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Linkages Between Rural Community Capitals and Healthcare Provision: A Survey of Small Rural Towns in Three U.S. Regions

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Abstract

This report identifies community-level factors affecting the recruitment and retention of rural healthcare professionals. The authors used key informant interviews and a survey of healthcare professionals in 150 small rural towns in 9 States, emphasizing a broad range of community assets and investments. Most participants perceived social capital (involving personal and professional relationships) to be important for the recruitment and retention of healthcare professionals. Human capital (resources inherent in people—such as their education, skills, and health) and physical capital (infrastructure, buildings, and equipment) were also important to most healthcare professionals but generally less so than social capital. Other types of community capital were important to a minority of health professionals. These findings suggest that rural communities can have a significant influence on attracting and retaining healthcare professionals through investments in social, human, and physical capital. The importance of many of these factors varies across the study regions and professional categories.

Keywords: rural healthcare workforce, recruitment, retention, community capitals

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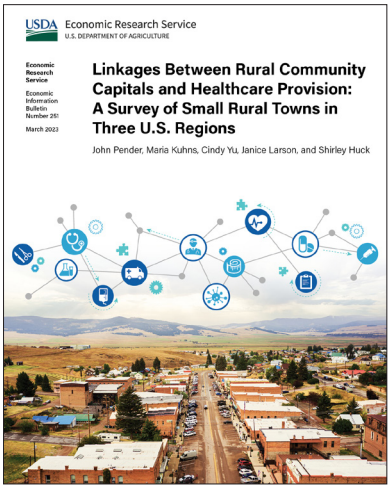
What Is the Issue?



Although healthcare is one of the largest and fastest-growing sectors in the rural United States, many rural communities suffer from poor access to healthcare, in part due to difficulties recruiting and retaining healthcare professionals. Although there is a large body of research on the problem, very few studies address the issue from the perspective of rural communities themselves and the factors the communities can affect. In addition, few studies investigate the recruitment and retention of rural healthcare professionals other than physicians.

This study focuses on how rural communities can attract and retain healthcare professionals. The findings are based on key informant interviews with community leaders, health facility administrators, and other healthcare representatives—along with a survey of healthcare professionals that includes primary care physicians, dentists, nurse practitioners, physician assistants, and certified nurse midwives—in 150 small rural towns in 9 States (Arkansas, Iowa, Kansas, Louisiana, Mississippi, Minnesota, Oklahoma, Texas, and Wisconsin). The study addresses the following questions:

- How do the assets and investments of rural communities ("community capitals") affect their communities' recruitment and retention of healthcare professionals?
- How does the importance of these factors vary across regions and types of healthcare professionals?
- Does the importance of these factors differ between recruitment and retention?
- What can rural communities do to help recruit and retain healthcare professionals?

What Did the Study Find?

Many types of community capitals were important for recruiting and retaining healthcare professionals in the small rural towns in the study, including:

- **Social capital**—the value of personal and professional relationships—was widely perceived by both key informants and healthcare professionals as important for the recruitment and retention of the professionals.

Many key informants and most healthcare professionals highlighted the importance of relationships with family, friends, colleagues, and patients in recruitment and length-of-stay decisions.

- **Physical capital** (such as the availability and quality of housing, medical facilities, and equipment), was widely cited as a factor, though less often than social capital.
- **Human capital**, reflected in the quality of both schools (which also reflects social and physical capital) and healthcare professionals, is also widely perceived as important for recruitment and retention, though cited less often than social capital. Key informants more often cited the importance of school quality for recruitment—while healthcare professionals often cited the quality of the medical community, colleagues, and staff as important to accepting and retaining employment.
- **Natural amenities and outdoor recreation opportunities** were also cited as important by many key informants and nearly half of healthcare professionals but generally less often than social or human capital. Professionals rarely cited these as their main reason to locate or stay in the town or to consider leaving.
- **Local culture and cultural amenities** were less commonly cited as important by key informants and healthcare professionals than other types of community capital.
- **Other workforce issues that are important to many healthcare professionals** (that did not qualify as community capital, though were likely affected by it) include the community's need for healthcare professionals, financial rewards offered, workload and on-call responsibilities, and effects of location and retention decisions on their spouse or partner.

Lack of access to urban amenities – which reflect human, physical, and cultural capital found in urban settings – was the most often cited barrier to recruitment by both key informants and healthcare professionals. However, few healthcare professionals who had considered leaving viewed this as the main reason.

These results show the importance of social, human, and physical capital in the recruitment and retention of healthcare professionals and suggest that rural communities can have a significant influence on attracting and retaining healthcare professionals by investing in these types of assets. However, the importance of many of these factors varied across regions and healthcare-professional types.

How Was the Study Conducted?

This study is based on key informant telephone interviews with 341 community leaders (e.g., town mayor or city manager, leaders of local economic development organizations or planning commissions, and local educators), health facility (hospital or clinic) administrators, and other healthcare representatives, plus a mail/web survey of 928 healthcare professionals (physicians, dentists, physician assistants, nurse practitioners, and certified nurse midwives) in 150 randomly sampled small towns in the study regions and States in 2014 and 2015. The sample towns represent 809 small towns in these States. The interviews and surveys collected information on a broad range of community assets and amenities that may affect the decisions of healthcare professionals to locate and stay in rural small towns. The key informant interviews and survey of healthcare professionals were conducted by the Survey and Behavioral Research Services group of the Center for Survey Statistics and Methodology, Iowa State University.

Linkages Between Rural Community Capitals and Healthcare Provision: A Survey of Small Rural Towns in Three U.S. Regions

Introduction

Inadequate access to healthcare services is a chronic problem in much of the rural United States, especially because of a limited supply of healthcare professionals. Almost 90 percent of nonmetro U.S. counties are classified by the U.S. Health Resources and Services Administration (HRSA) as entirely or partially primary care Health Professional Shortage Areas (HPSAs), and 83 percent are classified as entirely or partially dental HPSAs.[1][2] In November 2021, about 30 percent of the nonmetro U.S. population lived in designated primary care HPSAs, compared to less than 13 percent of the metro population.[3] Similarly, more than 24 percent of the nonmetro population lived in designated dental HPSAs, compared to about 8 percent of the metro population.

People living in primary care HPSAs report having less access to primary healthcare services and are more likely to be in poor health than those living in other areas (Kohrs and Mainous, 1995; Liu, 2007). Having fewer primary care physicians per capita—often the case in rural areas—is associated with lower life expectancy (Basu et al., 2019). Rural residents have higher age-adjusted mortality rates than urban residents across a wide variety of causes of death (Callaghan et al., 2020).

In addition to their importance for rural people's health, healthcare services are important to rural economies. Healthcare services is one of the largest and most rapidly growing economic sectors in the United States, including in the rural United States. Across 20 major industrial sectors, healthcare services was the third-largest sector in nonmetro areas in 2019 in terms of earnings, after government (mostly local) and

[1] In this study, the term "rural" is used without a specific definition of rural areas when the term refers to the generic concept of rural, as in "rural United States" and "rural health," as there are many definitions of rural in the literature and data sources cited herein. When citing data for a specific classification used as a proxy for rural areas (such as nonmetro areas), we refer to nonmetro rather than rural. We also provide a specific definition of the "rural small towns" that are the focus of this study in appendix A.

[2] Primary care HPSAs are areas that have a population of more than 3,500 people per full-time equivalent primary care doctor (including non-Federal Doctors of Medicine (M.D.) and Doctors of Osteopathy (D.O.)), or more than 3,000 people per primary care doctor and unusually high needs for primary care services or insufficient capacity of existing primary care providers. Dental HPSAs are areas that have more than 5,000 people per full-time equivalent dentist, or more than 4,000 people per dentist, and unusually high needs or insufficient capacity of existing dentists. In all cases for HPSAs, healthcare professionals in contiguous areas are overutilized, excessively distant, or inaccessible to the population of the area under consideration. In addition to primary care and dental HPSAs, HRSA also designates areas as mental health HPSAs. We do not cite figures on this because this study is focused on primary healthcare and dental professionals.

[3] These figures are estimated using HRSA data on the population of designated primary care HPSAs, including geographic HPSAs, high needs geographic HPSAs, and population HPSAs, and excluding HPSAs in U.S. territories, facility HPSAs (to avoid double-counting of the population in HPSAs), and HPSAs whose status has been withdrawn or proposed for withdrawal. The estimated population of designated primary care HPSAs in nonmetro areas does not include the population of HPSAs that includes both metro and nonmetro areas; hence, the population is a conservative estimate of this share. Including the population of partially nonmetro HPSAs in the estimate of the nonmetro HPSA population, an upper-bound estimate of the share of the nonmetro population in designated primary care HPSAs is 31 percent.

manufacturing (U.S. Bureau of Economic Analysis (USBEA), 2020).[4] Between 2001 and 2019, the share of nonmetro earnings in the healthcare sector grew from 8.1 percent to 9.4 percent.

The growing economic importance of the healthcare sector in rural areas likely will continue as the Baby-Boom generation retires. The U.S. Bureau of Labor Statistics (BLS) projects that between 2019 and 2029, the healthcare and social assistance sector will have the fastest rate of growth in output and employment of all major sectors. Ten of the 20 fastest-growing subsectors will be in healthcare, driven largely by the aging of the population and chronic health conditions, which are more prevalent in rural areas (Dubina et al., 2020). Providing adequate healthcare services may be a key factor in attracting retirees and other migrants to rural areas offering such services (Duncombe et al., 2003; Oehmke et al., 2007; Poudyal et al., 2008; Dorfman and Mandich, 2016).

Addressing the shortage of healthcare professionals in rural areas and realizing the economic opportunities due to the growing demand for healthcare services are major concerns for healthcare stakeholders in rural areas. Access to quality health services was ranked as the top health priority out of 38 possible priorities in a national survey of rural health stakeholders in 2010 through 2012 (Bolin et al., 2015). In a national survey of rural hospital Chief Executive Officers (CEOs) in 2008, three-quarters reported shortages of primary care physicians in their town, and 70 percent reported shortages of 2 or more primary care specialties (MacDowell et al., 2010).

A large body of research has investigated factors affecting the recruitment and retention of healthcare professionals—especially physicians—in rural areas.[5] Many studies have investigated the influence of "nature versus nurture" on physicians' decisions to practice in rural locations, with "nature" referring to factors in physicians' backgrounds (such as growing up in a rural area, demographic characteristics, or professional motivations and intentions), versus "nurture" (factors like the location and characteristics of the medical school the healthcare professional attended, the residency experience, or Federal and State programs providing incentives to practice in rural areas). The most robust findings across many studies are that healthcare professionals who grew up in a rural area or who participated in a rural rotation during their training or residency are more likely to choose to practice in a rural location (MacQueen et al., 2018). Other factors positively associated with healthcare professionals' choice of rural locations in some (but not all) studies reviewed by MacQueen et al. include: having family in the chosen location, being male, being focused on primary care or family medicine, participation in programs providing scholarships or loan repayment assistance in exchange for rural practice, being interested in a broad scope of practice, having lived or spent recreational time in rural areas, and recreational activities or small town lifestyle being important to healthcare professionals in their location choice.

Many of the same factors have been found to affect the retention of healthcare professionals. Several studies highlight the importance of work-related factors (beyond the importance of having a rural background, prior rural exposure, or training experience in a rural area) such as: professional autonomy, the scope of practice, workload, reimbursement rates, professional isolation, and extent of professional support. Several factors also

[4] The other 17 major sectors (not in order of importance) include: (1) farming, forestry, fishing, and hunting; (2) mining, quarrying, and oil and gas extraction; (3) utilities; (4) construction; (5) wholesale trade; (6) retail trade; (7) transportation and warehousing; (8) information services; (9) finance and insurance; (10) real estate, rental and leasing; (11) professional, scientific, and technical services; (12) management of companies and enterprises; (13) administration, support, waste management, and remediation services; (14) educational services; (15) arts, entertainment, and recreation; (16) accommodation and food services; and (17) other services (except government and government enterprises). Healthcare is the third largest sector in terms of earnings, with or without including social assistance. Healthcare and social assistance was the fourth largest sector in terms of employment in nonmetro areas in 2019, after government, manufacturing, and retail trade (BEA, 2020). BEA does not report employment data for healthcare separately from social assistance for nonmetro areas.

[5] Excellent reviews of the literature on factors affecting the recruitment of healthcare providers to rural areas in the United States include Rabinowitz et al. (2008), Ballance et al. (2009), Goodfellow et al. (2016), and MacQueen et al. (2018). Reviews of the literature on factors affecting retention (some of which also review literature on factors affecting recruitment) include Brooks et al. (2002), Cogbill et al. (2012), Feeley (2003), Gamm et al. (2003), Kumar and Clancy (2021), and Parlier et al. (2018).

highlight quality-of-life considerations, such as: having a sense of belonging in the community, quality of the schools, needs and preferences of healthcare professionals' family members, preferences regarding small town life, the natural environment versus urban amenities, and recreational activities (Parlier et al., 2018).

Most past studies on factors affecting the recruitment and retention of healthcare professionals focus on physicians, with few studies focused on the recruitment and retention of other types of healthcare professionals.[6] Relatively few studies focus on the problem of recruitment and retention of healthcare professionals from the perspective of rural communities themselves, including factors that such communities can influence. Most of the studies that do investigate community-level factors are relatively small (with fewer than 100 respondents) and are usually qualitative studies conducted in a few communities.[7] Several studies investigated the impacts of community-level (usually county-level) factors on the numbers of physicians, using statistical analysis of secondary data.[8] Most of these studies are quite dated and focus on the effects of factors that are measurable at a county level but that cannot be readily addressed or influenced by communities.

In this study, we investigate community-level factors that affect the ability of rural small towns in nine States in the Lower Mississippi Delta (LMD) region (Mississippi, Louisiana, and Arkansas); the Southern Great Plains (SGP) region (Texas, Oklahoma, and Kansas); and the Upper Midwest (UMW) region (Iowa, Minnesota, and Wisconsin) to recruit and retain healthcare professionals. Rural communities in these States have not been the focus of many studies on factors affecting the recruitment and retention of healthcare professionals.[9] The study sample includes 150 small towns in these States, selected using a stratified random sampling design.[10] Unlike most studies of the recruitment or retention of healthcare professionals, we investigated other types of healthcare professionals (in addition to primary care physicians), including dentists, nurse practitioners, physician assistants, and certified nurse midwives.[11] We used both quantitative and qualitative approaches to data collection and analysis, combining two data collection instruments: (i) a mail/web survey questionnaire of 928 healthcare professionals using mostly closed-ended questions and (ii) semi-structured telephone interviews using mostly open-ended questions with 341 community leaders, healthcare facility administrators, and other knowledgeable key informants.

The design of the data collection instruments and the analysis was informed by a review of the literature on the factors affecting the recruitment and retention of healthcare professionals in rural areas—with an emphasis on community-level factors—and the literature on rural community assets or "capitals" (Castle, 1998; Flora et al., 2003; Green and Haines, 2002; Kretzmann and McKnight, 1993) and rural wealth creation in the United States (Pender et al., 2012; Pender et al., 2014). We hypothesized that many types of rural community capital—including not only financial and physical capital but also human, natural, social,

[6] Examples of studies of factors affecting the recruitment or retention of healthcare providers (other than physicians) include Chipp et al. (2011), Daniels et al. (2007), Henry and Hooker (2007), and Renner et al. (2010).

[7] These studies include Cameron et al. (2010), Chipp et al. (2011), Conte et al. (1992), Cutchin (1997a) (1997b), Hancock et al. (2009), Henry and Hooker (2007), and Hughes (2019). The findings of these and other studies of the effects of community-level factors on the recruitment or retention of healthcare providers in the United States, Canada, or Australia are compared to our findings in a later section of this paper. One quantitative study investigated community-level factors and other factors affecting recruitment of emergency-medicine graduates, based on a national survey (Helland et al., 2010). Other survey-based studies investigated such factors in particular regions and States, including six northwestern States (Ellsbury et al., 2002), Colorado (Renner et al., 2010), eastern Kentucky (Cutchin et al., 1994), New Mexico (Daniels et al., 2007), Massachusetts (Stenger et al., 2008), and Wisconsin (Jarman et al., 2009).

[8] These studies include Newhouse et al. (1982), Dionne et al. (1987), Langwell et al. (1987), Carpenter and Neun (1999), McGrail et al. (2017), and Hughes (2019).

[9] Henry and Hooker (2007), who studied factors affecting the retention of physician assistants in rural Texas—and Hughes (2019), who studied factors affecting the recruitment and retention of general surgeons in 12 midwestern States—are exceptions.

[10] The sampling approach is described briefly in a subsequent section and in more detail in appendix A.

[11] In our sample selection and in the analysis, we combined nurse practitioners, physician assistants, and certified nurse midwives into a single category (NP/PA/CNM).

and cultural capital—may be important in affecting the ability of rural communities to attract and retain healthcare professionals (see box, "Types of Community Capital," for definitions of these types of community capital). The focus of this study is on investigating the effects of the different types of community capital on the recruitment and retention of rural healthcare professionals, with some emphasis on factors that rural communities can affect.

The study makes several contributions to the literature, first by adding to the limited literature on the effects of community-level factors on the recruitment and retention of rural healthcare professionals in the United States. Our focus on rural healthcare professionals in addition to physicians expands the scope of most previous research on these issues. The focus on nine States in the Lower Mississippi Delta, Southern Great Plains, and Upper Midwest regions expands knowledge of these issues to places that have not been well-studied in this literature. The regions studied offer contrasts of one region that is relatively well endowed in terms of access to healthcare professionals, health insurance, income, and other socioeconomic advantages—the Upper Midwest—to two regions that are more challenged in terms of such factors. Our focus on the effects of the different types of rural community capital demonstrates how community capital concepts can be useful in research and practice related to rural health workforce issues. Finally, our analysis of quantitative and qualitative data drawn from a relatively large sample of healthcare professionals and key informants in a random sample of small rural towns strengthens our confidence that our findings are robust and representative.

Types of Community Capital[1]

In this study, we focus on the effects of six types of community capital that have been defined in the related literature.

Physical capital includes the stock of produced capital goods (i.e., buildings and equipment) used by firms to produce outputs; infrastructure used to reduce costs of commerce (e.g., roads, bridges, waterways, telecommunication networks) or provide public services (e.g., water and sewage treatment plants); and durable goods used by households for either production or consumption purposes (e.g., houses, vehicles, household equipment).

Financial capital is the supply of money and other liquid financial assets (such as stocks, bonds, and letters of credit)—net of financial liabilities—that can be readily converted to money. Financial capital includes claims of rights to income or services from other forms of capital.

Natural capital is the stock of healthy environmental assets (e.g., air, water, land, flora, fauna) in a region capable of producing returns in the form of flows of goods and services, including nonmarketed ecosystems services. Natural capital includes (1) nonrenewable resources such as oil and minerals extracted from ecosystems and (2) renewable resources (such as fish, wood, and drinking water) that are produced and maintained by the processes and functions of ecosystems (Costanza and Daly, 1992).

Human capital refers to resources imbedded in people (such as their stock of education, skills, and physical and mental health) (Becker, 1962).

Social capital has been defined by Robert Putnam (1993, page 35) as "features of social organization, such as networks, norms and trust that facilitate coordination and cooperation for mutual benefit".[2] There are at least two forms of social capital; bridging and bonding (Putnam 2000).[3] Investments in bridging social capital are those that lead to connections between otherwise unconnected individuals and groups. Investments in bonding social capital are those that strengthen relationships within groups.

Cultural capital is the stock of knowledge and practices that reflect values and identity rooted in place, class, and/or ethnicity.[4] An example is the "Protestant work ethic," which Weber (1905) argued was an important factor contributing to the rise of capitalism in the West.

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[1] Adapted from Pender and Ratner (2014). Two additional capital types that were not investigated in this study—intellectual capital and political capital—are also discussed in Pender and Ratner (2014) and in the literature.

[2] Definitions of social capital abound in the literature. For example, Bourdieu (1986, pages 248–9) defined social capital as "… the aggregate of the actual and potential resources which are linked to … membership in a group." According to Coleman (1988, page S98), "Social capital is defined by its function. It is … a variety of different entities, with two elements in common: They all consist of some aspect of social structures, and they facilitate certain actions of actors—whether persons or corporate actors—within the structure. Like other forms of capital, social capital is productive, making possible the achievement of certain ends that in its absence would not be possible. … Unlike other forms of capital, social capital inheres in the structure of relations between actors and among actors."

[3] Some authors have defined a third type of social capital—"linking" social capital—as "norms of respect and networks of trusting relationships between people who are interacting across explicit, formal or institutionalized power or authority gradients in society" (Szreter and Woolcock, 2004, page 655). As defined, linking social capital is a subcategory of bridging social capital as originally conceived, though distinct from bridging social capital involving relationships among people having similar power or status.

[4] Flora et al. (2003) defined cultural capital as people's understanding of society and their role in it, values, symbols, and rituals.

Rural Healthcare Access in the United States and the Study Regions

The availability of healthcare professionals in rural areas lags behind that in urban areas, and the gap is growing. Between 2010 and 2018, the number of non-Federal primary care physicians per 10,000 residents in metro areas grew 5 percent—from 7.6 to 8.0—while the number in nonmetro areas declined 5 percent—from 5.5 to 5.2 (figure 1).[12] During the same period, the number of dentists, nurse practitioners, physician assistants, and nurse midwives (all per 10,000 residents) grew in both metro and nonmetro areas but to a greater extent in metro areas.

The gap in the availability of healthcare professionals is increasing along the rural-urban continuum, with the most professionals per capita in metro areas and in nonmetro areas having larger urban populations, and the fewest in completely rural nonmetro areas (figure 2). Among nonmetro counties, there are fewer healthcare professionals per capita in counties that are adjacent to metro counties than in those further away from metro areas. This difference likely reflects the use of metro healthcare professionals by residents of nearby nonmetro areas, reducing demand for local healthcare professionals in nonmetro areas adjacent to metro areas.

The availability of healthcare professionals varies across and within regions of the United States. For example, the number of primary care physicians per 10,000 residents is generally higher in much of the Northeast, along the West Coast, in Hawaii, and in parts of the mountainous West and upper Midwest (figure 3). The availability of primary care physicians per capita is generally lower in much of the Great Plains—especially the Southern Great Plains—and the Lower Mississippi Delta and Southeast, although there are substantial variations in the availability of physicians within these regions. Similar spatial patterns exist in the availability of other types of healthcare professionals, although nurse practitioners, physician assistants, and certified nurse midwives are relatively more available in some parts of the South (such as Mississippi) than primary care physicians or dentists.

The study regions reflect the range of availability of healthcare professionals in rural areas. Compared to national averages, the Upper Midwest region has a relatively high availability of primary care physicians and dentists, and the Lower Mississippi Delta and Southern Great Plains regions have a relatively low availability in both nonmetro and metro areas (table 1). By contrast, the nonmetro Lower Mississippi Delta region has a relatively high availability of nurse practitioners, physician assistants, and certified nurse midwives.

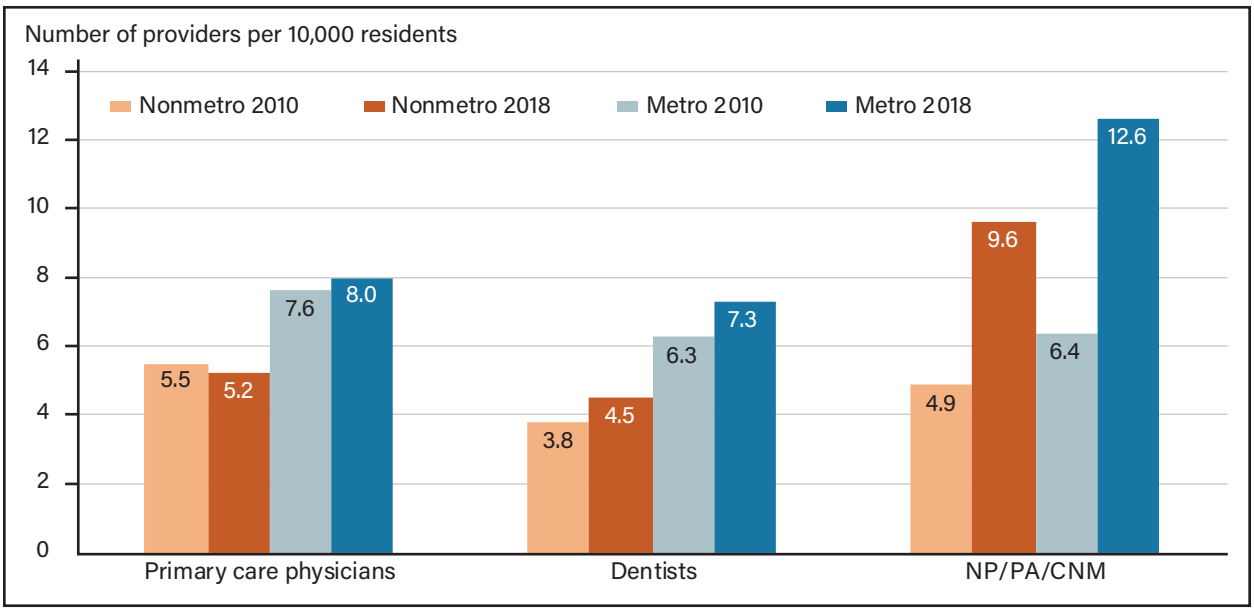
These regions also differ in their socioeconomic, demographic, and natural characteristics. Nonmetro areas of the Upper Midwest have a higher per capita income and lower poverty rate than nonmetro areas in the United States as a whole, while the Southern Great Plains—and especially the Lower Mississippi Delta—have a below-average per capita income and above-average poverty rate in both nonmetro and metro areas. A relatively high proportion of the population in the nonmetro Upper Midwest is age 65 or older, while a smaller than average share of the nonmetro populations of the other two regions is in this age group. Of the population that is under age 65 (in both nonmetro and metro areas), a smaller percentage lacks health insurance in the Upper Midwest region than nationally or in the other two study regions, while the share without health insurance is particularly high in the Southern Great Plains region. In both nonmetro and metro areas, the share of the adult population age 25 or older with at least a 4-year college degree is close to the national average in the Upper Midwest region but below average in the other two regions and lowest in the Lower Mississippi Delta region. In terms of natural amenities (as measured by the USDA, Economic Research Service (ERS) natural amenities scale (McGranahan, 1999)), the Upper Midwest region ranks lowest, and

[12] As classified by HRSA, primary care physicians include non-Federal Doctor of Medicine (M.D.) and Doctors of Osteopathy (D.O.) providing direct patient care, who practice principally in one of the four primary care specialties—general or family practice, general internal medicine, pediatrics, and obstetrics and gynecology. Physicians engaged solely in administration, research, and teaching are excluded.

the Southern Great Plains ranks highest. The low ranking of the Upper Midwest is mainly due to the cold winters in this region, while the Southern Great Plains has sunnier winters and less humid summers than the other two regions.

Overall, the evidence in table 1 indicates that the Upper Midwest is generally more advantaged than the other two study regions (in terms of access to healthcare professionals and health insurance, income, poverty level, and educational attainment), while the Lower Mississippi Delta and Southern Great Plains each suffer greater disadvantages on some indicators. However, the Upper Midwest is disadvantaged by its cold winter climate. In all regions, nonmetro areas are less advantaged than metro areas in terms of the indicators in table 1.

Figure 1
Number of selected types of healthcare professionals per 10,000 residents in metro and nonmetro counties, 2010 and 2018

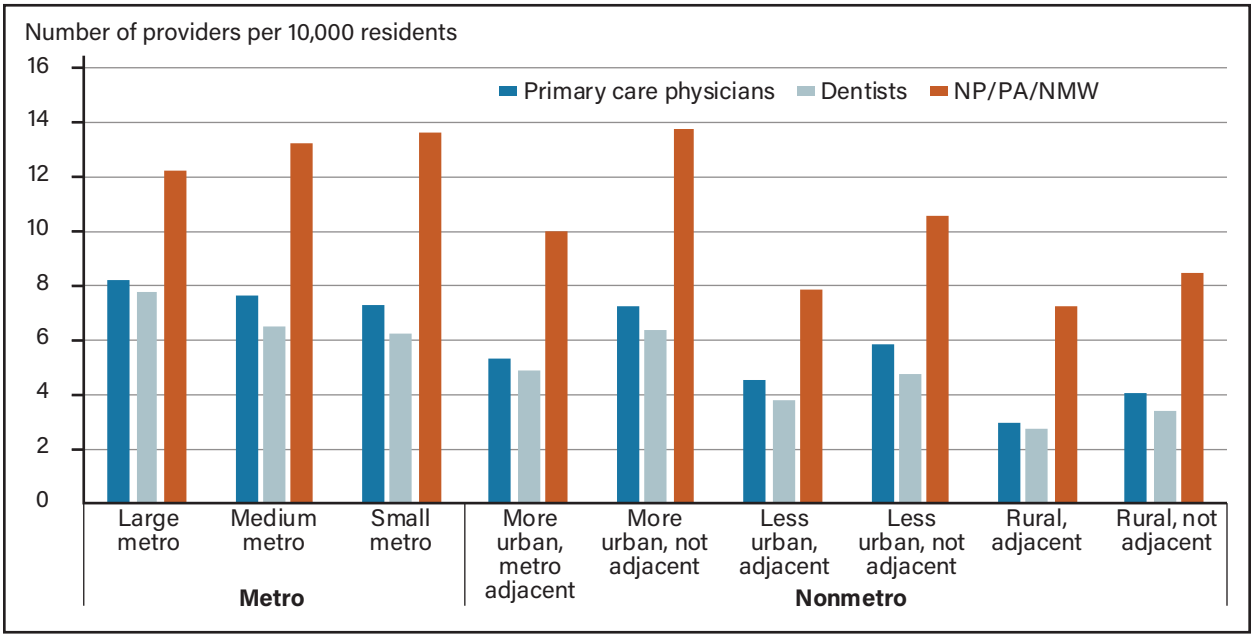


Note: Metro and nonmetro areas are as classified by the Office of Management and Budget in 2013. "NP/PA/CNM" refers to a combined category of healthcare professionals that includes nurse practitioners, physician assistants, and certified nurse midwives.

Source: USDA, Economic Research Service analysis of Area Health Resource File (AHRF) data (Health Resources and Services Administration, 2020).

Figure 2

Number of selected types of healthcare professionals (primary care physicians, dentists, and NP/NA/CNM) per 10,000 residents across the rural-urban continuum, 2018



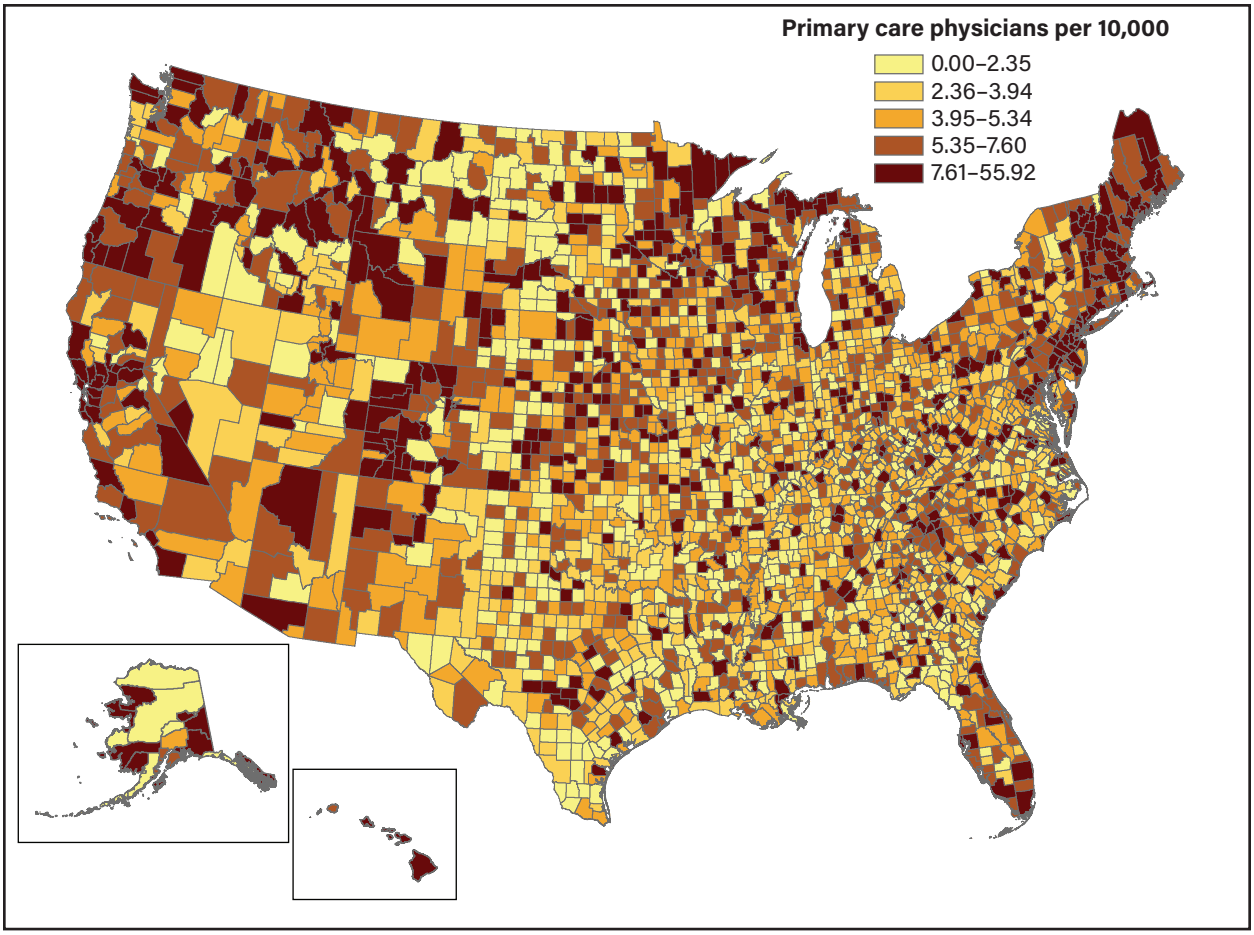
Note: "NP/PA/CNM" refers to a combined category of healthcare professionals that includes nurse practitioners, physician assistants, and certified nurse midwives.

The classification of areas in this figure is based on the USDA, Economic Research Service's 2013 Rural Urban Continuum Codes. Metro and nonmetro areas are as classified by the Office of Management and Budget in 2013. There are nine codes, three denoting metro areas and six denoting nonmetro areas. Large metro areas include counties (or county equivalents) in metro areas of 1 million population or more, medium metro areas include counties in metro areas of 250,000 to 1 million population, and small metro areas include counties in metro areas of fewer than 250,000 population. More-urban nonmetro areas include nonmetro counties with an urban population of 20,000 or more; less-urban nonmetro areas include nonmetro counties with an urban population of 2,500 to 19,999; and rural nonmetro areas include nonmetro counties with an urban population of less than 2,500. Adjacent nonmetro areas include nonmetro counties that are adjacent to a metro area, and nonadjacent nonmetro areas are not adjacent to a metro area.

Source: USDA, Economic Research Service analysis of Area Health Resource File (AHRF) data (Health Resources and Services Administration, 2020).

Figure 3

Number of primary care physicians per 10,000 residents by county, 2018



Note: The categories represented in the map are quintiles of the distribution of primary care physicians per 10,000 residents.

Source: USDA, Economic Research Service using Area Health Resource File (AHRF) data.

Table 1

Availability of healthcare professionals and selected demographic and socioeconomic characteristics of nonmetro and metro areas, nationally and in study regions, 2018

Variable	Nonmetro				Metro			
	National	LMD	SGP	UMW	National	LMD	SGP	UMW
All physicians per 10,000 residents	12.99	10.89	9.54	13.25	34.44	32.93	28.13	36.59
Non-Federal primary care physicians per 10,000 residents	5.20	4.52	4.20	6.34	7.96	7.22	6.59	8.89
Dentists per 10,000 residents	4.50	3.53	3.94	5.43	7.30	5.77	6.14	7.50
NP/PA/CNM per 10,000 residents	9.60	9.90	7.65	9.07	12.59	12.57	10.74	15.10
Personal income per capita	41,523	35,769	40,397	47,056	56,579	46,550	51,680	56,020
Percent of population in poverty	16.2	22.2	17.3	11.0	12.6	16.8	14.3	10.4
Percent of population age 65 or older	19.4	17.8	18.2	20.5	15.5	15.1	12.3	15.1
Of population under age 65, percent without health insurance	11.5	12.4	19.2	6.7	10.3	10.1	18.7	5.5
Of population age 25 or older, percent with at least a 4-year college degree	22.4	18.9	20.0	22.2	36.8	28.2	34.1	38.3
Natural amenities scale	1.03	-0.22	0.86	-2.39	1.59	-0.04	1.06	-1.92

Note: "LMD" = Lower Mississippi Delta; "SGP" = Southern Great Plains; "UMW" = Upper Midwest. "NP/PA/CNM" refers to a combined category of healthcare professionals that includes nurse practitioners, physician assistants, and certified nurse midwives.

The USDA, Economic Research Service natural amenities scale (McGranahan, 1999) is a measure of the physical characteristics of a county area that enhance the location as a place to live. The scale was constructed for each county in the lower 48 States by adding 6 standardized measures that reflect environmental qualities most people prefer (including climate, topography, and water area). These measures include the average temperature in January and the number of sunny days in January; the negative residual of a regression of July temperature on January temperature (higher values indicate places with less increase in temperature between January and July, controlling for January temperature); the negative of relative humidity in July (higher values indicate lower July humidity); a measure of topographic variation; and a measure of water area as a percentage of the total county area. Values of the scale range from a low of -6.4 in Red Lake County, MN, to a high of 11.2 in Ventura County, CA.

Source: USDA, Economic Research Service analysis of Area Health Resource File (AHRF) and ERS natural amenities scale data.

Data Sources and Analytical Methods

For the study, we focused on 150 small rural towns selected by a stratified random sampling design in the 3 study regions (see appendix A for more information about the sampling approach). The data are from the Survey of Rural Community Wealth and Healthcare Provision (SRCWHCP), implemented in 2014 and 2015 by the Center for Survey Statistics and Methodology at Iowa State University in collaboration with USDA, ERS. The SRCWHCP was implemented in nine States representing three regions of the United States: the Lower Mississippi Delta (Arkansas, Louisiana, Mississippi), Southern Great Plains (Kansas, Oklahoma, Texas), and Upper Midwest (Iowa, Minnesota, Wisconsin) regions.

The universe of rural communities from which the sample towns were selected included zip code tabulation areas (ZCTAs) in rural small town areas of the study regions.[13] Rural small town ZCTAs were defined as those having an estimated population in 2008 of between 2,500 and 20,000, with weak commuting linkages to urbanized areas (urban areas having a population of 50,000 or more in 2010) but strong commuting linkages within or to urban clusters (clusters having a population of 2,500 to 49,999), as classified by Rural Urban Commuting Area (RUCA) codes.[14] Rural communities with fewer than 2,500 residents (or with strong commuting linkages to metro areas) were considered unlikely to be able to recruit or retain most types of healthcare professionals. Conversely, large rural communities with more than 20,000 residents almost always have a hospital; for these communities, local community assets were expected to be less critical in recruiting and retaining healthcare professionals than for smaller rural towns. There were 809 such rural ZCTAs in the study regions.

Within each sample ZCTA, the largest town (if there was more than one town) was selected as the focus of the key informant interviews and the healthcare professional survey.[15] The total population of the universe of towns (the set of towns represented by the sample of towns) was 3.6 million in 2010. These towns were stratified by region and whether the town had a hospital, and the random sample of study towns was allocated to the strata to minimize the variance of the estimated mean number of primary care physicians per capita. The selected sample included 39 towns in the Lower Mississippi Delta region, 46 towns in the Southern Great Plains region, and 65 towns in the Upper Midwest region.

Two information collection instruments were used to collect data in the sample towns: semi-structured telephone interviews with key informants (using mostly open-ended questions) and a mail/internet survey questionnaire of healthcare professionals (using mostly closed-ended questions). (The key informant questionnaire and the healthcare professional survey questionnaire are included in appendices B and C.) Key informant interviews were conducted in all 150 sample communities, while the healthcare professional survey was conducted only in communities that had healthcare professionals (132 communities).

The main focus of this study was the effects of different types of community capital on the recruitment and retention of rural healthcare professionals, particularly factors that rural communities can affect. The survey of health professionals was of primary importance in pursuing this objective since health professionals themselves decide whether to locate or stay in a rural small town. Also, health professionals could be clearly defined and randomly sampled, allowing statistically representative conclusions to be drawn from the results.

[13] ZCTAs are areal-approximation U.S. Postal Service (U.S.P.S.) ZIP Code service areas developed by the U.S. Bureau of the Census and correspond to areas with a single U.S.P.S. ZIP Code. In rural areas, ZCTAs typically include one or a few small towns and surrounding unincorporated areas. ZCTAs were used as the basis for the sample selection because this is the lowest geographic level at which data on healthcare access used in the sampling were available from the Dartmouth Health Atlas.

[14] See appendix A for an explanation of how the RUCA codes were used to classify rural small towns.

[15] In a few cases there was more than one ZCTA associated with a rural small town; in such cases the ZCTAs were combined into a single sampling unit.

The key informant interviews were of supplementary value in pursuing this objective. Though healthcare facility administrators and other healthcare representatives do not directly determine whether healthcare professionals decide to locate or stay in a rural town, they can influence these decisions. Furthermore, as noted, there were no healthcare professionals in some of the sample towns, so key informants were the only source of information about the study issues for those towns.

We conducted the key informant interviews in each sample town before we mailed the health professional survey questionnaires. We used this sequence because the key informants helped to finalize the list of health professionals working in each study town. Although the information from the key informant interviews was available before the survey questionnaires were sent, the timing of the study did not enable us to use an analysis of that information as an aid in designing the survey.

The study team judged the use of mostly open-ended questions in the key informant interviews as the most appropriate way to learn the informants' perceptions about the questions without overly restricting what perceptions the informants could report or what issues they could talk about.[16] The use of mostly closed-ended questions in the survey of healthcare professionals was for practicality and statistical analysis of the results. For the survey respondents, replying to many open-ended questions in a mail/online survey would have been time-consuming and could have substantially decreased response rates. It was also beyond the capacity of the study team to code and analyze a large number of qualitative open-ended responses in a survey of more than 900 respondents.

Key Informant Interviews

The objectives of the key informant interviews were to (1) collect qualitative information on the perceptions of community leaders, health facility administrators, and other healthcare representatives about the factors affecting the ability of the community to recruit and retain healthcare professionals and (2) validate and correct the list of healthcare professionals working in the community, for sampling the professionals who would be sent the survey.

The key informants were of two types: (i) community representatives knowledgeable about the town (including community leaders such as the mayor or city manager, leaders of local economic development organizations or planning commissions, or local educators) and (ii) healthcare facility (hospital or clinic) administrators, county health department administrators, or, where such informants were not available, other knowledgeable representatives of the healthcare sector. Up to two key informants of each type were interviewed in each study town. The key informants were selected based on secondary information sources and on a sequential interview process to identify relevant, knowledgeable, and available individuals of each type (usually starting with the office of the mayor or of other senior leaders).

In total, 341 key informants (representing all study towns) were interviewed by telephone, including 177 community representatives (89 elected local leaders, 24 hired city administrators, 58 leaders of economic development organizations or planning commissions, and 6 educators). The informants also included 164 healthcare representatives (97 CEOs or administrators of healthcare facilities, 38 health department administrators, 22 staff of healthcare organizations or hospital foundations, and 7 pharmacists). There were 84 key informants from the Lower Mississippi Delta region, 102 from the Southern Great Plains region, and 155

[16] This approach draws from the literature on grounded theory in qualitative social research, which starts with open-ended questions (Glaser and Strauss, 1967; Strauss and Corbin, 1998). However, the goal of the open-ended key informant questions in our case was not to construct a theory but to supplement the information from the survey of health professionals and allow triangulation of findings using different data sources and methods. In the lexicon of the literature on mixed-methods research, the design of this study is "qual + QUANT" (primarily quantitative, secondarily qualitative, with analysis of both phases conducted concurrently rather than sequentially) (Creswell, 2009).

from the Upper Midwest. In all but one of the sample towns, a minimum of two and a maximum of four key informants were interviewed (only one key informant could be interviewed in one town in the Southern Great Plains region). Most key informants resided in or near the study town and had been there for at least 5 years.

The key informant interviews were conducted by a team of five trained and experienced telephone interviewers of the Iowa State University Survey and Behavioral Research Services (SBRS) group. The interviews lasted 27 minutes on average, with a range of 8 to 74 minutes. The interviewers took detailed notes of each interview, which were then transcribed and entered in text format in an Excel file.

The responses to the key informant interviews were coded by USDA, ERS researchers using thematic analysis, aided by the qualitative data analysis software NVivo (Castleberry and Nolen, 2018). An initial version of the response codes was developed by a Master's degree student in Sociology from Kansas State University (Vivian Hughes), and a final version was developed subsequently by an M.A. student in Agricultural and Applied Economics from the University of Missouri (Maria Kuhns), both with supervision and checking of coded responses by the project leader (John Pender). The process of code development was repeated from reading and assigning initial codes to a set of responses, reading further responses, applying and revising the initial codes, and developing new codes as necessary until a complete set of codes was developed.

The project leader checked the set of codes against the text versions of the responses at several points in the process—suggesting revisions in some cases to ensure clarity of the codes, consistency between the interview text and the codes and across responses, and sufficient detail in the codes to avoid loss of useful information. Most codes assigned by the first coder did not need to be changed after review by the second coder and project leader. Codes were changed for 3 questions—questions 14 (positive characteristics of the town that would attract healthcare professionals), 15 (negative characteristics of the town that would not attract healthcare professionals), and 23 (most important thing community could do to recruit healthcare professionals)—mainly allowing for more codes to preserve more of the detailed information in the text responses.

Analysis of the key informant data involved simple tabulations of the frequencies of response codes in the full set of communities and by region and respondent types. Because of the nonrandom nature of the sample of key informants included in the study, these frequency statistics are reported in raw form only. An estimation of probability-weighted frequencies or shares of responses in the underlying population of community leaders or healthcare administrators/other healthcare representatives is not feasible given the sampling approach. In addition to tabulations of frequencies, selected quotes from the interviews are used to illustrate common themes evident in the responses.

Healthcare Professional Survey

The healthcare professional survey questionnaire was mailed to healthcare professionals (primary care physicians, dentists, nurse practitioners, physician assistants, and certified nurse midwives) in the 132 study towns that had any healthcare professionals. The survey could also be completed online. A complete list of each type of healthcare professional was assembled using secondary information and supplemented by information from the key informants in each study town. A census of each professional type in each study town was sent the survey, up to a maximum of 32 professionals. If there were more than 32 healthcare professionals in the town, a stratified simple random sample was proportionately selected from 3 strata: physicians, dentists, and nurse practitioners/physician assistants/certified nurse midwives. The survey was conducted in three phases: a pilot phase during the fall of 2014 and winter of 2015, an initial full phase during the spring of 2015, and a final nonresponse follow-up phase in the fall of 2015. The response rate in the first two phases was 23 percent. In the final phase, all sampled professionals (including those who had already responded) received a letter of

appreciation and a $40 cash gift. After further efforts to request responses from nonresponders, a final sample of 928 respondents and a final response rate of 64 percent was achieved overall. This response rate included 50 percent in the Lower Mississippi Delta region, 62 percent in the Southern Great Plains region, and 69 percent in the Upper Midwest region. Statistical tests of differences between the results of the first two phases and the third phase revealed little evidence of nonresponse bias. The results of the nonresponse bias study are reported in appendix D.

The multi-stage stratified random sampling design of the healthcare professional survey assures that the sample of professionals is representative of all healthcare professionals in the study universe of rural small towns in the nine States studied. The estimation procedures account for the nature of the probability sampling using sample weights, producing unbiased estimates of the population parameters. Standard errors were estimated using the Jackknife method. The statistical formulas used are provided in appendix E.

Factors Affecting Recruitment and Retention of Rural Healthcare Professionals

A discussion follows on our findings about the factors affecting rural communities' ability to recruit and retain healthcare professionals, first from the perspectives of community leaders and healthcare representatives and then from the perspectives of healthcare professionals.

Perspectives of Community Leaders and Healthcare Representatives

The key informant interviews of community leaders and healthcare representatives (mostly health facility administrators) indicated the perceived importance of the recruitment and retention of healthcare professionals; three-fourths of key informants felt it was important or very important for communities to actively try to recruit and retain healthcare professionals. Statements from some key informants clarify the importance and challenge of recruiting and retaining healthcare professionals:

"We are probably going to have to replace some healthcare providers due to retirements. How do we convince young doctors to commit to living here and make [town name] their home?"

"The lack of stability in providers [is the greatest healthcare challenge faced by the community]. It's a huge detriment and we're just starting to dig out of the hole. That instability has fueled a lack of support by the community for the local healthcare system."

Factors Affecting Recruitment

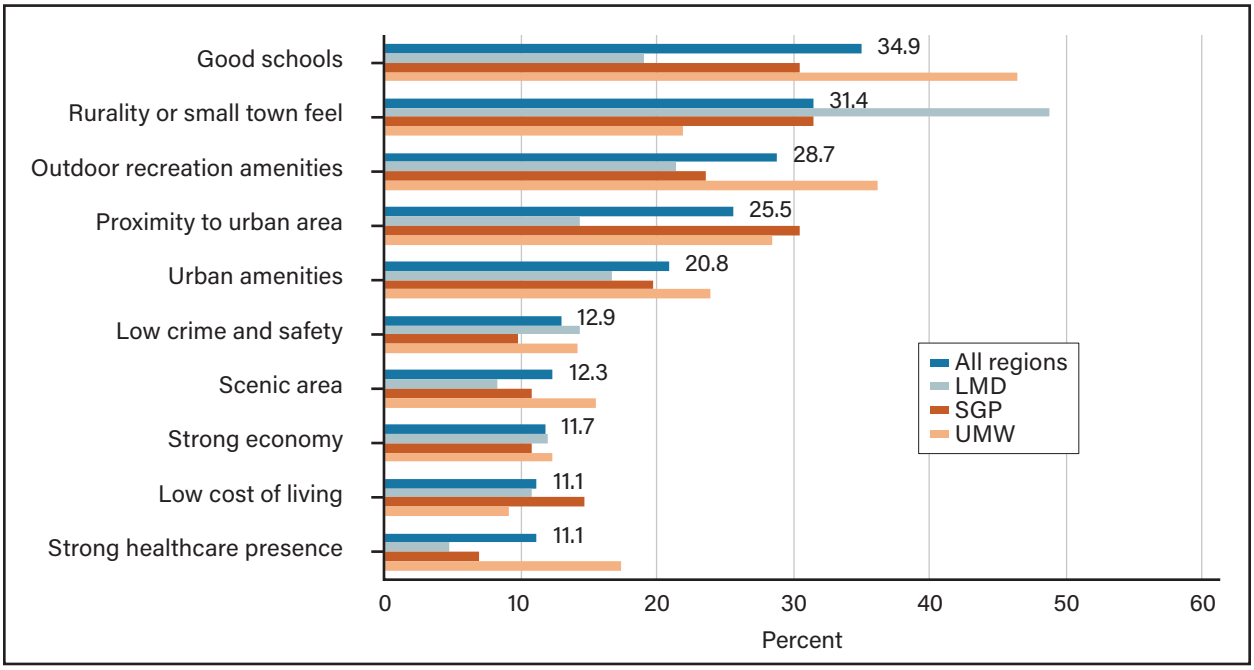
Key informants cited many factors as important in helping to recruit and retain healthcare professionals.

In response to the question, "What do you think are the positive characteristics of this town that would encourage healthcare professionals to want to live and work there?" the three most frequently cited character-

istics by key informants were good schools, a rural or small-town feel of the town,[17] and outdoor recreation amenities (figure 4). Good schools and outdoor recreation amenities were mentioned most often in the Upper Midwest region, while rural or small-town feel was mentioned most often in the Lower Mississippi Delta region. Healthcare representatives more often cited rural/small-town feel than community leaders.

Key informants were also asked about negative characteristics of the study town that may cause healthcare professionals not to want to live and work there (i.e., barriers to recruiting healthcare professionals). The three most frequently cited barriers were lack of urban amenities, rurality/lack of population,[18] and lack of affordable housing (figure 5). The housing lack was most often cited in the Southern Great Plains region. Community representatives cited a lack of affordable housing as a barrier to recruiting healthcare professionals more often than healthcare representatives, while healthcare representatives more often cited a lack of urban amenities.

Figure 4
Top 10 key informant responses to "What do you think are the positive characteristics of this town that would encourage healthcare professionals to want to live and work there?"



Note: "LMD" = Lower Mississippi Delta; "SGP" = Southern Great Plains; "UMW" = Upper Midwest.

Reported responses are simple percentages of the total number of key informants interviewed in all regions or each region. For example, 34.9 percent of all key informants said "good schools" were a positive characteristic of the town that would encourage healthcare professionals to want to live and work there. Responses were classified and tabulated from open-ended responses. Multiple responses were allowed; hence, percentages can add to more than 100 percent.

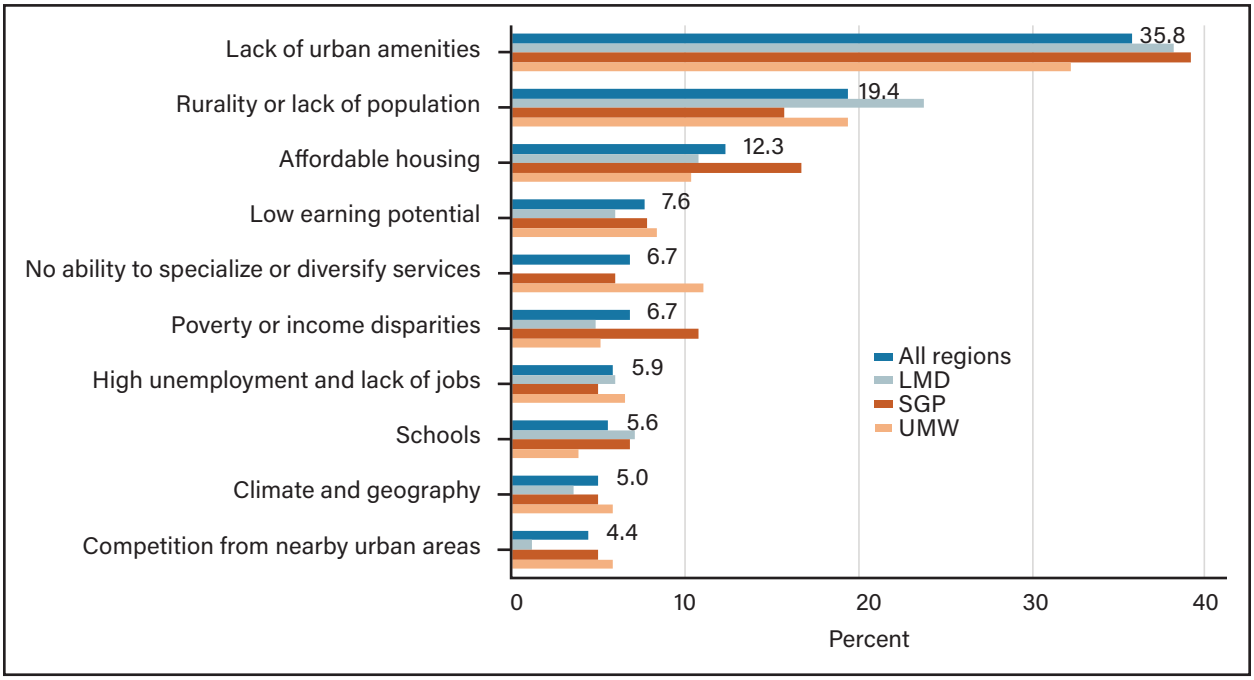
Source: USDA, Economic Research Service analysis of key informant interview responses collected by Iowa State University's Survey and Behavioral Research Services, 2014–2015.

[17] Key informants who mentioned the rural or small-town feel of the town as a positive characteristic most often mentioned the social characteristics of living in a small town, such as: knowing everyone, being in a "tight-knit" community, people caring about or helping each other, and being a good place to raise a family. In some cases, other characteristics were mentioned in connection with small-town life, such as: safety and lack of crime, lack of traffic, quietness, a slower pace of life and work, and low cost of living. Multiple codes were used to reflect characteristics that were sometimes (but not usually) associated with this term.

[18] As with "small town feel" as a positive characteristic, informants who cited being in a small town or a rural area as a negative characteristic sometimes cited multiple factors associated with being small or rural, such as: there being little for people to do, lack of access to urban amenities or infrastructure in the town, being a long distance from a city, or having an insufficient population to support healthcare providers. If such responses were cited by more than one informant, additional response codes were assigned. Thus, the "rurality/lack of population" response to this question was sometimes associated with other response codes, such as the codes for lack of urban amenities or infrastructure. In many cases, responses coded as having rurality (or lack of population) as a negative characteristic simply stated the fact that the area was very rural or had a small population, without elaboration.

Figure 5

Top 10 key informant responses to "What do you think are the negative characteristics of this town that would cause healthcare professionals to NOT want to live and work there?"



Note: "LMD" = Lower Mississippi Delta; "SGP" = Southern Great Plains; "UMW" = Upper Midwest.

Reported responses are simple percentages of the total number of key informants interviewed in all regions or each region. Responses were classified and tabulated from open-ended responses. Multiple responses were allowed. A missing bar for a particular region means there was no response of that type from key informants in that region.

Source: USDA, Economic Research Service analysis of key informant interview responses collected by Iowa State University's Survey and Behavioral Research Services, 2014–2015.

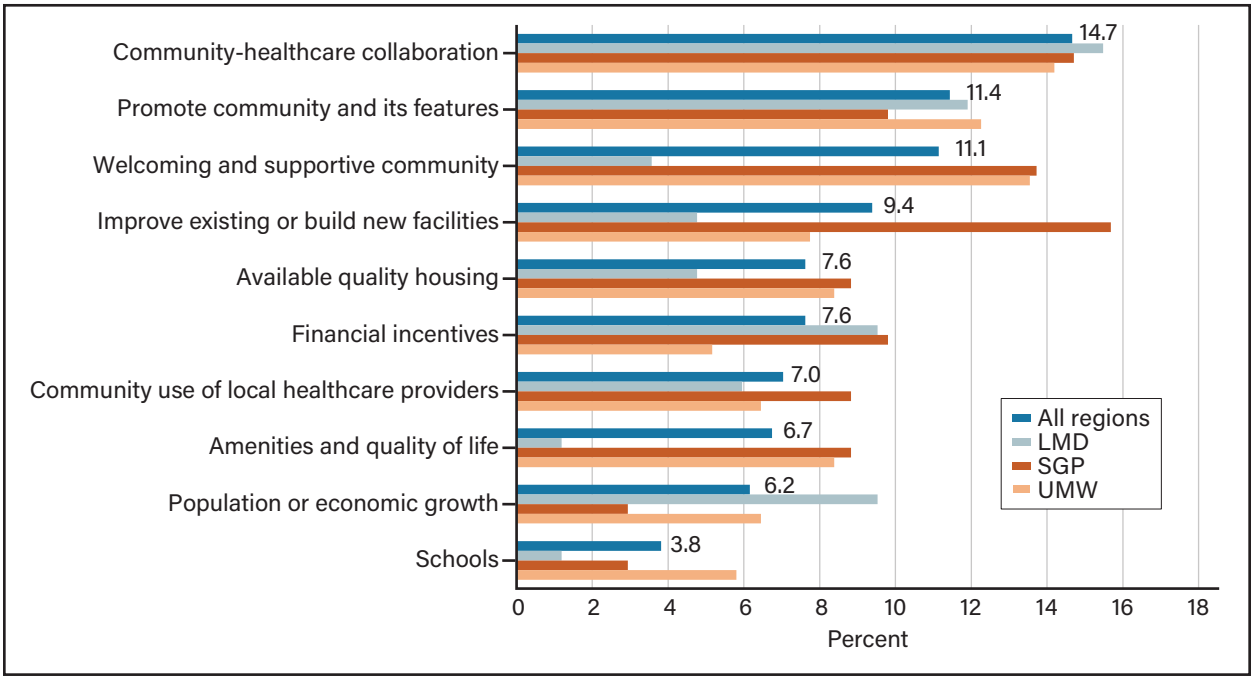
Key informants were asked about specific efforts to recruit healthcare professionals to the community. More than half (53 percent) indicated that their communities actively recruit healthcare professionals. The most frequently mentioned types of recruitment efforts included working with recruitment businesses (mentioned by 7 percent of key informants), working with a college or university (5 percent), providing financial assistance/loan repayment assistance (5 percent), networking strategies (5 percent), and partnering with a healthcare system (5 percent).

Recruitment efforts were usually led by a hospital or clinic (mentioned in about two-thirds of cases discussed with key informants), though in some cases, the recruitment was led by an affiliated healthcare system (9 percent) or community members (6 percent). The remaining 27 percent of recruitment efforts that were discussed involved a partnership among healthcare professionals and community members. Key informants overwhelmingly considered the recruitment efforts that they were aware of to be successful (80 percent). This perception was similar across regions and respondent types.

Key informants were also asked what they thought was the most important thing their community could do to recruit healthcare professionals. The three most common responses included collaboration between the community and healthcare professionals, promoting the community and its features, and being a welcoming and supportive community (figure 6). Some of the ideas suggested by key informants for collaboration included having community leaders or members help healthcare administrators identify healthcare needs and "home-grown" professionals to recruit; welcoming the professionals being recruited and providing them information about the town (e.g., schools, housing, recreational opportunities); and providing facilities or fundraising support for healthcare facilities.

Figure 6

Top 10 key informant responses to "What do you think is the most important thing your community could do to recruit healthcare professionals?"



Note: "LMD" = Lower Mississippi Delta; "SGP" = Southern Great Plains; "UMW" = Upper Midwest.

Reported responses are simple percentages of the total number of key informants interviewed in all regions or each region. Responses were classified and tabulated from open-ended responses.

Source: USDA, Economic Research Service analysis of key informant interview responses collected by Iowa State University's Survey and Behavioral Research Services, 2014–2015.

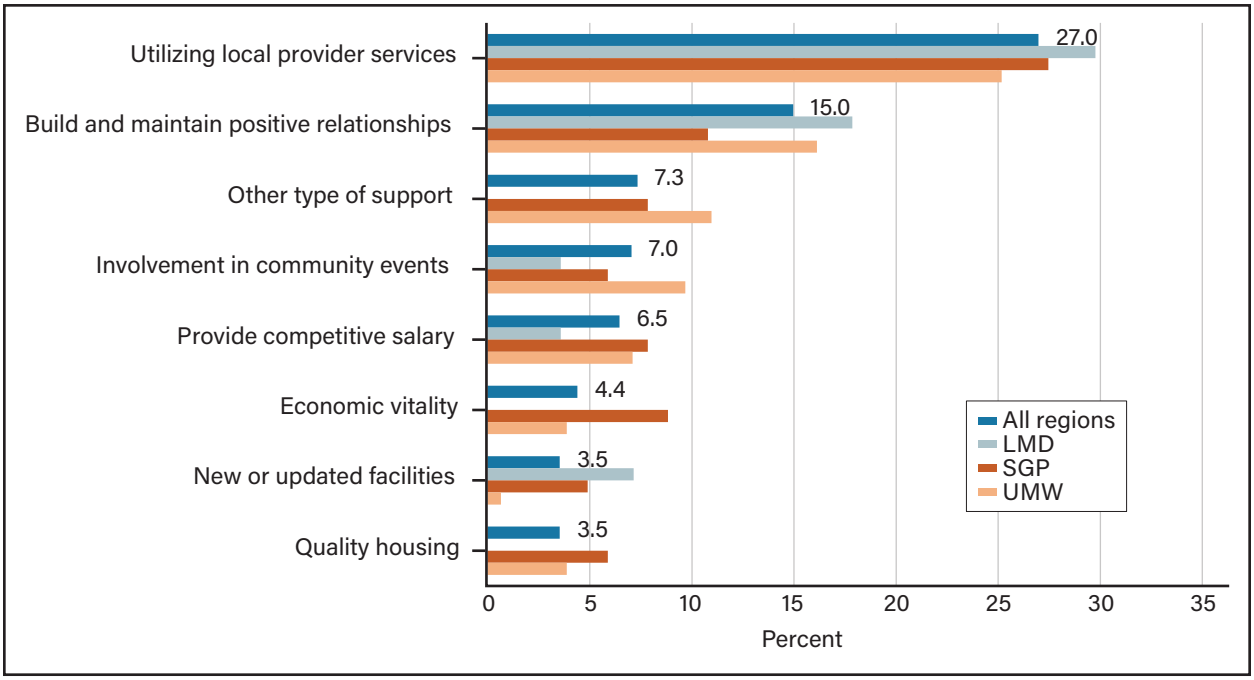
Factors Affecting Retention

Key informants were asked if they were aware of any specific efforts to retain healthcare professionals in the study town. Less than one-fourth of respondents (23 percent) reported awareness of any active local efforts to retain healthcare professionals. Such efforts were most often reported in the Southern Great Plains region and least in the Lower Mississippi Delta region; efforts were more commonly reported by healthcare representatives than by community representatives. The form of such efforts included: relationship building, communicating with healthcare professionals about their needs, providing resources such as equipment, technology, and buildings, maintaining competitive salaries, and offering bonuses. Such efforts were predominantly reported to be pursued by hospital or clinic administrators (85 percent of cases discussed), but community leaders were involved in some cases. These efforts were reported to be successful in retaining healthcare professionals in all but one case.

Key informants were asked their views on the most important thing their community could do to retain its healthcare professionals. By far, the most common response was for community residents to use the services of local providers (cited by 27 percent of key informants) (figure 7). The second most common response was building and maintaining positive relationships with healthcare professionals, while other responses were far less common.

Figure 7

What do you think is the most important thing your community could do to retain or keep its healthcare professionals?



Note: "LMD" = Lower Mississippi Delta; "SGP" = Southern Great Plains; "UMW" = Upper Midwest.

Reported responses are simple percentages of the total number of key informants interviewed in all regions or each region. Responses were classified and tabulated from open-ended responses. A missing bar for a particular region means there was no response of that type from key informants in that region.

Source: USDA, Economic Research Service analysis of key informant interview responses collected by Iowa State University's Survey and Behavioral Research Services, 2014–2015.

Qualitative Perspectives on Key Factors Affecting Recruitment and Retention

Going beyond the numbers, what key informants said during the interviews highlighted some interesting themes and complex effects of community assets on the ability to recruit and retain healthcare professionals.

Role of Schools

"Good schools" was the most common response from key informants when asked what characteristics of the town would encourage healthcare professionals to live and work there. Several key informants discussed how healthcare professionals' children would have greater opportunities due to small class sizes and a greater ability to participate in extracurricular activities in their small-town schools. For example, a few commented:

"We have very good schools. We have a large community high school that draws from several towns around. Our middle school was built 5 years ago and is brand new. We have school choice and a number of students come into the district because of that option."

"We have a smaller school so more kids can participate in extracurricular activities and sports."

However, schools were also one of the top 10 barriers to recruiting healthcare professionals. Respondents explained that despite smaller and more individualized settings, parents had less ability to choose from public and private schools or different schools within a district. Additionally, some key informants said that while their schools were strong, the schools did not compare with the level of rigor or extracurricular activities that urban-area schools provide:

"The local school is good but there's not a lot of choice for education, so some people drive their kids to schools in the metro areas. Sometimes the doctors live on the fringes of town so they can drive their kids into the city easier."

"Although we have good schools, a lot of people are looking for something more for their children. We no longer have a faith-based school. Parents would like more opportunities for their kids. Our program for Talented and Gifted is minimal, we have no soccer team, no gymnastics team. People move someplace where they want their kids to have opportunities."

Effects of Rurality

"Rurality or small-town feel" was the second most cited positive characteristic by key informants about their communities, but "rurality and small population" was also the second most cited negative characteristic (sometimes this was cited both as a positive and negative characteristic by the same informant). Key informants discussed how their communities were "tight-knit" and "family-oriented" but also explained that these same characteristics could mean lack of access to goods and services or lack of privacy:

"Small town community: This was a big draw for me personally; friendly people, good people who reach out and help each other, good Chamber of Commerce that reaches out and tries to benefit the community as a whole."

"We have friendly people who enjoy outsiders and embrace new people. There is a large group of volunteers and that is how everything is done. It's small-town life. There is a need for those who want to make a difference."

"As a provider in a small community, it doesn't allow you to have a very private life."

Another way of considering rurality is the presence or absence of urban amenities:

"It is a small town so there's not a lot of choices in shopping, etc. We're an hour to an hour and a half from any bigger cities."

While the most cited negative characteristic by key informants regarding the study communities was the lack of urban amenities, 20 percent of key informants felt that urban amenities were a positive characteristic of the community. What key informants considered to be an urban amenity depended on whether they were discussing an asset of the community or something lacking. When discussing urban amenities that were lacking, many key informants talked about the absence of big box stores, retail stores, chain restaurants, theater, and the arts. When discussing urban amenities that their communities have, many key informants talked about local festivals and events, vibrant downtowns with many storefronts, and local entertainment.

Importance of Outdoor Recreation and Scenic Beauty

Over a quarter of key informants felt that a positive characteristic of their community was access to outdoor recreation activities, including hiking, access to a recreational lake, or park districts. Another 12 percent of respondents felt that a positive characteristic of the community was that it was a scenic area, using words like "beautiful" or "good views" to describe their community.

"We're a little community … with a laid-back lifestyle. We are a very big tourist destination. It's a good place to visit and to live. We have a lot of natural beauty around here. Lots of outdoor activities to do, like ice fishing in the winter."

Role of Collaboration Between the Community and Healthcare Professionals

As noted, the most common answer to the question of what the most important thing communities could do to recruit healthcare professionals involved collaboration between community members and healthcare professionals. The statements by many key informants emphasized the importance of this issue, such as:

"We need to put forth a unified effort. We need to show that the community is involved and interested. If the community and healthcare professionals came together for recruitment, it would be much better."

"We need to reach out and make the community a part of it [recruiting healthcare professionals]. We need to better partner with the community. We had a realtor involved to show property, got the chamber involved to answer questions, but I think we could do more to involve the community."

Beyond the value of community involvement to demonstrate community interest in healthcare recruits or provide information, several key informants stressed the need for help from community members to identify potential recruits with ties to the local community:

"Be active in the relationships. If community members know medical students, or family members, or anybody involved in the medical field they can be proactive to give the name to the recruiter or myself so we can try and recruit them. We're trying to "home grow" some providers and we don't know who those people are if the community doesn't help us out."

Importance of Friendliness and Supporting Healthcare Professionals

The third most common response to the question about what the most important thing the community could do to recruit healthcare professionals emphasized being a welcoming and supportive community:

"Maybe just promoting why they live here, what are the assets to living in a small community. If you're not used to living in a small community, you might not appreciate the people who live there but if the community could promote that friendliness, I think that would be something that would help."

Support of healthcare professionals was also described as important for retention. More than one-fourth of key informants felt that using local healthcare services, rather than going elsewhere for those services, was the most important thing the community could do to retain its healthcare professionals. Another 15 percent felt that building and maintaining positive relationships was key to retaining healthcare professionals. Respondents stated that patronizing local providers in the community would ensure the future of local healthcare provision.

"Support them and utilize their services. Welcome them when you see them. Befriend them and help them adapt to the community and do things with them. Orient them to what's available. It takes more than just telling them. You've got to offer to do things with them."

"We need to welcome them personally into our neighborhoods and schools and make sure we are inviting and warm. We need to support them."

Relationship of Key Informant Responses to Community Capitals

The key informants' open-ended responses to questions about the factors affecting the recruitment and retention of healthcare professionals emphasize several types of community capital, including social capital (e.g., rural or small-town feel, collaboration between the community and healthcare professionals, being a welcoming and supportive community, building and maintaining positive relationships); human capital

(quality of the schools, strong presence of healthcare professionals); physical capital (urban amenities, access to infrastructure and urban areas, availability, affordability, and quality of housing, new or improved medical, school, or other facilities); and natural capital (outdoor recreational amenities, scenic beauty, climate, and geography).

Some of these factors may reflect more than one type of community capital. For example, the quality of the schools may reflect social capital in the form of an active parent-teacher association, school clubs, or extracurricular activities; the physical capital may be represented by the quality of the school buildings and equipment; and the human capital may be represented by the knowledge and skills of teachers, students, and their parents. Similarly, urban amenities may reflect human and cultural capital through the availability of a diverse set of providers of goods and services with different knowledge, skills, and cultural backgrounds, and physical capital may be reflected by facilities and infrastructure found in urban settings.

Other factors that are not directly related to community capital (but may be indirectly related to some types of capital) were also mentioned by many key informants, such as patronizing local healthcare providers, having a strong economy or low cost of living, facing competition for healthcare services from nearby urban areas, and the availability of financial incentives and competitive salaries. In the survey of healthcare professionals, respondents were asked specifically about the importance of an array of such factors, as well as factors more directly related to the community capital.

Perspectives of Healthcare Professionals

The healthcare professional survey asked respondents about the importance of 23 specific factors that may have affected their decision to begin working in the study town and a similar set of factors that may have affected their decision to continue working there, all ranked on a Likert scale from 1 (not at all important) to 5 (very important). Table 2 shows the factors that were investigated. [19] This set of factors was based on a review of the relevant literature on factors affecting the recruitment and retention of healthcare professionals in rural areas.[20]

There is a great deal of consistency between the factors mentioned by the key informants and those included in the survey, although the timing of the key informant interviews and the survey of health professionals did not allow the set of factors investigated in the survey to be based on the results of the key informant interviews. Of the factors listed in table 2, the only ones not mentioned by key informants were the opportunity to own a practice (as a factor affecting the initial location decision) and the healthcare professional's investment in their practice (as a factor affecting the decision to stay). Of the key informants' common responses, shown in figures 4 through 7, most are closely related to the factors investigated in table 2.[21]

To facilitate discussion of the importance of different types of community capital and other factors in healthcare professionals' recruitment and retention decisions, we classify in table 2 the types of community capital

[19] These specific factors are those addressed in questions 21a–21w for location decisions and questions 24a–24w for retention decisions (see appendix C for survey questionnaire).

[20] See the literature cited in footnotes 5, 6, and 7.

[21] Factors mentioned by key informants that were not specifically included in survey questions 21a—21w and questions 24a—24w included: those related to the growth and vitality of the local economy, safety and low crime, the availability and quality of housing, and collaboration between the community and healthcare providers. All but one of these factors were mentioned by some of the survey respondents in response to open-ended questions about the most important positive or negative factors affecting their decisions to locate or stay in the community (survey questions 22, 23, 26, and 27), except collaboration between the community and healthcare providers.

(if any) represented by each factor investigated. This classification is based on the definitions of the different types of community capital used in the relevant literature.[22] The order of the factors listed in table 2 corresponds to how often the factor was cited by respondents as important or very important (listed in order of most to least commonly cited) in affecting recruitment or retention decisions.[23]

As with the factors mentioned by key informants, some of the factors listed in table 2 reflect mainly one type of community capital, while others reflect multiple types of capital or other factors. For example, "friendliness" or "friendships" primarily represents a type of social capital, while "good place to raise a family" may reflect all types of assets in a community. Or, as noted previously, "quality of schools" may reflect community human, social, and physical capital.

[22] See box "Types of community capital" and the references cited there.

[23] More precisely, the mean value of the percent reporting the factor was important or very important for location and retention decisions was used to order the factors listed in table 2. If the factor was investigated only for location or retention decisions, the percent reporting that factor was important for that decision was used in the ordering.

Table 2
Types of community capitals represented by factors affecting healthcare professional location and retention decisions

Specific factor investigated	Percent responding factor is important		Types of community capital/other factors						
	Location decision	Retention decision	Social capital	Human capital	Physical capital	Financial capital	Natural capital	Cultural capital	Other factors
Friendliness/friendships	77.8	82.1	X						
Need for healthcare professionals/impact	74.0	75.4							X
Good place to raise family	77.2	67.1	X	X	X	X	X	X	
Reasonable workload	71.5	71.0							X
Professional contacts/collegiality (R)		69.0	X	X					
Quality of medical community	69.0	64.9		X					
Family settled here (R)		67.3	X						
Relatives or friends nearby	63.1	64.2	X						
Quality of schools	68.3	55.8	X	X	X				
Opportunities for professional growth	68.8	55.1		X					X
Quality of medical facilities	62.8	59.7			X				
Investment in practice (R)		59.6	X	X	X				
Good financial package	62.4	55.7				X			X
Familiarity with area (L)	58.5		X						X
Size of town	54.3	52.6	X	X	X	X		X	X
Natural amenities	49.2	47.7					X		
Involvement in community activities (R)		47.6	X						
Recreational opportunities	46.9	41.9			X		X	X	
Opportunities for spouse or partner, their career	44.8	37.6	X	X					X
Availability of goods and services	44.4	34.5							X
Social opportunities (L)	44.1		X						
Opportunity to own a practice (L)	41.8								X
Low cost of living	36.2	34.7							X
Recruitment/retention efforts by town	22.1	38.7							X
Low taxes	22.3	24.6							X
Cultural amenities	19.6	20.8						X	
Placement by a program (L)	8.9								X

Note: (L) means the importance of the factor was investigated for healthcare professionals' location decisions only, (R) means the importance of the factor was investigated for retention decisions only. All other factors were investigated for both location and retention decisions. Percentages are weighted to account for sampling probability. Standard errors of the percent responding that the factor is important are reported in appendix F (all are less than 3.0 percent). The column "Other factors" refers to factors other than the types of community capital mentioned in the table.

Source: USDA, Economic Research Service analysis of healthcare professional survey responses collected by Iowa State University's Survey and Behavioral Research Services, 2014–2015.

Factors Affecting Location Decisions

The factors cited as either important or very important (response 4 or 5) for locating in the town (by more than 50 percent of healthcare professionals) are shown in figure 8.[24] Half of these factors reflect social characteristics of the town, including: "Friendliness of the people," "good place to raise a family, "quality of schools," "relatives or friends nearby," "familiarity with the area," and "size of the town." Some of these factors may also reflect other types of community capital besides social capital, as noted in table 2.

Almost all the other factors cited as important by most healthcare professionals reflect characteristics of the practice, job, or medical community. These factors include: "Reasonable workload," "quality of the medical community," "opportunities for professional growth," "quality of medical facilities," and "good financial package." The "need for healthcare professionals," which reflects both characteristics of the town and of the medical community, was the third most often cited factor. Most of these factors also likely reflect community capitals—the quality of the medical community is a form of human capital, the quality of the medical facilities is a form of physical capital, the ability to provide a good financial package likely depends on the financial wealth of the community, and opportunities for professional growth likely depend on the human capital (e.g., clinical knowledge and experience) present in the medical community.

The importance of some of these factors varied across study regions.[25] Factors cited most often in the Upper Midwest region and least in the Lower Mississippi Delta region are: being a good place to raise a family, quality of the medical community, quality of the schools, quality of medical facilities, and size of the town.

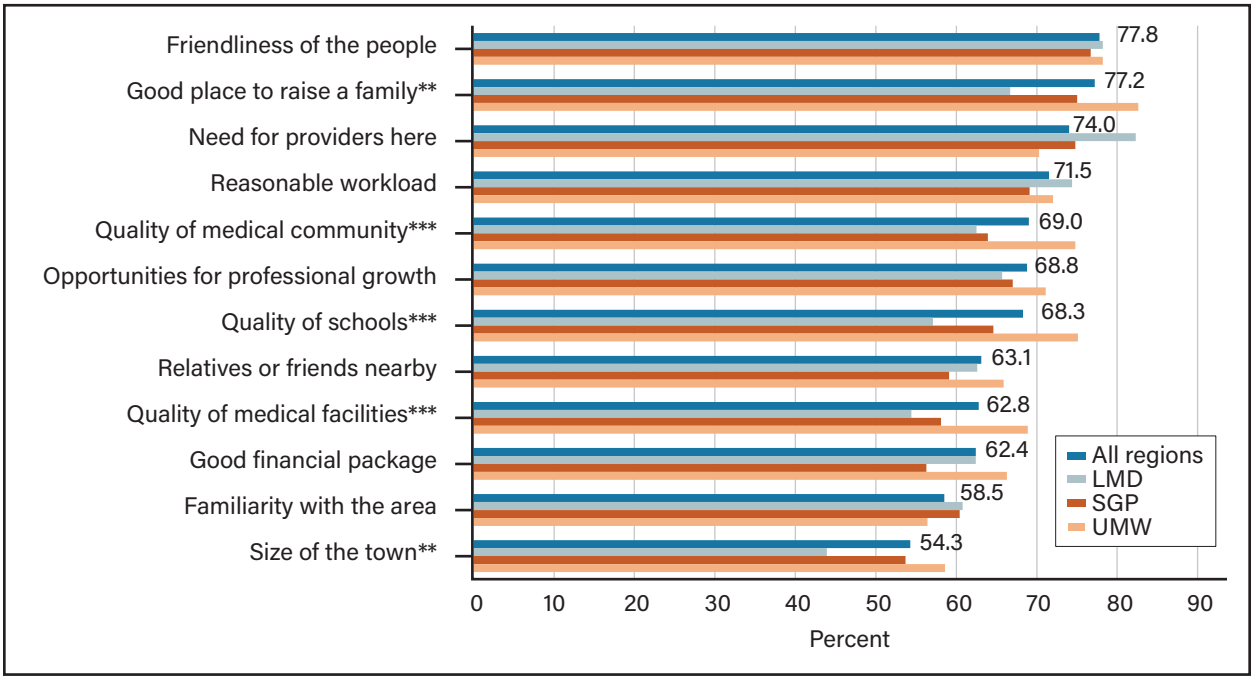
The importance of several factors also varied across professional types (figure 9). Nurse practitioners/physician assistants/certified nurse midwives were most likely to indicate: importance of reasonable workload, quality of the medical community and facilities, opportunities for professional growth, a good financial package, having friends or relatives nearby, and familiarity with the area. Dentists were least likely to cite as important: the quality of the medical community, quality of medical facilities, or a good financial package. Dentists were most likely to indicate the importance of the opportunity to own a practice. This finding is consistent with the fact that more than 80 percent of dentists in the study regions are sole or part owners of their practice, whereas only about one-third of physicians and 2 percent of nurse practitioners, physician assistants, and certified nurse midwives are sole or part owners of their practice.

[24] Full results of the provider survey are presented in detail in appendix F.

[25] Unless otherwise stated, in this section, we discuss only statistically significant (at the 5 percent level or less) differences across regions or provider types in the percentages of providers reporting a factor as important or as the most important factor. The statistical significance of differences across groups was based on Wald tests (significance levels are reported in appendix F).

Figure 8

Factors cited as "important" or "very important" by most healthcare professionals in their decision to locate in the study town, total and by region (percent of healthcare professionals)



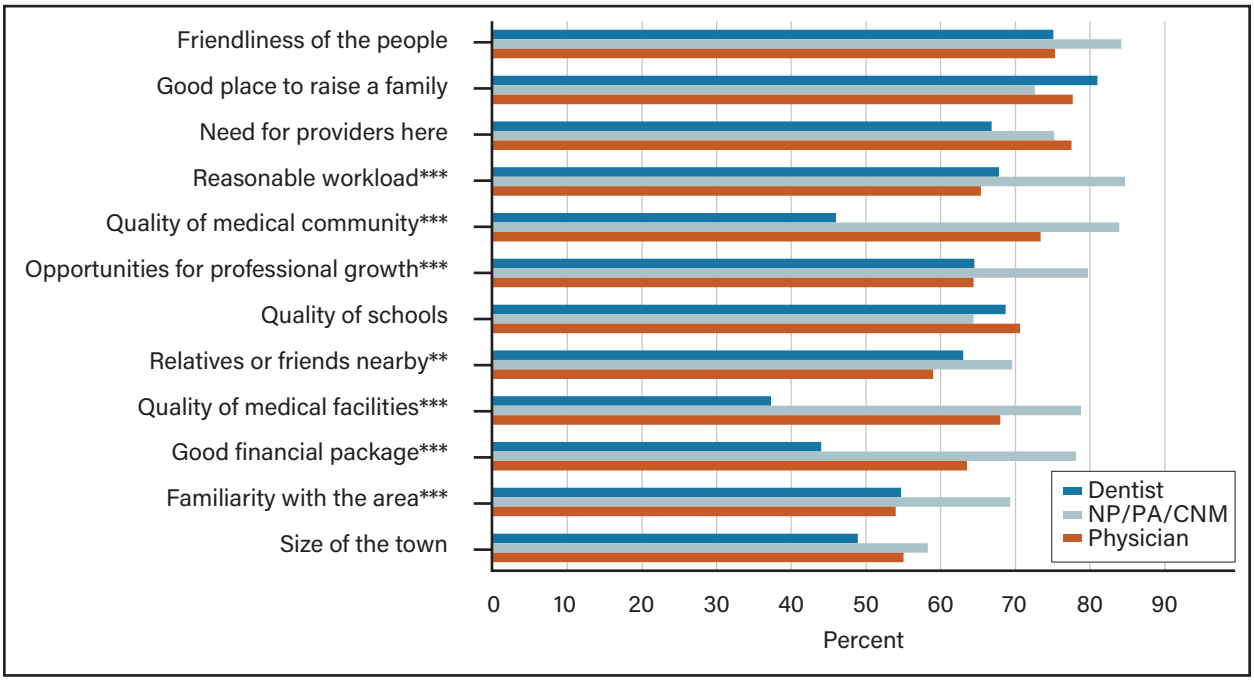
Note: "LMD" = Lower Mississippi Delta; "SGP" = Southern Great Plains; "UMW" = Upper Midwest.

*, **, *** indicate that the differences across regions in percent of healthcare professionals reporting the factor as important or very important are statistically significant at 10 percent, 5 percent, or 1 percent levels, respectively. Respondents indicated the importance of each factor separately, so the percentages do not total to 100 percent. Reported percentages are adjusted for sampling probability, so the percentages are representative of the population of healthcare professionals in the universe of small towns in the three study regions.

Source: USDA, Economic Research Service analysis of healthcare professional survey responses collected by Iowa State University's Survey and Behavioral Research Services, 2014–2015.

Figure 9

Factors cited as "important" or "very important" by most healthcare professionals in their decision to locate in the study town, by type of professional (percent of healthcare professionals)



Note: "NP/PA/CNM" = Nurse Practitioner/Physician Assistant/Certified Nurse Midwife.

*, **, *** indicate that the differences across professional types in percent of healthcare professionals reporting the factor as important or very important are statistically significant at 10 percent, 5 percent, or 1 percent levels, respectively. Respondents indicated the importance of each factor separately, so the percentages do not total to 100 percent. Reported percentages are adjusted for sampling probability, so the percentages are representative of the population of healthcare professionals in the universe of small towns in the three study regions.

Source: USDA, Economic Research Service analysis of healthcare professional survey responses collected by Iowa State University's Survey and Behavioral Research Services, 2014–2015.

The Most Important Factors in Location Decisions

Healthcare professional survey respondents were asked an open-ended question about which factor was the most important in their decision to locate in the town. Given the focus of this question on the most important factor, these responses may convey more information about the factors that had the greatest weight in healthcare professionals' decisions to locate in the study town.[26] Also, because the question was open-ended, other factors besides those shown in table 2 could have emerged as important.

The responses were classified as being characteristics or issues related to: the community or the respondent's family, characteristics of the medical/dental community, practice, or job that the respondent was recruited to, or other factors. Nearly 62 percent of healthcare professionals cited: characteristics of the community or family characteristics/issues, including that the community was the person's hometown; close to family and friends or a place they were already familiar with (cited by 36 percent); being a small town or rural area (12 percent); positive social aspects of the community—such as being a good place to raise a family, liking the people or their friendliness, being safe, or being church-oriented (11 percent); simply liking the community or

[26] Our intent in asking this question was that respondents would provide only one answer. However, many respondents provided multiple responses.

the location (5 percent); the spouse's career (4 percent); natural amenities or outdoor recreation opportunities (2 percent); the quality of the schools (1 percent); and being close to an urban area (1 percent).[27]

More than 41 percent of respondents cited characteristics of the medical/dental community, practice, or job as the most important factor. The most often cited of these characteristics involved: human or social capital aspects of the practice or job (such as having friendly or high-quality colleagues or staff), having previous familiarity or experience with the colleagues or staff, knowing patients personally, having a positive work environment, or having opportunities for professional growth (20 percent). Sixteen percent of the respondents cited economic aspects of the job, such as: the salary or earning potential, the employee benefits offered, the opportunity to own a practice, requirements to work in a qualified health facility in a HPSA in exchange for a scholarship or student loan repayment under the National Health Service Corps (NHSC) or other programs, or simply that the position was an available job opportunity at the time they were recruited. About 4 percent cited the reasonable workload or desire for a change of pace or better work/life balance as the main reason they chose to work in the study community and job, and 2.5 percent cited the availability or quality of the medical/dental facilities (physical capital).

Some responses to the question could not be classified only as a characteristic of the community/family or of the medical/dental community, practice, or job. Twelve percent of respondents referred to the need for their services and/or their desire to help people—reflecting characteristics of the community, the job, and the preferences of the individual respondent.

The fact that more than one-third of survey respondents cited that the town was their home town, close to family and friends, or familiar to them as the most important reason they chose to work in the study town is consistent with the literature, which has found in many studies in many contexts that healthcare professionals who grew up in a rural area or who have family and friends in the area are more likely to choose that rural location (MacQueen et al., 2018). However, even beyond having a personal history or familiarity with a community, social factors play a key role in healthcare professionals' decisions of where to locate—given the substantial fractions of respondents citing other positive social characteristics of the town or of the medical/dental community, practice, or job. Regarding the characteristics of the medical/dental community, practice, or job, it is difficult to distinguish social factors from human capital characteristics as respondents often cited both—such as the friendliness, supportiveness, and quality of colleagues and staff. Thus, human capital may be as important as social capital in considering the characteristics of the practice or job. Other types of capital—such as natural capital (reflected in natural amenities and outdoor recreation opportunities), physical capital (reflected in facilities), school quality or access to urban amenities (both reflecting multiple types of capital)—were not often cited as the main reason the respondents chose to work in the study town.

The importance of some of these factors varied across regions. Respondents in the Lower Mississippi Delta region were less likely than those in other regions to cite liking the community or location, natural amenities, or outdoor recreation opportunities—or the opportunity to own a practice—as the main reason they chose to locate in the study town. Respondents in both the Lower Mississippi Delta and Southern Great Plains regions were less likely than those in the Upper Midwest region to cite being close to an urban area or the characteristics of the medical/dental community, practice, or job (especially the human or social capital aspects). By contrast, respondents in the Lower Mississippi Delta and Southern Great Plains regions were more likely to cite the community's need for providers and the desire to help people as their main reason for locating in the study town. It appears that in the absence of some of the assets perceived to be more common or important in the Upper Midwest region, altruistic motives weigh more heavily in the decisions of healthcare professionals who locate in the Lower Mississippi Delta and Southern Great Plains regions.

[27] The total of the percentages cited in this sentence add to greater than the 62 percent of respondents that cited characteristics of the community or family characteristics/issues because some respondents gave multiple responses to the question. All the results of the responses to open-ended questions discussed in this section are shown in appendix F.

The importance of some factors also varied across types of healthcare professionals. Physicians were least likely to cite characteristics of the community or family issues, particularly being from or familiar with the community. This finding may be related to the fact that a smaller share of physicians than other types of healthcare professionals had lived in the study town before locating there for their medical practice (22 percent of physicians lived in the study town prior to working there compared to 29 percent of dentists and 48 percent of nurse practitioners, physician assistants, and certified nurse midwives). Also consistent with this finding, nurse practitioners/physician assistants/certified nurse midwives were most likely to cite being from or familiar with the community as the most important reason they chose to locate in the study town. These professionals were least likely to cite natural amenities/outdoor recreation opportunities or being close to an urban area. Dentists were least likely to cite characteristics of the medical/dental community, practice, or job—particularly human or social capital aspects or workload issues—but most likely to cite the opportunity to own a practice (the most important reason for more than 13 percent of dentists). These differences between dentists and other healthcare professionals may be due to dentists usually owning their own practice and thus being less affected by the characteristics of an existing practice and more affected by the opportunity to own a practice. Dentists were also less likely than other provider types to cite their spouse's career as the main reason they chose their practice location, while physicians were most likely to cite this reason.

The Biggest Drawbacks of Locating in the Study Town

Respondents were also asked the biggest drawback of choosing to practice in the study town. Fifty-one percent cited perceived negative characteristics of the community or family concerns. These characteristics included lack of access to urban amenities (like available goods and services, entertainment opportunities, or an airport), being far from an urban area, or simply too small or rural (21 percent); or too distant from the respondents' home, family, or friends (11 percent). Respondents also mentioned social characteristics, such as: lack of privacy or anonymity, lack of social activities or opportunities, a feeling of social isolation, lack of safety, or a community's bad reputation (8 percent). The drawbacks included economic characteristics, such as: lack of growth, high poverty or unemployment, high taxes, lack of available housing or high housing costs, and lack of employment opportunities for the spouse (7 percent). Negative human capital characteristics included a lack of available school options or low-quality schools[28] and low education and health awareness or health status of community residents (5 percent). The responses included cultural characteristics, such as: lack of cultural amenities (e.g., arts and museums), resistance to change, lack of cultural diversity, and political/cultural divisions (5 percent), and an area's lack of natural amenities or its adverse climate (3 percent).

About one-third of respondents cited perceived negative characteristics of the medical community, practice, or job as the biggest drawback. These included human capital or workload characteristics, such as: lack of other healthcare professionals in the same facility or community to provide coverage for leave periods, lack of specialists for patient referrals, difficulties recruiting and retaining other professionals or staff in the facility, and excessive workload or call responsibilities (13 percent). Economic characteristics were cited, such as: low salary or earning potential, lack of professional opportunities, and competition from other providers in the same town or nearby communities (11 percent). Negative social or cultural characteristics included problems such as: difficulties with the leadership or management of the healthcare facility, conflict or lack of collegiality among healthcare providers, challenges in gaining trust of patients, a feeling of professional isolation, lack of community support or respect, and unfriendly patients (7 percent). A few respondents mentioned limited access to resources, facilities, or medical technology (4 percent).

[28] As stated previously, the quality of schools may reflect other types of community capital besides human capital, such as social capital or physical capital.

It is interesting that the same factors cited by some healthcare professionals as the main reason they chose to work in the study town are cited by others as the biggest drawback to working there. For example, 12 percent of respondents cited the small size or rural nature of the town as the main attraction, while 9 percent cited this as the biggest drawback.[29] Similarly, although more than a third of respondents viewed being close to family and friends and knowing people personally as the major reason they chose the location, 4 percent cited the lack of privacy or anonymity of small-town life as the biggest drawback. Several respondents indicated that working as a healthcare provider for people they grew up with was a challenge, in some cases because of the difficulty of being seen and treated as a professional by people who watched them grow up. Thus, close social connections are not always viewed as a positive thing by healthcare professionals, though positive views of such connections were more common than negative ones.

There were no statistically significant differences (at the 5-percent level) across the study regions in how often any of the factors were cited as the biggest drawback. We did find significant differences across types of healthcare professionals, however. Dentists were significantly more likely than other types to cite negative community characteristics, particularly the lack of urban amenities and the social characteristics of the community. Part of the reason for this may be that dentists depend upon social connections to develop the customer base of their practices more than physicians or nurse practitioners, physician assistants, or certified nurse midwives—who were more likely to be employees of larger facilities or practices rather than independent practitioners. Dentists were least likely to cite characteristics of the medical/dental community, practice, or job—particularly the human capital/workload characteristics. Because they are usually sole or part owners of an independent practice rather than being employees or partners of a larger facility or practice, dentists have more autonomy and are less affected than most medical healthcare professionals by decisions made by employers that affect the quality of their colleagues and staff or their workload.

Among the health professional types included in the survey, physicians were most likely to cite human capital and workload concerns, while nurse practitioners, physician assistants, or certified nurse midwives were most likely to cite economic characteristics of the practice or job. Physicians were particularly concerned about the availability of other qualified physicians and support staff, and the implications that has for their workload. Since more than 97 percent of the nurse practitioners, physician assistants, or certified nurse midwives in our study towns were employees, it is not surprising that they were most concerned about the salary and benefits offered by the employer.

Factors Affecting Retention

The healthcare professional survey also asked respondents about the importance of 23 factors affecting their decision to continue practicing in the study town (table 2). Except for familiarity with the area (which was not among the factors investigated as affecting retention), all the factors cited as important by most healthcare professionals for their initial location decision were also cited by most professionals as important for their decision to remain in the town (figure 10). However, three additional factors that were not among those investigated for the initial location decision were cited by most healthcare professionals as affecting their decision to stay: professional contacts/collegiality, the family being settled in the town, and the professional's investment in their practice. As with the factors affecting decisions to locate initially in the study town, social relationships weighed heavily in healthcare professionals' decisions to remain there. An additional factor that affects retention (but is not relevant to initial recruitment) is healthcare professionals' investment in their practices, which may involve investments in social or professional relationships and in human capital, as well as in physical capital.

Statistically significant differences across regions were evident for some factors. The factors most often cited as important in the Upper Midwest region were professional contacts/collegiality, the quality of the medical

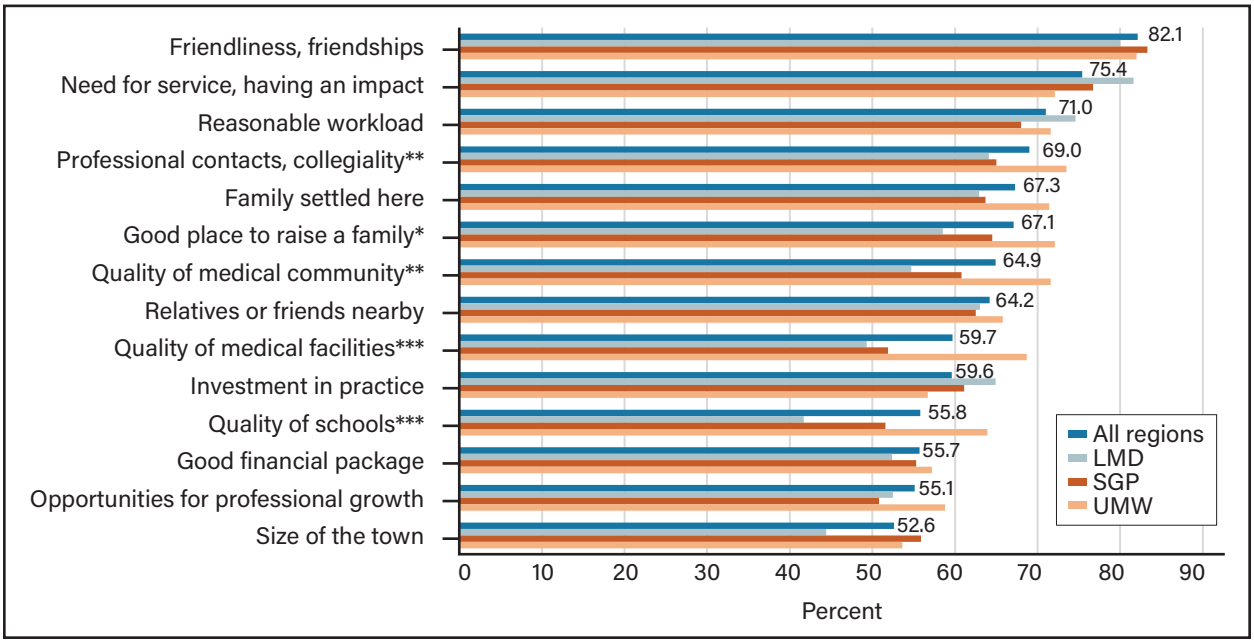
[29] Two respondents cited the smallness of the town as both the most important reason they chose to work there and as the biggest drawback.

community and of medical facilities, and quality of schools. Most of these factors were least often cited in the Lower Mississippi Delta region. Most of these differences mirror differences across regions in similar factors affecting healthcare professionals' location decisions.

Differences across professional types were evident for most factors (figure 11). Nurse practitioners, physician assistants, or certified nurse midwives were most likely to cite professional contacts/collegiality, reasonable workload, need for their services, quality of the medical community and medical facilities, having relatives or friends nearby, opportunities for professional growth, good financial packages, and the size of the town as important. Part of the reason that a larger percentage of these healthcare professionals than physicians or dentists cited several factors as reasons they decided to continue working in the community may be because these professionals are more likely to have considered leaving. Nearly 52 percent of nurse practitioners, physician assistants, or certified nurse midwives had considered leaving their job in the study town—compared to 43 percent of physicians and 30 percent of dentists. Physicians' responses were similar to those of nurse practitioners, physician assistants, or certified nurse midwives regarding the importance of need for their services and quality of the medical community and medical facilities. Dentists were far more likely than the medical professionals to cite investment in their practice as an important reason they decided to keep working in the town. This finding is consistent with dentists being much more likely than medical professionals to be a sole or part owner of their practice.

Figure 10

Factors cited as "important" or "very important" by most healthcare professionals in their decision to continue working in the study town, total and by region (percent of healthcare professionals)



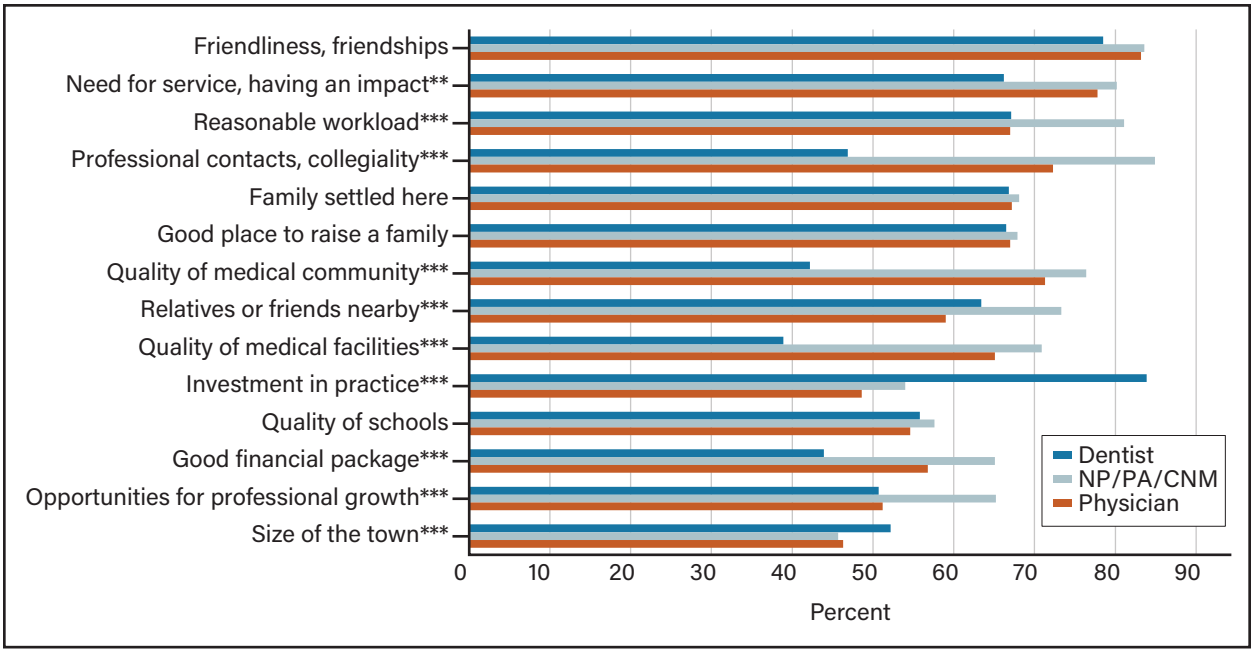
Note: "LMD" = Lower Mississippi Delta, "SGP" = Southern Great Plains, "UMW" =Upper Midwest.

*, **, *** indicate that the differences across regions in percent of healthcare professionals reporting the factor as important or very important are statistically significant at 10 percent, 5 percent, or 1 percent levels, respectively. Respondents indicated the importance of each factor separately, so the percentages do not total to 100 percent. Reported percentages are adjusted for sampling probability, so the percentages are representative of the population of healthcare professionals in the universe of small towns in the three study regions.

Source: USDA, Economic Research Service analysis of healthcare professional survey responses collected by Iowa State University's Survey and Behavioral Research Services, 2014–2015.

Figure 11

Factors cited as "important" or "very important" by most healthcare professionals in their decision to continue working in the study town, by type of professional (percent of health care professionals)



Note: "NP/PA/CNM" = nurse practitioners/physician assistants/certified nurse midwives.

*, **, *** indicate that the differences across types of professionals in percent of healthcare professionals reporting the factor as important or very important are statistically significant at 10 percent, 5 percent, or 1 percent levels, respectively. Respondents indicated the importance of each factor separately, so the percentages do not total to 100 percent. Reported percentages are adjusted for sampling probability, so are representative of the population of healthcare professionals in the universe of small towns in the three study regions.

Source: USDA, Economic Research Service analysis of healthcare professional survey responses collected by Iowa State University's Survey and Behavioral Research Services, 2014–2015.

Main Reasons Healthcare Professionals Considered Leaving

If respondents had considered leaving, they were asked an open-ended question about the main reason they considered leaving their job or practice in the study town. Eighteen percent of all respondents cited characteristics of the community or family issues, and 28 percent cited characteristics of the medical/dental community, practice, or job (the rest had not considered leaving or didn't respond to the question). Among community or family characteristics, social characteristics—such as having family and friends elsewhere, lack of available childcare, and lack of social or recreational opportunities—were most often cited (by 8 percent of respondents). Human capital characteristics of the community (such as low quality of the schools and lack of health awareness) were cited by 3 percent of respondents. Economic characteristics (such as poverty or economic decline, high cost of living or taxes, or lack of job opportunities for the spouse) were also cited by about 3 percent. The small, rural, or remote nature of the town or lack of urban amenities was cited by about 2 percent. Natural amenities (usually complaints about the climate) and the local culture or politics were each cited by less than 2 percent of respondents.

Among characteristics of the medical/dental community practice or job, the most often cited reason to consider leaving related to economic characteristics (cited by 13 percent of respondents)—such as the pay or benefits, better opportunities elsewhere, competition from other healthcare providers, lack of growth of the practice, and payment problems. Eleven percent of respondents cited human capital or workload considerations (often together), such as: the heavy workload or call schedule, problems recruiting to the town or retaining other healthcare professionals, lack of specialists for patient referrals, low quality of healthcare in

the town, a desire to change specialty or the scope of practice, or professional growth opportunities elsewhere. Eight percent of respondents cited social or administrative problems in the practice or job (such as dissatisfaction with relationships with colleagues, staff, or the administration, feeling professionally isolated, "politics" of the local medical community, and lack of community support).

There are no statistically significant differences across the study regions or types of healthcare professionals in the percentage of respondents citing any of the community characteristics or family considerations mentioned above. There are significant differences across regions and healthcare professional types in the percentage citing characteristics of the medical/dental community, practice, or job. Across regions, healthcare professionals in the Upper Midwest region were less likely than those in the Lower Mississippi Delta or Southern Great Plains regions to cite economic characteristics of the practice or job as the main reason to consider leaving but more likely to cite social or administration concerns. These differences may be related to the greater tendency of healthcare professionals in the Upper Midwest region to be employees of larger healthcare organizations than those in the other regions: 70 percent of respondents in the Upper Midwest region were employees, compared to 54 percent in the Lower Mississippi Delta and 56 percent in the Southern Great Plains regions.

Across healthcare professional types—nurse practitioners, physician assistants, or certified nurse midwives were most likely to cite characteristics of the medical/dental community, practice, or job as reasons to consider leaving; dentists were least likely to cite such characteristics. This grouping is also true for economic characteristics, human capital characteristics, workload concerns, and social or administration concerns. The fact that nurse practitioners, physician assistants, or certified nurse midwives were almost always employees, while the vast majority of dentists were sole- or part-owners of their practices, is likely related to these results.

Main Reasons to Stay

Respondents were also asked an open-ended question about the main reason they decided to stay in their job or practice in the study town if they had considered leaving. Nineteen percent of the respondents cited family considerations or characteristics of the community. Family considerations were the most frequent responses (cited by 14 percent), such as: stability for the family, being close to home or family, being a good place to raise a family, the spouse's career, and health issues in the family. Other social considerations, such as liking the people of the town or having a personal commitment to the town, were cited by about 6 percent of respondents. Economic factors such as the low cost of living or the respondent's investments in their homes were much less commonly cited, by less than 1 percent.

About 22 percent of respondents cited characteristics of the medical or dental community, practice, or job as the main reason to stay. Social or administrative considerations were most often cited, by 12 percent (such as relationships with patients and colleagues, administrative support or improvement, and commitment to the organization), especially the importance of the respondent's relationships with patients and colleagues (8 percent). Economic factors were cited by 10 percent of respondents, such as: the level of or improvement in the salary or financial package, the respondent's investment in the practice or the opportunity to buy a practice, not finding a better job elsewhere or finding a better job in the study town, and contract or loan repayment obligations. Human capital and workload considerations were cited by 4 percent of respondents, such as: having a manageable workload or call schedule, good work/life balance, ability to develop professionally, or limitations of their medical license.

About 6 percent of respondents cited other factors that could not be classified as family or community characteristics or characteristics of the medical/dental community, practice, or job. Most common among these responses was that the respondent was planning to move or may move (about 2 percent). Other responses (in diminishing order of frequency) referred to the need in the community, the cost or hassle of moving, the

timing not being right to move, or the respondent changing his/her perception, making a financial adjustment, or being close to retirement.

Across regions, nonfamily social considerations (such as liking the people of the town or having a personal commitment to the town) were cited least often in the Lower Mississippi Delta region and most often in the Upper Midwest region. Human capital and workload considerations were cited most often in the Lower Mississippi Delta region and least in the Southern Great Plains.

Across types of healthcare professionals, family considerations and professional social or administration considerations—particularly relationships with patients and colleagues—were cited most often by nurse practitioners, physician assistants, or certified nurse midwives and least by dentists. Dentists were also least likely to cite salary or the financial package and most likely to cite investment in their practice as their main reason to stay, consistent with the greater tendency of dentists to be sole or part owners of their practice. Dentists were also least likely to state that they were planning to move or might move, perhaps in part because of their investment in their practices.

Discussion

This study sought to shed light on several questions:

- How do the assets and investments of rural communities—broadly defined to reflect multiple types of community capital—affect recruitment and retention of healthcare professionals?
- How does the importance of these factors vary across regions and across types of healthcare professionals?
- Does the importance of these factors differ between recruitment and retention?
- What can rural communities do to help recruit and retain healthcare professionals?

In this section, we summarize the findings of the survey related to these questions, then compare the findings to those of studies in the literature that investigated similar issues.

Effects of Community Assets and Investments on Recruitment and Retention

Social capital

The results of both the key informant interviews and the healthcare professional survey reveal the great importance of social capital—that is, the value of human relationships—in the recruitment of healthcare professionals. Among key informants, the second most often cited factor as important for attracting healthcare professionals was the small-town feel of the community, which referred to the closeness of personal relationships in a small town. The most often cited factor by key informants for attracting healthcare professionals was good schools—which appears from explanations by several key informants to reflect social qualities of the schools (e.g., opportunities to participate in extracurricular activities or the religious orientation)—as well as the quality of human capital (the quality of teachers and students) and physical capital (school facilities). Other factors reflective of social capital were also cited by many key informants, including: safety, low crime levels, and being a close-knit, friendly, or a welcoming community. Two of the top three suggestions by key informants as the most important things their community could do to recruit healthcare professionals emphasized social relationships: collaboration between the community and healthcare professional and being a welcoming and supportive community.

Social and professional relationships were also often cited by healthcare professionals as important in their location decisions. The two factors most frequently cited by healthcare professionals as important in their decision to locate in the community were the friendliness of the people and the community being a good place to raise a family. As noted, friendliness primarily reflects social capital—while a good place to raise a family may relate to all types of community capital—though social relationships are likely to be among the most important. Also commonly cited among the important reasons to locate in the community were good schools, having friends or relatives living nearby, being familiar with the area, and the small size of the town—all of which reflect the value of social relationships, as well as (in some of these cases) other types of community capital.

Healthcare professionals also indicated the importance of social relationships—with family members, the broader community, professional colleagues, and patients—in their responses to an open-ended question about the main reason they decided to locate in the study community. The most common response was that the town was their hometown, close to family and friends, or a place they were already familiar with. But more than one-tenth of respondents cited other social aspects of the community, and one-fifth cited social or human capital aspects of the medical community, practice, or job—such as having friendly or high-quality staff and colleagues and knowing patients and colleagues personally.

In response to an open-ended question about the biggest drawback of locating in the study town, some respondents cited negative social characteristics of the town or of the medical community, practice, or job—such as lack of privacy, lack of social opportunities, feeling socially or professionally isolated, conflicts or lack of collegiality among colleagues and staff, challenges in gaining trust of patients, and lack of community support. However, such negative views about social characteristics were less commonly expressed than positive ones.

The importance of social or professional relationships for retention of healthcare professionals was similar, if not higher. The second most common suggestion by key informants as the most important thing the community could do to retain its healthcare professionals was building and maintaining positive relationships with them, and the fourth most common suggestion was to involve healthcare professionals in community events.

The most often cited factor by healthcare professionals as important in their decision to continue working in the study town was the friendliness of the people/friendships. Other relatively commonly cited factors included professional contacts/collegiality, family settled here, good place to raise a family, relatives or friends nearby, quality of schools, size of the town, and involvement in community activities. In response to an open-ended question about the main reason the respondents had considered leaving the study town (if they had considered it), personal and professional relationships were most often cited. And in response to an open-ended question about the main reason the professionals decided to stay in the study town (if they had considered leaving), the most-cited reasons involved family considerations or other social considerations.

Human capital

The human capital assets and investments of a community were also very important to healthcare professionals in their decisions to locate and continue working in the study towns. The quality of the schools was the most often cited factor by key informants among factors important for recruiting healthcare professionals and was also among the top 10 factors cited as a drawback to locating in the study town. In addition to the social and physical capital aspects of schools, the quality of schools reflects the education, skills, and motivation of the teachers, other school staff, and the broader community population—that is, it reflects local human capital.

More than two-thirds of healthcare professionals cited the quality of schools as an important factor affecting their decision to locate in the study town, and more than half indicated that the quality of the schools was

important in their decision to stay. However, only 1 percent of respondents said that the quality of the schools was the main reason they chose to work in the study town. A larger share (but still less than 5 percent) cited the lack of school options or low quality of the schools as the main drawback to working in the study town, and a similarly small share indicated that concerns about the quality of the schools was the main reason they had considered leaving the town.

Healthcare professionals were even more concerned about the human capital of the local medical community, particularly in their place of employment, than about the quality of the schools. The quality of the medical community was the fifth most often cited factor by healthcare professionals as important to their decision to locate in the study community, and opportunities for professional growth—that is, opportunities to invest in their own human capital—was the sixth most often cited factor. One-fifth of healthcare professionals cited human or social capital aspects of the practice or job as the main reason they chose the job in that town. One in eight respondents cited human capital and/or workload issues as the main drawback to working in the town, and a similar percentage cited such issues as the main reason they had considered leaving. Although often cited by healthcare professionals, this factor was not often cited by key informants, who may not have been aware of professionals' views on this factor.

Physical capital

Physical capital (such as buildings, facilities, and equipment) was less commonly cited than social or human capital factors by key informants or healthcare professionals as important for recruiting or retaining healthcare professionals but was still cited by many. Lack of affordable housing was the third most often cited barrier to recruiting healthcare professionals by key informants. Improving existing or building new medical facilities and providing affordable quality housing were the fourth and fifth most common suggestions from key informants as the most important thing the community could do to recruit healthcare professionals.

Most healthcare professionals cited the quality of the medical facilities as important in their decisions to initially locate in the study town and to continue working there. However, only about 2 percent of healthcare professionals cited the availability or quality of medical/dental facilities as the main reason they decided to locate in the study town, and 4 percent cited lack of access to resources, facilities, or medical technology as the main drawback to that decision. Few healthcare professionals mentioned housing or community infrastructure as the most important factor affecting their decisions to locate or stay in the study town.[30]

Another factor affecting healthcare professional retention, which likely reflects investments in physical capital as well as in social and human capital, is the professional's investment in their own practice. This factor was cited by most healthcare professionals as important in their decision to continue working in the study town, though only 3 percent of professionals— mostly dentists—cited this as the main reason they decided to stay.

[30] The survey of healthcare professionals did not ask specifically about housing as a factor affecting the respondents' decisions to locate or stay in the study town. However, only four survey respondents (less than 0.4 percent of healthcare professionals) mentioned the lack of available or affordable housing as the main drawback to locating in the study town, and this factor was mentioned by only one respondent as the main reason the person decided to locate there. No respondents cited housing in response to the open-ended questions about the most important positive or negative factors affecting their decision to stay in the study town. Lack of access to broadband was cited by one respondent as the most important reason considered for leaving the study town.

Financial capital, strength of the local economy, and financial rewards

Factors reflecting the financial capital of a community and the strength of the local economy were cited by many key informants as affecting the recruitment and retention of healthcare professionals. A strong local economy was the eighth most often cited positive factor by key informants as attracting healthcare professionals. Low earning potential, poverty and income disparities, and high unemployment and lack of jobs—were the fourth, fifth, and seventh most often cited barriers affecting recruitment, respectively. Population or economic growth was the ninth most cited most important factor by key informants for attracting healthcare professionals to the community, and economic vitality was the eighth most important factor cited for retaining professionals.

Some healthcare professionals also cited financial or economic characteristics of the community as affecting their decisions to locate and continue working in the study town. About 5 percent of healthcare professionals cited adverse local economic conditions or poverty as the biggest drawback to deciding to practice in the town, and about 1 percent cited such conditions as the main reason they had considered leaving.

The financial wealth of a community and the strength of its economy can affect the financial rewards available to healthcare professionals—especially, but not only, for those who own their practices. Not surprisingly, the financial package or earning potential available to healthcare professionals was an important factor for recruiting and retaining healthcare professionals, according to many key informants. Offering financial incentives was the sixth most often cited suggestion by key informants regarding the most important thing the community could do to recruit healthcare professionals. The most important thing the community could do to retain healthcare professionals (most often suggested by key informants) was town residents using local providers' services—which directly determines the financial rewards of professionals who are sole or part owners of their practice and may affect the employment and salary prospects of healthcare professionals who are employees. Providing a competitive salary was the fifth most common suggestion for increasing retention.

Many healthcare professionals also cited financial rewards as important to their decisions to locate and stay in the study town. A good financial package was cited by most healthcare professionals as important in their decisions to locate and continue working there. However, only 4 percent said the salary or earning potential of the practice or job was the most important reason they decided to locate in the study town, and the same percentage cited this as the main reason they stayed. A larger percentage—almost 8 percent—cited the low salary or earnings potential as the biggest drawback of locating there and as the main reason they considered leaving.

Overall, the financial wealth of the community and the financial package offered to healthcare professionals was important to many in their decisions about locating and staying in the study town and practice or job, but these were not often cited as the most important factor.

Urban amenities

Urban amenities were cited by many key informants and healthcare professionals as important for recruiting and retaining healthcare professionals but more often as a drawback than as a positive feature of the study town. Access to urban amenities likely reflects several types of capital—such as the human, physical, and cultural capital found in urban settings, as well as access to goods and services. Proximity to an urban area and urban amenities were the fourth and fifth most often cited factors by key informants as positive characteristics that would attract healthcare professionals to the study town. However, lack of urban amenities was the most cited barrier to recruiting healthcare professionals.

Availability of goods and services was cited by only a minority of healthcare professionals as important in their decision to locate or stay in the study town. But, most often cited by healthcare professionals as the biggest drawback to locating in the study town was the lack of urban amenities, distance to a city, or small size of the town. However, if they had considered leaving, only about 2 percent of healthcare professionals cited the lack of urban amenities or the small or remote nature of the town as the main reason they considered leaving it. Thus, although many healthcare professionals saw a lack of urban amenities or remoteness from an urban area as a major drawback to locating in the study town, most of those concerned about it seem to have accepted it and did not see it as a major reason to consider leaving.

Natural amenities and outdoor recreation opportunities

Natural amenities—such as the climate, scenery, and access to bodies of water—were cited by many key informants and healthcare professionals as an important factor affecting healthcare professionals' decisions to locate and stay in the study town, though less often than most of the other types of community capital already discussed. Outdoor recreation amenities and the town's location in a scenic area were the third and seventh characteristics most often cited by key informants as encouraging healthcare professionals to locate there, and climate and geography was the ninth most often cited negative characteristic of the town by key informants.

Natural amenities and recreational opportunities were each cited by between 40 and 50 percent of healthcare professionals as important factors affecting both their decision to initially locate in the study town and to continue working there. However, only 2 to 3 percent of healthcare professionals cited these factors as the most important reason they decided to locate in the study town or as the biggest drawback to locating there. About 2 percent cited the climate or the lack of other natural amenities as the main reason they had considered leaving, and none cited these factors as the main reason to stay. Although these factors are important to a large minority of healthcare professionals in their decisions to locate and stay in a town, they are rarely cited as the most important factor.

Culture and cultural amenities

Local cultural characteristics or cultural amenities, such as local arts, historical sites, and cultural events, were not commonly cited by key informants or healthcare professionals as an important factor affecting the recruitment or retention of healthcare professionals. Such cultural features were not among the top 10 positive or negative characteristics that key informants said would affect the decisions of healthcare professionals to locate in the study town, although emphasizing local cultural amenities was sometimes mentioned by key informants as among the important things the community could do to recruit healthcare professionals.[31] Cultural amenities was one of the factors least often cited by healthcare professionals as important in their decisions to begin or continue practicing in the study town; it was never cited as the main reason the professionals chose to practice in the town or decided to stay if they had considered leaving. About 5 percent of healthcare professionals cited cultural factors as the biggest drawback to locating in the study town, with the lack of cultural amenities cited in about half of these cases. Less than 2 percent cited cultural factors as the main reason they had considered leaving, with the lack of cultural amenities mentioned by less than 1 percent.

[31] Such responses are included in the category of emphasizing local amenities and quality of life, the eighth most common suggestion by key informants noted in figure 6.

Effects of Other Factors Besides Community Capitals

The importance of several other factors that are not community capitals was also investigated or mentioned by key informants and healthcare professionals in their responses. Although not themselves forms of community capital, these factors may be affected by community capitals.

Need of the community

Possibly related to the potential for financial reward and the altruistic motives of healthcare professionals is the need for healthcare professionals in the study community. This was the third most often cited factor by healthcare professionals as important in their decision to initially locate in the study town and the second most often cited factor as important in their decision to continue working there. This factor was cited by 12 percent of healthcare professionals as the most important reason they decided to locate in the study town but by less than 2 percent of professionals as the main reason they decided to stay if they had considered leaving. In contrast to professionals' responses, key informants did not mention this factor, perhaps because the responders were not aware of healthcare professionals' altruistic motives.

Workload/call responsibilities[32]

Workload is a job-related factor important for the recruitment and retention of many healthcare professionals. A reasonable workload was the fourth most often factor cited by healthcare professionals as important in their decision to locate in the study town and practice/job and was the third most often cited factor as important in their decision to stay. Having a manageable workload or change of pace was cited by 4 percent of healthcare professionals as the main reason they chose to work in the study town and practice/job, and 3 percent cited the favorable work/life balance as the main reason they decided to stay. Nearly 7 percent cited excessive workload or on-call responsibilities as the biggest drawback of that choice, and 8 percent cited workload concerns as the main reason they had considered leaving. Although this factor was mentioned by many healthcare professionals, it was seldom mentioned by key informants, who appear to be less aware of the importance of this issue to professionals.

Effects on spouse/partner

The effect of healthcare professionals' decisions on their spouse or partner is another factor cited as important by a large minority of professionals but not by key informants. Nearly half of professionals indicated that opportunities for the spouse or partner were important in their initial location decision, and more than one-third indicated that the spouse's or partner's career was important in their decision to remain in the town. However, only 4 percent of professionals cited the spouse's career as the most important reason they decided to locate in the study town, and less than 2 percent cited this as the main reason they decided to stay.

Differences Across Regions

Numerous differences in the importance of community capitals and other factors are evident across the study regions. Many factors often cited by healthcare professionals as important for both location and retention decisions in the Upper Midwest region were least often cited as important in the Lower Mississippi Delta. These factors include several related to community capitals: professional contacts and collegiality (social

[32] In an earlier subsection, we combined responses from healthcare professionals to open-ended questions related to human capital and workload considerations because these responses were often difficult to separate. For example, respondents concerned about excessive workload or on-call schedule were (in many cases) concerned about the lack of other healthcare professionals in the community, which contributed to their workload concerns. In this subsection, we discuss responses that specifically mentioned concerns about workload or on-call responsibilities.

capital in the work setting), being considered a good place to raise a family (possibly all types of capital), the quality of the medical community (human capital) and medical facilities (physical capital), the quality of the schools (human, social, and physical capital), size of the town (most types of community capital), natural amenities (natural capital), recreational opportunities (natural and physical capital), opportunities for the professionals' spouse or partner (social and human capital), and cultural amenities (cultural capital).

By contrast, healthcare professionals in the Lower Mississippi region were most likely and those in the Upper Midwest region were least likely to cite community need, low cost of living, or low taxes as important in their location or retention decisions. The Southern Great Plains region occupied a middle ground on several of these factors (good place to raise a family, quality of schools and medical facilities, size of the town), though for most of these factors, professionals' responses in that region were similar to those in the Lower Mississippi Delta.

These regional differences in the importance of community-level factors may be due in part to regional differences in healthcare and capital endowments. As noted in our discussion of the characteristics of the study regions, the Upper Midwest is advantaged compared to the other two regions in access to healthcare and health insurance, educational attainment of the adult population, and degree of poverty. Since the Upper Midwest region has better access to healthcare services and health insurance, it may attract healthcare professionals who place a high importance on the quality of the healthcare system. As a region with higher levels of human capital, indicated by higher levels of educational attainment, the Upper Midwest region may also attract professionals who place relatively high importance on the quality of schools. As a region with less poverty, the Upper Midwest region may be less likely to attract providers motivated primarily by a desire to serve the neediest people. The Upper Midwest region also has higher levels of social capital than the other two regions, as measured by Rupasingha et al. (2006), which could help explain why professionals who put a high importance on social capital-related factors (such as a good place to raise a family, quality of schools, and professional collegiality) may be more likely to be attracted to this region. By contrast, in the less well-endowed Lower Mississippi Delta and Southern Great Plains regions, healthcare professionals' primary motivation for working in small towns is more often related to the need for their services.

One apparently puzzling comparison among these regions is the fact that the Upper Midwest region generally ranks lower on the ERS natural amenities scale than the other two regions, yet healthcare professionals in that region were more likely to cite natural amenities as important in their location and retention decisions. It may be that providers in the other regions care more about other factors than natural amenities, and/or the weighting of factors in the ERS natural amenities scale—with equal weight given to the mean temperature and hours of sunlight in January, mean temperature and relative humidity in July, topography, and access to water bodies (McGranahan, 1999)—does not reflect the natural amenity characteristics that healthcare professionals in the Upper Midwest region most care about. The low natural amenity score of the region is due mainly to low temperatures in January. If the professionals attracted to this region are less concerned about cold winters or are more concerned about other natural amenities (such as access to lakes and rivers), those professionals may be attracted to the region for its natural amenities despite the cold winters.[33]

Other responses from key informants and healthcare professionals largely support and augment these regional comparisons, although there are some differences in the comparisons depending on the question asked. Consistent with the healthcare professional survey results discussed above, key informants from the Upper Midwest region more frequently than those from other regions mentioned natural amenities, recreation opportunities, and the strength of the healthcare system as important factors for recruiting healthcare professionals.

[33] A key informant's comment quoted earlier about some healthcare professionals being attracted to ice fishing in their region illustrates this point.

Healthcare professionals in the Upper Midwest region were more likely than those in the Lower Mississippi Delta region to cite—as the main reason they decided to locate in the study town—liking the community or location, natural amenities or outdoor recreation opportunities, being close to an urban area, human or social capital characteristics of the medical/dental community, practice or job, or the opportunity to own a practice. For some of these factors (liking the community or location, natural amenities or outdoor recreation opportunities, opportunity to own a practice), these responses were as common or more common from professionals in the Southern Great Plains region.

Excessive workload or on-call responsibilities were more often cited as the main drawback of the practice or job in the Upper Midwest and Southern Great Plains regions than in the Lower Mississippi Delta. Dissatisfaction with the workplace and relationships with the administration, colleagues, or staff was most often cited by healthcare professionals in the Upper Midwest region as the main reason they had considered leaving and least often cited in the Lower Mississippi Delta region. By contrast, economic concerns about the practice or job situation (such as better pay or economic potential elsewhere) were least often cited by professionals as the main reason to consider leaving in the Upper Midwest region but to a similar extent in the Lower Mississippi Delta and Southern Great Plains regions. Healthcare professionals in the Upper Midwest region were most likely to cite nonfamily social factors related to the community (such as liking the people or being committed to the community) as the main reason they decided to stay, while those in the Lower Mississippi Delta region were least likely to cite these reasons.

These results concerning the greater importance of workload issues, administration, workplace relationships and the lesser importance of workplace economic issues may be due in part to the greater tendency of professionals in the Upper Midwest region to be employees of larger health systems than healthcare professionals in the other two regions. Employees in these systems may have better salary and benefits in which they are generally satisfied. However, they may also have greater workload pressures and potential for conflicts (with healthcare administrators, colleagues, and staff) because of those pressures than employees of smaller healthcare facilities or owners of independent practices.

Differences Across Healthcare Professional Types

Across the types of healthcare professionals studied, nurse practitioners, physician assistants, and certified nurse midwives were more likely than other professional types to cite many factors listed in table 2 as important in their decisions to locate and stay in the study towns, including characteristics of the place of employment and the job (reasonable workload, quality of the medical community and facilities, opportunities for professional growth, good financial package, and professional contacts/collegiality), familiarity and social connections (familiarity with the area, having friends or relatives nearby, the town's efforts to encourage them to stay), socioeconomic characteristics of the town (town size, need for their services, low cost of living, low taxes, availability of goods and services), and opportunities for their spouse or partner. Nurse practitioners, physician assistants, and certified nurse midwives were more likely than other professional types to cite being close to family and friends or being from the area as the most important reason they chose to locate in the study community. They were more likely to cite low salary or earnings as the biggest drawback of deciding to work in the study town and job. They were also more likely than other healthcare professionals to have considered leaving the job and more likely to cite desire for better pay or benefits, excessive workload, or dissatisfaction with the workplace administration and professional relationships as the main reason they had considered leaving. They were more likely to cite family considerations, relationships with patients and colleagues, or work/life balance as the main reason they decided to stay.

Dentists were least likely to cite many of the factors listed in table 2 as important for their location or retention decisions, including their need in the community (though differences were statistically significant for retention only), the quality of the medical community and facilities, professional contacts and collegiality, good financial package, the spouse's career, and recruitment or retention efforts by the town. Dentists were far more likely than other professional types to cite the opportunity to own a practice as important or as the most important factor for their initial location decision and the investment in their practice as important or as the most important factor for retention. Dentists were the least likely healthcare professionals to cite—as the most important reason they chose to locate in the study town—their spouse's career, human or social capital aspects of the practice or job, or workload or change of pace. Dentists were most likely to cite—as the biggest drawback to locating in the study town—lack of urban amenities or social opportunities and were least likely to cite—as major drawbacks—characteristics of the practice or job (such as human capital and workload issues, or low salary or earning potential). Dentists were least likely to have considered leaving the study town and least likely to cite—as the main reason they had considered leaving—the desire for better pay or benefits, human capital or workload issues, or work relationships. They were also least likely to cite—as the main reason they decided to stay—family considerations, work relationships, the financial package, or work/life balance.

Physicians were less likely than other healthcare professionals to cite having relatives or friends nearby, familiarity with the area, or low cost of living as important to their location or retention decisions and more likely to cite recruitment efforts by the town as important to their location decision. Physicians were least likely to cite the fact that the town was their hometown or familiarity with the area and most likely to cite reasonable workload or change of pace as the most important reason they located in the study town. They were least likely to cite social characteristics of the town or economic characteristics of the practice or job and most likely to cite workload and on-call responsibilities as the biggest drawback of practicing in the study town. Physicians were more likely than other healthcare professionals to cite satisfaction with the salary or financial package as the main reason they decided to stay if they were not planning to move.

Some of these differences in responses across healthcare professional types appear consistent with the nature of employment in these professions in the study regions. Nurse practitioners, physician assistants, and certified nurse midwives were almost entirely employees of hospitals, clinics, or larger health systems; dentists were almost always sole or part owners of their practice; and physicians occupied a mix of these situations, though about two-thirds of physicians were employees. These differences may explain why dentists were more concerned about opportunities to own a practice and their investments in their practice, given their usual role as owners of a small business. The fact that dentists more often cited lack of social opportunities as a major drawback to locating in the study town may also be partly due to their role as owners of small businesses—they may build the customer base of their practice through social connections. Given that they are almost always employees, it's not surprising that nurse practitioners, physician assistants, and certified nurse midwives were more concerned about characteristics of the place of employment (such as the financial package, quality of staff and facilities, and workload demands). Physicians were also quite concerned about on-call responsibilities and workload, which is consistent with the fact that the average number of hours per week that survey respondents reported working was highest for physicians (51 hours for physicians compared to 42 hours for nurse practitioners, physician assistants, and certified nurse midwives, and 35 hours for dentists).

The fact that physicians were more likely to report recruitment efforts by the town as important to their location decision is consistent with the fact that a much larger share of physicians reported being recruited by the town (39 percent) than other professional types (17 percent of nurse practitioners, physician assistants, and certified nurse midwives and 5 percent of dentists). It is interesting, however, that a larger share of nurse practitioners, physician assistants, and certified nurse midwives than of physicians or dentists reported that

the town's efforts to encourage them to stay was important in their decision to stay. Encouraging healthcare professionals to remain in a town may rely more heavily on social connections than efforts to recruit these professionals, and such connections may be more critical to nurse practitioners, physician assistants, and certified nurse midwives in these decisions.

In general, nurse practitioners, physician assistants, and certified nurse midwives appear to be somewhat more motivated by social relationships—both personal and professional—than other healthcare professionals in their decisions to locate and stay in the communities. This may be related to the fact that a much larger share of nurse practitioners, physician assistants, and certified nurse midwives lived in the study town before working there (48 percent of them lived in the study town before working there, compared to 29 percent of dentists and 22 percent of physicians).

Differences in income, gender, and age across healthcare professional types—with nurse practitioners, physician assistants, and certified nurse midwives having the lowest incomes, being much more likely to be female, and being younger on average than dentists or physicians—may help explain some of the differences in the factors important to the different types of professionals. The lower incomes of nurse practitioners, physician assistants, and certified nurse midwives may explain in part their greater concern about economic factors such as salary and benefits, low cost of living, and low taxes. Gender and age differences across professional types may help explain a greater concern among nurse practitioners, physician assistants, and certified nurse midwives about the career opportunities of the spouse (since male spouses are more likely to be in the labor force than female spouses[34]) and about the presence of relatives and friends (for example, to help with child-care responsibilities faced by younger adults). Age differences may also help explain the greater importance of opportunities for professional growth to nurse practitioners, physician assistants, and certified nurse midwives, who were younger and earlier in their career on average than dentists or physicians.

Differences in Factors Affecting Recruitment and Retention

Overall, the set of factors important for recruiting healthcare professionals is similar to the set of factors important for retaining them. Among the specific factors investigated for their importance in both location and retention decisions, all those considered important by most healthcare professionals in the initial location decision were also considered important by most professionals in their decision to stay (table 2).

We did not investigate the importance for retention decisions of some factors investigated as possibly important for healthcare professionals' initial location decision—familiarity with the area, social opportunities, and placement by a program—as we expected these factors to mainly be relevant to the initial location decision. Of these, familiarity with the area was considered important by most healthcare professionals and social opportunities important to nearly half of professionals, while placement by a program was important to only 9 percent of professionals. This finding indicates the relative importance of initial social relationships (proxied by prior familiarity with the area) and opportunities to develop social relationships as factors affecting recruitment, which may not have much impact on retention (though the survey didn't address this).

Three factors that we investigated as potentially affecting retention (but did not investigate as affecting recruitment) were the professional contacts and collegiality among healthcare professionals, the fact that the professional's family was settled in the town, and investment in the practice. All these factors were cited by most healthcare professionals as important in their decision to stay in the town, indicating the importance of

[34] For example, for the United States as a whole, labor force participation in 2019 was 94.1 percent for married men and 70.0 percent for married women (U.S. Bureau of Labor Statistics, 2021).

family and other social considerations in professionals' retention decisions.[35] Hence, social capital is important for both recruitment and retention decisions, though somewhat different types of social capital may be important in location versus retention decisions.

The factors cited by healthcare professionals as most important in their location and retention decisions support the view that somewhat different factors weigh heavily in these different decisions. In the initial location decision, being from or familiar with the town was by far most cited as the most important factor, though other social characteristics of the town (and social and human capital characteristics of the medical community or practice) were most important for many professionals. For retention decisions, stability for the healthcare professional's family and social and administrative relationships in the medical community, practice, or job were of high relative importance. Economic and workload concerns with the practice or job appear to be of greater relative importance in retention decisions than in initial location decisions. Need in the community was cited much more often by healthcare professionals as the main reason they initially chose to work in the study community than as the main reason they decided to stay. Concerns about the lack of urban amenities or distance to an urban area were more often cited by healthcare professionals as the biggest drawback of locating in the study town than as their main reason to consider leaving.

Factors That Rural Communities Can Affect

Some of the factors that influence healthcare professionals' decisions regarding where to work cannot be readily affected by rural communities. Factors in professionals' backgrounds are mostly or entirely beyond the ability of rural communities to affect, such as whether the professional grew up or had a residency in a rural area, as are the natural amenities that are available in an area or proximity to a city. Communities may be more effective, however, by taking such factors into account in their strategies for recruiting and retaining healthcare professionals, building upon each community's strengths and mitigating weaknesses. For example, communities may encourage local young people to become healthcare professionals and return to work in their town, or the communities may enhance local natural amenities by investing in recreational facilities and activities that are suited to the local environment.

Many of the factors important to healthcare professionals in their decisions to locate and remain in a particular community can be influenced by the community. Social factors are all factors that rural communities may be able to influence, such as: friendliness of the people, collegiality among healthcare professionals, opportunities to participate in community activities, social opportunities, and recruitment and retention efforts by the town. Similarly, investments in the quality of the schools and the quality of the healthcare professionals in the town can improve these forms of human capital and help attract and retain professionals. Attracting and retaining current healthcare professionals can help future efforts to recruit and retain healthcare professionals, creating the potential for a virtuous cycle in which the success of initial efforts may contribute to further success. Investments in physical capital (such as the availability and quality of housing or infrastructure) may also contribute to the success of these efforts, though our results suggest that the impact of these investments on the recruitment and retention of healthcare professionals is likely to be limited.

Some of the factors important for recruiting or retaining healthcare professionals are more the responsibility of health facility administrators than of the community, especially for professionals who are employees of such facilities (as are most nurse practitioners, physician assistants, nurse midwives, and physicians). Many of the job-related factors are largely determined by the employer in such cases—the financial package offered, organizational culture, workload, quality of medical facilities, and other characteristics of the facility and the job.

[35] As noted earlier, even investment in the practice likely involves investments in social capital, as well as in physical and human capital.

For professionals who are sole or part owners of their practice—predominantly the case for dentists and also for many rural physicians—many of these factors are largely determined by the professionals themselves. This situation is changing for physicians and dentists, however, as an increasing share of both professions are employees. For the United States as a whole, the share of physicians who were employees increased from 52 percent in 2001–2005 to 64 percent in 2011–2015, while the share of dentists who were employees increased from 23 to 30 percent (Nasseh and Vujacic, 2018).

One suggestion by many key informants as being the most important thing the local community could do to recruit healthcare professionals involves both health facility administrators and the broader community: increase collaboration between the community and health facility administrators. Some of the ideas suggested by key informants—such as involving community leaders and members in identifying healthcare needs and potential recruits, welcoming and informing recruits about the resources and opportunities in the community, and helping healthcare facilities to develop new facilities and raise funds—are being implemented in some of the study towns and might be useful in other towns as well.

Comparison of Findings to the Literature

Each of the factors discussed above has been found in several studies to be important in the recruitment and retention decisions of rural healthcare professionals in the United States, Canada, or Australia.[36] In general, the literature is consistent with our findings that social and professional relationships are among the most important factors affecting rural healthcare professional recruitment (Ellsbury et al., 2002; Hancock et al., 2009; Helland et al., 2010; MacDowell et al., 2010; Renner et al., 2010; Hughes 2019) and retention (Conte et al., 1992; Cutchin et al., 1994; Cutchin, 1997a; Cutchin, 1997b; Mayo and Mathews, 2006; Henry and Hooker, 2007; Stenger et al., 2008; Cameron et al,. 2010; Chipp et al., 2011; Hughes, 2019) across a wide range of contexts.

Most of the same studies and some others (e.g., Daniels et al., 2007; Jarman et al., 2009; MacDowell et al., 2009; McGrail et al., 2017) find important factors affecting the recruitment and retention of rural healthcare professionals that are dimensions of human, physical, natural, or financial capital—though, in most cases, these factors were less important than social capital.[37] Urban amenities—which combine elements of physical, human, and cultural capital—are also found to be important in some of these studies (Conte et al., 1992; Helland et al., 2010; McGrail et al., 2017; Hughes, 2019), but in other cases, urban amenities are not among the most important factors (Cutchin et al., 1994; Ellsbury et al., 2002) or are valued less by rural healthcare professionals than urban ones (Hughes, 2019).

Access to cultural amenities generally is less important to rural healthcare professionals than most other factors studied in this literature. However, healthcare professionals' concerns about their cultural differences with people in rural communities (and the differences from them that rural people face) are mentioned in several studies (Conte et al., 1992; Cutchin et al., 1994; Cutchin, 1997a; Cutchin, 1997b; Mayo and Mathews, 2006) and such concerns may underlie issues raised about the fit between the professional or their family and the community in some studies (e.g., Renner et al., 2010). These issues are closely related to the importance of social relationships noted above.

[36] We included selected studies from Canada and Australia in our literature review because many rural communities in Canada and Australia are similar to U.S. rural communities in terms of population density and economic indicators.

[37] The literature cited does not use the terminology of community capitals to discuss these factors.

Other factors besides community capitals found in this study to be important in healthcare professionals' recruitment and retention decisions have also been cited in many studies in the literature. As we have found, financial rewards are usually less important to rural healthcare professionals than other factors, such as social and professional relationships (Cutchin et al., 1994; Ellsbury et al., 2002; Heneghan et al., 2005; Daniels et al., 2007; Helland et al., 2010; Renner et al., 2010). The desire to feel needed or to have an impact is among the most important factors affecting location choices of healthcare professionals in several studies (Conte et al., 1992; Daniels et al., 2007; Hancock et al., 2009), though this is not true in every study that investigated this factor (Helland et al., 2010). Workload and on-call responsibilities are also found to be very important in many studies, especially in affecting the retention of healthcare professionals (Conte et al., 1992; Cutchin et al., 1994; Cutchin, 1997b; Ellsbury et al., 2002; Humphreys et al., 2002; Pathman et al., 2004; Mayo and Mathews, 2006). The effects of healthcare professionals' location decisions on their spouse or partner are also cited as important by a substantial fraction of professionals in several studies, though this is usually not one of the most often cited factors (Conte et al., 1992; Cutchin et al., 1994; Ellsbury et al., 2002; Daniels et al., 2007; Renner et al., 2010).

Our findings are broadly consistent with the findings in the literature concerning: the high importance of social relationships, need for healthcare professionals, and workload and on-call responsibilities, and the relatively low importance of cultural amenities, financial rewards, and perspectives of the spouse or partner in the recruitment and retention of rural healthcare professionals. Other types of community capitals are found to be of varying importance across the contexts studied in the literature—including human, physical, natural, and financial capital. For example, few studies found natural amenities and outdoor recreation opportunities to be among the most important factors cited by healthcare professionals, but in the Northwest States studied by Ellsbury et al. (2002), these factors were highly important. It may be that healthcare professionals who are attracted to that region value such natural amenities to a greater extent than professionals who are attracted to other regions less well-endowed with natural amenities. Differences across study contexts in terms of access to other types of community assets may also help explain some of the other variations across studies in the importance of those types of assets.

Conclusion

The authors of this study investigated the factors affecting the ability of rural communities in nine States in three U.S. regions to recruit and retain healthcare professionals, with an emphasis on the effects of community capitals or assets. Regarding the effects of the different community capitals, we find:

- **Social capital**—the value of personal and professional relationships—is widely perceived as important for the recruitment and retention of healthcare professionals. Many responses by both key informants and healthcare professionals highlighted the importance of relationships with family, friends, professional colleagues, and patients in these decisions.
- **Human capital**—as reflected in the quality of schools (which also reflects social and physical capital) and the quality of healthcare professionals—is also widely perceived as important for recruitment and retention. Key informants more often cited school quality as important for recruiting healthcare professionals, while healthcare professionals more often cited the quality of the medical community, colleagues, and staff.
- **Physical capital**—such as the availability and quality of housing, medical facilities, and equipment—was less often cited as important than social or human capital, but it was still important to most key informants and healthcare professionals. Key informants cited housing more often than medical facili-

ties and equipment, while the reverse was true for healthcare professionals. Healthcare professionals rarely cited these factors as the most important factors affecting their decisions to locate or stay in the study town.

- **The financial wealth or poverty of the community and the strength of the local economy** were cited by many key informants as important factors affecting the recruitment of healthcare professionals—though less often than social, human, or physical capital. Some healthcare professionals viewed poverty or other adverse economic conditions as a major drawback to locating in the study town but rarely as the main reason they considered leaving. By contrast, the need for healthcare professionals in the community, which is likely associated with poverty, was one of the most cited factors by healthcare professionals as important in their decisions to locate or stay in the study town.

- **The financial rewards offered to healthcare professionals** was important for recruiting and retaining healthcare professionals, according to many key informants and most healthcare professionals. Financial rewards are not a form of community capital but may depend on the community capitals, especially financial capital. Using local providers' services was the most common suggestion by key informants as the most important thing their community could do to retain health professionals. Although most healthcare professionals viewed the financial package as important, this factor was not commonly viewed as the most important reason the professional chose to locate in the study town or considered leaving.

- **Access to urban amenities** was the most often cited barrier to recruitment by both key informants and healthcare professionals. Urban amenities likely reflect physical as well as human and cultural capital found in urban settings. However, few healthcare professionals viewed a lack of urban amenities as the main reason they considered leaving if they had considered leaving.

- **Natural amenities and outdoor recreation opportunities** were also cited as important by many key informants and nearly half of healthcare professionals but generally less often than social or human capital. These factors were rarely cited as their main reason to locate or stay in the town or to consider leaving.

- **The local culture and cultural amenities** were less commonly cited as important by key informants and healthcare professionals than other types of community capital. Cultural factors were not cited by any healthcare professionals as the main reason they decided to locate or stay in the study town, while a small percentage cited the lack of cultural amenities as the biggest drawback to locating there.

- **Other workforce issues that were not types of community capital** (though likely affected by community capitals) that were also important to many healthcare professionals included workload and on-call responsibilities and effects of location and retention decisions on the spouse or partner.

The importance attached to some of these factors varies across regions. For example, several factors—reflecting social, human, physical, and natural capital—were all cited as important most often by healthcare professionals in the Upper Midwest region and least often by professionals in the Lower Mississippi Delta region. By contrast, professionals in the Lower Mississippi Delta region were most likely to cite a need for their services as important than those in the Upper Midwest region. These differences may be in part due to differences in endowments of community capitals across the regions and in the preferences of healthcare professionals who choose to live in these regions.

Dentists were much more likely than other health professional types to cite the importance of the opportunity to own a practice in the dentists' initial location decisions and investment in their practice in their decision to stay in the community. By contrast, nurse practitioners, physician assistants, and certified nurse

midwives and physicians were more likely than dentists to cite concerns about factors related to the job (e.g., workload, quality of the medical/dental community or facilities, professional relationships, and the financial package). These differences may be partly due to dentists being much more likely to be in private practice and to the greater workloads experienced by medical professionals in the study towns.

Overall, the factors that affect the recruitment and retention of healthcare professionals in the study towns are similar, with social and human capital more important than other factors for both decisions. However, there are some differences in the specific factors that were most important for recruitment versus retention.

Implications and Contribution of Findings

Our findings concerning the relative importance of social, human, and physical capital suggest that rural communities can have a significant influence on attracting and retaining healthcare professionals. While rural communities can do little to change the local climate, the natural scenery, or proximity to a city, communities can affect the types of social opportunities and relationships available to professionals living there and invest in the quality of local schools, medical staff and facilities, housing, recreational facilities, and other social, human, and physical capital. Being a friendly and welcoming community that seeks collaboration and support between the community and healthcare professionals may make a difference for many professionals considering whether to locate or remain in a rural community.

Many of our findings have implications for healthcare professional recruitment and retention strategies used by rural communities. For example, the significant differences that we find across regions and professional types in the importance of many factors in recruitment and retention implies the need for understanding regional and local contexts in defining such strategies. The fact that some factors cited as important by healthcare professionals were cited less often or not at all by key informants—such as need in the community, workload and on-call responsibilities, and impacts of professionals' decisions on their spouse or partner—suggests that many community leaders and health facility administrators may lack awareness of the importance of such factors. These and other discrepancies between the perceptions of healthcare professionals and community leaders and health facility administrators may offer a fruitful avenue for seeking ways of improving the effectiveness of rural communities' efforts to recruit and retain healthcare professionals.

These findings are not unique to this study. As the review of the literature has shown, several studies have yielded similar findings concerning most of these factors in some contexts. The main contributions of this study are demonstrating how the community capitals framework can be applied to studying healthcare workforce issues and providing further evidence on the importance of the community capitals and other community-level factors in the recruitment and retention of rural healthcare professionals in the three study regions—especially those factors about which rural communities themselves can do something. We have shown these results for a much larger sample of communities and healthcare professionals and in different regions for more professional types than most previous studies and have related our findings to the growing body of literature on community capitals and rural wealth creation. We have also shown how the importance of these factors varies across study regions and professional types.

Study Limitations

As with all studies, this study has limitations. The key informants interviewed were not based on a random sample and thus are not necessarily representative of an underlying population of healthcare administrators or community representatives. This is the reason we did not use probability weighting or estimate standard errors for the key informant interview results. The healthcare professional survey respondents were selected from a stratified random sample and the results are representative of the underlying population of healthcare

professionals in the universe of small rural towns in the study regions, based on the use of probability weights in the analysis. There may have been sampling bias due to nonresponse, but as shown in appendix D, there was little evidence of nonresponse bias in the nonresponse follow-up study.

Another form of bias in the healthcare professional survey results could be due to the population of healthcare professionals studied, including only professionals who chose to work in and remained in the study towns at the time of the survey. By the nature of the study, we have no information on professionals who might have considered working in the study towns or those who had worked in these towns prior to the survey but left. The perspectives of such professionals also matter in understanding issues of recruitment and retention, and their perspectives might be significantly different than those of professionals who came to and stayed in the study towns. Addressing this issue would require a different sampling design that includes representatives of these other groups.

Another limitation of the study is the subjective and qualitative nature of most of the responses. Most of the results are findings about the reported perceptions of key informants and healthcare professional respondents. Such reported perceptions could be in error, either because respondents misremembered or misreported the actual situation. Some of the questions required key informants and healthcare professionals to recall past situations and reasons for decisions taken in the past (e.g., what factors were important in professionals' decision to work in and stay in the study town). These responses could be subject to errors in recall. Some respondents may have misreported responses to some questions due to biases in self-perception or to seeking to meet social norms. Examples might include overemphasizing the importance of altruistic motives or underemphasizing the importance of self-interest and financial motives for past decisions.

The study design sought to overcome some of these possible errors by collecting similar information from multiple sources and by asking multiple questions on similar topics, allowing for more robust conclusions based on multiple sources and responses, rather than excessive reliance on a single type of respondent or single question. But there remains the potential for nonquantifiable errors that affect the results, beyond the issues of sampling variance and possible nonresponse bias, which have been addressed in the healthcare professional survey.

Suggestions for Future Research

Future research could usefully expand upon this study by investigating similar issues in other regions and States not well studied so far in the literature on the recruitment and retention of healthcare professionals. As in this study, future research could expand the populations studied beyond rural primary care physicians, including types of professionals in great need in rural areas but not yet well studied—such as registered nurses (not only nurse practitioners and nurse midwives as in this study) and mental health professionals, to name a few. The lack of representation of professionals who did not work in or left the study town could be addressed using a different sampling approach, such as sampling healthcare professionals in a first stage and then sampling the towns that those professionals considered working in or have worked in. In future research, qualitative data collection from key informants and healthcare professionals could be supplemented by collecting additional secondary data on the study towns regarding community capital and other factors affecting recruitment and retention. Researchers could also collect data on outcomes, such as: changes in population levels and migration, local business dynamics and business migration decisions, and local employment changes. More research rigorously assessing the impacts of interventions that seek to promote the recruitment and retention of healthcare professionals in different contexts would also be valuable.

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Appendix A. Sampling Approach

This appendix describes how the sample was selected, as well as how the list frame was created and how data collection for the stratified systematic random sampling was set up. This appendix also describes characteristics of interest in the regions and the methods used to evaluate the list frame for accuracy.

The first step for implementing the survey was to determine which communities would be part of the sample. Eligible communities were defined as rural Zip Code Tabulation Areas (ZCTAs), with a population between 2,500 and 20,000 in 2008, using data from the Dartmouth Health Atlas and located in the States of Arkansas, Iowa, Kansas, Louisiana, Minnesota, Mississippi, Oklahoma, Texas, and Wisconsin. These States were selected to represent three contrasting regions of the United States—the Lower Mississippi Delta Region (Arkansas, Louisiana, Mississippi), the Southern Great Plains (Kansas, Oklahoma, Texas), and the Upper Midwest (Iowa, Minnesota, Wisconsin). These three regions have large rural populations and widely varying characteristics (across and within regions) regarding: access to rural healthcare, access to cities and infrastructure, levels of economic development and poverty, local assets and amenities, among other factors. The study focused on small rural towns because the ability to attract and retain healthcare professionals was hypothesized as most likely to be affected by local assets and amenities for such towns.

ZCTAs were used as the primary sampling unit for this survey because this is the lowest geographic level at which data on healthcare access have been compiled by the Dartmouth Health Atlas (some of the data from the Atlas were used in our sampling approach), and because there is often only one incorporated town in a ZCTA in rural areas. However, ZCTAs can include more than one rural town, as well as outlying unincorporated rural areas. When there was more than one town in a ZCTA, we sampled the largest town. Some larger towns have more than one ZCTA; in such cases, we combined the ZCTAs into a single sampling unit.

In addition to the population of the ZCTA in 2008, Rural Urban Commuting Area (RUCA) codes were used to classify rural small-town areas. ZCTAs with primary/secondary RUCA code values of 3.0, 4.0, 4.2, 5.0, 5.2, 6.0, 6.1, 7.0, 7.2, 7.3, 7.4, 8.0, 8.3, 8.4, 9.0, 9.1. 9.2, 10.2, and 10.3 were included in the sample frame based on RUCA Code Version 2.0 (published on the University of Washington's Washington, Wyoming, Alaska, Montana, Idaho (WWAMI) Rural Health Research Center's (RHRC's) website. This classification excludes ZCTAs in urbanized areas having an urban population of 50,000 or more (RUCA codes 1.0 and 1.1) and areas having 30 percent or more of their workers commuting to such urbanized areas (RUCA codes 2.0, 2.1, 4.1, 5.1, 7.1, 8.1, and 10.1). We also excluded rural areas without an urban cluster of at least 2,500 people and that did not have 30 percent or more of their workers commuting to an urban cluster of at least 2,500 people (RUCA codes 10.0, 10.4, 10.5, and 10.6). This classification of RUCA codes combines the RHRC's Categorization E of Large Rural City/Towns (RUCA codes 3.0, 4.0, 4.2, 5.0, 5.2, 6.0, 6.1, 7.2, 8.2, and 10.2) and Small Rural Towns (RUCA codes 7.0, 7.3, 7.4, 8.0, 8.3, 8.4, 9.0, 9.1, 9.2, and 10.3). We assigned RUCA codes to ZCTAs using a crosswalk between USPS ZIP Code service areas in 2004 and RUCA codes based on the 2000 decennial census, available from RHRC. Only ZCTAs whose codes matched the codes of USPS ZIP Code service areas were used in the sampling.

The universe of eligible ZCTAs included 809 rural small towns, with a total population of 3.6 million in 2010. Stratified systematic sampling with a random start was used to choose which ZCTAs would be part of the sample. To accomplish this, the ZCTAs were organized into six strata: the three different geographic regions, with each region divided into communities that had a hospital according to the Dartmouth Atlas of Health Care and communities that did not have a hospital. The number of sample ZCTAs (150) was calculated to ensure a margin of error of no more than 0.05 in measuring proportions in the healthcare professional survey.

The allocation of the sample size among the strata was based on minimizing the variance of the estimated average of the number of primary care physicians per 100,000 population, which was expected to be strongly correlated with most of the variables investigated in the survey (e.g., local factors affecting healthcare provision, availability and quality of healthcare). Within each stratum, systematic sampling with a random start was used with the list of ZCTAs sorted by two variables: a variable based on ranges of the number of primary care physicians in the towns and the population size of the town. Systematic sampling was used because it produces unbiased and consistent estimates of population parameters and is more efficient than simple random sampling if the variables used to sort the sample are correlated with the response variables.[38]

The second stage of the sample selection involved selecting key informants and primary healthcare professionals from the sampled towns. The key informants were of two types: (1) community representatives knowledgeable about the town (including community leaders such as the mayor or city manager); leaders of local economic development organizations or planning commissions, or local educators; and (2) healthcare facility (hospital or clinic) administrators, county health department administrators, or other knowledgeable representatives of the healthcare sector. Up to two key informants of each type were interviewed in each study town. The key informants were selected purposively—based on secondary information sources and a sequential interview process to identify relevant, knowledgeable, and available individuals of each type—usually starting with the mayor's or other senior leader's office. In all, we interviewed 341 key informants by telephone, representing all study towns. In all but one of the sample towns, a minimum of two and maximum of four key informants were interviewed (only one key informant could be interviewed in one town in the Southern Great Plains).

In each sample town, a list of all primary healthcare professionals working in the town was developed using secondary data sources and information from the key informants. Part of the telephone interview with key informants included obtaining feedback on the preliminary list of healthcare professionals in that community. For the purposes of this study, "primary healthcare professionals" included licensed physicians (with either a Doctor of Medicine or Doctor of Osteopathic Medicine degree) with a primary care specialty of family practice, general practice, internal medicine, geriatric medicine, or pediatric medicine;[39] dentists (with a Doctor of Dental Surgery or Doctor of Dental Medicine degree); physician assistants or associates (with an appropriate graduate degree such as a Master of Physician Assistant Studies); nurse practitioners (Registered Nurses with an appropriate graduate degree such as a Masters in Nursing); and certified nurse midwives (Registered Nurses with at least a Masters in Nursing and certification as a Certified Nurse Midwife). Nurse practitioners (NP), certified nurse midwives (CNM), and physician assistants (PA) were treated as a single stratum in sampling healthcare professionals, while physicians and dentists were each treated as separate strata. Other categories of healthcare professionals were beyond the scope of this study—such as other nurses besides nurse practitioners and nurse midwives, mental health professionals, physical therapists, and others.

A stratified simple random sampling was done using this list frame to obtain the final sample of healthcare professionals for the survey. The stratified simple random sample was performed as follows: Within each community, a sample of up to 32 professionals was proportionately selected from the three professional strata—dentists, physicians, and nurse practitioners, physician assistants, and certified nurse midwives. If there were fewer than 32 professionals in a community, a census was taken. Using this sampling methodology, a sample of 1,821 healthcare professionals was obtained. These are the professionals who were sent the Healthcare Professional Survey in 2015.

[38] If the variables used to sort the sample are uncorrelated with the variables of interest and the sort order is random, systematic sampling and simple random sampling are of similar efficiency (see Särndal, et al. (1991), section 3.4).

[39] This definition of primary care specialties is based upon definitions used by Medicare.

Appendix B. Key Informant Interview Questions

1. You are the (title) at (Organization) in (town), is that correct?
2. (IF NEEDED: What are your general job duties and responsibilities?)
3. Do you have any other official roles or leadership positions in (town)? (If so, what are they?)
4. How many years have you worked in (town)?
5. Do you live in (town) or outside the city limits? IF OUTSIDE CITY LIMITS: How far away do you live?
6. How many years have you lived in this area?
7. How knowledgeable are you about issues related to healthcare provision in this community? Would you say you have no knowledge, a little knowledge, some knowledge, quite a bit of knowledge, or a great deal of knowledge?
8. How would you describe the availability and quality of healthcare in (town)?
9. How have the availability and quality of healthcare services in this community changed in the last 5 years?
10. In your opinion, what has caused these changes (in the quality or availability of healthcare)?
11. Have these changes in healthcare services attracted people or businesses to your town? Or have they contributed to people or businesses moving away?
12. Have these changes in healthcare services affected the business community or general population in any other way? (Please explain your answer)
13. What events or changes in the community, not directly related to healthcare services, have impacted the quality or availability of healthcare?
14. What do you think are the positive characteristics of this town that would encourage healthcare professionals to want to live and work there?
15. What do you think are the negative characteristics of this town that would cause healthcare professionals to NOT want to live and work there?
16. Are you aware of any specific efforts to recruit healthcare professionals to this community?
17. IF NO: Why have there been no recruitment efforts? (GO TO Q23 - RETAIN TAB)
18. IF YES: When did these efforts occur?
19. Please describe the most recent effort (what did it involve?).
20. What groups or individuals were involved in these efforts?
21. What was your role, if any, in these efforts?
22. How successful have these efforts been (what were the results?)?
23. What do you think is the most important thing your community could do to recruit healthcare professionals (if your community wanted to do so)?

24. Are you aware of any specific efforts (organized or otherwise) to retain healthcare professionals in this community?

25. IF NO: Why have there been no efforts to retain professionals? (GO TO Q31 - ISSUES TAB)

26. IF YES: When did these efforts occur?

27. Please describe the most recent effort (what did it involve?).

28. What groups or individuals were involved in these efforts?

29. What was your role, if any, in these efforts?

30. How successful have these efforts been (what were the results?)?

31. What do you think is the most important thing your community could do to retain (or keep) its healthcare professionals?

32. How important is it for your community to actively try to recruit and/or retain healthcare professionals? Would you say it is not at all important, slightly important, moderately important, important, or very important?

33. Thinking of all aspects of healthcare, what would you say is the most important healthcare issue currently facing (your town)?

34. What changes in healthcare provision do you expect to see in this community over the next 5 years?

35. Those are all the specific questions I have for you. But I have one more request. We would like to contact (some) healthcare professionals who work in your community, and we want to make sure that we have accurate information about who is currently working there. We are using the Medicare definition of Primary Healthcare Professionals—so this list includes Physicians with a specialty of General or Family Medicine, Internal Medicine, Pediatrics, or Geriatrics. We also include Dentists, Physician's Assistants, Nurse Practitioners, and Nurse Midwives.

36. Do you have any other comments you would like to make about these issues or the Community Assets/ Community Health project?

Appendix C. Healthcare Professional Survey Questions and Response Codes

Variable names

Case ID of Respondent	CaseID
First Digit = Region	
4 = Mississippi Delta Region (Region 1 for Key Informant data)	
5 = Upper Midwest Region (Region 2 for Key Informant data)	
6 = Southern Great Plains Region (Region 3 for Key Informant data)	
Digits 2-4 = Community identifier	
Digits 5-6 = Healthcare Professional identifier	
Completion status	Status
Survey Mode	Mode
Respondent type (Physician, Dentist, Physician Assistant, Nurse Practitioner, Certified Nurse Midwife)	Type
Respondent credentials	Credential
Sample community	City
Sample State	State
Sample region	Region
Date survey was completed or received	Date
1. Are you currently working as a healthcare professional in [TOWN]?	Q1
1 = Yes	
2. Your current role as a healthcare professional:	Q2
1 = Physician (MD or DO)	
2 = Dentist	
3 = Physician's Assistant	
4 = Nurse Practitioner	
5 = Midwife	
3. Your specialty:	Q3
0 = Missing	
1 = Family Practice, General Practice	
2 = Internal Medicine	
3 = Geriatrics	
4 = Pediatrics	
5 = Other	
Other specialty (specified)	Q3_Other
4. Year you completed your highest level of medical/dental training:	Q4
{0 = Missing}	
5. Year you began working as a healthcare professional in this community:	Q5
{0 = Missing}	

6. Location of your medical/dental training:

   State (U.S.) Q6_State

   Country Q6_Country

7. Did you spend any part of your residency, an internship, or externship in a rural area or a small town? (<20,000 population) Q7

   0 = Missing

   1 = Yes

   2 = No

8. Location where you graduated from high school:

   State (U.S.) Q8_State

   Country Q8_Country

9. Where did you primarily grow up? Q9

   0 = Missing

   1 = Farm/ranch, not in a town or city (includes acreage 3 miles from town)

   2 = Town of less than 20,000 population

   3 = City of 20,000 to 100,000 population

   4 = City/Metropolitan area over 100,000 population

   5 = All (such as the military)

10. Did you ever live in this community before you began working there as a healthcare professional? Q10

    0 = Missing

    1 = Yes

    2 = No

11. Where do you live in relationship to this community? Q11

    0 = Missing

    1 = Within city limits

    2 = Within 2 miles of town

    3 = 2 to 10 miles from town

    4 = 10 to 20 miles from town

    5 = 20 or more miles from town

12. Where is your current practice based? Q12

    0 = Missing

    1 = In a hospital

    2 = In a clinic

    3 = In an office setting

    4 = In a retail business setting

    5 = Other:

    Other practice base (specified) Q12_Other

13. Are you the sole owner, a part-owner, or an employee of your practice Q13

    0 = Missing

    1 = Sole owner

    2 = Part-owner

3 = Employee

4 = Independent contractor

14. Number of hours you work per week in **this** community (on average): Q14

15. Number of hours you work per week in **other** communities (if any, on average): Q15

0 = None

1 = 1 hour or less per week, including intermittent/spotty hours {e.g. 4 hours 5x/year}

16. Which best describes your current on-call responsibilities? Q16

0 = Missing

1 = Do not have on-call responsibilities

2 = Acceptable on-call responsibilities

3 = Unacceptable on-call responsibilities

17. Do you have adequate professional coverage for your practice while you are on vacation? Q17

0 = Missing

1 = Yes

2 = No

3 = Sometimes/maybe

18. How did you learn about the opportunity to work in this community? (Circle all that apply)

0 = Not selected

1 = Selected

Family or friends	Q18_1
Professional colleague	Q18_2
School faculty or placement office	Q18_3
Position announcement	Q18_4
Town representative or organization	Q18_5
Professional recruiter	Q18_6
Someplace else	Q18_7
Other place you learned about the opportunity (specified)	Q18_7_Other

19. Was there a specific recruitment effort on the part of town leaders to encourage you to work in this community? Q19

0 = Missing

1 = Yes

2 = No [If No or Unsure, Q20_1-6 = 0]

3 = Unsure, don't remember [If No or Unsure, Q20_1-6 = 0]

20. If Q19 = Yes: What did the recruitment entail? (Circle all that apply)

0 = Not selected

1 = Selected

Information provided by community (e.g., brochures, lists of services, etc.)	Q20_1
Site visit for myself arranged by community	Q20_2
Site visit for my spouse/children arranged by community	Q20_3
Site visit for myself arranged by employer	Q20_4
Site visit for my spouse/children arranged by employer	Q20_5

Other Q20_6

Other recruitment (specified) Q20_6_Other

21. How important to you were each of the following factors in your decision to practice in this community?

    0 = Missing

    1 = Not important

    2

    3 = Neutral

    4

    5 = Very important

    a. Your own familiarity with this area Q21_a
    b. Opportunities for your spouse or partner Q21_b
    c. Relatives or friends are nearby Q21_c
    d. Good place to raise a family Q21_d
    e. Quality of schools Q21_e
    f. Size of the town Q21_f
    g. Recreational opportunities Q21_g
    h. Natural amenities (climate, scenery, lakes/rivers/ocean, etc.) Q21_h
    i. Cultural amenities (local arts, historical sites, cultural events, etc.) Q21_i
    j. Social opportunities (churches, social organizations, etc.) Q21_j
    k. Friendliness of the people Q21_k
    l. Availability of goods and services Q21_l
    m. Low taxes Q21_m
    n. Low cost of living Q21_n
    o. The need for healthcare professionals in the community Q21_o
    p. Recruitment efforts by the community Q21_p
    q. Placement through a program (National Health Service Corps, visa waiver, etc.) Q21_q
    r. Quality of medical facilities Q21_r
    s. Quality of the medical community Q21_s
    t. Opportunities for your professional growth/advancement Q21_t
    u. Opportunity to own a practice Q21_u
    v. Good financial package (salary, benefits, loan forgiveness, etc.) Q21_v
    w. Reasonable workload Q21_w

22. What is the **most important reason** why you chose to practice in this community? Q22

[OPEN TEXT]

23. What was the **biggest drawback** to choosing to practice in this community? Q23

[OPEN TEXT]

24. How important to you are each of the following reasons for **continuing to work** in this community?

    0 = Missing

    1 = Not important

    2

3 = Neutral

4

5 = Very important

a. Your family is settled there; don't want to uproot them — Q24_a
b. Your spouse or partner has a good job/career — Q24_b
c. Relatives or friends are nearby — Q24_c
d. Good place to raise a family — Q24_d
e. Quality of schools — Q24_e
f. Size of the town — Q24_f
g. Recreational opportunities — Q24_g
h. Natural amenities (climate, scenery, lakes/rivers/ocean, etc.) — Q24_h
i. Cultural amenities (local arts, historical sites, cultural events, etc.) — Q24_i
j. Your involvement in community activities — Q24_j
k. Friendliness of the people, good friendships — Q24_k
l. Availability of goods and services — Q24_l
m. Low taxes — Q24_m
n. Low cost of living — Q24_n
o. The need for healthcare professionals in the community, having a positive impact through your practice — Q24_o
p. Efforts by the community to encourage you to stay — Q24_p
q. Quality of the medical facilities — Q24_q
r. Quality of the medical community — Q24_r
s. Good professional contacts and collegiality in the medical community — Q24_s
t. Opportunities for your professional growth/advancement — Q24_t
u. Your investment in your practice (patient base, office, equipment, etc.) — Q24_u
v. Good financial package — Q24_v
w. Reasonable workload — Q24_w

25. Have you ever seriously considered moving and practicing in a different location? — Q25

0 = Missing

1 = Yes

2 = No [IF NO, Q26 and Q27 = blank]

26. IF Q25 = YES: What was the main reason that you considered leaving? — Q26

[OPEN TEXT]

27. IF Q25 = YES: What was the main reason that you decided to stay? — Q27

[OPEN TEXT]

28. How would you rate the overall **availability** of healthcare in this community? — Q28

0 = Missing

1 = Poor

2 = Fair

3 = Good

4 = Very good

5 = Excellent

29. How would you rate the overall **quality** of healthcare in this community? Q29

0 = Missing
1 = Poor
2 = Fair
3 = Good
4 = Very good
5 = Excellent

30. In your opinion, how has the **availability** of healthcare services in this community changed over the past 5 years? Q30

0 = Missing
1 = Declined a lot
2 = Declined a little
3 = No Change
4 = Improved a little
5 = Improved a lot

31. In your opinion, how has the **quality** of healthcare services in this community changed over the past 5 years? Q31

0 = Missing
1 = Declined a lot
2 = Declined a little
3 = No Change
4 = Improved a little
5 = Improved a lot

32. In your opinion, are the changes in the **availability** of healthcare in this community due to any of the following reasons?

0 = Missing
1 = Yes
2 = No
3 = Don't know

a. Changes in healthcare facilities or equipment Q32_a
b. Changes in healthcare professionals Q32_b
c. Changes in health facility administration/ownership Q32_c
d. Changes in government policies/programs Q32_d
e. Changes in the health insurance industry Q32_e
f. Changes in the local economy or business community Q32_f

33. In your opinion, are the changes in the **quality** of healthcare in this community due to any of the following reasons?

0 = Missing
1 = Yes
2 = No
3 = Don't know

a. Changes in healthcare facilities or equipment Q33_a
b. Changes in healthcare professionals Q33_b

c. Changes in health facility administration/ownership Q33_c

d. Changes in government policies/programs Q33_d

e. Changes in the health insurance industry Q33_e

f. Changes in the local economy or business community Q33_f

34. In the past 5 years, have you ever been involved in the recruitment of other healthcare professionals to this town? Q34

    0 = Missing

    1 = Yes

    2 = No

35. In the past 5 years, have you ever been involved in an organized effort to encourage other local healthcare professionals to stay in this town? Q35

    0 = Missing

    1 = Yes

    2 = No

36. In general, what would you say is the most important factor in successfully recruiting or retaining healthcare professionals in this town? Q36

    [OPEN TEXT]

37. In general, what would you say is the greatest difficulty in recruiting or retaining healthcare professionals in this town? Q37

    [OPEN TEXT]

38. How much have you been involved in volunteer activities in this community that are related to healthcare or promoting healthy lifestyles? (e.g., speaking to local groups on health issues, helping address a local health problem, participating in a community health fair, etc.) Q38

    0 = Missing

    1 = Not at all

    2 = Some

    3 = A lot

    4 = A lot in the early years – not at all in recent years

39. How much have you been involved in other volunteer activities in this community that are not related to health? (E.g., school, charity, sports activities, etc.) Q39

    0 = Missing

    1 = Not at all

    2 = Some

    3 = A lot

40. Do you currently hold a local **government** leadership position in this community? Q40

    0 = Missing

    1 = Yes

    2 = No

41. Do you currently hold a leadership position in a **civic organization** in this community? Q41

    0 = Missing

    1 = Yes

    2 = No

42. How many local organizations or associations do you belong to in this community? (E.g., churches, service or sports clubs, school or business organizations, etc.) Q42

0 = None
1 = One or two
2 = Three to five
3 = 6 to 10
4 = More than 10

43. How easy is it for someone to get involved in community activities in this town? Q43

0 = Missing
1 = Very easy
2 = Somewhat easy
3 = Unsure
4 = Somewhat difficult
5 = Very difficult

44. What are your professional plans for the next 5 years? Q44

0 = Missing
1 = Continue to practice in this community [IF Q44 = 1, 5, or 6, Q45 = blank]
2 = Move practice to another location
3 = Change career path in this community
4 = Change career path in another location
5 = Retire [IF Q44 = 1, 5, or 6, Q45 = blank]
6 = Other [IF Q44 = 1, 5, or 6, Q45 = blank]

Other professional plans (specified) Q44_Other

45. If Q44 is 2, 3, or 4: Please explain why. Q45

[OPEN TEXT]

46. Your gender Q46

1 = Male
2 = Female

47. Your current age Q47

0 = Missing

48. Your ethnicity Q48

0 = Missing
1 = Hispanic
2 = Not Hispanic

49. Your race (Circle all that apply)

0 = Not selected
1 = Selected

White Q49_1
Black or African American Q49_2
American Indian or Alaska Native Q49_3
Asian Q49_4
Native Hawaiian or Other Pacific Islander Q49_5

Other Q49_6

Other race (specified) Q49-6_Other

50. Your current marital status: Q50

    0 = Missing

    1 = Married or living as married

    2 = Divorced or separated

    3 = Widowed

    4 = Single never married

51. Your household (HH) size:

    Number in HH age 18 or older Q51Adults

    0 = Missing

    Number in HH under 18 years old Q51Kids

52. Your household income last year Q52

    0 = Missing

    1 = Less than $25,000

    2 = From $25,000 up to $50,000

    3 = From $50,000 up to $75,000

    4 = From $75,000 up to $100,000

    5 = From $100,000 up to $150,000

    6 = $150,000 or more

53. Please record any other comments you would like to make regarding your experience as a healthcare professional in this community. Q53

    [OPEN TEXT]

Appendix D. Non-response Bias Study

This appendix describes the non-response follow up portion of the study and how it improved the overall quality of the survey.

(D.1) Rationale for a Non-Response Follow up

The initial overall healthcare professional response rate to the initial survey for all 150 communities (prior to the non-response follow up) was 23.3 percent. Even the largest regional response rate (28.0 percent in the Upper Midwest) and the largest professional type response rate (29.6 percent for dentists) were much less than anticipated. This response rate reduces the statistical power of the analysis and increases concern about potential non-response bias—i.e., the possibility that non-respondents to the survey differ in systematic ways from respondents that would affect the mean values estimated for the various variables.

The purpose of the follow-up study was to obtain more data to increase the statistical power to detect differences across domains and to detect whether there is non-response bias. More data allows for more precise estimates, meaning smaller standard errors and greater power to detect statistically significant differences. The follow-up study also helped to address non-response bias by testing for differences in the responses of the initial respondents and those responding later in the non-response follow up. The follow-up method can also

be used as a solution to adjust the non-response bias if it does exist. The follow-up process involved providing a $40 unconditional cash gift to all sampled professionals, including both respondents and non-respondents from the initial phase, and again requesting the initial non-respondents to complete the survey. This resulted in a substantial increase in the response rate. By comparing differences in mean responses between the initial respondents and the later respondents (and controlling for other factors such as geographic region and professional type), we were able to test whether there were statistically significant differences between these two groups. Failure to find statistically and quantitatively significant differences between the initial and follow-up responders is evidence against a concern about non-response bias. The results of these comparisons are presented next.

(D.2) Results of the Non-Response Follow up

(D.2.1) Question results and domain comparisons

Tables D1 and D2 show the updated responses to the survey after Wave 2 was performed. The overall response rate increased from 23.3 percent to 64.0 percent, with increases within each domain of interest of at least 37 percentage points.

Table D1
Healthcare professional survey response outcomes by region after Wave 2

Number in	UMW	SGP	LMD	Total
Sample	951	513	357	1,821
Not eligible	132	141	97	370
Eligible sample	819	372	260	1451
Refuse	14	19	2	35
No response	238	122	128	488
Completed surveys	567	231	130	928
Response rate	69.2%	62.1%	50.0%	64.0%

Note: "UMW" refers to the Upper Midwest region (Iowa, Minnesota, Wisconsin), "SGP" refers to the Southern Great Plains region (Kansas, Oklahoma, Texas), and "LMD" refers to the Lower Mississippi Delta region (Arkansas, Louisiana, Mississippi).

Source: Iowa State University Center for Survey Statistics and Methodology.

Table D2
Healthcare professional survey outcomes by professional type after Wave 2

Number in	Dentists	NP/PA/CNMs	Physicians	Total
Sample	472	562	787	1821
Not eligible	78	145	147	370
Eligible sample	394	417	640	1451
Refuse	10	11	14	35
No response	106	131	251	488
Completed surveys	278	275	375	928
Response rates	70.6%	65.9%	58.6%	64.0%

Note: "NP/PA/CNM" refers to a combined category including nurse practitioners, physician assistants, and certified nurse midwives.

Source: Iowa State University Center for Survey Statistics and Methodology.

Appendix F provides the results, including respondents from both waves. The standard errors of these estimates were calculated using the Jackknife method described in appendix E. With the follow-up data, the number of statistically significant regional and professional differences increased, as expected. For regional differences, there are 25 more statistically significant questions, using a 90-percent confidence level (10-percent significance level). There are 17 questions that are no longer statistically significant after including the follow-up data. Most of the questions that are no longer statistically significant are due to the mean estimates of the Lower Mississippi Delta region being closer to the overall estimate than they were in the first wave of questionnaire responses. This might indicate a non-response bias in the first wave of the survey in the Lower Mississippi Delta region. For the healthcare professional differences, there are 17 questions that are statistically significant after the follow-up data is used (but not before), and there are 13 questions that are no longer statistically significant.

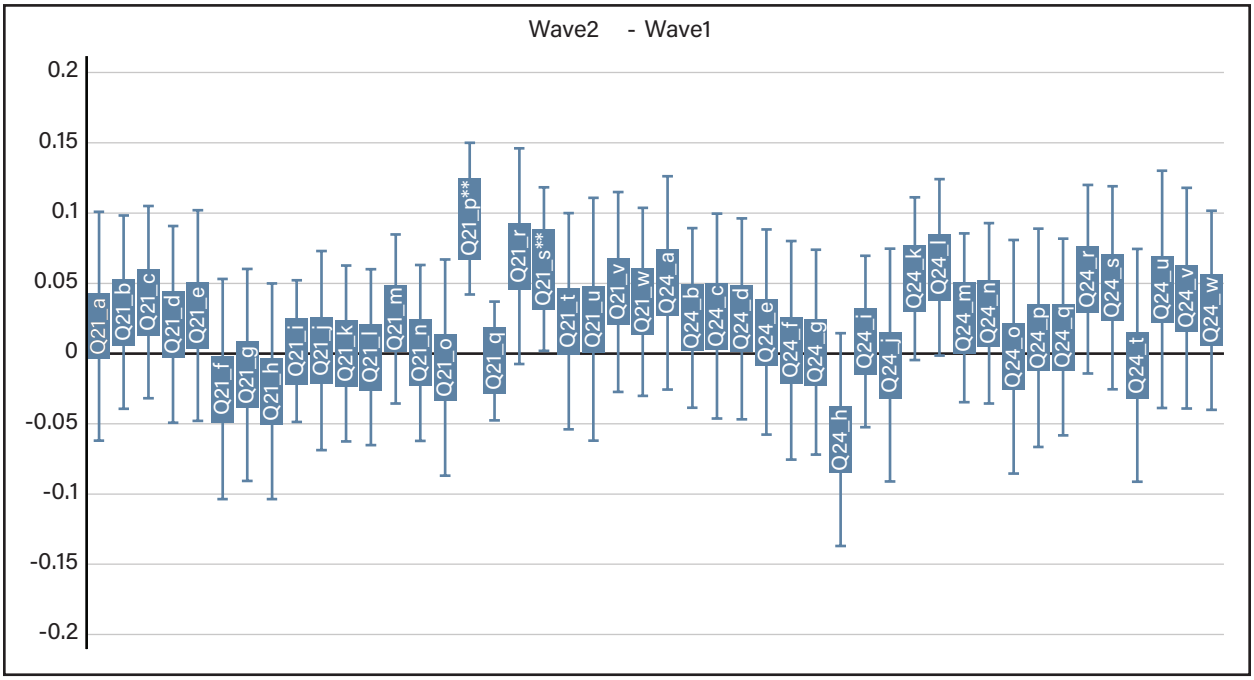
The follow-up data reduced the standard error of most of the estimates by about half, although the standard errors increased for some estimates due to increased variation in the responses. This increased the statistical power of the analysis substantially.

(D.2.2) Checking for Non-Response Bias

Figure D1 shows the 95-percent confidence intervals of the mean difference between estimated values for the initial Wave 1 respondents and the later Wave 2 respondents in the follow-up study for questions Q21_a to Q21_w (importance of factors affecting healthcare professionals' decision to locate in the study community) and questions Q24_a to Q24_w (importance of factors affecting healthcare professionals' decision to stay in the study community). We focus on responses to these questions from the healthcare professional survey since these are the basis of the analysis reported in table 2 and figures 8 to 11 and discussed in the main body of the report. There is evidence of statistically significant differences between the Wave 1 and Wave 2 responses for only two of these 46 questions: Q21_p (importance of "Recruitment efforts by the community") and Q21_s (importance of "Quality of the medical community"). Compared to initial Wave 1 respondents, Wave 2 respondents were somewhat more likely to report recruitment efforts by the community or quality of the medical community as important in their decision to locate in the town. Given the 5 percent significance level of the test, a finding of statistically significant differences in fewer than 5 percent of these questions may simply be a result of sampling variation and does not indicate a significant tendency towards non-response bias in the responses to these questions. We also found little evidence of non-response bias in the other survey questions.

Figure D1

Non-response bias estimates for survey questions Q21_a – Q21_w and Q24_a – Q24_w (95-percent confidence intervals of mean differences between Wave 2 and Wave 1 responses)



Note: Ranges shown are 95-percent confidence intervals of the mean share of Wave 2 respondents that reported the factor as important or very important minus the mean share of Wave 1 respondents that reported the factor as important or very important.

Source: Iowa State University Center for Survey Statistics and Methodology.

(D.3) Conclusion

The follow-up study was successful in increasing the response rate by 41 percentage points and making region and healthcare professional type estimators more accurate. Non-response bias also appears to be low or nonexistent for most of the questions in the survey. One important assumption is that the non-respondents from wave 2 would have answered the questions similarly to the respondents of waves 1 and 2. This assumption may not be the case, leading to a situation called nonignorable non-response. To account for this, additional follow-up surveys could be performed. Kim and Im (2014) have developed methods that are directly applicable to complex sampling setups and account for this nonignorable non-response when multiple follow-up surveys are used.

Appendix E. Estimation Methods and Formulas

This appendix describes the estimation methods used to calculate different values of interest for the questions involved in the survey. Section E.1 discusses how total and mean estimates were derived using a two-phase non-response setup. The variance estimation using this two-phase non-response framework is described in section E.2. Section E.3 discusses how means, totals, and variances were estimated for specific domains of interest.

(E.1) Total and Mean Estimates

Non-response occurs in surveys due to refusal of sampled respondents to participate, and this needs to be taken into account when estimating question totals, means, and variances. To account for this non-response, a two-phase sampling framework was used. The two phases were defined as follows:

The first phase sample was a two-stage sampling that selected the professionals who had the opportunity to participate in the survey. The first stage was the stratified systematic sampling (with a random start) of communities using ZCTAs, and the second stage was the stratified random sampling of the professional types within each ZCTA community.

The second phase sampling corresponds to non-response in the survey. Each individual who received the survey was treated as a Poisson sample, where the individual has a probability of responding or not responding, and these decisions were assumed to be made independently across respondents.[40]

The general notation for the total estimate of a given question, y, using this two-phase non-response set up is given by Sarndal (1991), is:

$$\hat{t}_y = \sum_{k \in S} w_k y_k \ , \tag{1}$$

$$\text{where} \quad w_k = \frac{1}{\pi_{1k}} \frac{1}{\pi_{2k}} \tag{2}$$

where k represents a single professional, π_{1k} is the probability a survey was sent to a professional, and π_{2k} is the probability the professional responded to the survey that the professional received.

We use the following notation:

h: index for stratum h,

i: index for town i,

N_h: number of towns in stratum h (population of towns),

n_h: number of sampled towns in stratum h,

M_{ig}: number of professionals of type g in town i (population of professionals),

$\widetilde{m}_{ig}$: number of sampled professionals of type g in town i,

m_{ig} : number of completed surveys by professionals of type g in town i,

S_h: is the sample containing the individuals who are in stratum h,

s: is the final sample collected

In this setup,

$$\pi_{1k} = \frac{n_{h(k)}}{N_{h(k)}} \frac{\widetilde{m}_{ig(k)}}{M_{ig(k)}} \text{, and} \tag{3}$$

$$\pi_{2k} = \frac{m_{ig(k)}}{\widetilde{m}_{ig(k)}} \tag{4}$$

where the subscript *h(k)* indicates an individual in stratum h and *ig(k)* is an individual from town i and is a professional of type g.

[40] This assumption only affects the analytical variance that is discussed below. The replication variance described in section E.2 automatically ensures that any correlation and covariances in the data are maintained. The effect on the analytical variance is that if individuals aren't independently making decisions and are giving positively correlated responses, the standard error will be overestimated. If the responses are negatively correlated, the standard error will be underestimated (Sarndal et al., 1991, page 45).

The estimator for the total of any variable y using equation (1) is:

$$\hat{t}_y = \sum_{h=1}^{6} \frac{N_h}{n_h} \sum_{i \in S_h} \sum_{g=1}^{3} \frac{M_{ig}}{\widetilde{m}_{ig}} \sum_{k=1}^{m_{ig}} \frac{\widetilde{m}_{ig}}{m_{ig}} y_k \,. \tag{5}$$

Using the total estimator in our setup gives us the total value of the given response. Most questions were setup as binary responses, so this means that the total is the estimated number of professionals who answered positively to the question. While this total may be of some interest, a more practical estimate would be of the average response. The average response of the binary responses would provide the percentage of professionals who responded positively to the question. The estimator for the population mean of any variable, y is:

$$\hat{\bar{y}} = \hat{K}^{-1} \hat{t}_y \,, \tag{6}$$

$\hat{t}_y$ is defined in equation (5) and $\hat{K}$ is the estimated population size, i.e., the estimated number of professionals in the nine States. $\hat{K}$ can be calculated by replacing y_k in equation (5) with 1.

$$\hat{K} = \sum_{h=1}^{6} \frac{N_h}{n_h} \sum_{i \in S_h} \sum_{g=1}^{3} \frac{M_{ig}}{\widetilde{m}_{ig}} \sum_{k=1}^{m_{ig}} \frac{\widetilde{m}_{ig}}{m_{ig}} 1 \,. \tag{7}$$

(E.2) Variance Estimation

The deleting group Jackknife method (Kim et al., 2006; Fuller, 2009) was used to estimate the variance of our estimator. The reason that the Jackknife method was used over analytical formulas of the variance estimator was mainly for convenience. Creating replicate weights allows anyone with the weights to estimate statistics for any question in the survey.

The groups deleted in the Jackknife method are the primary sampling units (towns in our application). Denote the $[b_h]$–th replicate estimate of $\hat{t}_y$ as $\hat{t}_y^{[b_h]}$ where the $[b_h]$ is the index for the town in stratum h that has been removed. Note that the total number of replicates in stratum h is equal to the number of towns that have been sampled in stratum h.

Define: $\hat{t}_y^{[b_h]} = \sum_{k \in S} w_k^{[b_h]} y_k \,,$ (8)

$$w_k^{[b_h]} = w_{1k}^{[b_h]} \pi_{2k}^{-1} \,. \tag{9}$$

$$\hat{V}(\hat{t}_y) = \sum_{h=1}^{6} \frac{n_h - 1}{n_h} \sum_{b_h=1}^{n_h} (\hat{t}_y^{[b_h]} - \hat{t}_y)^2 \,, \tag{10}$$

where $w_k^{[b_h]}$ are the replicate weights in the first phase, which are given by:

$$w_{1k}^{[b_h]} = \begin{cases} 0 & \text{if } k \in S_{b_h} \text{ (in the town that is deleted)} \\ \dfrac{n_h}{n_h - 1} w_{1k} & \text{if } k \in h,\ k \notin S_{b_h} \text{ (in the same stratum as the deleted town, but not in the deleted town)} \\ w_{1k} & \text{if } k \notin h \text{ (in a different strata of the deleted town)} \end{cases} \tag{11}$$

where $w_{1k} = \frac{N_{h(k)}}{n_{h(k)}} \frac{M_{ig(k)}}{\widetilde{m}_{ig(k)}}$.

To calculate the variance estimate for the population mean parameter, the following formula is used:

$$\hat{V}(\hat{\bar{y}}) = \sum_{h=1}^{6} \frac{n_h - 1}{n_h} \sum_{a_h=1}^{n_h} (\hat{\bar{y}}^{[b_h]} - \hat{\bar{y}})^2 , \tag{12}$$

where

$$\hat{\bar{y}}^{[b_h]} = \frac{\hat{t}_y^{[b_h]}}{\hat{K}^{[b_h]}} , \tag{13}$$

$\hat{t}_y^{[b_h]}$ is defined in (10), and $\hat{K}^{[b_h]} = \sum_{k \in S} w_k^{[b_h]}$, again replacing y_k with 1 in equation (8).

(E.3) Domain Estimation

The domains of interest in this study include the three geographic regions and the three professional types.

Specify the domain indicator for professional *k* as follows:

$$\delta_{k,d} = \begin{cases} 0, if\ k \notin \mathrm{U_d} \\ 1, if\ k \in \mathrm{U_d} \end{cases}$$

where U_d is the universe of all elements in the domain of interest.

The domain total and mean estimators for $t_{y,d}$, the true total for question y in domain d, and their variance estimators can be obtained in a similar pattern as in section 3.2 (Fuller 2009).

$$\hat{t}_{y,d} = \sum_{k \in S} w_k y_k \delta_{k,d} . \tag{14}$$

where $w_k = \frac{N_h}{n_h} \frac{M_{ig}}{m_{ig}}$.

The variance estimator of the total estimate is given by

$$\hat{V}(\hat{t}_d) = \sum_{h=1}^{6} \frac{n_h - 1}{n_h} \sum_{a_h=1}^{n_h} (\hat{t}_d^{[b_h]} - \hat{t}_d)^2 , \tag{15}$$

where

$$\hat{t}_{y,d}^{[b_h]} = \sum_{k \in S_2} w_k^{[b_h]} y_k \delta_{k,d} ,$$

and $w_k^{[b_h]}$ is defined in equation (9).

The domain mean estimator is

$$\hat{\bar{y}}_d = \frac{\hat{t}_{y,d}}{\hat{K}_d} , \tag{16}$$

where

$$\hat{K}_d = \sum_{k \in S_2} w_k \delta_{k,d} .$$

The variance estimator of the mean estimate is given by:

$$\hat{V}(\hat{\bar{y}}_d) = \sum_{h=1}^{6} \frac{n_h - 1}{n_h} \sum_{a_h=1}^{n_h} (\hat{\bar{y}}_d^{[b_h]} - \hat{\bar{y}}_d)^2 , \tag{17}$$

where

$$\hat{\bar{y}}_d^{[b_h]} = \frac{\hat{t}_{y,d}^{[b_h]}}{\hat{K}_d^{[b_h]}},$$

and

$$\hat{K}_d^{[b_h]} = \sum_{k \in S_2} w_k^{[b_h]} \delta_{k,d}.$$

Appendix F. Results of the Healthcare Professional Survey

Means or proportions of variables (standard errors in parentheses)

Variable	Full sample	Region			Type of professional		
		LMD	SGP	UMW	Dentist	NP/PA/ CNM	Physician
Type of professional							
Physician	0.439 (0.016)	0.474 (0.035)	0.410 (0.031)	0.445 (0.020)	0.006*** (0.004)	0.000*** (ne)	0.978*** (0.012)
Dentist	0.269 (0.013)	0.222 (0.023)	0.284 (0.032)	0.277 (0.014)	0.994*** (0.004)	0.000*** (ne)	0.004*** (0.002)
Physician's Assistant	0.097 (0.015)	0.018*** (0.011)	0.121*** (0.041)	0.113*** (0.016)	0.000*** (ne)	0.344*** (0.045)	0.000*** (ne)
Nurse Practitioner	0.189 (0.014)	0.286*** (0.040)	0.185*** (0.029)	0.154*** (0.015)	0.000*** (ne)	0.637*** (0.045)	0.018*** (0.011)
Certified Nurse Midwife	0.004 (0.002)	0.000*** (ne)	0.000*** (ne)	0.009*** (0.003)	0.000*** (ne)	0.015*** (0.006)	0.000*** (ne)
Specialty							
Missing	0.007 (0.002)	0.000*** (ne)	0.004*** (0.004)	0.011*** (0.004)	0.018*** (0.006)	0.000*** (ne)	0.004*** (0.003)
Family or General Practice	0.813 (0.018)	0.835 (0.040)	0.833 (0.026)	0.792 (0.028)	0.964*** (0.015)	0.780*** (0.031)	0.743*** (0.030)
Internal Medicine	0.075 (0.013)	0.079 (0.027)	0.079 (0.021)	0.071 (0.021)	0.000*** (ne)	0.028*** (0.011)	0.150*** (0.027)
Geriatrics	0.008 (0.004)	0.000 (ne)	0.006 (0.006)	0.013 (0.008)	0.014 (0.014)	0.016 (0.009)	0.000 (ne)
Pediatrics	0.029 (0.008)	0.023 (0.011)	0.030 (0.018)	0.031 (0.011)	0.000*** (ne)	0.028*** (0.011)	0.047*** (0.014)
Other	0.067 (0.010)	0.064 (0.024)	0.047 (0.013)	0.082 (0.017)	0.003*** (0.003)	0.148*** (0.027)	0.055*** (0.013)
Year completed training	1996 (0.5)	1995*** (1.4)	1994*** (0.9)	1998*** (0.5)	1991*** (1.0)	2003*** (0.7)	1995*** (0.8)
Year began work in town	2000 (0.5)	1998* (1.4)	1999* (1.0)	2001* (0.5)	1995*** (0.8)	2004*** (0.6)	2000*** (0.8)
Medical training in United States	0.951 (0.013)	0.913 (0.040)	0.962 (0.016)	0.958 (0.019)	0.996*** (0.003)	1.000*** (ne)	0.893*** (0.029)
Graduated high school in U.S.	0.930 (0.014)	0.874 (0.037)	0.943 (0.019)	0.943 (0.021)	0.993*** (0.004)	0.990*** (0.006)	0.854*** (0.031)
Any training in rural area/ small town	0.554 (0.021)	0.536 (0.066)	0.562 (0.035)	0.555 (0.028)	0.323*** (0.032)	0.848*** (0.026)	0.505*** (0.032)
Grew up in rural area or small town	0.654 (0.023)	0.702 (0.056)	0.645 (0.054)	0.640 (0.023)	0.644*** (0.039)	0.766*** (0.033)	0.588*** (0.032)
Lived in this town before working here	0.311 (0.019)	0.450*** (0.051)	0.312*** (0.040)	0.258*** (0.023)	0.289*** (0.038)	0.477*** (0.034)	0.219*** (0.025)

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Variable	Full sample	Region			Type of professional		
		LMD	SGP	UMW	Dentist	NP/PA/ CNM	Physician
Where do you live (distance from this town)							
Missing	0.011 (0.003)	0.006 (0.006)	0.013 (0.008)	0.011 (0.004)	0.004 (0.003)	0.011 (0.007)	0.014 (0.006)
Within city limits	0.337 (0.025)	0.307 (0.060)	0.333 (0.046)	0.350 (0.034)	0.367*** (0.034)	0.243*** (0.032)	0.377*** (0.037)
Within 2 miles	0.108 (0.014)	0.094 (0.026)	0.133 (0.031)	0.097 (0.016)	0.116 (0.023)	0.084 (0.020)	0.118 (0.021)
2 to 10 miles away	0.187 (0.021)	0.167 (0.052)	0.190 (0.032)	0.193 (0.032)	0.173 (0.029)	0.209 (0.032)	0.182 (0.026)
10 to 20 miles away	0.130 (0.013)	0.124 (0.022)	0.104 (0.021)	0.149 (0.021)	0.118 (0.022)	0.161 (0.026)	0.117 (0.020)
20 or more miles away	0.228 (0.019)	0.302 (0.042)	0.227 (0.042)	0.200 (0.021)	0.222** (0.028)	0.292** (0.032)	0.190** (0.029)
Where is your practice based							
Missing	0.003 (0.002)	0.000 (ne)	0.005 (0.004)	0.003 (0.003)	0.000 (ne)	0.003 (0.003)	0.006 (0.003)
Hospital	0.059 (0.012)	0.044 (0.022)	0.070 (0.021)	0.058 (0.018)	0.000*** (ne)	0.053*** (0.017)	0.099*** (0.024)
Clinic	0.535 (0.020)	0.515*** (0.056)	0.446*** (0.030)	0.600*** (0.027)	0.163*** (0.025)	0.775*** (0.031)	0.606*** (0.030)
Office	0.302 (0.016)	0.347*** (0.050)	0.387*** (0.027)	0.230*** (0.017)	0.800*** (0.026)	0.059*** (0.018)	0.156*** (0.025)
Retail setting	0.005 (0.002)	0.000* (ne)	0.003* (0.003)	0.009* (0.004)	0.015* (0.007)	0.004* (0.004)	0.000* (ne)
Other	0.096 (0.013)	0.095 (0.039)	0.089 (0.020)	0.101 (0.018)	0.022*** (0.010)	0.107*** (0.026)	0.134*** (0.024)
Ownership of practice							
Missing	0.002 (0.001)	0.000* (ne)	0.000* (ne)	0.005* (0.003)	0.000 (ne)	0.003 (0.003)	0.003 (0.002)
Sole owner	0.234 (0.019)	0.283*** (0.044)	0.346*** (0.039)	0.143*** (0.015)	0.612*** (0.037)	0.016*** (0.008)	0.145*** (0.027)
Part owner	0.136 (0.017)	0.166 (0.046)	0.095 (0.026)	0.151 (0.025)	0.204*** (0.033)	0.007*** (0.005)	0.177*** (0.034)
Employee	0.625 (0.023)	0.540*** (0.063)	0.556*** (0.043)	0.701*** (0.025)	0.184*** (0.027)	0.975*** (0.009)	0.668*** (0.044)
Independent contractor	0.003 (0.002)	0.011 (0.011)	0.003 (0.003)	0.001 (0.001)	0.000 (ne)	0.000 (ne)	0.008 (0.005)
Hours worked per week in this town	41.4 (0.5)	42.0* (1.8)	42.7* (0.9)	40.3* (0.5)	33.0*** (0.7)	38.7*** (0.9)	48.2*** (1.1)
Hours worked per week elsewhere	2.9 (0.4)	3.9 (1.3)	2.4 (0.7)	2.9 (0.5)	2.1 (0.4)	3.4 (0.8)	3.1 (0.6)
Unacceptable on-call responsibility	0.044 (0.007)	0.029 (0.015)	0.045 (0.014)	0.049 (0.011)	0.005*** (0.005)	0.025*** (0.009)	0.079*** (0.014)
Adequate vacation coverage	0.839 (0.019)	0.776 (0.068)	0.821 (0.031)	0.875 (0.021)	0.834 (0.029)	0.842 (0.028)	0.840 (0.028)

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Variable	Full sample	Region			Type of professional		
		LMD	SGP	UMW	Dentist	NP/PA/ CNM	Physician
How learned about opportunity to work in this town							
Family or friends	0.372 (0.020)	0.477 (0.062)	0.367 (0.027)	0.335 (0.029)	0.433* (0.036)	0.381* (0.035)	0.330* (0.031)
Professional colleague	0.296 (0.018)	0.330 (0.053)	0.285 (0.038)	0.290 (0.019)	0.228*** (0.034)	0.388*** (0.037)	0.278*** (0..028)
School faculty or placement office	0.040 (0.007)	0.012*** (0.009)	0.025*** (0.011)	0.060*** (0.012)	0.071** (0.018)	0.019** (0.007)	0.034** (0.010)
Position announcement	0.100 (0.012)	0.009*** (0.006)	0.087*** (0.022)	0.143*** (0.018)	0.090 (0.025)	0.118 (0.020)	0.094 (0.016)
Town representative of organization	0.040 (0.010)	0.052 (0.025)	0.026 (0.011)	0.044 (0.017)	0.026** (0.010)	0.012** (0.006)	0.066** (0.022)
Professional recruiter	0.107 (0.012)	0.063** (0.020)	0.087** (0.020)	0.137** (0.020)	0.059*** (0.017)	0.065*** (0.015)	0.162*** (0.021)
Someplace else	0.187 (0.015)	0.154 (0.034)	0.199 (0.031)	0.192 (0.019)	0.225*** (0.030)	0.117*** (0.022)	0.208*** (0.024)
Recruitment effort by town leaders	0.236 (0.015)	0.262 (0.028)	0.254 (0.030)	0.214 (0.021)	0.053*** (0.015)	0.166*** (0.032)	0.391*** (0.030)
What did recruitment entail							
Information provided	0.079 (0.010)	0.079 (0.024)	0.085 (0.021)	0.075 (0.012)	0.010*** (0.006)	0.039*** (0.015)	0.146*** (0.020)
Site visit for myself arranged by town	0.054 (0.008)	0.046 (0.021)	0.070 (0.017)	0.046 (0.011)	0.005*** (0.004)	0.005*** (0.004)	0.114*** (0.018)
Site visit for spouse and children by town	0.044 (0.008)	0.026 (0.014)	0.064 (0.015)	0.039 (0.011)	0.007*** (0.004)	0.002*** (0.002)	0.094*** (0.015)
Site visit for myself by employer	0.134 (0.013)	0.117 (0.027)	0.133 (0.025)	0.141 (0.019)	0.025*** (0.010)	0.100*** (0.021)	0.220*** (0.027)
Site visit for spouse and children by employer	0.087 (0.010)	0.047* (0.022)	0.083* (0.021)	0.105* (0.013)	0.007*** (0.005)	0.030*** (0.015)	0.171*** (0.022)
Other	0.045 (0.008)	0.066 (0.023)	0.040 (0.013)	0.041 (0.010)	0.011*** (0.007)	0.044*** (0.016)	0.067*** (0.015)
Important factors in decision to locate practice in this town							
Friendliness of the people	0.778 (0.018)	0.782 (0.041)	0.767 (0.039)	0.782 (0.020)	0.751 (0.031)	0.842 (0.035)	0.753 (0.030)
Good place to raise a family	0.772 (0.021)	0.667** (0.068)	0.750** (0.042)	0.826** (0.018)	0.810 (0.029)	0.726 (0.034)	0.777 (0.029)
Need for healthcare professionals	0.740 (0.020)	0.823 (0.053)	0.748 (0.038)	0.703 (0.026)	0.668 (0.042)	0.752 (0.035)	0.775 (0.028)
Reasonable workload	0.715 (0.020)	0.744 (0.052)	0.691 (0.039)	0.720 (0.026)	0.678*** (0.045)	0.847*** (0.028)	0.654*** (0.031)
Quality of medical community	0.690 (0.019)	0.625*** (0.057)	0.639*** (0.031)	0.748*** (0.024)	0.460*** (0.039)	0.839*** (0.024)	0.734*** (0.030)
Opportunities for professional growth	0.688 (0.020)	0.657 (0.054)	0.670 0.034)	0.711 (0.027)	0.645*** (0.036)	0.797*** (0.032)	0.644*** (0.029)
Quality of schools	0.683 (0.022)	0.571*** (0.058)	0.646*** (0.050)	0.751*** (0.021)	0.687 (0.042)	0.644 (0.037)	0.706 (0.029)
Relatives or friends nearby	0.631 (0.021)	0.626 (0.056)	0.591 (0.043)	0.659 (0.023)	0.630** (0.031)	0.696** (0.031)	0.590** (0.032)
Quality of medical facilities	0.628 (0.019)	0.544*** (0.046)	0.581*** (0.033)	0.689*** (0.026)	0.373*** (0.036)	0.788*** (0.025)	0.680*** (0.031)

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Variable	Full sample	Region			Type of professional		
		LMD	SGP	UMW	Dentist	NP/PA/ CNM	Physician
Good financial package	0.624 (0.024)	0.624 (0.068)	0.563 (0.039)	0.663 (0.032)	0.440*** (0.036)	0.781*** (0.035)	0.635*** (0.035)
Familiarity with the area	0.585 (0.020)	0.608 (0.064)	0.604 (0.038)	0.564 (0.022)	0.547*** (0.040)	0.693*** (0.036)	0.540*** (0.031)
Size of the town	0.543 (0.024)	0.439** (0.051)	0.537** (0.054)	0.586** (0.027)	0.489 (0.035)	0.583 (0.045)	0.550 (0.033)
Natural amenities	0.492 (0.027)	0.403*** (0.058)	0.402*** (0.051)	0.585*** (0.033)	0.491 (0.040)	0.494 (0.037)	0.492 (0.038)
Recreational opportunities	0.469 (0.025)	0.336*** (0.053)	0.357*** (0.041)	0.591*** (0.031)	0.468 (0.041)	0.452 (0.035)	0.480 (0.036)
Opportunities for spouse	0.448 (0.022)	0.324** (0.047)	0.456** (0.045)	0.492** (0.029)	0.390*** (0.039)	0.551*** (0.039)	0.419*** (0.032)
Availability of goods/ services	0.444 (0.017)	0.399 (0.051)	0.469 (0.032)	0.445 (0.020)	0.439 (0.038)	0.511 (0.036)	0.405 (0.031)
Social opportunities	0.441 (0.022)	0.395 (0.056)	0.470 (0.041)	0.440 (0.030)	0.439 (0.037)	0.467 (0.043)	0.426 (0.033)
Opportunity to own a practice	0.418 (0.026)	0.436* (0.060)	0.494* (0.059)	0.362* (0.026)	0.824*** (0.036)	0.107*** (0.026)	0.370*** (0.042)
Low cost of living	0.362 (0.021)	0.460*** (0.054)	0.401*** (0.031)	0.298*** (0.030)	0.363** (0.039)	0.440** (0.036)	0.311** (0.030)
Low taxes	0.223 (0.019)	0.252 (0.052)	0.263 (0.037)	0.186 (0.023)	0.184** (0.031)	0.281** (0.032)	0.210** (0.029)
Recruitment efforts by town	0.221 (0.017)	0.245 (0.033)	0.226 (0.031)	0.210 (0.025)	0.050*** (0.018)	0.197*** (0.029)	0.340*** (0.028)
Cultural amenities	0.196 (0.017)	0.126** (0.033)	0.170** (0.022)	0.240** (0.028)	0.162 (0.023)	0.232 (0.029)	0.193 (0.024)
Placement by a program	0.089 (0.014)	0.137 (0.041)	0.092 (0.022)	0.069 (0.020)	0.053* (0.019)	0.069* (0.015)	0.123* (0.026)
Most important reason chose to work in this town							
Characteristics of community/family	0.619 (0.018)	0.619 (0.053)	0.638 (0.029)	0.607 (0.024)	0.675** (0.033)	0.661** (0.035)	0.559** (0.031)
Hometown, close to family & friends, familiar with area	0.359 (0.021)	0.465* (0.057)	0.361* (0.034)	0.317* (0.027)	0.393*** (0.036)	0.462*** (0.034)	0.273*** (0.029)
Small town or rural area	0.121 (0.016)	0.089 (0.025)	0.119 (0.021)	0.135 (0.029)	0.146 (0.030)	0.119 (0.028)	0.109 (0.024)
Social characteristics	0.112 (0.014)	0.091 (0.027)	0.097 (0.024)	0.130 (0.022)	0.098 (0.019)	0.109 (0.030)	0.123 (0.023)
Like community or location	0.052 (0.008)	0.023** (0.011)	0.064** (0.020)	0.056** (0.010)	0.064 (0.019)	0.039 (0.012)	0.053 (0.011)
Spouse's career	0.039 (0.009)	0.021* (0.022)	0.018* (0.012)	0.058* (0.013)	0.013*** (0.005)	0.038*** (0.013)	0.054*** (0.018)
Natural amenities/outdoor recreation	0.024 (0.006)	0.005** (0.005)	0.035** (0.016)	0.024** (0.007)	0.042*** (0.011)	0.000*** (NE)	0.028*** (0.010)
Schools	0.013 (0.004)	0.011 (0.011)	0.006 (0.004)	0.019 (0.006)	0.019 (0.009)	0.005 (0.003)	0.016 (0.007)
Close to urban area	0.011 (0.003)	0.000*** (NE)	0.003*** (0.003)	0.020*** (0.006)	0.013*** (0.005)	0.000*** (NE)	0.016*** (0.006)
Characteristics of medical community, practice or job	0.411 (0.020)	0.314*** (0.045)	0.372*** (0.036)	0.473*** (0.029)	0.365 (0.032)	0.405 (0.031)	0.443 (0.035)

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Variable	Full sample	Region			Type of professional		
		LMD	SGP	UMW	Dentist	NP/PA/ CNM	Physician
Human or social capital aspects	0.198 (0.020)	0.098*** (0.031)	0.143*** (0.037)	0.272*** (0.029)	0.082*** (0.017)	0.231*** (0.031)	0.247*** (0.030)
Economic aspects	0.160 (0.015)	0.205 (0.042)	0.165 (0.026)	0.140 (0.017)	0.257*** (0.028)	0.100*** (0.020)	0.140*** (0.026)
Salary or earning potential	0.038 (0.007)	0.059 (0.023)	0.039 (0.010)	0.030 (0.009)	0.044 (0.013)	0.034 (0.012)	0.038 (0.011)
Opportunity to own a practice	0.054 (0.008)	0.024** (0.011)	0.067** (0.016)	0.057** (0.011)	0.135*** (0.022)	0.005*** (0.004)	0.037*** (0.012)
Workload or change of pace	0.042 (0.007)	0.029 (0.018)	0.049 (0.013)	0.042 (0.010)	0.012*** (0.007)	0.052*** (0.015)	0.054*** (0.012)
Physical capital aspects (facilities)	0.025 (0.006)	0.028 (0.020)	0.023 (0.011)	0.024 (0.008)	0.012 (0.005)	0.017 (0.007)	0.037 (0.012)
Other factors							
Need/want to help people/ impact	0.122 (0.013)	0.181*** (0.037)	0.180*** (0.023)	0.061*** (0.012)	0.133 (0.025)	0.118 (0.028)	0.117 (0.018)
Biggest drawback of choosing to practice in this town							
Characteristics of community/family	0.513 (0.023)	0.488 (0.061)	0.508 (0.034)	0.525 (0.034)	0.650*** (0.032)	0.420*** (0.033)	0.489*** (0.035)
Urban amenities/ goods & services	0.208 (0.018)	0.164 (0.024)	0.216 (0.039)	0.219 (0.026)	0.288*** (0.038)	0.117*** (0.025)	0.216*** (0.027)
Distance to home, family, friends	0.113 (0.011)	0.140 (0.031)	0.085 (0.022)	0.120 (0.013)	0.101 (0.021)	0.133 (0.022)	0.107 (0.019)
Social characteristics	0.077 (0.011)	0.078 (0.035)	0.066 (0.018)	0.084 (0.012)	0.126*** (0.022)	0.077*** (0.015)	0.048*** (0.014)
Economic characteristics	0.066 (0.009)	0.059 (0.022)	0.085 (0.021)	0.057 (0.010)	0.104 (0.023)	0.060 (0.020)	0.048 (0.012)
Human capital characteristics	0.051 (0.010)	0.082 (0.022)	0.057 (0.022)	0.035 (0.013)	0.057 (0.014)	0.029 (0.015)	0.061 (0.017)
Cultural characteristics	0.047 (0.010)	0.019* (0.009)	0.059* (0.021)	0.051* (0.013)	0.051 (0.017)	0.034 (0.014)	0.054 (0.015)
Natural amenities/Climate	0.026 (0.010)	0.014 (0.010)	0.019 (0.014)	0.034 (0.018)	0.025 (0.017)	0.021 (0.007)	0.029 (0.019)
Characteristics of medical community, practice, or job	0.336 (0.019)	0.381 (0.049)	0.339 (0.036)	0.316 (0.023)	0.204*** (0.030)	0.460*** (0.032)	0.336*** (0.031)
Human capital/Workload	0.133 (0.013)	0.159 (0.035)	0.122 (0.025)	0.131 (0.017)	0.032*** (0.011)	0.147*** (0.025)	0.185*** (0.024)
Workload or on-call responsibilities	0.065 (0.009)	0.019*** (0.013)	0.073*** (0.019)	0.078*** (0.013)	0.015*** (0.007)	0.056*** (0.014)	0.101*** (0.016)
Economic characteristics	0.113 (0.014)	0.126 (0.033)	0.112 (0.026)	0.108 (0.018)	0.094*** (0.021)	0.209*** (0.031)	0.063*** (0.015)
Low salary or earning potential	0.075 (0.010)	0.078 (0.028)	0.072 (0.014)	0.077 (0.015)	0.038*** (0.013)	0.162*** (0.029)	0.043*** (0.010)
Social/cultural characteristics	0.075 (0.011)	0.068 (0.031)	0.073 (0.021)	0.079 (0.012)	0.054 (0.015)	0.087 (0.024)	0.080 (0.017)
Resources/ facilities technology	0.043 (0.008)	0.093* (0.029)	0.039* (0.016)	0.026* (0.006)	0.028 (0.014)	0.037 (0.011)	0.055 (0.014)

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Variable	Full sample	Region			Type of professional		
		LMD	SGP	UMW	Dentist	NP/PA/ CNM	Physician
Important reasons for continuing to work in this town							
Friendliness, friendships	0.821 (0.016)	0.800 (0.042)	0.833 (0.029)	0..820 (0.020)	0.785 (0.031)	0.836 (0.023)	0.832 (0.024)
Need for service, having an impact	0.754 (0.019)	0.816 (0.058)	0.767 (0.039)	0.721 (0.019)	0.662** (0.039)	0.802** (0.031)	0.778** (0.027)
Reasonable workload	0.710 (0.019)	0.746 (0.061)	0.680 (0.035)	0.716 (0.022)	0.671*** (0.039)	0.811*** (0.032)	0.670*** (0.027)
Professional contacts, collegiality	0.690 (0.018)	0.641** (0.061)	0.650** (0.026)	0.735** (0.023)	0.469*** (0.041)	0.849*** (0.024)	0.723*** (0.027)
Family settled here	0.673 (0.022)	0.629 (0.061)	0.637 (0.043)	0.714 (0.026)	0.668 (0.036)	0.681 (0.033)	0.672 (0.035)
Good place to raise a family	0.671 (0.021)	0.585* (0.058)	0.645* (0.043)	0.721* (0.023)	0.665 (0.035)	0.679 (0.035)	0.670 (0.032)
Quality of medical community	0.649 (0.022)	0.547** (0.063)	0.608** (0.033)	0.716** (0.031)	0.422*** (0.036)	0.764*** (0.031)	0.713*** (0.036)
Relatives or friends nearby	0.642 (0.020)	0.630 (0.053)	0.625 (0.040)	0.658 (0.025)	0.634*** (0.035)	0.733*** (0.029)	0.590*** (0.030)
Quality of medical facilities	0.597 (0.021)	0.493*** (0.059)	0.519*** (0.035)	0.687*** (0.028)	0.389*** (0.034)	0.709*** (0.034)	0.651*** (0.036)
Investment in practice	0.596 (0.022)	0.649 (0.063)	0.611 (0.038)	0.567 (0.029)	0.839*** (0.027)	0.540*** (0.037)	0.486*** (0.037)
Quality of schools	0.558 (0.021)	0.417*** (0.040)	0.516*** (0.045)	0.639*** (0.026)	0.558 (0.043)	0.576 (0.036)	0.546 (0.030)
Good financial package	0.557 (0.023)	0.524 (0.077)	0.553 (0.035)	0.572 (0.030)	0.439*** (0.037)	0.651*** (0.039)	0.568*** (0.034)
Opportunities for professional growth	0.551 (0.023)	0.525 (0.062)	0.508 (0.029)	0.588 (0.034)	0.507*** (0.040)	0.652*** (0.036)	0.512*** (0.035)
Size of the town	0.526 (0.020)	0.444 (0.054)	0.559 (0.034)	0.536 (0.025)	0.518*** (0.030)	0.636*** (0.034)	0.461*** (0.032)
Natural amenities	0.477 (0.026)	0.402** (0.062)	0.404** (0.050)	0.553** (0.033)	0.522 (0.042)	0.457 (0.034)	0.463 (0.036)
Involvement in community activities	0.476 (0.022)	0.454 (0.062)	0.499 (0.032)	0.470 (0.034)	0.504 (0.036)	0.492 (0.035)	0.450 (0.033)
Recreational opportunities	0.419 (0.022)	0.369*** (0.058)	0.305*** (0.035)	0.511*** (0.027)	0.435 (0.039)	0.457 (0.035)	0.385 (0.030)
Town's efforts to encourage to stay	0.387 (0.021)	0.446 (0.055)	0.421 (0.036)	0.343 (0.030)	0.251*** (0.034)	0.517*** (0.040)	0.387*** (0.028)
Spouse's or partner's career	0.376 (0.020)	0.298** (0.047)	0.337** (0.037)	0.431** (0.028)	0.289*** (0.037)	0.561*** (0.037)	0.311*** (0.028)
Low cost of living	0.347 (0.021)	0.433** (0.057)	0.390** (0.041)	0.286** (0.024)	0.324** (0.037)	0.427** (0.035)	0.310** (0.031)
Availability of goods and services	0.345 (0.018)	0.365 (0.062)	0.357 (0.030)	0.330 (0.022)	0.307*** (0.032)	0.462*** (0.034)	0.294*** (0.030)
Low taxes	0.246 (0.019)	0.305** (0.053)	0.285** (0.034)	0.198** (0.023)	0.211*** (0.032)	0.346*** (0.033)	0.204*** (0.024)
Cultural amenities	0.208 (0.017)	0.206 (0.036)	0.190 (0.029)	0.220 (0.026)	0.217 (0.030)	0.251 (0.032)	0.175 (0.024)
Ever considered leaving	0.420 (0.021)	0.370 (0.050)	0.417 (0.036)	0.442 (0.031)	0.305*** (0.035)	0.518*** (0.035)	0.428*** (0.035)

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Variable	Full sample	Region			Type of professional		
		LMD	SGP	UMW	Dentist	NP/PA/ CNM	Physician
Main reason considered leaving							
Characteristics of community/family	0.181 (0.017)	0.241 (0.045)	0.154 (0.031)	0.175 (0.021)	0.189 (0.027)	0.190 (0.031)	0.170 (0.027)
Social characteristics	0.078 (0.012)	0.108 (0.037)	0.051 (0.020)	0.084 (0.014)	0.057* (0.017)	0.114* (0.020)	0.068* (0.020)
Family/friends considerations	0.063 (0.011)	0.077 (0.039)	0.039 (0.017)	0.074 (0.014)	0.049 (0.017)	0.085 (0.016)	0.059 (0.020)
Social/recreational opportunities	0.016 (0.005)	0.031 (0.012)	0.015 (0.013)	0.010 (0.004)	0.008 (0.005)	0.030 (0.016)	0.011 (0.005)
Human capital characteristics	0.031 (0.008)	0.051 (0.025)	0.032 (0.014)	0.022 (0.009)	0.025 (0.014)	0.037 (0.015)	0.030 (0.012)
Economic characteristics	0.029 (0.006)	0.036 (0.019)	0.014 (0.007)	0.036 (0.010)	0.047 (0.016)	0.026 (0.010)	0.021 (0.008)
Small/rural/remote/lack of urban amenities	0.025 (0.006)	0.043 (0.014)	0.030 (0.015)	0.016 (0.005)	0.050 (0.019)	0.018 (0.008)	0.015 (0.006)
Natural amenities	0.019 (0.006)	0.030 (0.022)	0.010 (0.006)	0.021 (0.007)	0.015 (0.010)	0.016 (0.007)	0.024 (0.011)
Culture or politics	0.017 (0.005)	0.015 (0.008)	0.019 (0.013)	0.017 (0.006)	0.032 (0.011)	0.017 (0.014)	0.009 (0.004)
Characteristics of medical community/practice/job	0.276 (0.019)	0.239 (0.044)	0.286 (0.033)	0.284 (0.027)	0.149*** (0.027)	0.358*** (0.030)	0.300*** (0.032)
Economic characteristics	0.128 (0.013)	0.156** (0.037)	0.166** (0.026)	0.094** (0.013)	0.089* (0.022)	0.178* (0.027)	0.121* (0.024)
Seeking better pay or benefits	0.076 (0.011)	0.101 (0.035)	0.084 (0.021)	0.062 (0.011)	0.026*** (0.009)	0.129*** (0.022)	0.073*** (0.020)
Human capital/Workload	0.114 (0.012)	0.109 (0.031)	0.099 (0.022)	0.125 (0.014)	0.030*** (0.014)	0.155*** (0.024)	0.138*** (0.019)
Workload	0.080 (0.009)	0.057* (0.024)	0.061* (0.017)	0.101* (0.012)	0.005*** (0.004)	0.116*** (0.021)	0.102*** (0.016)
Social/administration/ management	0.081 (0.013)	0.024*** (0.014)	0.063*** (0.019)	0.116*** (0.021)	0.021*** (0.011)	0.110*** (0.023)	0.099*** (0.018)
Work relationships	0.036 (0.007)	0.018** (0.013)	0.015** (0.008)	0.056** (0.013)	0.015* (0.009)	0.056* (0.015)	0.036* (0.010)
Main reason decided to stay							
Characteristics of community/family	0.189 (0.017)	0.146 (0.029)	0.193 (0.027)	0.203 (0.027)	0.145 (0.027)	0.230 (0.031)	0.190 (0.026)
Social factors	0.184 (0.017)	0.141 (0.029)	0.187 (0.027)	0.199 (0.027)	0.143 (0.027)	0.219 (0.031)	0.187 (0.025)
Family considerations	0.141 (0.014)	0.133 (0.030)	0.149 (0.027)	0.139 (0.021)	0.089** (0.021)	0.184** (0.028)	0.145** (0.024)
Other social factors	0.065 (0.011)	0.019*** (0.011)	0.066*** (0.018)	0.083*** (0.020)	0.066* (0.022)	0.041* (0.011)	0.080* (0.016)
Economic factors	0.007 (0.002)	0.004 (0.004)	0.006 (0.004)	0.009 (0.003)	0.004 (0.003)	0.009 (0.005)	0.008 (0.004)
Characteristics of medical community, practice, job	0.222 (0.017)	0.188 (0.049)	0.232 (0.030)	0.229 (0.022)	0.151* (0.036)	0.257* (0.026)	0.243* (0.030)
Social, administration or management	0.121 (0.013)	0.095 (0.040)	0.102 (0.019)	0.144 (0.017)	0.045*** (0.018)	0.169*** (0.024)	0.137*** (0.024)

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Variable	Full sample	Region			Type of professional		
		LMD	SGP	UMW	Dentist	NP/PA/ CNM	Physician
Relationships -patients/ colleagues	0.082 (0.010)	0.053 (0.025)	0.080 (0.019)	0.096 (0.014)	0.037** (0.018)	0.126** (0.022)	0.083** (0.017)
Economic	0.099 (0.013)	0.070 (0.030)	0.142 (0.029)	0.083 (0.014)	0.102 (0.024)	0.096 (0.021)	0.099 (0.017)
Salary/financial package	0.043 (0.009)	0.040 (0.022)	0.049 (0.019)	0.039 (0.009)	0.014*** (0.006)	0.045*** (0.016)	0.058*** (0.013)
Investment in practice	0.032 (0.008)	0.026 (0.018)	0.049 (0.021)	0.023 (0.006)	0.064** (0.021)	0.008** (0.005)	0.027** (0.010)
Human capital, workload	0.039 (0.009)	0.079*** (0.039)	0.012*** (0.007)	0.042*** (0.008)	0.018 (0.010)	0.042 (0.011)	0.051 (0.017)
Work/life balance	0.029 (0.006)	0.044* (0.023)	0.012* (0.007)	0.033* (0.007)	0.005*** (0.005)	0.040*** (0.011)	0.036*** (0.011)
Other factors	0.063 (0.009)	0.085 (0.028)	0.048 (0.013)	0.064 (0.012)	0.033** (0.013)	0.078** (0.017)	0.072** (0.014)
Moving or may move	0.025 (0.006)	0.046 (0.023)	0.017 (0.007)	0.022 (0.007)	0.000*** (NE)	0.032*** (0.011)	0.036*** (0.011)
Need in the community	0.017 (0.005)	0.031 (0.016)	0.013 (0.006)	0.015 (0.006)	0.012 (0.007)	0.017 (0.007)	0.020 (0.008)
Perception of overall healthcare availability in town							
Missing	0.003 (0.001)	0.009* (0.006)	0.000* (ne)	0.003* (0.002)	0.004* (0.003)	0.000* (ne)	0.005* (0.003)
Poor	0.010 (0.003)	0.018* (0.010)	0.017* (0.008)	0.002* (0.002)	0.026** (0.011)	0.000** (ne)	0.006** (0.004)
Fair	0.120 (0.014)	0.219*** (0.045)	0.165*** (0.032)	0.053*** (0.012)	0.119 (0.025)	0.117 (0.025)	0.123 (0.022)
Good	0.313 (0.020)	0.375** (0.052)	0.366** (0.036)	0.255** (0.026)	0.384* (0.034)	0.298* (0.033)	0.279* (0.031)
Very good	0.431 (0.022)	0.340** (0.061)	0.393** (0.034)	0.491** (0.033)	0.397 (0.032)	0.439 (0.034)	0.447 (0.032)
Excellent	0.123 (0.017)	0.040*** (0.014)	0.060*** (0.018)	0.195*** (0.029)	0.069** (0.014)	0.147** (0.024)	0.140** (0.026)
Perception of overall healthcare quality in town							
Missing	0.016 (0.005)	0.009 (0.006)	0.028 (0.015)	0.011 (0.005)	0.019 (0.010)	0.014 (0.014)	0.016 (0.006)
Poor	0.010 (0.004)	0.035 (0.020)	0.008 (0.006)	0.001 (0.001)	0.022 (0.014)	0.002 (0.002)	0.008 (0.004)
Fair	0.087 (0.011)	0.128*** (0.022)	0.135*** (0.026)	0.040*** (0.010)	0.150** (0.028)	0.069** (0.020)	0.061** (0.016)
Good	0.249 (0.020)	0.303* (0.045)	0.291* (0.037)	0.202* (0.029)	0.308** (0.030)	0.220** (0.034)	0.233** (0.032)
Very good	0.449 (0.020)	0.418 (0.041)	0.424 (0.039)	0.478 (0.028)	0.401 (0.033)	0.486 (0.042)	0.455 (0.032)
Excellent	0.188 (0.016)	0.108*** (0.028)	0.114*** (0.029)	0.268*** (0.024)	0.101*** (0.018)	0.210*** (0.026)	0.228*** (0.032)
Perception of change in healthcare availability in town in past 5 years							
Missing	0.012 (0.005)	0.009 (0.006)	0.014 (0.014)	0.012 (0.005)	0.027 (0.017)	0.005 (0.004)	0.007 0.003)
Declined a lot	0.056 (0.012)	0.056 (0.026)	0.085 (0.026)	0.037 (0.017)	0.044 (0.016)	0.044 (0.016)	0.071 (0.017)

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Variable	Full sample	Region			Type of professional		
		LMD	SGP	UMW	Dentist	NP/PA/ CNM	Physician
Declined a little	0.144 (0.019)	0.077** (0.023)	0.164** (0.031)	0.157** (0.030)	0.145* (0.030)	0.110* (0.022)	0.165* (0.025)
No change	0.167 (0.014)	0.307*** (0.043)	0.136*** (0.026)	0.134*** (0.015)	0.203 (0.028)	0.168 (0.031)	0.145 (0.024)
Improved a little	0.427 (0.022)	0.393 (0.042)	0.432 (0.049)	0.437 (0.029)	0.421 (0.038)	0.403 (0.032)	0.446 (0.036)
Improved a lot	0.194 (0.019)	0.159 (0.041)	0.169 (0.036)	0.224 (0.028)	0.160*** (0.029)	0.270*** (0.035)	0.167*** (0.023)
Perception of change in healthcare quality in town in past 5 years							
Missing	0.025 (0.007)	0.009 (0.006)	0.041 (0.019)	0.021 (0.006)	0.040 (0.018)	0.022 (0.014)	0.018 (0.007)
Declined a lot	0.026 (0.005)	0.039*** (0.014)	0.044*** (0.014)	0.009*** (0.004)	0.024* (0.011)	0.010* (0.005)	0.037* (0.010)
Declined a little	0.126 (0.022)	0.051*** (0.020)	0.172*** (0.036)	0.125*** (0.037)	0.161 (0.033)	0.096 (0.022)	0.124 (0.029)
No change	0.206 (0.020)	0.268 (0.052)	0.219 (0.035)	0.173 (0.026)	0.210 (0.029)	0.226 (0.040)	0.191 (0.024)
Improved a little	0.456 (0.025)	0.465 (0.050)	0.386 0.046)	0.497 (0.037)	0.421 (0.033)	0.444 (0.039)	0.485 (0.038)
Improved a lot	0.162 (0.015)	0.168 (0.034)	0.137 (0.026)	0.175 (0.024)	0.144 (0.024)	0.202 (0.031)	0.147 (0.025)
Changes in healthcare (HC) availability are due to:							
Changes in HC facilities or equipment	0.514 (0.024)	0.471 (0.055)	0.495 (0.048)	0.542 (0.033)	0.562 (0.042)	0.506 (0.043)	0.490 (0.039)
Changes in HC professionals	0.688 (0.019)	0.650 (0.048)	0.677 (0.035)	0.709 (0.025)	0.578*** (0.035)	0.706*** (0.036)	0.743*** (0.027)
Changes in HC facility admin or ownership	0.407 (0.029)	0.371 (0.073)	0.409 (0.048)	0.419 (0.041)	0.398 (0.039)	0.410 (0.039)	0.410 (0.039)
Changes in government policies/programs	0.296 (0.020)	0.307* (0.039)	0.354* (0.037)	0.255* (0.028)	0.256 (0.030)	0.340 (0.035)	0.293 (0.030)
Changes in health insurance industry	0.347 (0.019)	0.361 (0.038)	0.359 (0.034)	0.334 (0.029)	0.273** (0.029)	0.397** (0.034)	0.360** (0.030)
Changes in local economy or businesses	0.238 (0.018)	0.287** (0.048)	0.281** (0.039)	0.192** (0.018)	0.264 (0.029)	0.234 (0.028)	0.226 (0.025)
Changes in healthcare (HC) quality are due to:							
Changes in HC facilities or equipment	0.549 (0.023)	0.467* (0.064)	0.514* (0.042)	0.602* (0.027)	0.508 (0.042)	0.519 (0.041)	0.592 (0.036)
Changes in HC professionals	0.662 (0.018)	0.552* (0.054)	0.684* (0.024)	0.690* (0.024)	0.553*** (0.032)	0.661*** (0.036)	0.729*** (0.025)
Changes in HC facility administration or ownership	0.394 (0.026)	0.401 (0.072)	0.387 (0.042)	0.396 (0.036)	0.352 (0.037)	0.393 (0.034)	0.420 (0.038)
Changes in government policies/programs	0.280 (0.019)	0.319* (0.044)	0.324* (0.037)	0.236* (0.027)	0.248 (0.030)	0.302 (0.033)	0.285 (0.032)
Changes in health insurance industry	0.301 (0.021)	0.343** (0.045)	0.364** (0.038)	0.244** (0.028)	0.244 (0.028)	0.335 (0.032)	0.313 (0.032)
Changes in local economy or businesses	0.194 (0.020)	0.238* (0.044)	0.233* (0.044)	0.152* (0.023)	0.220 (0.028)	0.196 (0.028)	0.177 (0.026)

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Variable	Full sample	Region			Type of professional		
		LMD	SGP	UMW	Dentist	NP/PA/ CNM	Physician
Involved in recruitment of HC professionals in past 5 years	0.515 (0.020)	0.351*** (0.043)	0.467*** (0.039)	0.609*** (0.023)	0.282*** (0.032)	0.480*** (0.034)	0.677*** (0.030)
Involved in effort to retain HC professional in past 5 years	0.237 (0.016)	0.199 (0.041)	0.243 (0.033)	0.248 (0.020)	0.105*** (0.022)	0.224*** (0.026)	0.325*** (0.026)
Most important factor in successfully recruiting or retaining healthcare (HC) professionals in this town (top 10)							
Financial package	0.214 (0.020)	0.270 (0.058)	0.201 (0.035)	0.201 (0.026)	0.119*** (0.022)	0.258*** (0.032)	0.243*** (0.033)
Work/life balance	0.100 (0.011)	0.069** (0.022)	0.076** (0.021)	0.128** (0.014)	0.030*** (0.010)	0.121*** (0.022)	0.129*** (0.017)
Healthcare colleagues, staff	0.088 (0.013)	0.023*** (0.018)	0.092*** (0.028)	0.110*** (0.017)	0.011*** (0.007)	0.086*** (0.022)	0.135*** (0.022)
Promoting community characteristics	0.088 (0.010)	0.027*** (0.012)	0.090*** (0.019)	0.110*** (0.017)	0.129* (0.022)	0.075* (0.018)	0.071* (0.014)
Finding HC professionals suited to community	0.086 (0.012)	0.086 (0.040)	0.111 (0.023)	0.069 (0.012)	0.078 (0.019)	0.070 (0.023)	0.101 (0.020)
Administration or organization culture	0.075 (0.011)	0.032** (0.023)	0.062** (0.018)	0.101** (0.017)	0.042 (0.020)	0.089 (0.017)	0.087 (0.017)
Facilities and equipment	0.060 (0.009)	0.040*** (0.016)	0.115*** (0.022)	0.033*** (0.007)	0.061 (0.017)	0.073 (0.020)	0.052 (0.013)
Good place to raise a family	0.054 (0.010)	0.048 (0.017)	0.046 (0.022)	0.061 (0.014)	0.087*** (0.022)	0.085*** (0.025)	0.014*** (0.008)
Recruiting local people	0.053 (0.014)	0.035 (0.022)	0.035 (0.016)	0.072 (0.026)	0.033* (0.015)	0.062* (0.019)	0.059* (0.021)
Personal relationships	0.044 (0.008)	0.034 (0.011)	0.029 (0.011)	0.057 (0.013)	0.042 (0.013)	0.047 (0.014)	0.043 (0.013)
Greatest difficulty in recruiting or retaining healthcare (HC) professionals in this town (top 10)							
Small town, rurality	0.316 (0.019)	0.315** (0.046)	0.237** (0.036)	0.367** (0.026)	0.308 (0.033)	0.283 (0.031)	0.342 (0.030)
Lack of amenities & social opportunities	0.165 (0.014)	0.120*** (0.036)	0.230*** (0.026)	0.140*** (0.018)	0.176* (0.029)	0.205* (0.026)	0.132* (0.022)
Workload	0.105 (0.012)	0.034*** (0.022)	0.060*** (0.016)	0.161*** (0.021)	0.024*** (0.011)	0.104*** (0.021)	0.154*** (0.021)
Financial package, low earnings	0.101 (0.012)	0.169 (0.040)	0.086 (0.022)	0.085 (0.014)	0.058*** (0.016)	0.162*** (0.030)	0.088*** (0.020)
Economic conditions of town, poverty	0.053 (0.010)	0.091** (0.023)	0.067** (0.025)	0.029** (0.009)	0.079 (0.019)	0.051 (0.021)	0.038 (0.013)
Administration or work culture	0.049 (0.010)	0.011*** (0.007)	0.048*** (0.018)	0.065*** (0.016)	0.023 (0.012)	0.063 (0.020)	0.056 (0.013)
Spouse opportunities, happiness	0.048 (0.008)	0.012*** (0.009)	0.050*** (0.020)	0.061*** (0.011)	0.049 (0.014)	0.031 (0.009)	0.059 (0.013)
Lack of facilities, equipment	0.046 (0.009)	0.059** (0.021)	0.076** (0.024)	0.021** (0.006)	0.018** (0.010)	0.053** (0.015)	0.057** (0.016)
Quality of schools	0.043 (0.010)	0.087* (0.041)	0.055* (0.018)	0.018* (0.007)	0.047 (0.015)	0.055 (0.022)	0.033 (0.011)
No potential for growth	0.031 (0.008)	0.000*** (ne)	0.053*** (0.020)	0.028*** (0.008)	0.058** (0.022)	0.009** (0.005)	0.028** (0.011)

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Variable	Full sample	Region			Type of professional		
		LMD	SGP	UMW	Dentist	NP/PA/ CNM	Physician
Involvement in volunteer activities in town related to healthcare or promoting healthy lifestyles							
Missing	0.006 (0.002)	0.014 (0.008)	0.005 (0.005)	0.003 (0.002)	0.007 (0.006)	0.006 (0.004)	0.005 (0.003)
Not at all	0.164 (0.015)	0.199 (0.042)	0.139 (0.023)	0.166 0.021)	0.159 (0.028)	0.177 (0.028)	0.159 (0.025)
Some	0.645 (0.017)	0.622 (0.046)	0.651 (0.033)	0.651 (0.022)	0.632 (0.038)	0.655 (0.032)	0.647 (0.032)
A lot	0.185 (0.014)	0.164 (0.035)	0.205 (0.031)	0.180 (0.016)	0.202 (0.030)	0.163 (0.025)	0.189 (0.023)
Involvement in other volunteer activities (non-health related) in town							
Missing	0.005 (0.002)	0.014 (0.008)	0.005 (0.005)	0.002 (0.001)	0.007 (0.006)	0.004 (0.004)	0.005 (0.003)
Not at all	0.165 (0.015)	0.165 (0.036)	0.167 (0.029)	0.163 (0.019)	0.156 (0.026)	0.174 (0.026)	0.164 (0.023)
Some	0.518 (0.019)	0.561 (0.055)	0.487 (0.031)	0.522 (0.026)	0.456* (0.033)	0.564* (0.034)	0.527* (0.031)
A lot	0.312 (0.019)	0.260 (0.047)	0.341 (0.040)	0.313 (0.022)	0.381** (0.035)	0.258** (0.032)	0.304** (0.028)
Local government leader in town	0.037 (0.006)	0.018** (0.010)	0.065** (0.014)	0.026** (0.007)	0.050 (0.015)	0.032 (0.012)	0.032 (0.009)
Leader of civic organization in town	0.164 (0.013)	0.096** (0.033)	0.203** (0.024)	0.165** (0.018)	0.245** (0.033)	0.122** (0.022)	0.142** (0.019)
How many local organizations in this town do you belong to?							
None	0.165 (0.015)	0.211 (0.039)	0.140 (0.026)	0.164 (0.021)	0.145 (0.027)	0.200 (0.026)	0.155 (0.026)
One or two	0.445 (0.018)	0.449 (0.048)	0.446 (0.035)	0.444 (0.024)	0.349*** (0.032)	0.473*** (0.041)	0.486*** (0.033)
Three to five	0.334 (0.019)	0.267 (0.037)	0.367 (0.043)	0.338 (0.022)	0.449*** (0.040)	0.284*** (0.035)	0.297*** (0.025)
6 to 10	0.051 (0.009)	0.072 (0.025)	0.038 (0.015)	0.052 (0.011)	0.048 (0.013)	0.044 (0.013)	0.058 (0.016)
More than 10	0.004 (0.002)	0.000* (ne)	0.009* (0.005)	0.002* (0.002)	0.008* (0.006)	0.000* (ne)	0.004* (0.003)
How easy is it to get involved in community activities in this town?							
Missing	0.006 (0.002)	0.014 (0.008)	0.005 (0.005)	0.003 (0.002)	0.007 (0.006)	0.006 (0.004)	0.005 (0.003)
Very easy	0.533 (0.020)	0.509 (0.048)	0.554 (0.030)	0.527 (0.031)	0.592*** (0.032)	0.422*** (0.035)	0.567*** (0.034)
Somewhat easy	0.306 (0.019)	0.267 (0.038)	0.292 (0.028)	0.330 (0.030)	0.286* (0.030)	0.379* (0.038)	0.272* (0.030)
Unsure	0.119 (0.013)	0.177 (0.042)	0.096 (0.020)	0.112 (0.015)	0.077** (0.018)	0.162** (0.027)	0.117** (0.020)
Somewhat difficult	0.031 (0.007)	0.029 (0.018)	0.042 (0.014)	0.025 (0.008)	0.035 (0.012)	0.028 (0.011)	0.031 (0.010)
Very difficult	0.006 (0.002)	0.004 (0.004)	0.011 (0.007)	0.002 (0.002)	0.003 (0.003)	0.003 (0.003)	0.009 (0.005)

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Variable	Full sample	Region			Type of professional		
		LMD	SGP	UMW	Dentist	NP/PA/ CNM	Physician
Professional plans for next 5 years							
Missing	0.007 (0.003)	0.019 (0.010)	0.005 (0.005)	0.005 (0.002)	0.007 (0.006)	0.008 (0.005)	0.007 (0.004)
Continue to practice here	0.747 (0.019)	0.696 (0.059)	0.762 (0.029)	0.757 (0.024)	0.754 (0.028)	0.739 (0.036)	0.748 (0.028)
Move practice to another place	0.048 (0.010)	0.069 (0.034)	0.048 (0.017)	0.041 (0.012)	0.036 (0.017)	0.069 (0.019)	0.042 (0.016)
Change career in this town	0.013 (0.004)	0.004 (0.004)	0.013 (0.006)	0.017 (0.008)	0.000*** (ne)	0.030*** (0.014)	0.011*** (0.005)
Change career in another place	0.023 (0.006)	0.044 (0.024)	0.011 (0.006)	0.022 (0.007)	0.022 (0.013)	0.011 (0.005)	0.031 (0.009)
Retire	0.112 (0.014)	0.116 (0.055)	0.110 (0.020)	0.112 (0.015)	0.161** (0.022)	0.074** (0.023)	0.107** (0.019)
Other	0.049 (0.008)	0.053 (0.025)	0.053 (0.016)	0.046 (0.009)	0.019*** (0.008)	0.070*** (0.019)	0.055*** (0.013)
Gender							
Male	0.554 (0.019)	0.574** (0.047)	0.617** (0.035)	0.506** (0.023)	0.747*** (0.034)	0.146*** (0.025)	0.697*** (0.028)
Female	0.446 (0.019)	0.426** (0.047)	0.383** (0.035)	0.494** (0.023)	0.253*** (0.034)	0.854*** (0.025)	0.303*** (0.028)
Age and ethnicity							
Age	49.3 (0.5)	51.5*** (1.6)	51.5*** (0.9)	47.0*** (0.6)	50.4*** (0.8)	45.4*** (0.8)	51.2*** (0.9)
Hispanic	0.018 (0.005)	0.011 (0.008)	0.034 (0.014)	0.011 (0.004)	0.015 (0.008)	0.008 (0.005)	0.026 (0.011)
Race							
White	0.895 (0.015)	0.866 (0.037)	0.866 (0.029)	0.924 (0.019)	0.931** (0.021)	0.939** (0.017)	0.845** (0.028)
Black/African American	0.025 (0.007)	0.072* (0.027)	0.032* (0.015)	0.003* (0.002)	0.017 (0.010)	0.024 (0.011)	0.031 (0.013)
American Indian/Alaska Native	0.022 (0.008)	0.004** (0.004)	0.063** (0.024)	0.002** (0.002)	0.024 (0.017)	0.019 (0.011)	0.023 (0.011)
Asian	0.040 (0.011)	0.024 (0.018)	0.032 (0.016)	0.052 (0.019)	0.014** (0.009)	0.009** (0.005)	0.076** (0.024)
Native Hawaiian/Other Pacific Islander	0.006 (0.004)	0.000 (ne)	0.007 (0.005)	0.008 (0.008)	0.020 (0.015)	0.000 (ne)	0..002 (0.002)
Other	0.018 (0.006)	0.030 (0.020)	0.026 (0.012)	0.008 (0.004)	0.006 (0.004)	0.008 (0.005)	0.031 (0.012)
Marital status							
Missing	0.017 (0.005)	0.039 (0.019)	0.019 (0.008)	0.007 (0.003)	0.021 (0.008)	0.012 (0.007)	0.018 (0.009)
Married/living as married	0.872 (0.013)	0.842 (0.029)	0.866 (0.026)	0.888 (0.018)	0.861 (0.025)	0.849 (0.026)	0.894 (0.020)
Divorced or separated	0.070 (0.011)	0.073 (0.019)	0.078 (0.021)	0.063 (0.018)	0.067 (0.020)	0.107 (0.024)	0.048 (0.014)
Widowed	0.013 (0.004)	0.000*** (ne)	0.011*** (0.006)	0.019*** (0.007)	0.009 (0.004)	0.011 (0.005)	0.016 (0.007)
Single never married	0.028 (0.006)	0.046 (0.022)	0.026 (0.009)	0.023 (0.007)	0.043 (0.014)	0.022 (0.008)	0.024 (0.010)

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Variable	Full sample	Region			Type of professional		
		LMD	SGP	UMW	Dentist	NP/PA/ CNM	Physician
Number of adults (age 18 and over) in hh	2.15 (0.03)	2.19 (0.10)	2.21 (0.06)	2.11 (0.04)	2.17* (0.07)	2.05* (0.05)	2.21* (0.06)
Number of children in household	1.23 (0.06)	1.09** (0.14)	1.10** (0.11)	1.37** (0.06)	0.92*** (0.10)	1.28*** (0.11)	1.38*** (0.09)
Household income last year							
Missing	0.062 (0.013)	0.075 (0.020)	0.068 (0.035)	0.053 (0.014)	0.095* (0.025)	0.060* (0.018)	0.043* (0.014)
Less than $25,000	0.002 (0.001)	0.000 (ne)	0.003 (0.003)	0.002 (0.002)	0.003 (0.003)	0.003 (0.003)	0.000 (ne)
$25,000 to $50,000	0.006 (0.002)	0.004 (0.004)	0.009 (0.006)	0.004 (0.002)	0.002 (0.002)	0.011 (0.006)	0.004 (0.003)
$50,000 to $75,000	0.012 (0.003)	0.028 (0.012)	0.012 (0.006)	0.007 (0.003)	0.021** (0.008)	0.020** (0.008)	0.003** (0.003)
$75,000 to $100,000	0.071 (0.009)	0.073 (0.020)	0.090 (0.021)	0.058 (0.012)	0.055*** (0.018)	0.166*** (0.026)	0.020*** (0.007)
$100,000 to $150,000	0.201 (0.017)	0.208 (0.049)	0.240 (0.039)	0.173 (0.017)	0.208*** (0.029)	0.410*** (0.044)	0.064*** (0.014)
More than $150,000	0.647 (0.022)	0.610** (0.053)	0.579** (0.045)	0.704** (0.024)	0.616*** (0.041)	0.330*** (0.039)	0.866*** (0.022)

Note: "LMD" = Lower Mississippi Delta region, "SGP" = Southern Great Plains region, "UMW" = Upper Midwest region. "NP/PA/CNM" = nurse practitioners/physician assistants/certified nurse midwives.

*, **, *** indicate statistically significant differences across regions or types of professional at the 10 percent, 5 percent, or 1 percent level, respectively, based on Wald tests.

All values are mean proportions reporting the response (with standard errors in parentheses)—except for year completed training, year began working in town, hours worked per week in this town, hours worked per week elsewhere, age, number of adults in household, and number of children in household. For those variables, the values reported are the mean number (with standard errors in parentheses). The number of observations in the full sample equals 928 for all variables, except the variables reported as mean numbers rather than mean proportions. For those variables, the number of observations are: year completed training – 905, year began working in town – 913, hours worked per week in this town – 921, hours worked per week elsewhere – 922, age – 912, number of adults in household – 877, and number of children in household – 928. Means and standard errors estimated using the Jackknife method to account for stratification and weights as explained in appendix E.

Source: USDA, Economic Research Service analysis of responses to the healthcare professional survey.