

The Economics of Rural Health Care

The Challenges of Providing Health Care to Rural Communities

by Amy Watson, Economist



Montana is a rural state. The U.S. Census Bureau estimates there are only 6.8 people per square mile in the state, making the population twelve times more dispersed than the national average. There are plenty of advantages to living in Big Sky country: fresh air, privacy, little traffic, proximity to national parks and outdoor activities, to name a few. The rural landscape is what draws many people to the state, and it isn't something most Montanans are interested in changing. However, such a low-density population does create some difficulties, particularly in providing health care.

Economics provides a unique perspective on the complexities of the health care market and what makes providing health care to rural communities challenging. This article examines the unique characteristics of health care supply and demand that shape the study of health care economics, and how those characteristics manifest themselves in Montana's rural communities.

THE MARKET FOR HEALTH CARE IS COMPLEX

Economics is the study of how individuals make decisions when resources are limited. Within the market for a good, there are two actors: producers and consumers. Producers decide how much of a good to produce given the retail price and the cost of production. Consumers decide how much of the good to buy based on the benefit it provides, its price, the price of alternative goods, and their budget.

In a perfectly competitive market, producers and consumers have all the information they need to make decisions, and no individual producer or consumer has the ability to influence prices. In this simple market structure, supply and demand determine a good's price, and the resulting market price and quantity is the optimal outcome. However, this market structure does not accurately reflect the complexity of the market for many goods and services. Perhaps none is more complex than the market for health care.

Health care economics attempts to understand what determines the quantity and price of health care, and whether the prevailing quantity and price is socially

optimal. The socially optimal price and quantity provides the appropriate amount of care at the lowest cost to society as possible.¹ For an economist, the optimal amount of health care is where the marginal benefit is equal to the marginal cost of health care. If the marginal cost is higher than the marginal benefit, those resources could be better utilized elsewhere. However, the optimal production point is difficult to assess in health care.

In thinking about benefits and costs, economists include externalities that arise when producers or consumers do not bear the full costs or reap the full benefit of their decision. One common example of a positive externality in health care is vaccination. An individual gets vaccinated to reduce their risk of getting an illness. However, the full benefit of vaccination extends beyond its effect on one individual. The decision to get vaccinated also benefits others by reducing the spread of the illness. Because these external benefits are not typically considered by individuals in their decision to get a vaccination, the demand for vaccinations would lower than the socially optimum level in the absence of government requirements.

Economists also consider opportunity costs when estimating health care costs. An opportunity cost is the cost of the next best alternative an individual must forgo to achieve something else. For example, if visiting the doctor means missing two hours of work, economists consider those lost wages as a cost of health care.

There are many different markets for health care differentiated by disease, technology, location, and physician and patient characteristics. None of these markets are perfectly competitive. Instead, each contains a different set of market-distorting characteristics that lead to less than socially optimal outcomes.

HEALTH CARE SUPPLY – IS BIGGER BETTER?

Health care providers can often achieve greater efficiency with increased size because they are able to spread out high fixed costs—like facilities, equipment, and administrative costs—over a larger number of patients. A one hundred bed hospital may be less expensive per patient than a fifty bed hospital because the larger hospital can spread its costs over twice as many patients. This concept is called economies of scale, and it is an important characteristic of health care supply that shapes how and where health care is provided.

Although greater size can mean increased efficiency for health care providers, it also gives providers more market power and the ability to extract higher prices. There is a delicate balance between efficiency and market power in health care supply. Increased efficiency allows health care providers to operate at a lower cost. However, without competition from other providers, there is little incentive for suppliers to pass those savings on to consumers.

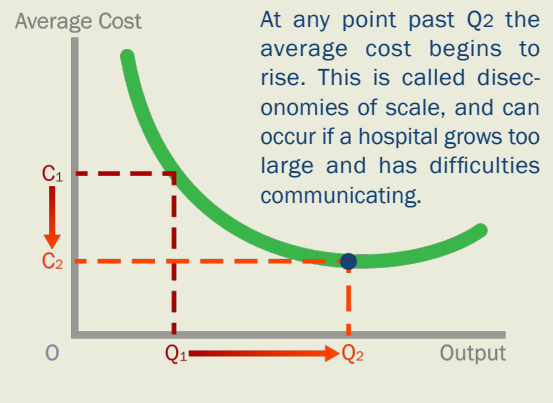
To achieve the most efficient scale, health care providers often locate in urban areas where there are more customers. In less populated places, such as Montana's cities and towns, economies of scale can lead to single providers, or natural monopolies. The consequence of economies of scale is that rural communities may have a difficult time accessing care, and their options for providers can be limited.

According to the Montana Department of Health and Human Services (DPHHS) Office of Primary Care, the majority of Montana qualifies as a Health Professional Shortage Area (HPSA). **Figure 1** shows all of the areas in Montana that qualify as a HPSA for primary care, based on a population to primary care physician ratio of 3,500 to 1.

The Primary Care Office also designates dental care and mental health shortage areas in addition to primary care. Dental shortage areas are not as prevalent as primary care. Mental health shortage areas are the most severe. Yellowstone County is the only county in Montana that doesn't qualify as a mental health shortage area.

ECONOMIES OF SCALE

As the quantity of health care produced by a single provider increases from Q_1 to Q_2 the average cost per patient decreases from C_1 to C_2 .



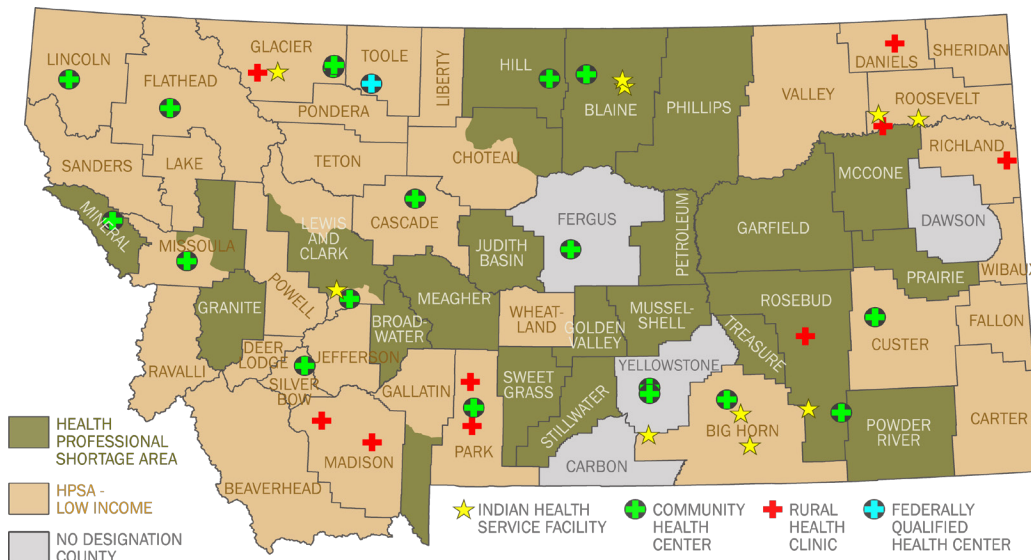
The prevalence of HPSA areas in Montana is testament to the difficulty of providing care to rural communities.²

Reducing the cost of transportation can help increase access to care in rural areas of the state. The less costly it is to travel to the nearest health care provider, the easier it will be for people in rural communities to receive care. Improving infrastructure, like air and road travel, is one way to reduce transportation costs. Another solution may be to improve broadband access in rural areas to facilitate telehealth and increase access to care in rural communities.

HEALTH CARE SUPPLY – PRICE OF INPUTS MATTERS

For any producer, the cost of inputs into the production process affects the quantity they can produce for a given price. In general, inputs fall into two categories; capital and labor. In the market for health care, capital inputs include things like facilities, medical equipment, and medicine. Medical professionals serve as the primary labor input in the production of health care. There is a combination of capital and labor that maximizes productivity and leads to the highest level output for a given level of inputs. Deviation from this optimal combination of inputs can drive up the cost of production.

Figure 1: Primary Care Health Professional Shortage Areas in Montana



Source: Montana Department of Health and Human Services PCO, HPSA Data, December 2014.

Capital and labor inputs are scarcer in rural communities than in urban areas, which means it is more costly for health care providers to secure the resources they need. Often, providers in rural communities have a difficult time recruiting and retaining employees because the recruiting costs are too high and retention is more difficult. Additionally, the cost of capital inputs can be more expensive for rural providers whose customer base is more widely dispersed. For example, individuals in rural areas may need to be transported by air to a hospital, which is much more expensive than if the individual was within driving distance.

Across Montana, the impending worker shortage is expected to increase the cost of labor as employers compete for a limited supply of workers.³ The worker shortage is anticipated to be particularly severe in the health care industry, where consistent employment

growth suggests there isn't a pool of trained workers who are able to fill new jobs as they come available. The aging population also generates more demand for health care at later stages in life, putting additional strain on health care providers.

Rural health care providers, who might already be struggling to secure the resources they need, may not be able to compete with urban providers to recruit workers as the labor market continues to tighten. One solution for rural providers is to look for less expensive inputs. Substituting labor inputs can reduce costs dramatically, especially in rural communities. For example, Licensed Practical Nurses (LPNs) may be able to fill some of the duties of Registered Nurses (RNs) within the scope of their license. Advanced Practice Registered Nurses (APRNs) or Physician's Assistants (PAs) may be able to substitute for Medical Doctors within the scope of their license. Data suggest this substitution may already be

How is the Montana Department of Labor & Industry addressing the workforce shortage?

The Montana Department of Labor & Industry is addressing the workforce shortage in the health care sector through an innovative program that is connecting the private and public sector to train medical professionals throughout the state, while integrating many of our two-year colleges.

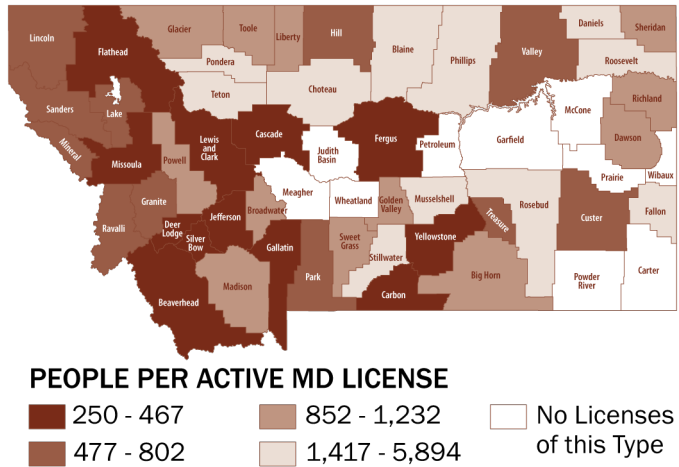
HealthCare Montana is funded through a grant from the US Department of Labor with a focus of building a channel of health care professionals for our local communities. These partnerships are building a pathway to training programs to meet the current and future needs of our health care industry workforce.



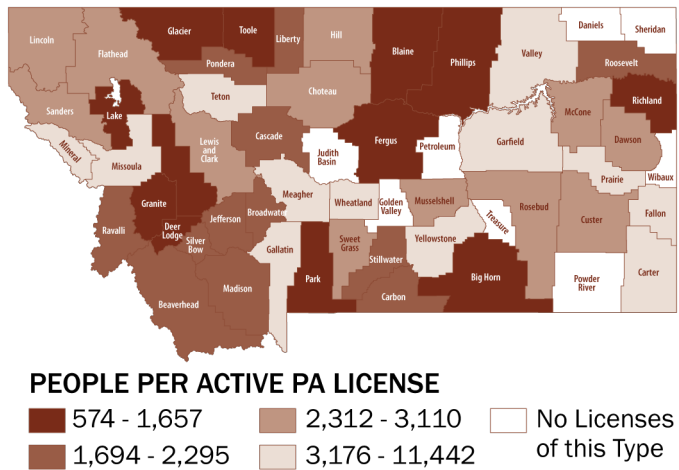
For more information please visit www.healthcaremontana.org or call the Montana Department of Labor & Industry at (406) 444-2840.

Figure 2: Medical Doctors

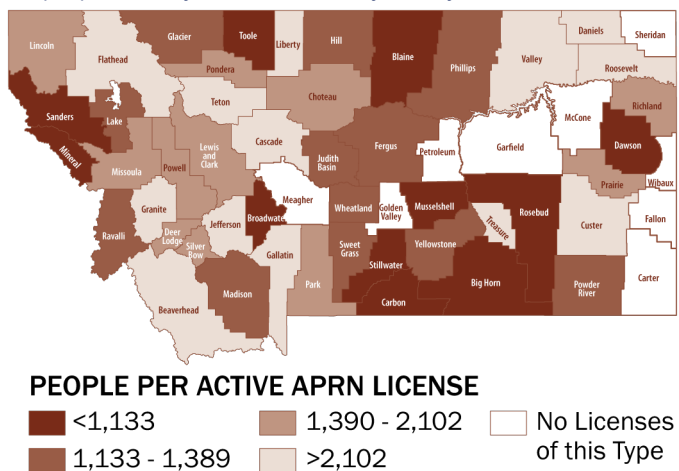
People per Actively Licensed Medical Doctor by County

**Figure 3: Physician's Assistants**

People per Actively Licensed Physician's Assistant by County

**Figure 4: Advanced Practice Registered Nurses**

People per Actively Licensed APRN by County



Source: Montana Department of Labor and Industry licensure database. Population data comes from the American Community Survey 2010-2014 five-year estimates.

occurring. Figures 2 through 4 show the number of people per actively licensed Medical Doctor, PA and APRN by county. The darker the county the larger the ratio of people to licensee. Counties colored white do not have any active licensees living in the county.

Medical doctors are fairly highly concentrated in the western portion of the state, as well as in some other more populated counties. In counties where there are no medical doctors living, there tends to be a fairly high concentration of either PAs or APRNs. This could suggest that APRNs or PAs are serving in place of primary care doctors in these areas. However, it could also be that medical doctors living in other counties are traveling to the underserved areas to provide services. These maps depict where the licensee lives, not necessarily the area they serve.

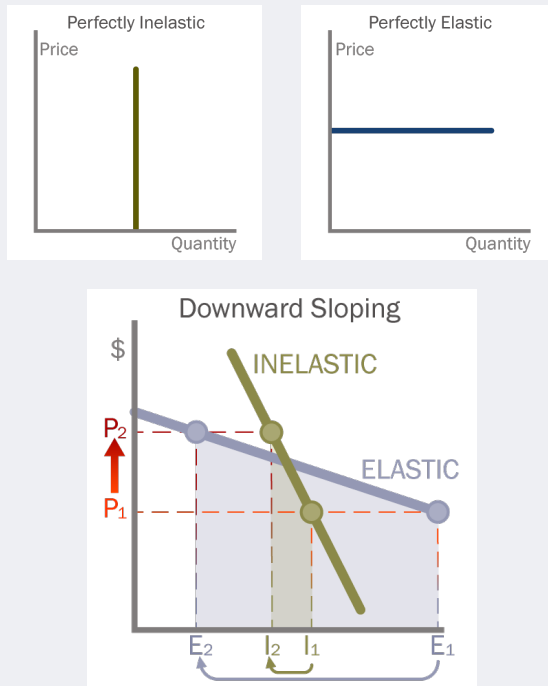
HEALTH CARE DEMAND – PRICE SENSITIVITY AND IMPERFECT INFORMATION

For most people, the demand for health care is uncertain and utilization is highly concentrated. This is particularly true of emergency care, which is difficult to predict and often seen as a necessary expense. As a result, demand for emergency care is not very sensitive to changes in price. In economics, this is referred to as inelastic demand. Because emergency care demand is sudden, consumers are limited in their choices of how and when they receive care, particularly those in rural areas with only a few providers. Preventative care, on the other hand, is more predictable and can be viewed as more optional. Therefore, demand for preventative care is more sensitive to changes in price.

The inelasticity of health care demand allows health care providers to engage in price discrimination – charging different price for the same service.⁴ Part of the reason health care providers have the ability to price discriminate is due to a lack of transparency in fees. Consumers often do not know the price of the service until months after the service has been provided. This makes it difficult for consumers to make rational decisions about how much health care they can afford prior to receiving services. Typically, a consumer's ability to pay is assessed after the care has already been received. If the consumer is unable to afford their care, this results in uncompensated care.

IN-ELASTIC VS. ELASTIC DEMAND

Elasticity of demand measures how sensitive consumers' purchasing decisions are to changes in the price of a good. The more elastic demand is, the more the price affects a consumer's decision about how much of the good to purchase. Elasticity of demand is represented by the slope of the demand curves in the graphs below.



When demand is perfectly inelastic, the quantity the consumer demands remains constant no matter the price. Perfectly elastic demand means that if the price of a good changes, the consumer will no longer demand any of that good. The demand for most goods falls somewhere in between perfectly inelastic and perfectly elastic, as represented by the bottom graph. For a given change in price (P_1 to P_2), the change in quantity demanded is much larger for the elastic demand (E_1 to E_2) than for the inelastic demand (I_1 to I_2).

Price discrimination occurs in the market for health care because individuals are charged different prices for the same service based on their ability to pay.

In general, patients have more information about their own health than providers, and doctors have more information about necessary treatments than patients. Imperfect information between doctors and patients causes inefficiencies in the market for health care, such as supplier-induced demand. Supplier-induced demand occurs when physicians order tests or treatment options of little value to the patient in order to increase revenue and to defend against a malpractice suit. Patients do

PRICE DISCRIMINATION

Price discrimination occurs when a supplier charges different prices to different individuals for the same service. Some examples of price discrimination outside of health care are senior or student discounts, college scholarships or need-based college grants, and matinee movie tickets.

not have a good understanding of whether particular treatments are necessary, and the doctor isn't certain that the treatment won't be valuable because they may not have all the information about the patient's health. Furthermore, supplier-induced demand can also be justified because the cost to the patient can be minimal in the presence of health insurance. Supplier-induced demand can drive up the cost of care, causing the market price and quantity of health care to deviate from the socially optimal outcome.

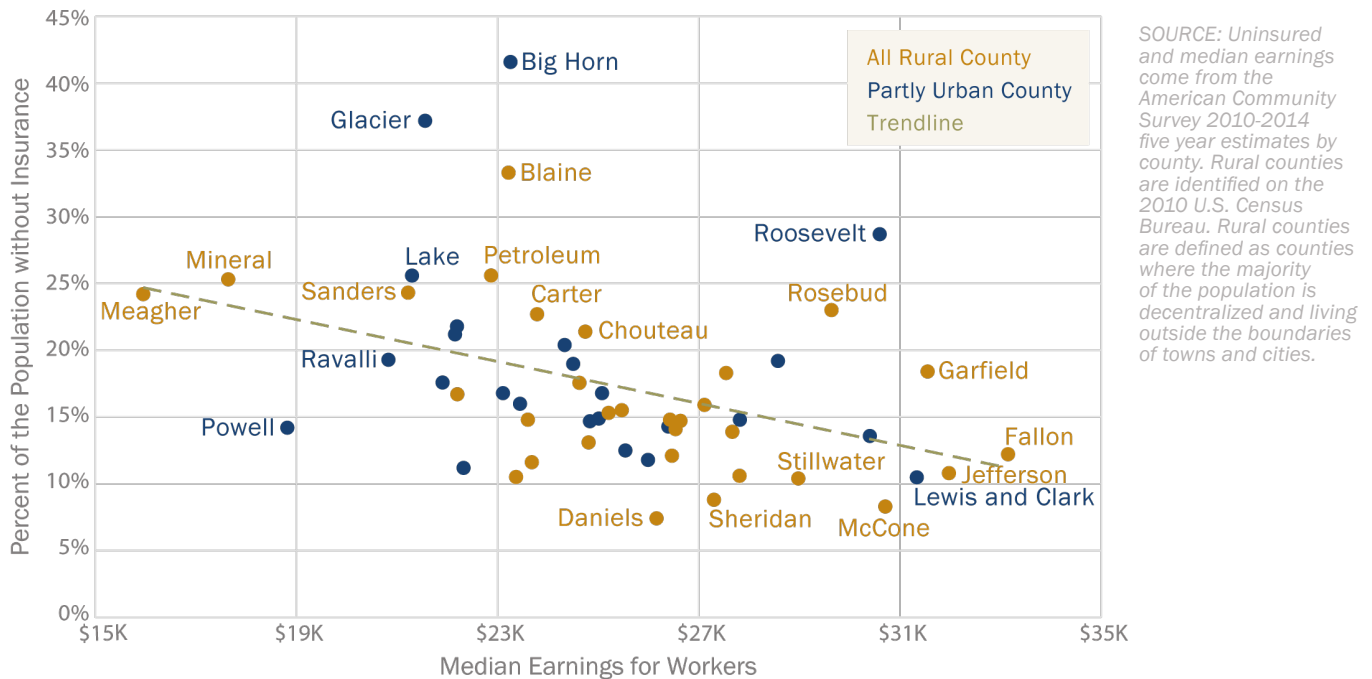
HEALTH CARE DEMAND - INSURANCE

The uncertainty and suddenness of health care demand generates demand for health insurance. Most people are risk-averse and would rather pay a little bit every month to avoid sudden large health care costs.⁵ While health insurance helps individuals hedge their risk against large medical bills, it also influences an individual's demand for health care. An individual's demand for health care is greater in the presence of insurance than without insurance because insurance effectively lowers the cost of care for the individual.⁶ In economics, this concept is called moral hazard, and it exists within many insurance markets.

Health insurance can also provide an incentive for people to take on more risky health behaviors. For example, an uninsured individual living in a rural community may forgo dental appointments and implement a daily flossing regiment to avoid a large dental bill. However, once they receive dental insurance they may be less careful to floss daily because the risk of an expensive dental bill is lower.

Individuals in rural communities without insurance may delay preventative care because it is too expensive and difficult to access, making them more susceptible to sudden large medical bills resulting from emergency care. In Montana, communities with a higher percentage of uninsured people also tend to have lower incomes, adding another barrier to receiving care.

Figure 5: Percent of Population without Health Insurance and Median Earnings by County



SOURCE: Uninsured and median earnings come from the American Community Survey 2010-2014 five year estimates by county. Rural counties are identified on the 2010 U.S. Census Bureau. Rural counties are defined as counties where the majority of the population is decentralized and living outside the boundaries of towns and cities.

Figure 5 shows the estimated percentage of the population without health insurance, and the median earnings for workers in each county. The negative relationship between earnings and the uninsured are demonstrated by the linear trendline.

Figure 5 also identifies counties where the population is fairly centralized into towns, labelled “urban” for short. The centralization of the population allows health care services to be provided more efficiently. The counties identified as rural have populations that are decentralized across the full county, not centered in towns, adding to the costs of providing care.

Lack of insurance and limited income can become additional barriers to receiving care in rural communities. Consistent access to preventative care and health insurance in rural communities may help bring down the cost of health care in those areas.

CONCLUSION

The structure of the market for health care presents some challenges to rural communities in Montana. Economies of scale and higher inputs costs in rural areas give health care providers the incentive to locate in urban areas, and make access to care more difficult in rural communities. Decreasing transportation costs through infrastructure improvements, and substituting labor inputs can increase access to care in rural communities and help rural providers control costs. Individuals in rural communities who are uninsured are more susceptible to large medical bills resulting from emergency care. Providing consistent access to preventative care, and lowering the cost of care through insurance may help rural communities better control their health care costs.

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