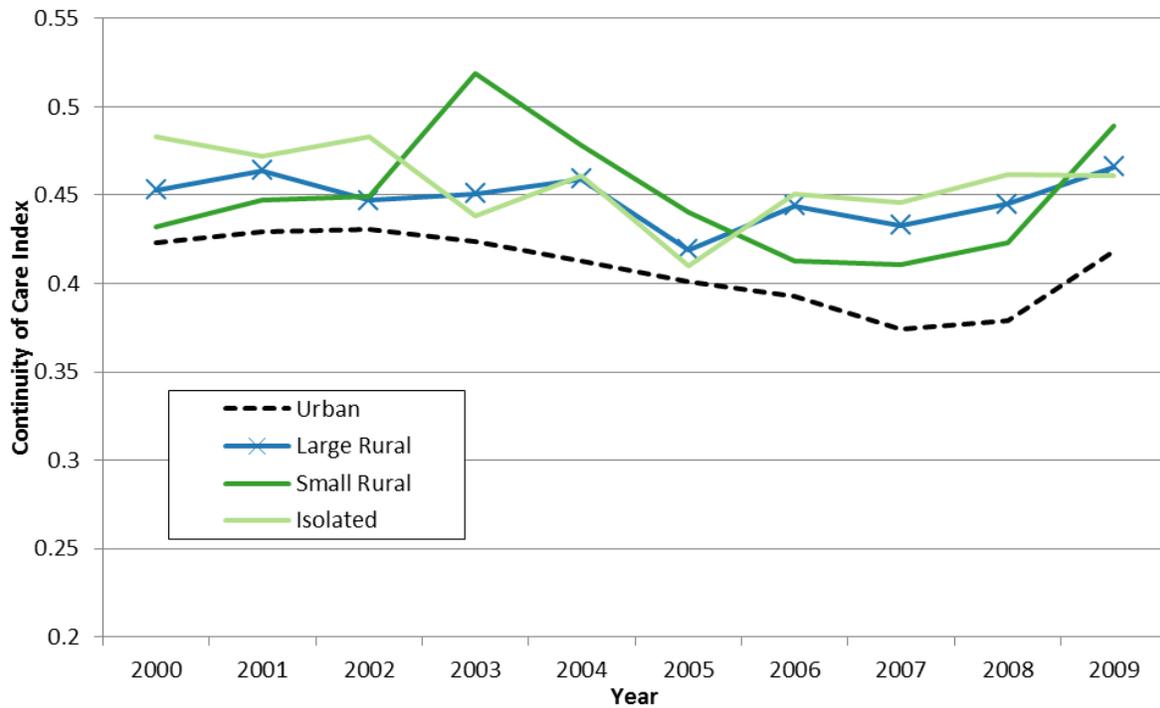
Table 1: Distribution of Continuity of Care Index Scores (COCI) across Rural Status, among Medicare Beneficiaries, 2000-2009 (N = 46,635)*

Rurality	Average COCI	Standard Deviation	Percent with COCI = 1	Average COCI if COCI < 1
<i>Rural-Urban Commuting Area</i>				
Urban	0.409	(0.30)	15.1%	0.304
Large Rural	0.448	(0.45)	19.0%	0.319
Small Rural	0.451	(0.33)	20.3%	0.310
Isolated	0.456	(0.33)	20.5%	0.316
<i>OMB Metropolitan Statistical Area</i>				
Metro	0.410	(0.30)	15.2%	0.304
Micro	0.445	(0.32)	19.0%	0.314
Non-core	0.461	(0.33)	20.8%	0.319
<i>ORHP Definition</i>				
Urban	0.407	(0.30)	14.9%	0.303
Rural	0.450	(0.32)	19.4%	0.318

*Estimated population standard deviation in parentheses. All differences statistically significant ($p < 0.001$) with exception of COCI < 1 differences in small rural and isolated rural.

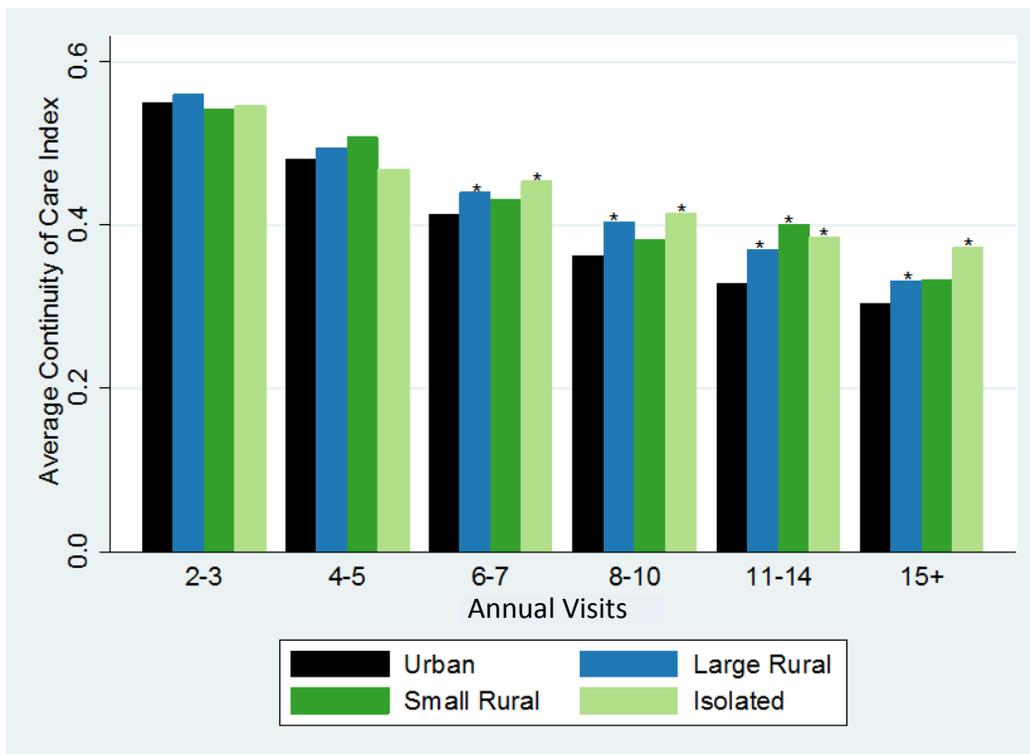
We also examined the trend in COCI over time using only the RUCA definition of rural. Figure 1 presents the average COCI by RUCA type over the study period. With the exception of one aberrant peak in small rural areas in 2003, continuity of care generally declined in all geographies in the first part of the decade. In recent years, continuity has improved in all locations. It is not known whether this change is a statistical artifact, a response to market reforms encouraging greater continuity of care, or a response to changing availability of care providers.

Figure 1: Average Continuity of Care Index by Rural Status, 2000-2009



Finally, we looked at the distribution of COCI across geographies for patients with different levels of health care utilization as measured by annual number of visits (Figure 2). Among those beneficiaries with a small number of visits (2-3), the continuity is roughly equal across rurality. As the number of visits increases, continuity decreases for all groups, but there is a larger disparity between urban and rural, with rural residents having consistently higher continuity. Among beneficiaries with 11 to 14 visits, Large Rural (0.370), Small Rural (0.401), and Isolated Rural beneficiaries (0.386) all had statistically significant higher continuity of care, relative to Urban beneficiaries (0.329) ($p < 0.05$).

Figure 2: Average Continuity of Care Index by Number of Evaluation and Management Visits



* denotes statistically significant at $p < 0.05$ from average urban COCI for that number of visits

DISCUSSION AND CONCLUSION

When patients have their health care delivered by many providers across different practices, it can be more difficult to effectively coordinate care. Many new payment initiatives and models of care have been developed to promote a coordinated system of care for the patient. Using one measure of continuity of care, we found that rural and urban Medicare beneficiaries have similar continuity. If anything, rural residents have slightly higher continuity or less fragmented care, particularly among those with many visits. Overall, the COCI is approximately 10% higher in rural areas; for example, the average COCI for Medicare beneficiaries living in Urban RUCAs is 0.409 compared to 0.451 to 0.456 in Small and Isolated RUCAs. Although this difference is statistically significant, the clinical significance may be modest. Previous studies found that a difference of 0.05 in the COCI is associated with a 3% decrease in the relative risk of a hospital admission⁵ and a 1% decrease in the risk of preventable admissions.⁶ Thus, the differences in continuity of care may not lead to large differences in outcomes.

Similarly, higher continuity of care may not always be desirable. A higher continuity score for rural residents may indicate that primary care providers are managing all health conditions for their patients in the absence of specialty care providers. Some beneficiaries, especially those with complex conditions, may have better outcomes if they obtain specialist consultation.⁷ Thus, it may be the case that rural beneficiaries who need more visits due to poor health may not be getting the mix of providers needed for better outcomes. It is important to note, however, that the definition of continuity used here may be influenced, particularly in rural areas, by the focus of this analysis on physicians and not practices. It is possible, for example, that urban residents receive their care across multiple providers in fewer, large practices. To the extent that intra-practice coordination is more effective than inter-practice coordination, the measures used here may lead to erroneous conclusions about rural-urban disparities in continuity of care. Finally, these analyses were not adjusted for beneficiary characteristics. Further analyses that consider other factors such as beneficiary health status and distribution of health care providers in terms of both availability and practice organization would help inform the discussion of models of care that seek to improve continuity and care coordination.

REFERENCES AND NOTES

1. Bice TW, Boxerman SB. A quantitative measure of continuity of care. *Med Care*. 1977;15(4):347-349.
2. Ejlertsson G, Berg S. Continuity-of-care measures: an analytic and empirical comparison. *Med Care*. 1984;22(3):231-239.
3. U.S. Department of Agriculture. Rural-Urban Commuting Area Codes. Available at: <http://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes.aspx>. Accessed 7-1-14.
4. U.S. Department of Health and Human Services. Defining the Rural Population: Office of Rural Health Policy. Available at: http://www.hrsa.gov/ruralhealth/policy/definition_of_rural.html. Accessed 7-11-14.
5. Hussey PS, Schneider EC, Rudin RS, Fox DS, Lai J, Pollack CE. Continuity and the costs of care for chronic disease. *JAMA Intern Med*. 2014;174(5):742-748.
6. Nyweide DJ, Anthony DL, Bynum JP, Strawderman RL, Weeks WB, Casalino LP, Fisher ES. Continuity of care and the risk of preventable hospitalization in older adults. *JAMA Intern Med*. 2013;173(20):1879-1885.
7. Chen LM, Ayanian JZ. Care continuity and care coordination: What counts? *JAMA Intern Med*. 2014;174(5):749-750.

This study was funded through Cooperative Agreement # UICRH03714 with the Federal Office of Rural Health Policy (ORHP), Health Resources and Services Administration, U.S. Department of Health and Human Services. ULI-TR000083; F30-HL110483; T32-GM008719 and UNC Institute on Aging pilot grant supported the purchase of the Medicare Current Beneficiary Survey. The conclusions and opinions expressed in this brief are the authors alone; no endorsement by the University of North Carolina, ORHP, or other sources of information is intended or should be inferred.



UNC
THE CECIL G. SHEPS CENTER
FOR HEALTH SERVICES RESEARCH

North Carolina Rural Health Research Program

Cecil G. Sheps Center for Health Services Research

The University of North Carolina at Chapel Hill

725 Martin Luther King Jr. Blvd. | Chapel Hill, NC 27599

919-966-5541 | www.shepscenter.unc.edu/programs-projects/rural-health