Spatial Analysis of the Difference in Long Term Care Policies and Facilities: Illinois as an example

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長期照顧政策及機構之差異性的空間分析:以美國伊利諾州為例

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Abstract

Purpose of the Study: State policies have recently trended towards encouraging home and community-based services (HCBS) over institutionalized care. No studies have inspected the performance of each state's long-term care (LTC) policy. This paper contributed to examining the preference of LTC policy across 50 states and disparities of counties' LTC resources in Illinois.

Design and Methods: Geographic Information Systems (ArcGIS) was used to visualize the performance of each state's LTC policies through maps. First, overall spatial analysis of Medicaid policy trends across each state was presented by measuring four indicators of LTC resource distribution: generosity, quality, accessibility, and priority. Second, special emphasis was put on the relationship between supplies (county LTC resources) and needs (neighborhood characteristics: elderly population) of LTC in Illinois.

Results: Finding from the analysis indicated that the overall performance of LTC in Illinois ranked number 47, compared to other states, which placed Illinois at the bottom quartile. Illinois ranked at the top quartile only on accessibility (8 of 50) but placed at the bottom quartile on generosity, quality, and HCBS priority (40, 49, and 46 respectively). There also existed disparities across urban and rural areas in Illinois. Most LTC resources, whether institutionalized or HCBS care, were located in urban area, such as Cook County (Chicago).

Implications: Intercommunity disparities were found, the awareness of which can help equip policy makers to allocate resources more efficiently and equitably, with the goal of mitigating disparities in LTC and improving the accessibility in vulnerable regions.

Key words: Long-term care, home and community-based services, the elderly, disparity, spatial analysis

摘要

往昔美國強調機構式照顧的長照政策，近日已朝向以鼓勵家庭及社區式的照顧服務(home and community-based services-HCBS)為基礎。很少研究檢視各個州之間長照政策，本文的目的在於檢視美國五十個州長照政策的表現，並進一步分析伊利諾州內部各郡之間的長照資源的分布差異。本文透過地理資訊系統 (Geographic Information Systems-ArcGIS)的透過地圖視覺化來呈現各個州的長照政策之表現。首先，透過長照政策資源分配的四個指標:慷慨度、品質、可近性及HCBS優先性，來呈現各州Medicaid政策趨勢表現的空間分析。第二，透過空間分析來特別分析伊州內部各郡供給(長期照顧資源)與需求(地區特質:老年人口及相對比例) 之間的關係。研究發現，相對於其他州，伊州的整體表現為第 47，排在底部。伊州只有可近性排在第8，但其他如慷慨度、品質及HCBS優先性都排在後段班(分別為40、49和46名)。伊州城鄉之間也存在極大的內部差異，大部分的長照資源，不論是機構或HCBS都集中在都市地區，如庫克郡(芝加哥)。研究結果望能讓政策規劃者在較弱勢的地區有效並公平地配置資源以減少區域間的不平等。

關鍵字: 長期照顧、家庭及社區為基礎的照顧服務、老年人、不平等、空間分析

Spatial Analysis of the Difference in Long Term Care Policies and Facilities: Illinois as an example

Background information

The growth, of the number of very old and disabled people requiring extensive acute and/or long-term health care and various related services, has led to the rapid increase in expenditures on Medicaid (Longest, 2010).To decrease cost and improve the quality of elders' lives, the current long-term care (LTC) policy in the United States is encouraging Home and Community-Based Services (HCBS) instead of nursing home arrangements, this may postpone institutionalization, slow down the worsening health status of the elderly, and improve the quality of care (Miller, Allen & Mor, 2009). HCBS also supports active and productive aging (Walker, 2009; Wheeler & Giunta, 2009).

In addition, compared to nursing home facilities, arranging for assistance to elders through HCBS provide care recipients with more private (free space to have power over their own lives), higher quality of life (varied social interaction) and this accompanied usually at lower financial costs (Lockhart, Giles-Sims & Klopfenstein, 2009; Yee, 2001). It also lowers Medicaid spending and creates a win-win situation for the government and care-recipients.

Because of the shortage of universal LTC insurance at the federal level, each State has its own LTC policies. Some states put more resources on nursing home care and others favor HCBS. The first part of this article uses spatial analysis to explore LTC budget allocation and available resources at the state level. The second part of this study explores how States' resource allocation, such as more spending (percentage) on nursing facilities or HCBS affects the facility deficiency rating and residents' potential choice between institutionalized care and community care. The third part analyzes the distribution of the nursing facilities and Home Health & Personal Care at the county level and its implication for future long-term care policy in Illinois.

Research Interests

The goal of this research is to focus on both the demand and supply of LTC services. In this study, I try to use the total amount of population over 65 years old as a measure of the demand for LTC services on state level. In addition, I also use the percentage of individuals over 65 years old as another indicator to measure the aging level of each state.

From the supply perspective on the state level, I respectively use Medicaid spending per elderly, nursing home deficiency rate, nursing facility beds among 10,000 elderly, and the percentage of LTC spending on HCBS as four indicators which measure the following dimensions: 1) generosity (measured as Medicaid spending per elderly); 2) quality (measured as the percentage of deficiency in nursing home facility); 3) accessibility (measured as the nursing home beds per 10,000 elderly); and 4) HCBS priority (measured as the percentage of LTC spending on home health and personal care).

Due to the limitation of the available data from other states, this study will be limited to the nursing facilities, Home Health & Personal Care and the population of the elderly in the state of Illinois. Furthermore, this project provides insights into the relationship between the needs of elderly and available resources in Illinois.

State Level

Treat the Elder Population by Demand. Illinois is the seventh largest state in the U.S. with 12.8 million people in 2010.The population of elderly, as the seventh highest, is nearly 1.6 million. The population increased by almost 3.3% or about 0.4 million people in the past decade (United States Census Bureau, 2010). The growth rate of the population of 65 years and over in Illinois grew from 4% in 1990 to 12.1% in 2000. From 1900 to 1990s, the growth rate tripled from 4.1% to 12.4% for the nation (see Figure 1.1).

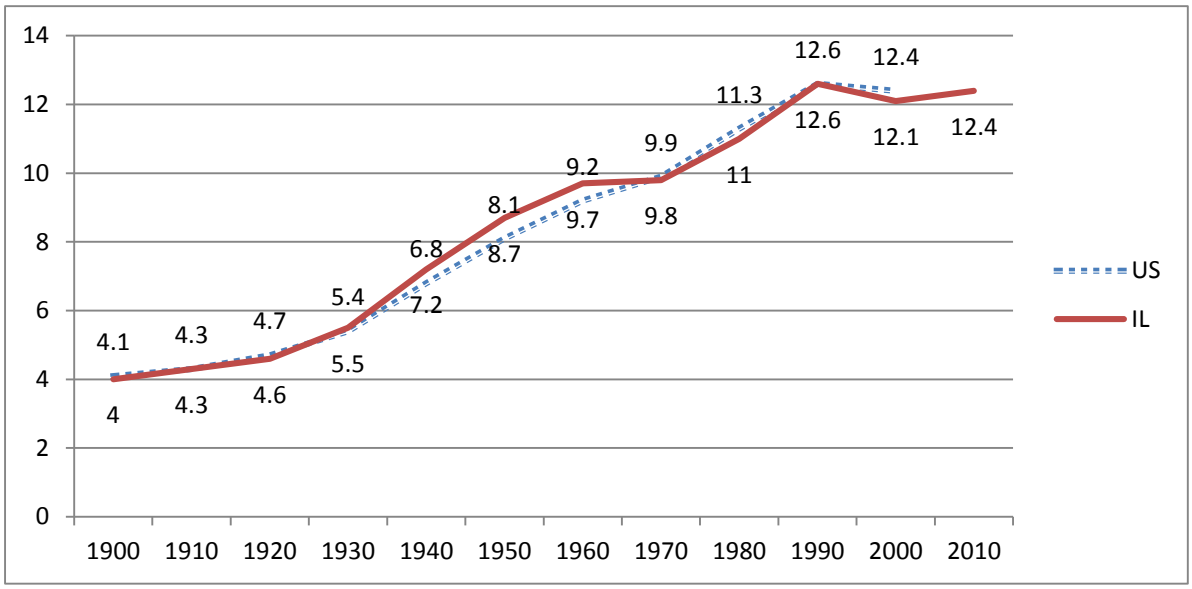

Figure 1.1: The trends of population in US and Illinois—65 years and over

In the US, the population of 65 years and over is 12.4% in 2010 and estimated to be 15% in 2020 and 18% in 2030 (U.S. Census Bureau, 2005). Approximately 10.3 million people (from figure 1.2) need LTC (LTC), 59% are elderly and 42% are under 65. Among them, 74% are cared for within the community and 26% are cared for in nursing home facilities (The Henry J. Kaiser Family Foundation, 2011). The largest percentage of LTC (75%) is informal care.

Figure 1.3 shows that the government is the largest payer of LTC services, with Medicaid covering the highest proportion (43%). Medicaid is followed by Medicare (24%); out-of-pocket (19%); private insurance (7%), other private (5%), and other public (2%).

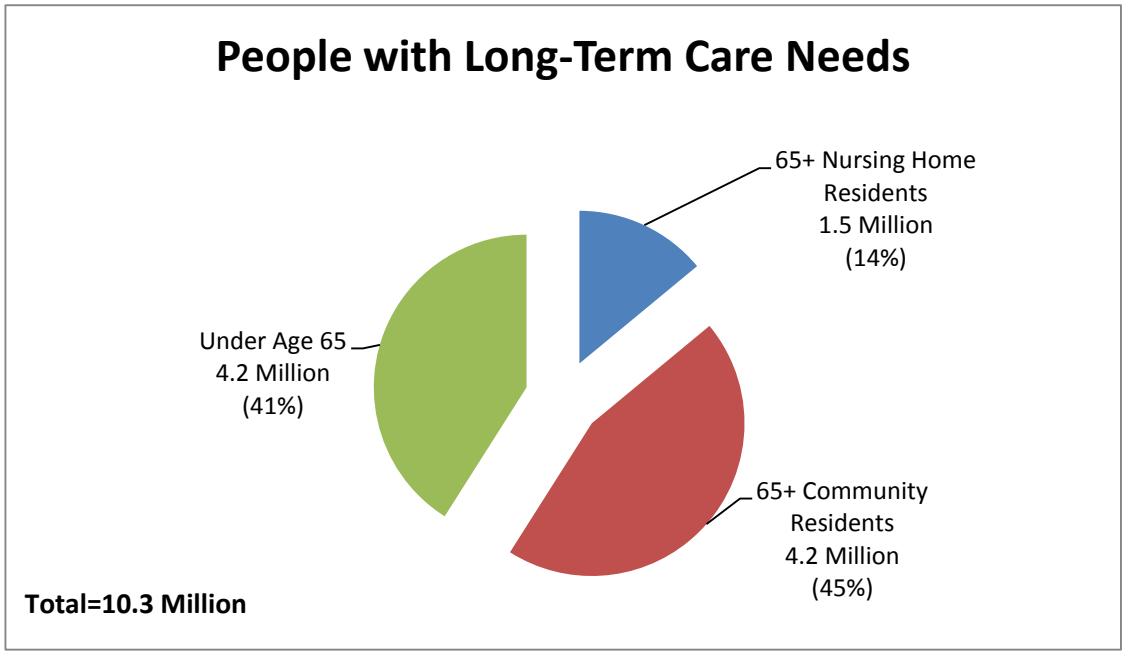

Figure 1.2: People with Long-Term Care Needs
Resource: The Henry J. Kaiser Family Foundation (2011). Kaiser Commission on Medicaid Facts, Medicaid and Long-Term Care Services and Supports

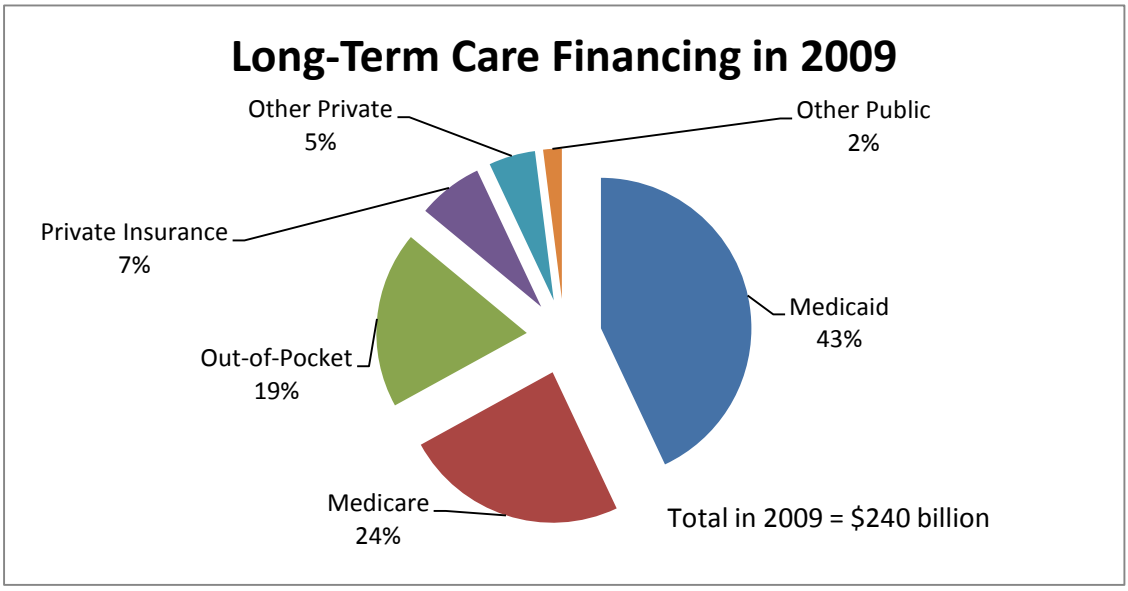

Figure 1.3: Long-term care financing in 2009
Note: Total LTC expenditures include spending on nursing home, home health services and home and community-based services waiver services. All home and community-based service are attributed to Medicaid. Total excludes residential care facilities for mental retardation, mental health, or substance abuse.
Resource: The Henry J. Kaiser Family Foundation (2011). Kaiser Commission on Medicaid Facts, Medicaid and Long-Term Care Services and Supports

Medicaid Spending per Elderly defined as Generosity. The "generosity" indicator is based on each state's total amount of Medicaid spending, the percentage of LTC spending on nursing home facilities and HCBS, and Medicaid spending per elderly. However, only

Medicaid spending per elderly could measure the real generosity of each state. In terms of averages, although the highest percentages of the Medicaid spending in each state are on LTC, it will be better to have the real percentage of the total amount of Medicaid spending on LTC instead of using the total amount of Medicaid spending. In addition, the percentage of LTC spending on nursing home facilities and HCBS shows each state's allocation of resources. The higher percentage of LTC spending on nursing home facilities implies that the state puts more budgetary emphasis on institutionalized care rather than HCBS.

The Nursing Home Beds per 10,000 Elderly defined as Accessibility. When discussing the issue of LTC services, the issues of accessibility, availability, affordability, and sustainability are key concepts to explore. However, it is always difficult to find these kinds of indicators to represent the concepts of accessibility, availability, affordability, and sustainability. Although, it is better to have detailed data of institutionalized beds and HCBS in each state, this project accounts for the total amount of nursing home facility beds. I used the nursing home beds per 10,000 elderly (nursing home beds/ elderly over 65 years old*10,000) as an indicator of accessibility. A higher value indicates that the elderly have more accessibility.

The Percentage of Deficiency in Nursing Home Facility defined as Quality. Not only is the cost of care important, but also the quality of LTC service is of concern. In this study, I use the percentage of deficiency in nursing home facilities defined as quality to represent the quality; the higher percentage of deficiency means the lower quality.

The Percentage of LTC Spending on Home Health & Personal Care defined as HCBS Priority. The current LTC policy advocates for HCBS rather than institutionalized care. Compared to nursing facilities, HCBS can provide care recipients a more private, free space at a lower cost (Sacco-Peterson & Borell, 2004). Also, care in the community maintains better health and functional status of the elderly as well as longevity. I use the percentage of

LTC Spending on Home Health & Personal Care as the HCBS priority. The higher score represents that the respective state put more resources into HCBS.

Illinois State

Nursing Home Facilities. Using detailed addresses of the 1255 nursing home facilities, I explore the distribution and disparity of institutionalized care at the county level in Illinois. I also analyzed the relationship between the location of nursing home facilities and the total elderly population or percentage at the county level.

Home Health & Personal Care. With the detailed addresses of the 789 home health & personal care, I explore the distribution and disparity of HCBS at the county level in Illinois. I further analyze the relationship between the location of home health & personal care and the total elderly population or percentage in county level.

Data Sources

This study uses three different data sources for analysis. The first source is population data on Illinois both at state and county level, is based on American Census Data. The second part is LTC statistics data, which are from the Commonwealth Foundation's Website. The third source of data is the location of nursing home facilities and home health & personal care in Illinois from Professor Ruiz.

The details are listed below:

Population data (from America Census Data)

A. Total amounts of population over 65 years old in 2009 in state level;

B. Total amounts of population over 60 year's old in 2010 in county level in Illinois;

C. Sixty five plus population in poverty

State level long-term care data in 2009

The following are indicators of state level LTC statistics from the Commonwealth Foundation's Website:

A. Medicaid spending

B. Total number of certificated nursing facility beds

C. Certified nursing facility occupancy rate

D. Percent of certified Nursing Facilities Receiving a Deficiency for Actual Harm or Jeopardy

E. Percentage of Nursing Facilities with Deficiencies

F. Percentage of Nursing Facilities with No Deficiencies

G. Distribution of Certified Nursing Facilities by Ownership Type (For profit, Non-profit, and Government)

H. 2007Medicaid Payments per Enrollee (Children, Disabled, Adults, and Elderly)

I. Spending percentage on LTC (ICF-MR, Mental Health Facilities, Nursing Facilities, and Home Health & Personal Care)

The Location of Long-Term Care Facilities Data from Professor Ruiz is shown as below:

A. Nursing Home Facilities

B. Home health & Personal Care Facilities

Research Findings

Long-Term Care Performance Ranking at state level

Ranking with Raw Data. Figure 2.1 shows that Illinois spent $9,567 per elderly each year, every ten thousand elderly shared 600 nursing home facility beds, had 42.71% deficiency rate among the nursing home facilities, and spent 31.38% budget of the LTC on home health & personal care. In addition, based on the raw data, the map presents different quartile compared to other states with the ranking.

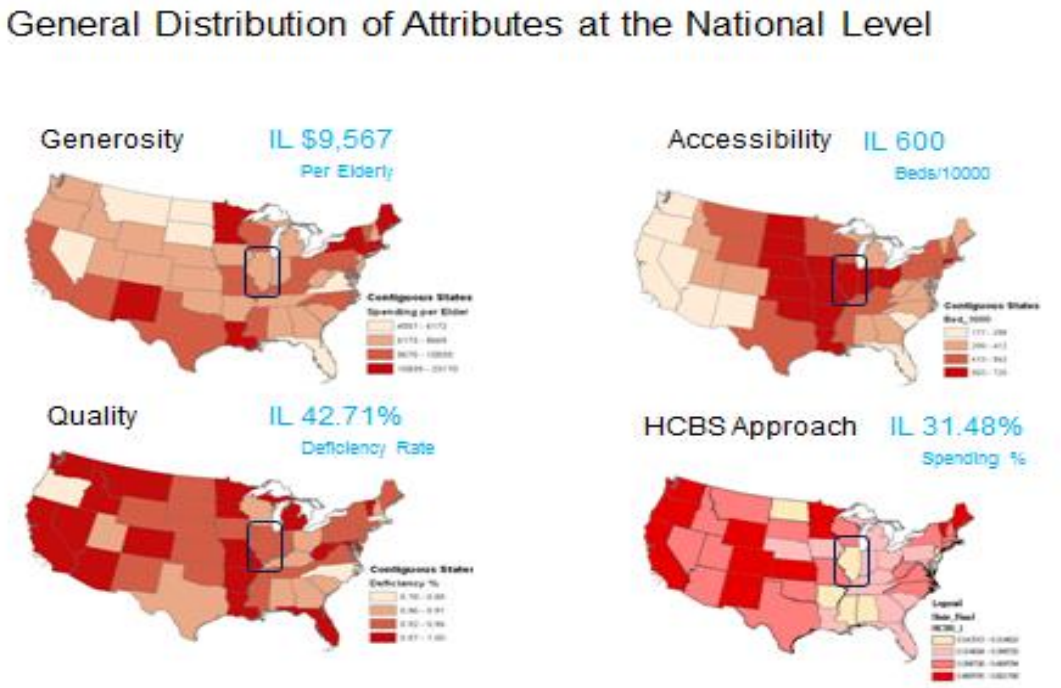

Figure 2.1: General distribution of attributes at the national level (original data)

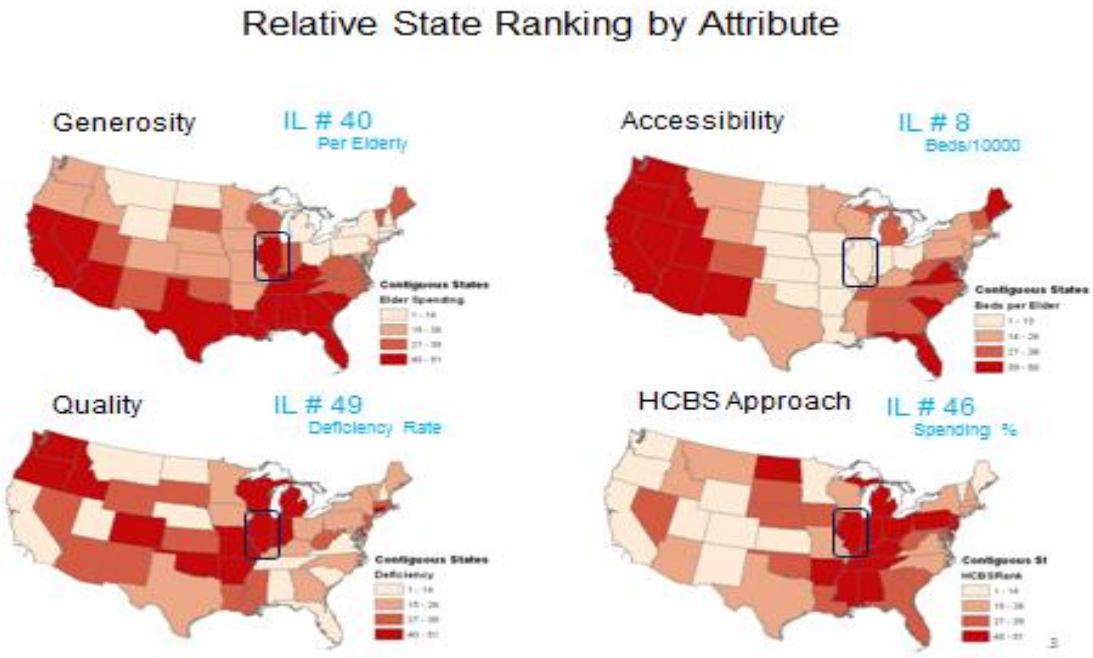

Figure 2.2: General distribution of attributes at the national level (Ranking)

Ranking with Average Scores from Fourth Dimensions. Figure 2.2 illustrates that Illinois was ranked 40th on the generosity scale measured by Medicaid spending on per

elderly, 49th on the quality measured by the deficiency rate of nursing home facilities, and 46th measured by the HCBS spending percentage on home health & personal care; all these ranking placed the state in the bottom quartile. Only accessibility was evaluated through per 10,000 elderly with nursing home facility beds and was ranked number eight in the top quartile.

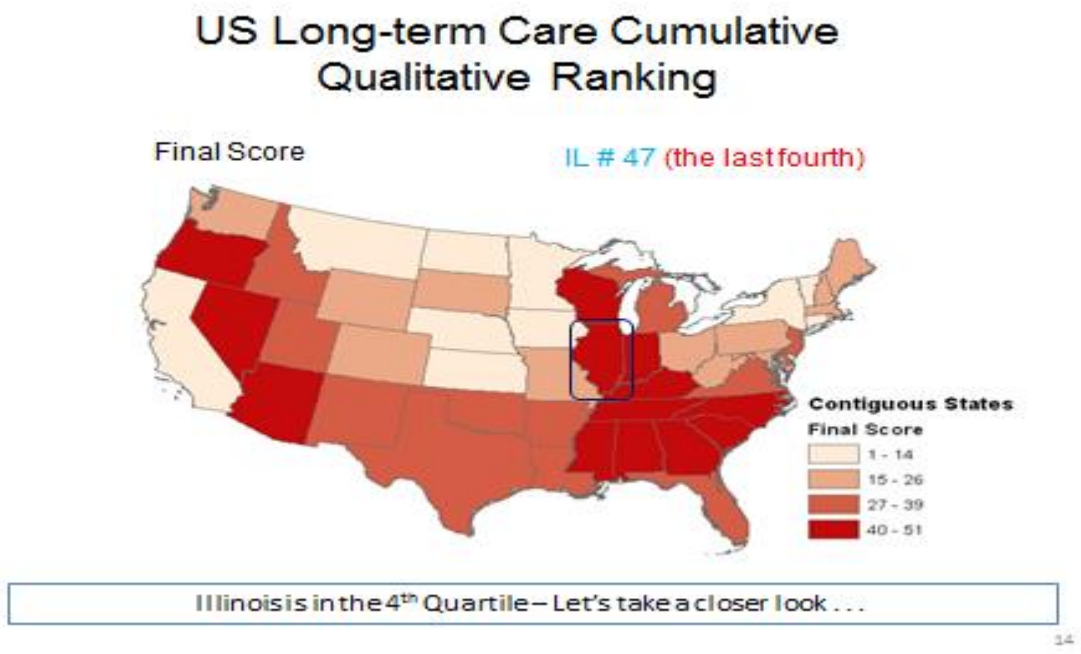

Figure 2.3: US long-term care final score ranking

Ranking with the Final Scores. By averaging the scores of the four dimensions—generosity, accessibility, quality, and HCBS priority (see figure 2.3 and table 1), the final ranking of Illinois is 47.

Compared to other states, Illinois was ranked number 40, 8, 49, and 46 respectively. This means that Illinois was ranked at the top quartile only on accessibility, but was placed at the bottom quartile on generosity, quality, and HCBS priority. Overall, the average of the four ranking from each dimension placed Illinois at the bottom quartile, which was number 47.

Table 1: The ranking of the performance of long-term care policy in each state

Top 25% Second 25% Third 25% Bottom 25%

Rank	State	Generosity	Accessibility	Quality	HCBS Approach	Rank	State	Generosity	Accessibility	Quality	HCBS Approach
1	Montana	3	17	10	14	27	Virginia	32	38	11	26
2	Minnesota	15	19	18	6	28	Louisiana	49	4	28	34
3	Alaska	7	51	6	5	29	Idaho	26	39	51	15
4	North Dakota	5	2	8	50	30	Arkansas	25	10	39	48
5	Connecticut	2	9	42	19	30	Utah	34	41	5	13
5	Iowa	23	1	20	31	32	Oklahoma	37	11	41	27
5	Vermont	28	36	15	3	33	New Mexico	30	45	36	1
8	District of Columbia	6	32	22	37	34	Delaware	18	30	46	39
9	Nebraska	17	3	12	32	35	Florida	46	46	1	38
10	Hawaii	33	48	2	7	35	Texas	47	16	21	20
10	New York	1	22	26	17	37	New Jersey	16	25	32	49
12	California	41	43	4	10	38	Michigan	13	37	50	40
12	Kansas	21	6	38	9	39	Tennessee	48	26	7	41
14	Missouri	24	5	40	18						
15	New Hampshire	10	27	3	23	40	North Carolina	38	35	14	22
16	Colorado	19	34	48	8	41	Nevada	42	49	33	28
17	Maryland	14	28	19	35	41	Oregon	20	47	43	2
18	Wyoming	11	24	34	12	43	Wisconsin	35	20	45	25
19	Pennsylvania	4	21	23	42	44	Indiana	27	12	47	43
19	Rhode Island	12	14	30	16	45	Arizona	51	50	37	24
21	Massachusetts	9	15	29	21	46	South Carolina	39	42	13	33
22	South Dakota	31	7	31	30	47	Illinois	40	8	49	46
23	West Virginia	29	33	35	29	48	Mississippi	44	18	27	51
24	Ohio	8	13	25	45	49	Kentucky	43	23	24	44
25	Maine	36	40	17	11	50	Georgia	50	31	16	36
25	Washington	22	44	44	4	51	Alabama	45	29	9	47

Resource: Commonwealth Fund Statistics on Long-Term Care, 2011.

Note: 1. Generosity means spending per elderly. 2. Accessibility means nursing facility bed per elderly.
3. Quality means deficiency percentage of nursing facility. 4. HCBS approach means state spent more money on HCBS.

In terms of demand, Illinois has the seventh highest population of the elderly, with nearly 1.6 million over the age of 65, which means that the elderly in this state are more in need of LTC services. Despite the demand, the performance from the generosity, quality, and HCBS priority in Illinois fails to meet the needs of the elderly.

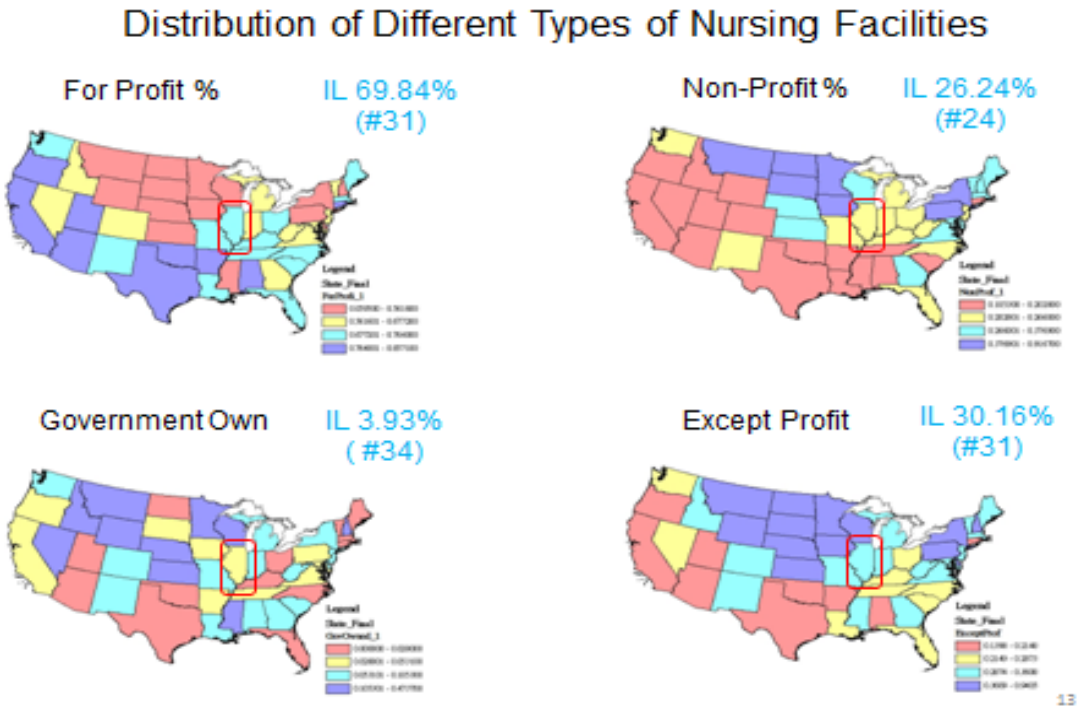

Figure 2.4: Different type of nursing facilities

Distribution of Different Types of Nursing Home Facilities. People who have the needs of nursing home care need to qualify for state-set eligibility standards and meet certain income levels (The Henry J. Kaiser Family Foundation, 2011). There are 38 states that allow people with institutionalized care to qualify for income up to 300 percent of Social Security Income ($2,022 per month in 2010). However, the private nursing facilities, especially for profit facilities, have higher cost and better quality, so they generally do not accept the Medicaid recipients or limit the number of beds for Medicaid qualified.

In this project, I also explored the distribution of different types of nursing home facilities at the state level (see figure 2.4), and I found that Illinois has a higher percentage of nursing home facilities run for profit (69.84%), than those run not-for-profit(26.24%), with 3.93% government owned. If we do not consider the quality of nursing home facilities, because the lower percentage of non-profit and government owned nursing home facilities available in Illinois, the poor elderly who are qualified for the Medicaid have less

accessibility for institutionalized care than their more wealthy counterparts who do not qualify for Medicaid.

Regrettably, due to the lack of data on poverty rate amongst the elderly at the state level, it is hard for this article to explore the relationship between the types of nursing home facilities and the percentage of poor elderly.

Demand and Supply in Illinois

Demands. In Illinois, Cook county has the highest population over 60 year olds (915,945 elderlies) (see figure 3.1), followed by Du Page (161,045 elderly), Lake (106,507 elderly), and Will (95,640 elderly). But if we want to see the percentage of the elder population (see figure 3.2), the map shows a totally different distribution compared to the total amount of the population. The rural areas in the Southern, Eastern, Central, North Western, and Western side of Illinois have the highest percentage of the elderly. It also shows that remote rural areas have the highest aging populations which affect the needs for institutionalized care or HCBS.

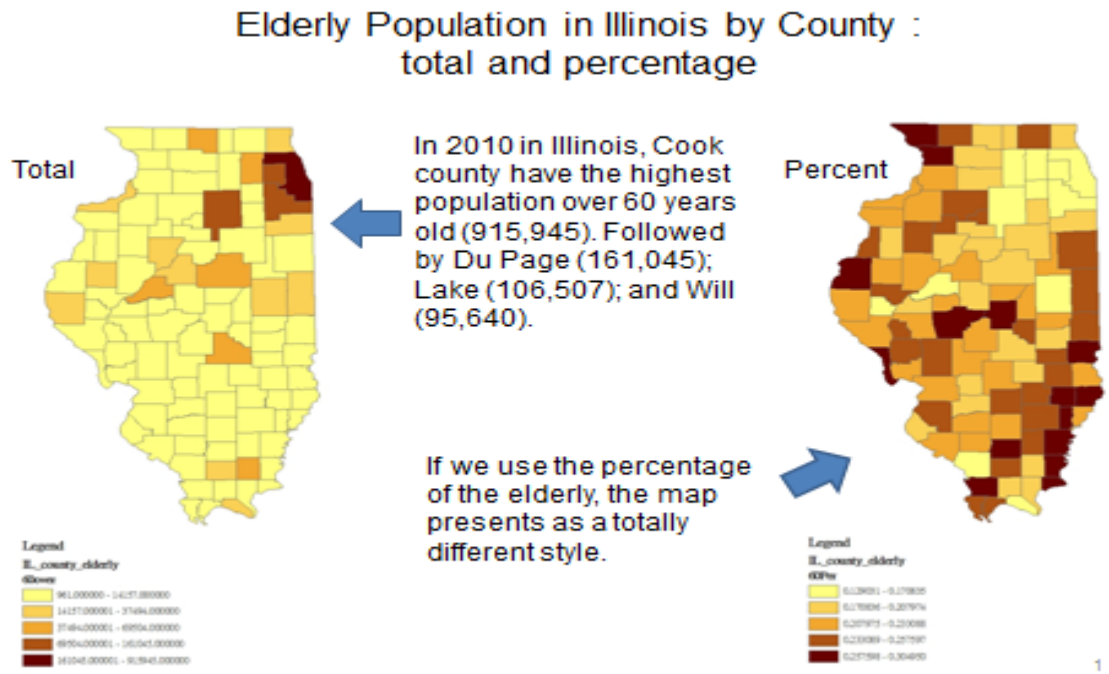

Figure 3.1: Elderly population in Illinois by county: total amount and percentage

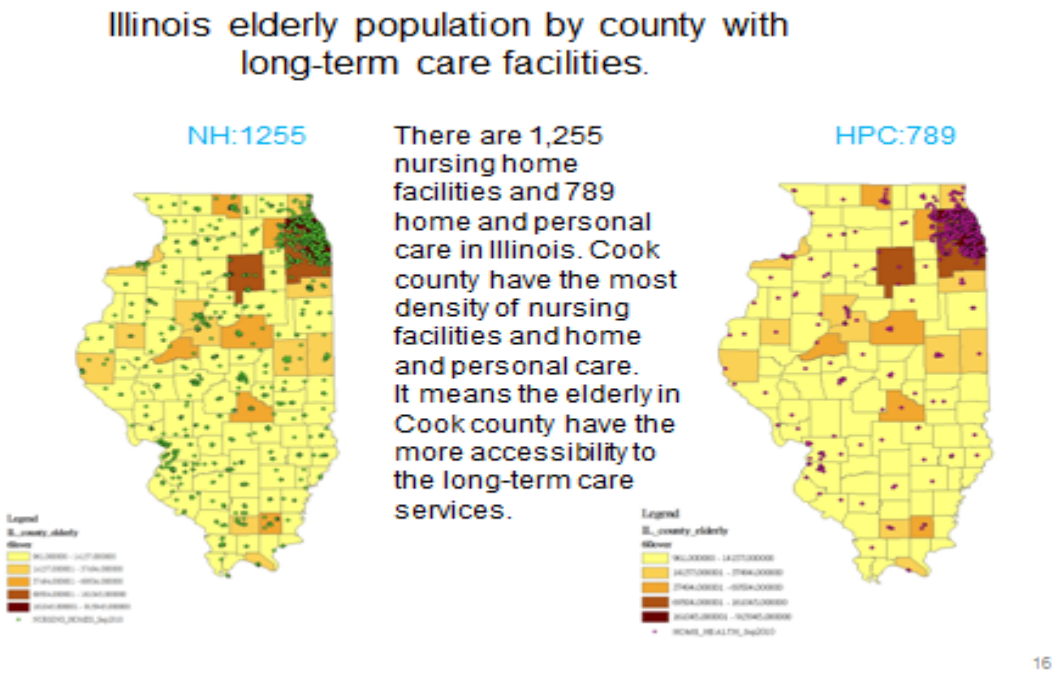

Figure 3.2: Illinois Elderly population in by county with long-term care facilities

LTC Resources. There are 1,255 nursing home facilities in Illinois and most of institutionalized care are located in Cook County with the highest amounts of the elderly (see figure 3.2). In addition, there are 789 home health & personal care and most of the HCBS are also located in Cook County. Evidently, in other counties there are less HCBS that the elderly and their family members can access. This suggests that that although the current LTC policy encourages the HCBS priority, in reality there are less resources for the elderly to access, especially in the remote rural areas. Compared to the urban areas, the higher percentages of the elderly population in rural areas are more vulnerable because of limited access to LTC due to the limited resources available (see figure 3.3).

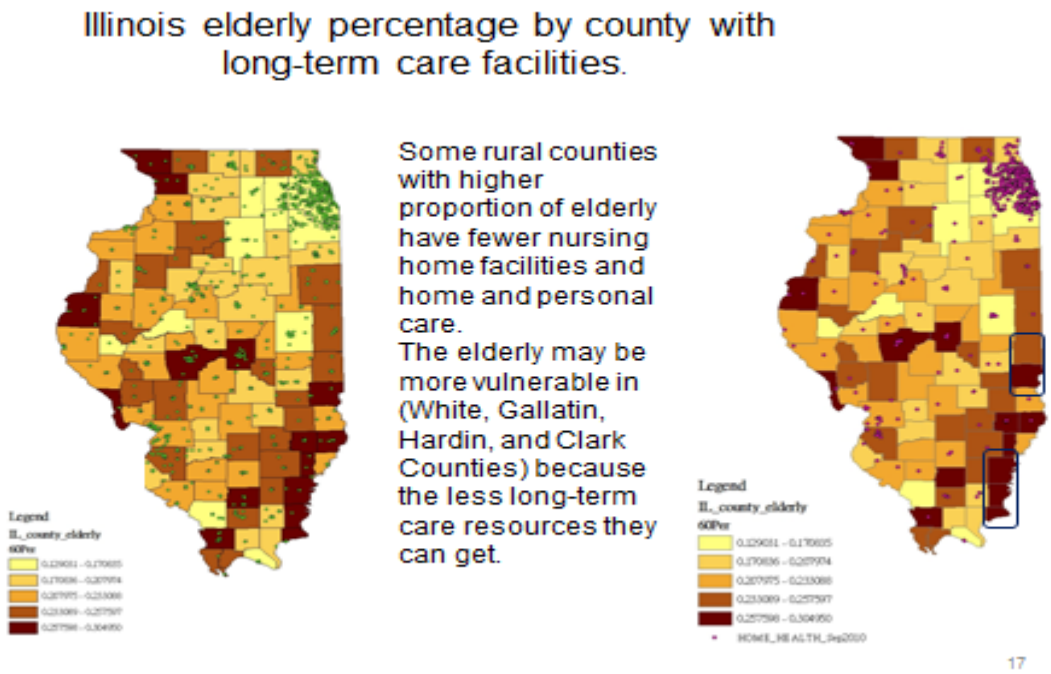

Figure 3.3: Illinois Elderly population in by county with long-term care facilities

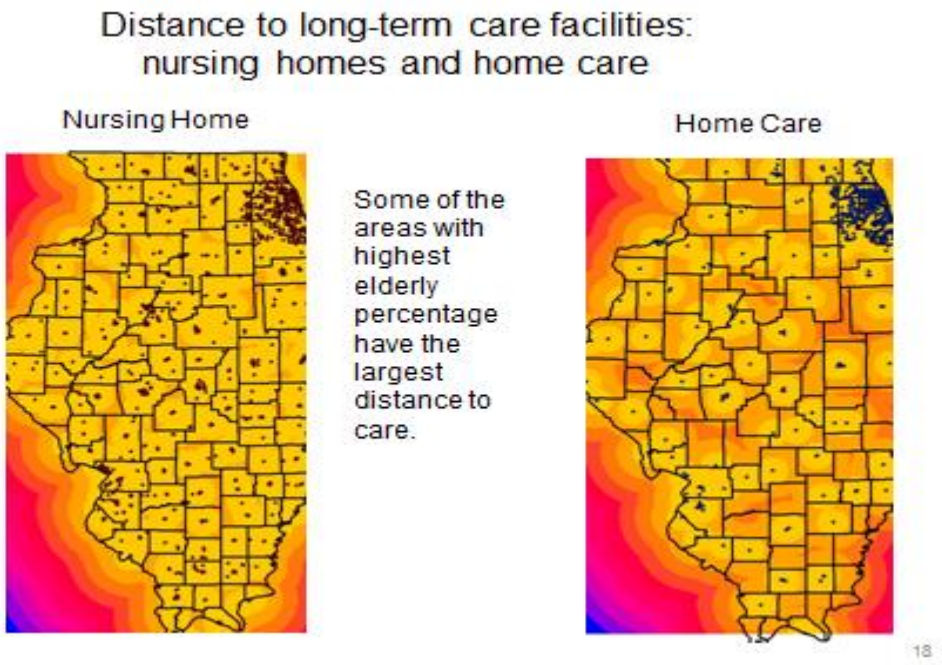

Figure 3.4: Illinois Elderly population in by county with long-term care facilities

Distance. Above is the analysis of the distance to LTC facilities with nursing facilities and home health & personal care (see figure 3.4). The more dark yellow area shows the long distance for the elderly to access the institutionalized care or HCBS.

Buffer. I chose five miles as the buffer distance to see the available resources for the elderly to access in each county (see figure 3.5). If the current LTC policy encourages HCBS priority, I find that the resources of HCBS are not distributed fairly. There exists extreme disparities across counties. The elderly that live in White, Gallatin, Hardin, and Clark counties may be more vulnerable because there are fewer LTC resources nearby.

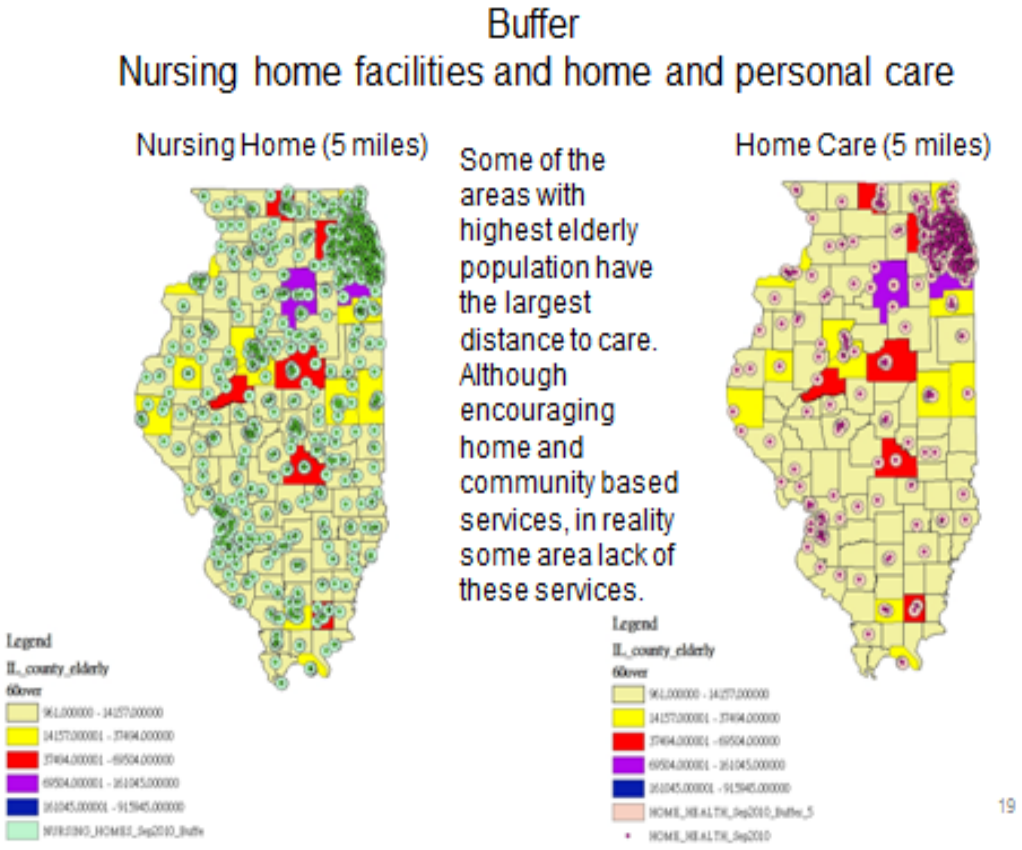

Figure 3.5: Illinois Elderly population in by county with long-term care facilities

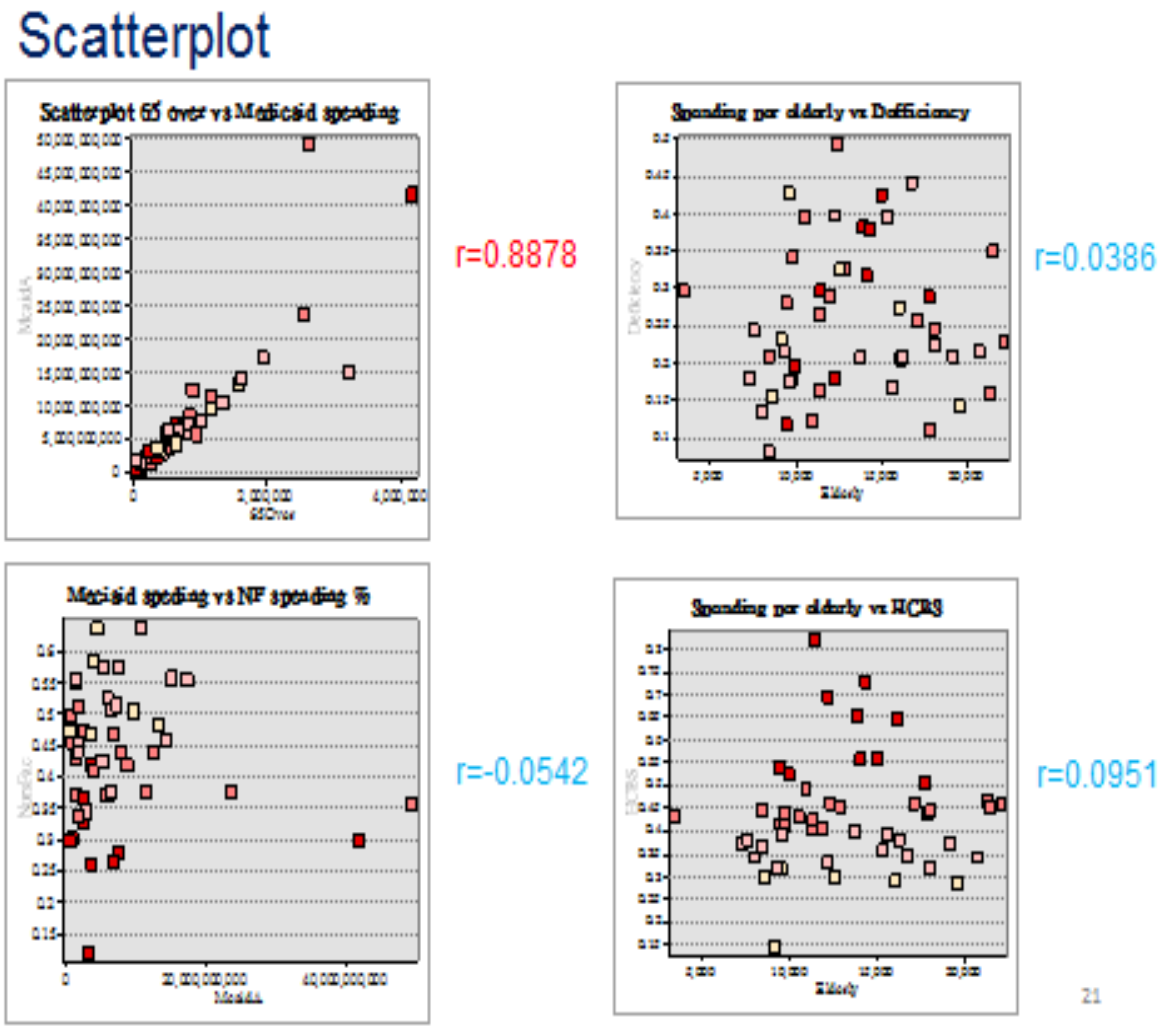

Figure 3.6: Illinois Elderly population in by county with long-term care facilities

Scatterplot in State Level. There exists a positive relationship (r=o.8878) between Medicaid spending and the number of the elderly over 65 years old (see figure 3.6). The larger the percentages of the population over 65 years old are, the more each state spends on Medicaid. This is particularly the case because most part of Medicaid budget is spent on LTC service, which is highly correlated to the higher numbers of the aging population. However, there exists a less positive relationship between generosity and quality (r=0.0386) and generosity and HCBS priority (r= 0.0951). On the other hand, there is a less negative

correlation between generosity and the percentage of spending on Nursing facilities(r=-0.0542).

Discussion

Illinois has the seventh highest population of the elderly, which implies greater needs for LTC services among the elderly. As the above discussion shows, compared to other states, Illinois has more nursing home facility beds for the elderly. However, Illinois has lower performance on spending on per elderly, quality of care, and the encouragement of HCBS priority. In addition, the discussion reveals that there exist significant differences and disparities in the distribution of nursing home facilities and home health and personal care. Regardless of nursing home facilities and home health and personal care, Cook County had the intensive numbers of institutionalized facilities and personal care service, particularly in the area of Chicago. Furthermore, the elderly living in isolated rural areas have less LTC services to access the institutionalized facilities and personal care services.

Limitations

The indicators are not comprehensive

This project uses Medicaid spending on per elderly, nursing home facility beds per 10,000 elderly, the deficiency rate of nursing home facilities, and the percentage of LTC spending on home health & personal care, which measure only four dimensions of generosity, accessibility, quality, and HCBS respectively. Most indicators, such as accessibility and quality, are calculated from institutionalized care statistics and lack of HCBS related data. In addition, these indicators are not comprehensive and sufficient enough to accurately capture the characteristics of generosity, accessibility, and quality.

Lack of elderly poverty rate in state level and county level in Illinois

Affordability is another dimension when discussing LTC service. If this study can get each state’s poverty rates among the elderly, it would be better to have a chance to explore the

relationship between the different types of nursing facilities and poor elderly. Because some states have lower percentage of non-profit and government owned nursing home facilities, they will deny the poor elderly accessibility to the facilities, if they qualify for the Medicaid criteria.

Through the use spatial analysis, the mapping could provide some implications and recommendations to state government about how to allocate the future resources to the most vulnerable population in certain areas.

Accessibility from distance and buffer analysis does not reflect the quality of care.

The analysis of the distance and 5 miles buffer with nursing home facilities and home health & personal care use the physical distance to show the potential accessibility to the services. Although some counties in Illinois have more accessibility in terms of available facilities, such as more nursing home facilities and home health & personal care, it does not guarantee the LTC quality. In addition, it does not necessarily mean that the elderly are willing or able to purchase services from the nearby nursing home facilities or home health & personal care, because of the personal or other reasons.

Future Research

From an ecological perspective, a person always lives in a certain environment and researcher needs to take both personal and environmental factors into consideration. Not only does spatial analysis offer a tool for researchers to explore the environmental phenomena, but it also provides a clear outline and overview to a better understanding of LTC performance at state level, including county level.

For future research, if the researcher can use Hierarchical Linear Model (HLM) to connect and merge macro level data and micro level data, this will provide the researcher a valuable and comprehensive opportunity to analyze how individual factors, neighborhood effects, and state level factors affect the elderly's LTC services options and health outcome. Combined with GIS and HLM tools, the analysis will give more comprehensive practical

insights and policy implications for future LTC reform at various levels, such as the federal, state, or county level.

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