Examining the Relationship Between Access to Healthcare, Health Outcomes, and Income and Employment

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Abstract

In this literature review we will parse through various sources to determine the effect that an increase in distance has on notable health outcomes. We want to look at how proximity to healthcare sources influences life expectancy (at birth, thirteen, and during adulthood), health resilience, and substance abuse, etc. We will also look at potential other factors that influence proximity and accessibility to healthcare. We want to examine how proximity to healthcare affects, or is affected by, income or employment levels in an area. There are many potential ways in which proximity to healthcare, socioeconomic characteristics, and health outcomes are related to each other. Our findings on how these concepts are related would have important implications for welfare in a specific region, both in health and more generally. These welfare implications could drive policies that call for increased investment into healthcare facilities.

Introduction

This paper explores the relationships between access to healthcare, health outcomes, and income and employment. These three things are potentially intricately related to each other and have important consequences. The relationship between access to healthcare and health outcomes alone is important, but in a general sense it is obvious. People who have access to healthcare will generally be able to consume more healthcare and will generally be healthier. The role in which income and employment play in this relationship adds an interesting layer to this relationship. We generally see that low income areas have poorer health than high income areas. We could conclude that this is because they have less access to healthcare services. While this is plausible, determining a causal relationship is not so clear. It could be areas with less healthcare access (less primary care physicians, for example) have poorer health, which could lead to lower income levels. It could also be that lower income areas deter private healthcare companies from establishing themselves in those areas, which leads to less access and poorer health. Beginning to identify the causal relationship would have important and potentially different policy implications. If low income causes decreased health or decreased access to healthcare, then stimulating the wages in these economies would be effective. If less access to healthcare causes decreased health or lower incomes, then policies that increase the supply of healthcare would be effective. This paper will first look at the relationship between healthcare access and health outcomes. We discuss healthcare access more in the sense of the supply and presence of healthcare services and less in the sense of affordability. We will then look to determine the causal relationship between healthcare access and income levels. We will conclude by discussing the policy implications of our findings as well as potential further research.

Relationship Between Access to Healthcare and Health Outcomes

Before analyzing the effect of access to healthcare on income and employment levels, it is first important to highlight how access to healthcare influences health outcomes. A large determinant of healthcare access in the United States, especially rural areas, is the physical or driving distance between a patient and their healthcare options. Due to the difference in population density in different areas of the United States, we must question to what extent the outcomes of any research are able to be applied to the entirety of the country, as there have been no large-scale, nation-wide studies done previously. Instead the studies tend to focus in on a particular region of the United States. One such study was conducted on the population of northern New England, specifically the states of Maine, New Hampshire and Vermont (Goodman et.al, 1997). Given this sample size we need to call into question the ability of this study to hold for the rest of the country, especially when it is recognized that the region has small metropolitan areas and an abnormally large rural population. The study finds that as distance to hospitals increases, hospitalizations for medical illness decrease. These results hold for both adult and pediatric patients. There are however, slight differences in the rates of hospitalizations for adults and pediatrics within the different distance brackets studied in the paper. Adults residing in the same zip code as a hospital were discharged at a rate of 80.7 per thousand persons, those residing within 15 minutes of the hospital had a rate of 63.7 per thousand, those residing between 16 and 30 minutes had a rate of 62.3 per thousand and those residing more than 30 minutes away had a discharge rate of 71.1 per thousand, creating a u-shaped distribution. The discharge rates for children show a stepwise function with discharge rates decreasing from 31.2 per thousand for those living in a zip code with a hospital to 25.1 per thousand for those residing at more than 30 minutes travel time. Despite finding these differing discharge rates the authors find that residents of northern New England who lived farther from hospitals were less likely to be hospitalized for

medical illness, in spite of their relatively high geographic access to primary care physicians. This effect was observed for illnesses where outpatient care was considered a reasonable alternative, and it is also worth noting that these types of illnesses are the most common reason for hospitalization. The strength of the effect deteriorates when the medical consensus for the need for hospitalization is strong, at this point the authors observed a slight and nonsignificant decline in hospitalization rates with increasing distance.

A paper done by Miller looked at Massachusetts healthcare reform that happened in 2006, which increased the number of insured people in Massachusetts. The additional insurance coverage lowered out of pocket costs for individuals, which caused them to utilize healthcare services more frequently, and as a result self reported physical and mental health improved in Massachusetts (Miller 2012). While this study looked at access in the sense of greater insurance coverage and increased affordability rather than closer proximity to healthcare services, the finding that greater utilization of healthcare services increased health is important. As was discovered by Goodman et al, closer proximity to hospitals increases the utilization of those hospitals (1997). Since Miller suggests that greater utilization increases health, these people who live closer to hospitals and can utilize them more would likely see increases in their health.

Researchers outside of the United States have found a similar result regarding healthcare usage with respect to distance. In their paper "*The Choice of Health Care Facilities in Rural Areas of Nigeria Analyzing the Impact of Distance and Socio-Economic Factors"* Olawole notes that access to health care varies because residents and physicians are not uniformly distributed. These variations are more pronounced in the rural areas of developing countries and are identified as a limiting factor in the development of rural areas. Referencing earlier research Olawole states that most people would not travel more than 5 kilometers for basic preventive or

curative care. They also show evidence from Zambia that shows for distances less than 5 kilometers fifty percent of patients would attend hospitals, with that number falling to two percent with a distance between 33 and forty kilometers(Olawole 2010). The analysis done within this paper shows a weak by positive correlation, r- squared value of 0.379, between distance and health facility utilized. This tells us that distance can not sufficiently account for the choice and utilization of health facilities in the study area.

While we recognize the validity of all of these studies and the findings of the authors, we believe that the scope of these studies are too narrow to apply to any population larger than the sample. The demographics of New England are different than those of the U.S. as a whole by a significant margin, while the population is overwhelmingly rural, there are also multiple highly regarded research hospitals in the region. A factor that could skew results as patients may be less likely to make use of local hospitals. The study in Nigeria has similar drawbacks, with the U.S. and Nigeria being very different in terms of standard of living. Assumptions made about the population of Nigeria would definitely not hold for the United States, especially given the higher likelihood that any individual in the U.S. has access to a car and would be more likely to travel a farther distance for medical care. In our opinion, in order to be able to expand results of a study to the entirety of the United States, we would need to have the sample spread across multiple regions of the United States, especially ones that include areas of differing income levels.

Relationship Between Health and Income and Employment Levels

The relationship between health and income and employment levels is also necessary to analyze in order to determine the relationship between access to healthcare on income and employment levels. To start with income/employment level's effect on health, many scholars have found that there is a positive correlation between the two. For example, as people gain more

income, they are able to take advantage of better quality, and usually more expensive, health services, pay for more frequent doctors visits, and live healthier lives. Karin Hederos et al. examine this relationship by specifically looking at how life expectancy changes with an increase in income for Swedish men from 1980 to 2007. Using cross-sectional data from Statistics Sweden, Hederos et al. find that "the change in men's life expectancy between 1970 and 2007 ranges from 4.1 years in the 2nd quintile group to 6.3 years in the 5th quintile group" (Hederos et al. 2018). With this finding, Hederos et al. points to how although life expectancy has increased amongst all income levels over the years, those with higher incomes have increased at a faster rate than those with lower incomes. We agree with Hederos et al. as an increase in life expectancy can be fueled by the ability to buy better quality, preventative health services more often. It is also important to add onto this study by mentioning that many scholars believe this gap between high and low income individuals' life expectancies is increasing. As upper-class citizens gain more money at the expense of lower-class citizens, upper-class citizens will continue to be able to invest in preventative health services while lower-class citizens cannot.

Otto Lenhart interestingly adds to the conversation about the relationship between health and income/employment levels by analyzing how an increase in income can also affect how people *perceive* their health status. Lenhart uses the Earned Income Tax Credit, a cash transfer program that gives low-income working families tax credit, as an independent variable and a participant self-reported health status, which is on a scale from 1 (excellent) to 5 (poor), as the dependent variable to explore this relationship. In his study, Lenhart discovers that as he analyzed families with more EITC given to them, it "increased the likelihood of affected heads of household reporting excellent or very good health by 6.9 to 8.9 percentage points" (Lenhart 2018). In other words, his study suggests that families with more income report better health. We

agree with his findings as more money to spend on health services usually result in a better health status. A limitation with his study, however, is, of course, that self-reporting of someone's health status does not always equate to an actual status of someone's health. As feeling healthy can be subjective, self-reporting could result in inaccurate information for the study. This limitation is important to highlight, yet overall, Lenhart provides promising information about a positive relationship between income and health.

In addition to exploring how income/employment levels can affect health, we also want to highlight how health can affect income/employment levels. To begin, Jonathan William Minton et al. study how long term illness affects unemployment and economic inactivity. By looking at cross sectional data of working-aged men and women from the United Kingdom, Minton et al. find that for men (see figure below) and women, a limiting long term illness provides a negative effect on employment, specifically for those who do have a long term illness (Minton 2012).

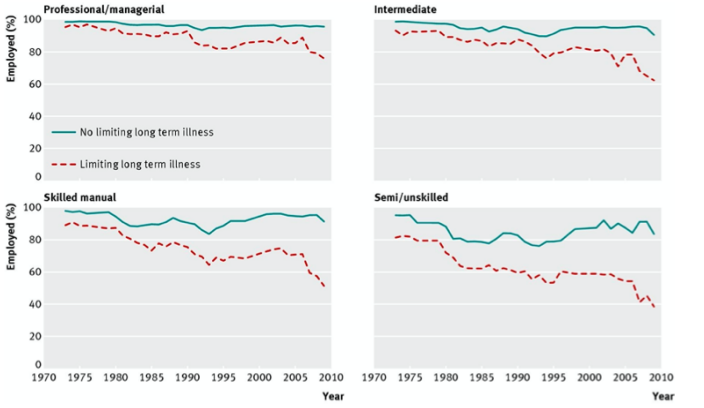

Fig 3 Employment rate in men of working age with and without limiting long term illness, by occupational group

We agree with Minton et al.'s findings. When people do not have good health, it can be difficult for them to perform well at their jobs. Unhealthy people are sometimes limited in the type of work they can do (ie. if one is overweight, one may not be able to work in a job that requires you

to be healthy like construction) and the duration of work they can do (ie. if one has breathing problems, one might need to take multiple breaks).

We see this similarly in the influence of health on income. Iveta Pauhofova et al.'s study used a sample of 77,310 people 16+ years old to analyze how health status impacts the one's income level. Through their analysis, the economists discover that "total income is 2.5% lower in the respondents, who mentioned current health problems and 3.6% lower for those who had mentioned any three years earlier" (Pauhofova et al. 2018). This study shines light on how those with health problems in turn have lower income than their healthy peers. We agree with this study as, for example, unhealthy individuals cannot work as long and, therefore, make less money. However, it is important to highlight that this study does not dive deeper into the reasons behind their findings other than not working as many hours. Other factors that can be explored include mental health challenges on work ability and bias against unhealthy individuals in the promotion process, for example.

Relationship Between Access to Healthcare and Income Levels

We next want to look at the relationship between access to healthcare and income levels. This is similar to the previous section that looked at the relationship between health and income and employment and discussed the ability to afford more health services with additional income. In this section, we want to focus on access to healthcare more in the sense of the supply of healthcare present in high and low income areas, rather than the affordability of services.

A study by Guerrero and Kao (2013) looked at the locations of substance abuse and mental illness care centers in Los Angeles County. They call these centers that offer both care for mental illness and substance abuse "integrated care" facilities. They found that communities that were mostly made up of minorities and communities that were low income had limited access to

these facilities (Guerrero and Kao, 2013). While this does help contribute to understanding the relationship between healthcare access and income, it does not attempt to address if the limited facility access caused the presence of low income areas or if the low income areas caused a lacking presence of these integrated facilities. A good way to determine which caused which would be to look at which existed before the other. If the integrated care facilities came about after these areas were already low and high income areas, then it is likely that high income areas attract the presence of these facilities. If the income levels of these areas only developed into low and high income areas after these facilities were already established, then these facilities likely drive these income effects. The paper does not suggest anything about the causal effect and also does not explain the timing of when these facilities were built or when these areas developed into low and high income areas, so we cannot conclude much from this paper beyond that low income areas see less access to these facilities.

A study by Nguyen et al (2019) examined the access to physicians and hospitals for low and high income areas in the United States after the passage of the Affordable Care Act. Access was examined in terms of supply, and the authors computed densities of primary care and specialty physicians in high and low income zip codes. They further stratified by rural and urban zip codes. The authors found that urban low-income areas were 0.5% more likely to have very low access to primary care physicians relative to high-income areas. Low access was defined as having less than 5 physicians per 10,000 people. When stratifying further into rural and urban areas, they found that looking just in suburban areas, low-income areas were 7.4% more likely to have very low primary care density relative to high-income areas (Nguyen et al, 2019).

This paper tells us a lot about how income and access to healthcare are related, and potentially suggests that income level is what causes the lack or presence of primary care. The

authors use the Affordable Care Act as a "shock" to the supply of healthcare, mentioning that one of the goals of the act was to provide greater access to healthcare (Nguyen et al, 2019). While the act primarily tried to increase access through increasing insurance coverage, the authors note that 1 in 13 Americans receive healthcare from one of the 10,000 health centers that were funded by the Affordable Care Act (Nguyen et al, 2019). This helps show that the ACA did not just try to increase insurance coverage, but also tried to increase the supply of healthcare. Because this increased coverage occurred relatively recently, it is likely that the increased supply came after these areas were already low or high income areas. The timing would indicate that healthcare services establish their location in response to the income levels of certain areas. However, the authors do not explicitly conclude this, so this is not a definitive answer.

Looking at these papers that explore the relationship between income levels and healthcare access, it seems that the more likely story for a causal relationship is that income levels cause access to healthcare. This is seen in the way some papers construct their models and the timing of the data that is used. While none of these papers make this assertion, it is a plausible causation story. Low income areas may seem unattractive to healthcare providers because perhaps because low income individuals may not pay for healthcare services as much as high income individuals do. According to Viscusi's mathematical expression for the statistical value of life, individuals with higher wages tend to value their life more because they are less willing to risk their life for additional units of consumption (2005). This might indicate that high income individuals are more inclined to pay for health services that are not essential to health but still beneficial to health. If that's true, healthcare providers would see greater business in high income areas and would rather set up in those areas. The reverse causality, which is that access to healthcare causes income levels, seems less evident in these papers. It seems that this could be

true only in the sense that access to healthcare could lead to greater health, and greater health could lead to higher income levels. Thus it isn't so much access to healthcare causing income levels to rise, but healthier individuals.

Conclusion, Implications for Policy, and Further Research

In surveying the literature, we have come to better understand the relationships between access to healthcare, health, and income and employment. We find some evidence that greater access to healthcare, particularly looking at a greater supply of and closer proximity to healthcare services, leads to greater utilization of these services, which are likely to result in greater health. Health and income and employment have a positive relationship, and there is evidence both that higher incomes lead to greater health and that greater health can lead to increased income and employment. Access to healthcare and income are related in that high income areas tend to have a greater supply of healthcare services around them, and it seems to because healthcare services providers are attracted to high income areas.

These findings can have important implications for policy. We see that low income areas tend to have less access to healthcare and are generally less healthy. Based on our findings that seem to indicate healthcare services are attracted to high income areas, policies that attempt to raise the health of individuals or raise their access to healthcare should focus more on raising people's incomes in these areas rather than spending money on building hospitals or incentivizing primary care physicians to practice in low income areas. By enabling individuals to earn higher incomes, they will have more money to spend on healthcare services, which could attract more healthcare service providers to their area.

Further research on this topic might include original research that attempts to better determine the causality between access to healthcare and income levels, as this is important for

guiding policy and the literature we have explored do not explicitly address this issue. We might also want to look at other demographic factors that could play a role in health and access to healthcare. For instance, Guerrero and Kao also found that communities made up of primarily minority races had less access to the integrated care facilities (2013). Perhaps healthcare providers also tend to cater to white populations more than others. Further research would attempt to discover all the determinants in why access to healthcare varies among the population.

Works Cited

Goodman, DC, Fisher, E., Stukel, TA, and Chang C. "*The distance to community medical care and the likelihood of hospitalization: is closer always better?*" American Journal of Public Health. 1997.

Guerrero, E. G., & Kao, D. (2013). Racial/ethnic minority and low-income hotspots and their geographic proximity to integrated care providers. *Substance Abuse Treatment, Prevention and Policy*, 8, 34. doi: http://dx.doi.org.proxy.wm.edu/10.1186/1747-597X-8-34

Hederos, Karin, Jäntti, Markus, Lindahl, Lena, and Torssander, Jenny. "Trends in Life Expectancy by Income and the Role of Specific Causes of Death." Economica (London) 85, no. 339 (2018): 606-25.

Lenhart, Otto. "The Effects of Income on Health: New Evidence from the Earned Income Tax Credit." Review of Economics of the Household 17, no. 2 (2018): 377-410.

Miller, S. (2012). The Effect of the Massachusetts Reform on Health Care Utilization. *Inquiry*, 49(4), 317-326. Retrieved November 11, 2020, from http://www.jstor.org/stable/23480769

Minton, Jonathan William, Pickett, Kate E, and Dorling, Danny. "Health, Employment, and Economic Change, 1973-2009: Repeated Cross Sectional Study." BMJ : British Medical Journal 344, no. 7856 (2012): 16.

Nguyen, Christina & Chernew, Michael & Ostrer, Isabel & Beaulieu, Nancy. (2019). Comparison of Healthcare Delivery Systems in Low- and High-Income Communities. *The American Journal of Accountable Care*, 7(4), 11-18. https://www.researchgate.net/publication/339106851_Comparison_of_Healthcare_Delive

ry_Systems_in_Low-_and_High-Income_Communities

Olawole, M.O. "*The choice of health care facilities in rural areas of Nigeria: Analyzing the impact of distance and socio-economic factors.*" IFE Research Publications in Geography.

Pauhófová, Iveta, Bukharbaeva, Liliya, and Egorova, Juliya. "Evaluation of Health Influence upon an Individual's Income." Ekonomický časopis 66, no. 10 (2018): 1051-064

Viscusi, W. Kip. (2005). The Value of Life. *New Palgrave Dictionary of Economics and the Law*, 2nd Edition, *Vanderbilt Law and Economics Research Paper No. 08-04*, Available at SSRN: https://ssrn.com/abstract=827205