Healthcare Access in Indiana

To the Point

Provision and access to healthcare services are essential for the well-being of a population. They are also key amenities that firms look for when selecting a new site. This report documents stark differences in the access to healthcare services across Indiana counties. In other words, where people live influences their access to health resources. While access to healthcare services is very favorable for most urban counties, it is notably unfavorable in the rural counties along the Ohio River and in the rural northwestern counties along the border with Illinois. To improve healthcare accessibility in these counties, the report recommends enhancing healthcare services in rural areas as well as improving rural residents’ ease of access to the wealth of services in the more urban areas.

Introduction

The Indiana State Department of Health is unequivocal about the relationship between health, quality of life, and economic prosperity:

“The Indiana State Department of Health supports Indiana’s economic prosperity and quality of life by promoting, protecting and providing for the health of Hoosiers in their communities.”

Source: [http://www.in.gov/isdh/18930.htm](http://www.in.gov/isdh/18930.htm)

Healthy populations and access to health services are vital factors in economic development and prosperity. Businesses do not locate in areas where there is limited access to healthcare services. And attracting new industries in rural communities hinges on good access to healthcare resources in those communities and surrounding regions.

Comparing Indiana to other U.S. states shows that provision of healthcare services in Indiana ranks below average. For example, using the number of physicians per capita as an indicator, Massachusetts takes the lead, with 450 physicians per 100,000 residents, followed by Maryland and New York State, with 411 and 389, respectively (Table 1, page 2). Indiana ranks 39th among the 50 states, with only 213 physicians per 100,000 residents. Phrased differently, Massachusetts has one physician for every 222 residents, while Indiana has only one physician for every 470 Indiana residents. Even when comparing Indiana to other Midwestern states, it still ranks quite low. Iowa is the only Midwestern state that has fewer physicians per capita than Indiana.

In Indiana, just as in Iowa, the impact of a physician deficit is somewhat mitigated by an above-average number of nurses per capita. With 877 nurses per 100,000 residents, Indiana has slightly more than the national average of 824 nurses per 100,000 residents and ranks 25th among U.S. states. Iowa ranks in the top five, and Michigan is the only Midwestern state that has fewer nurses per capita than Indiana.
The numbers of physicians and nurses per capita shown in Table 1 indicate Indiana’s overall healthcare service provision. However, the question remains whether healthcare services are located where the people are located. Do all Hoosiers enjoy accessible healthcare services, or are there areas in Indiana where residents are underserved because they cannot easily reach the state’s healthcare services? To answer this question, standard measures of access to healthcare services (like the one described in the next section), while useful, fall short. In this report, we therefore propose an alternative measure that permits more precise assessments. Using the alternative measure, this report shows that access to healthcare services is not the same for everyone. In short, where you live affects what you get.

### Health Professional Shortage Areas

The U.S. Department of Health and Human Services designates Health Professional Shortage Areas (HPSAs) for primary medical care, dental care, and mental health. For primary medical care, an area is designated as an HPSA if one of the following conditions is met:2

- The ratio of residents to primary care physicians exceeds 3,500:1, whereby all primary care physicians within a distance of 30-minutes travel time are included.
- The ratio of residents to primary care physicians is between 3,000:1 and 3,500:1 and the area has unusually high needs for primary care services. Unusually high needs occur if there are more than 100 births per year per 1,000 women aged 15 – 44, if there is a high infant mortality (above 20 infant deaths per 1,000 live births), or if more than 20% of the population is poor.
- Primary medical care professionals in contiguous areas are overutilized, excessively distant, or inaccessible to the population of the area under consideration.

Figure 1 shows the HPSAs in Indiana. These areas include the rural counties of Crawford, Daviess, Fountain, Franklin, Jennings, Lagrange, Newton, Owen, Parke, and Warren, as well as portions of the predominantly urban counties Elkhart, Lake, Marion, and St. Joseph. While the designations of areas and places to Health Professional Shortage Areas are insightful, the designations do have some problems.

Most important, they only indicate whether an area has a healthcare services deficit, but they do not allow us to assess differences in the severity of shortages or assess which areas are at risk of becoming shortage areas in the future. Moreover, because HPSAs do not coincide with political

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1 Access to medical care can be defined as residents’ ability to obtain particular healthcare services. It is a multidimensional concept that includes affordability, accommodation, acceptability availability, and accessibility (Penchansky and Thomas, 1981). The first three dimensions address barriers of a cultural, social, and economic nature such as healthcare financing arrangements. The final two dimensions are of a geographic nature. Availability refers to the supply of healthcare providers inside a region. Accessibility combines availability with distance or travel time separating patients and providers. This report focuses on accessibility only.

2 Refer to [http://bhpr.hrsa.gov/shortage/hpsacritpcm.htm](http://bhpr.hrsa.gov/shortage/hpsacritpcm.htm) for the exact specifications.
boundaries used by other agencies and institutions (e.g., the U.S. Census Bureau), it is difficult to link them to health outcomes such as cardiovascular disease rates. To remedy this shortcoming, we suggest an alternative measure that allows us to assess healthcare access for all counties.

**Measuring Relative Healthcare Accessibility for Indiana Counties**

We suggest a measure of relative healthcare accessibility that places counties on a scale from zero to one. The score of zero is assigned to the county in which the population has the worst access to the state’s healthcare services. The score of one is assigned to the county with the best healthcare access. The closer a county’s score to one, the better the county’s access to healthcare.

The measure is based on the idea that any resident can use all healthcare services in the state. However, services in close proximity are more accessible for the user than those further away. Moreover, services in a highly populated area must be shared with many other users. Thus, for residents of a specific location, the healthcare services are weighted by the distance to the providers and by the demand from other potential users. It should be noted that such a measure can be developed for any type of healthcare provider, be it nurses, physicians, or hospitals. In this report, we show the results for physicians (of any specialty) and for hospitals (weighted by the number of beds). It should be emphasized again that

\[ A_i = \sum_{j=1}^{n} \frac{S_j d_{ij}}{V_j} \]

\[ V_j = \sum_{k=1}^{m} P_k d_{kj} \]

where the denominator, \( V_j \), represents the demand for the care facility at location \( j \).

- \( S_j \) is the service capacity at provider location \( j \).
- \( d_{ij} \) is the distance between population point \( i \) and provider location \( j \).
- \( n \) is the total number of healthcare facilities location.
- \( m \) is the total number of population locations and \( P_k \) is the population size at point \( k \).

The population data were extracted from the U.S. Census Bureau (2000 Census Summary File 1). The number of physicians was derived from STATS Indiana. Data about healthcare service location (hospitals and rural health clinics) and number of beds were obtained from the healthcare providers’ directory of Indiana State Department of Health. Distances between hospitals and population centers were obtained via ArcGIS. For more details, see Unal, Chen, and Waldorf (2007).
the measures only address geographical access to healthcare and do not include other barriers to access such as insurance and affordability constraints.

**Access to Physician Care**

Figure 2 shows the landscape of access to Indiana’s physicians. The darkest shading indicates the best, and the lightest colors indicate the worst accessibility. The emerging pattern reveals a stark contrast between the locations with good access and those with poor access. Favorable access to physicians is characteristic of the more urban counties, especially the fast-growing suburban counties around Indianapolis (Boone, Hamilton, Hancock, and Hendricks counties) and counties that serve as regional centers, such as Vanderburgh County (Evansville) and Allen County (Fort Wayne). Favorable access to physician care is also characteristic of the two counties housing Indiana’s major universities (Tippecanoe and Monroe counties).

Table 2 shows the counties with the best and worst access to Indiana’s physicians. Marion County, with its abundance of physicians, tops the list. Its access score is 1.6 times as high as that of the second-ranked county, Vanderburgh County, and more than two times as high as all but four counties. Marion County’s primacy shows that access to physician care is very unequally distributed across Indiana.

Indiana counties with the worst access to physician care are listed at the bottom of Table 2. Posey County in southern Indiana has the worst access to physicians, followed by four other counties located along the Ohio River: Switzerland, Ohio, Perry, and Spencer counties. The poor access in some of these counties is mitigated to some extent by physicians in other states. For example, Ohio and Switzerland counties are in close proximity to Cincinnati.

Only two of the 10 counties with the worst physician access, Benton and Newton counties, are located in the northern portion of the state. They are part of a vast area along the Illinois border that has also been identified as a Health Professional Shortage Area according to the criteria of the U.S. Department of Health and Human Services.

Table 3 shows the characteristics of counties with the best and counties with the worst access to physician care. More than one third of Indiana’s population lives in one of the top 10 counties with excellent access to physician care. These counties not only have excellent access to physician care, they also tend to be fast-growing counties, where births outnumber deaths and where people moving in outnumber people moving out. The largest city of the 10-county area with excellent access to physician care is the state’s capitol, Indianapolis.

In stark contrast, the 10 counties with the worst access to physician care house less than 3% of Indiana’s residents. These counties are very rural, with a density of only 47 persons per square mile. The largest city, Tell City, has fewer than 8,000 residents.
**Table 3. Characteristics of Counties with Best and Worst Access to Physician Care**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Ten Counties with Worst Access</th>
<th>Ten Counties with Best Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population in 2006</td>
<td>165,521 (2.6%)</td>
<td>2,432,395 (38.5%)</td>
</tr>
<tr>
<td>Density (persons per sq mile)</td>
<td>47.2</td>
<td>582.7</td>
</tr>
<tr>
<td>Average rurality index 2000</td>
<td>0.55</td>
<td>0.17</td>
</tr>
<tr>
<td>Largest City (population in 2005)</td>
<td>Tell City (7,690)</td>
<td>Indianapolis (792,595)</td>
</tr>
<tr>
<td>Annual Population Change, 2005</td>
<td>Negative</td>
<td>Positive</td>
</tr>
<tr>
<td>Due to: migration</td>
<td>-2.9</td>
<td>+4.9</td>
</tr>
<tr>
<td>Due to births and deaths</td>
<td>+1.6</td>
<td>+7.1</td>
</tr>
</tbody>
</table>

a) Unless otherwise stated, the data are taken from *Stats Indiana* [http://www.stats.indiana.edu/profiles/pr18000.html](http://www.stats.indiana.edu/profiles/pr18000.html)

b) The index of relative rurality ranges from 0 (most urban) to 1 (most rural). It combines four variables: population density (log), population size (log), % urban, straight-line distance to the closest to Metropolitan Statistical Area. Each variable is re-scaled from 0 to 1, and the unweighted average of the rescaled variables is chosen as the link function (Waldorf 2007).

### Access to Hospital Care

Five counties that make the top-10 list of best physician accessibility also show up on the top-10 list of best access to hospital care, namely Marion County and some counties that serve as regional centers, i.e., Vanderburgh, Monroe, St. Joseph, and Allen counties. These counties are joined by five additional highly urbanized counties that become focal points of hospital care: Vigo County (Terre Haute), Jefferson County (New Albany), Lake County (Gary), Madison County (Anderson), and Porter County (Portage, Valparaiso) (see Table 4 and Figure 3). Five counties that make the top-10 list of best access to physician care do not appear on the top-10 list of best access to hospital care, namely Tippecanoe County and the four suburban counties of Indianapolis (Hamilton, Hancock, Hendricks, and Boone counties).

The most underserved counties with poor access to hospital care are listed at the bottom of Table 3. Seven of the 10 counties also appear on the list of the 10 counties with worst physician accessibility. However, the concentration of poor access to hospital care in the southern portion of Indiana, and especially along the Ohio River, is extreme. Here again, the poor access along the Ohio River will be somewhat mitigated if residents can also use hospital care across the border, that is in Cincinnati, OH, and Louisville, KY.

Table 5 (page 6) shows the characteristics of counties with the best and counties with the worst access to hospitals. More than 40% of Indiana’s population lives in one of the top-10 counties. They are characterized by a high population density and rapid population growth. The counties with the worst access to hospital care house only 2.4% of Indiana’s population, have a low population density, and record only slight population gains.

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**Table 4. Counties with Best and Worst Access to Hospital Care**

<table>
<thead>
<tr>
<th>Rank</th>
<th>County</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Marion</td>
<td>1.000</td>
</tr>
<tr>
<td>2</td>
<td>Vanderburgh</td>
<td>0.936</td>
</tr>
<tr>
<td>3</td>
<td>Vigo</td>
<td>0.706</td>
</tr>
<tr>
<td>4</td>
<td>Jefferson</td>
<td>0.662</td>
</tr>
<tr>
<td>5</td>
<td>Allen</td>
<td>0.640</td>
</tr>
<tr>
<td>6</td>
<td>Lake</td>
<td>0.628</td>
</tr>
<tr>
<td>7</td>
<td>St. Joseph</td>
<td>0.550</td>
</tr>
<tr>
<td>8</td>
<td>Madison</td>
<td>0.541</td>
</tr>
<tr>
<td>9</td>
<td>Monroe</td>
<td>0.536</td>
</tr>
<tr>
<td>10</td>
<td>Porter</td>
<td>0.517</td>
</tr>
</tbody>
</table>

a) The higher the score, the better the access.
Table 5. Characteristics of the Counties with Best and Worst Access to Hospital Care

<table>
<thead>
<tr>
<th>Characteristic (^a)</th>
<th>Ten Counties with Worst Access</th>
<th>Ten Counties with Best Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population in 2006 (% of state population)</td>
<td>148,506 (2.4%)</td>
<td>2,696,026 (42.7%)</td>
</tr>
<tr>
<td>Density (persons per sq mile)</td>
<td>45.5</td>
<td>631.2</td>
</tr>
<tr>
<td>Average rurality index 2000</td>
<td>.55</td>
<td>.17</td>
</tr>
<tr>
<td>Largest City (population in 2005)</td>
<td>Tell City (7,690)</td>
<td>Indianapolis (792,595)</td>
</tr>
<tr>
<td>Annual Population Change, 2005 (per 1,000 residents)</td>
<td>Positive</td>
<td>positive</td>
</tr>
<tr>
<td>Due to: migration</td>
<td>-0.9</td>
<td>-0.2</td>
</tr>
<tr>
<td>Due to births and deaths</td>
<td>+2.8</td>
<td>+5.7</td>
</tr>
</tbody>
</table>

\(^a\) See footnotes Table 3.

Table 6. Population Characteristics in Counties with Best and Worst Healthcare Access

<table>
<thead>
<tr>
<th>Population Characteristic</th>
<th>Poor Healthcare Access</th>
<th>Good Healthcare Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physicians</td>
<td>Hospitals</td>
<td>Physicians</td>
</tr>
<tr>
<td>% persons under 5</td>
<td>5.9%</td>
<td>5.6</td>
</tr>
<tr>
<td>% persons 65+</td>
<td>13.6%</td>
<td>13.8</td>
</tr>
<tr>
<td>Farm employment</td>
<td>7.3%</td>
<td>7.9%</td>
</tr>
<tr>
<td>% white</td>
<td>98.0%</td>
<td>98.6%</td>
</tr>
<tr>
<td>Per capita personal income</td>
<td>$25,815</td>
<td>26,307</td>
</tr>
<tr>
<td>% college-educated</td>
<td>11.2</td>
<td>11.4</td>
</tr>
<tr>
<td>% without a High School degree</td>
<td>20.7</td>
<td>22.0</td>
</tr>
</tbody>
</table>

Source: data are compiled from Stats Indiana [http://www.stats.indiana.edu/profiles/pr18000.html](http://www.stats.indiana.edu/profiles/pr18000.html) and the U.S. Census Bureau


Table 6 summarizes the characteristics of residents in counties with poor and residents in counties with good access to healthcare. Several distinct differences emerge, with income and education differences being the most obvious.

- The average per capita income is substantially lower in the area with poor healthcare access than in the area with good healthcare access. The difference in per capita income between poor and good healthcare access areas is greater than $5,000.
- Residents in areas with poor healthcare access are, on average, less educated than the residents of areas with good access. The percentage of residents with a college degree is more than twice as high in good compared to poor healthcare access areas. At the other end of the spectrum, persons without a high school degree are strongly over-represented in the area with poor healthcare access.
• The elderly and children—often facing severe health risks—will undoubtedly benefit from good healthcare access. While children under five are slightly over-represented in areas with good access to healthcare, this is not the case for the elderly.

• The population in areas with poor access to care is almost exclusively white, whereas 20% of the population in areas with good access to healthcare is non-white.4

• Farm employment in the area with poor healthcare access makes up almost 8%, but is nearly absent from areas with good access.

Policy Recommendations

Whether the focus is on access to hospital care or on access to physician care, it is Indiana's rural counties that turn out to be among the most poorly served. It is not surprising, thus, that 67% of the 2,314 respondents in a recent poll of residents in rural Indiana rated the lack of rural healthcare and services as a top priority for state government (PCRD, 2006). Worrisome also is that the affected population in these areas earns less income and has less education.

Equal provision of healthcare services for all people in all parts of Indiana is a challenge to policymakers. One problem in establishing an equitable healthcare system is providing resources in locations that are close enough to be reached with a reasonable amount of effort by the populations being served (Luo and Wang, 2003; Wang and Luo, 2005).

The physical distance between provider and consumer has long been recognized as an important barrier to care. In the case of acute care, distances to hospitals may actually be the difference between life and death. More broadly, long travel distances are known to reduce the use of healthcare services and perhaps lead to poorer health outcomes (Lovett et al., 2002). For example, studies have shown that most people will not travel long distances for basic preventive care (Perry and Gessler, 2000), and Starfield, Shield, and Macinko, (2005) suggest that the supply of primary care physicians has a beneficial impact on population health.

Ensuring physical access—for example, through emergency response services that can bridge the distance or through telemedicine—is a key objective for public planning. This is a difficult objective from a spatial point of view because economies of scale and scope support the development of health services in large urban areas. However, further consolidation of hospital care in Indianapolis and the regional centers may exaggerate the already stark disparities between the urban areas and the medically underserved rural areas of Indiana.

In this regard, Rural Health Clinics take on a pivotal role. Rural Health Clinics are located in areas designated as rural by the U.S. Census Bureau and as medically underserved or HPSA by the U.S. Department of Health and Human Services.5 Rural Health Clinics act as the first point of contact for patients. They provide first response emergency care and routine diagnostic and laboratory services, and establish arrangements with providers and suppliers to furnish medically necessary services not available at the clinic. Increasing the number of Rural Health Clinics or extending their services thus provides an opportunity to shrink the medically underserved areas and provide improved access to rural residents of Indiana.

4 This observation does not imply that race does not affect access to healthcare. Instead, it is possible that racial barriers of healthcare access play out within counties, e.g., at the neighborhood level.

Successful implementation depends on recruitment–and retention–of medical personnel. This is a difficult challenge because money alone does not seem to be sufficient to attract young physicians. For example, a recent study (Muhlenkamp and Waldorf, 2008) finds that young physicians in rural areas do not earn less than those in urban areas. Similarly, the 2000-01 HSC Community Tracking Study Physician Survey does not show significant differences in physicians’ incomes in rural and urban areas. When accounting for rural-urban gaps in cost of living, rural physicians even enjoy an income advantage over their urban colleagues (Reschovsky and Staiti, 2005).

Recruitment challenges are not unique to physicians but extend to the highly educated in general. Numerous studies have shown again and again (Glaeser, 1999; Costa and Kahn, 2000; and Florida, 2002) that young, well-educated households strongly prefer urban milieus to satisfy their lifestyle demands. Entertainment, recreation, social opportunities, diversity, and a wide range of consumer goods and services top their list of desirable place attributes.

In light of these preferences, rural areas face an uphill battle in the recruitment of medical personnel, and rural communities need support for comprehensive strategies to be successful. These could include scholarships for students who commit to providing healthcare in rural areas, bonuses for physicians willing to serve rural areas for at least part of the week, and removing obstacles for delivering basic medical services through nurses. In the short run, it is essential to turn to strategies that make it easier for rural residents to access healthcare services in urban areas. Extending the ambulance service, including airlifting patients needing emergency care, is just one example. However, we may also look to new technologies that enable remote access to the expertise of physicians and hospitals in urban centers.

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