

Rochester Institute of Technology

## RIT Digital Institutional Repository

---

Theses

---

5-2019

### Research on a Future Senior Housing Model in Wuhan, China

Fangyuan Shi  
fs1122@rit.edu

Follow this and additional works at: <https://repository.rit.edu/theses>

---

#### Recommended Citation

Shi, Fangyuan, "Research on a Future Senior Housing Model in Wuhan, China" (2019). Thesis. Rochester Institute of Technology. Accessed from

This Thesis is brought to you for free and open access by the RIT Libraries. For more information, please contact [repository@rit.edu](mailto:repository@rit.edu).

**R·I·T**

**RESEARCH ON A FUTURE SENIOR HOUSING MODEL  
IN WUHAN, CHINA**

By

Fangyuan Shi

Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of  
**MASTER OF ARCHITECTURE**

Department of Architecture  
Golisano Institute of Sustainability

**ROCHESTER INSTITUTE OF TECHNOLOGY**

**ROCHESTER, NEW YORK**

**MAY, 2019**

**COMMITTEE APPROVAL**

*“Research on a Future Senior Housing Model in Wuhan, China”*

*By Fangyuan Shi*

***Dr. Giovanna Potestà***

*Date*

Assistant Professor  
Department of Architecture  
Thesis Chair

***Jules J. Chiavaroli***

*Date*

Professor  
Department of Architecture  
Committee Member

***M. Ann Howard***

*Date*

Professor  
Department of Science, Technology and Society  
Committee Member

## **ACKNOWLEDGMENTS**

I am grateful to the Department of Architecture and the Rochester Institute of Technology. I am very lucky to be a part of the architecture program, to have experiences and learned so much from professional and supporting faculties with my wonderful classmates under an excellent academic environment.

I would like to express my deepest gratitude to my Thesis Committee, Chairman Dr. Potesta, Professor Howard, and Professor Chiavaroli, for their patient guidance, enthusiastic encouragement and useful critiques of this research. Also, I would like to thank Richard Napoli, for mentoring me over the years.

I would like to extend my thanks to my friends, Yan, Elmo, and Nancy, for their help in developing and conducting the interviews for my research.

Finally, I am especially grateful to my parents, who are always inspiring and supporting me. And a most loving thank you to my grandma, a woman of extreme strength, courage, and love. She taught me to be brave and kind, and I love you to the moon and back. Then, now and forever.

## **ABSTRACT**

Recently in China, seniors' health and living conditions after retirement have become the focus of increasing political and social concerns. Due to fertility policies in China since the 1980s, improvements in living conditions have led to longer average lifespan, increasing demand in the country's senior housing market. This research explores the future development of senior housing for this and the next generation, the evolution of needs after retirement, and possible future solutions for providing an up-to-date senior housing community in Wuhan, China.

Through documentary analysis of the current conditions as well as the needs and social concerns of seniors, case studies of successful senior housing projects, interviews with seniors and other generations in Wuhan, and online surveys, this study aims to look for possible future solutions for a sustainable community complex. To meet the need to live in a community that provides comfortable housing, and the desire of seniors to stay close to their family, this proposal seeks a solution that is affordable and suitable. This study aims to analyze the framework of a senior housing model that provides human services as well as physical infrastructure needed by seniors and their families for the well-being and high quality of life for seniors in the future.

This analysis is developed based on Wuhan, a typical populous city in northern will China, which potentially has further influence on senior housing in other cities in China.

## TABLE OF CONTENTS

COMMITTEE APPROVAL	I
ACKNOWLEDGMENTS	II
ABSTRACT	III
CHAPTER 1 INTRODUCTION	1
1.1 Three Main Types of Senior Housing	1
1.2 Justification for this Research	2
1.3 Significance of this Research	3
CHAPTER 2 PROBLEM STATEMENT	4
2.1 Problems to Be Addressed	4
2.2 Thesis Statement	4
CHAPTER 3 LITERATURE REVIEW	5
3.1 Introduction	5
3.1.1 Elderly Population	5
3.1.2 Increased Lifespan	6
3.1.3 Growing Need for the Senior Care Industry	7
3.2 Current Situation of the Pension Industry and Related Policies in China	9
3.3 Senior Life and Views of Aging from an Eastern Perspective	11
3.4 Social Concerns about Aging	12
3.4.1 Ageism	12
3.4.2 Empty-nester family problems	13
3.4.3 Decreased Working Population Ratio	15
3.4.4 Pension for Only-child Families	16
3.4.5 Needs of Seniors Change over Time	17
3.5 Aging Collectively Rather than Aging Individually	18
3.5.1 Aging in Place	18
3.5.2 Social Isolation and Loneliness	19
3.6 Current Senior Housing Models in China	23
CHAPTER 4 METHODOLOGY	25
4.1 Research Methodology and Approach	25
4.1.1 Documentary Analysis	25
4.1.2 Case Study Analysis	26
4.1.3 On-site observation	26
4.1.4 Survey and interviews	27
CHAPTER 5 CASE STUDIES	28
5.1 Current Senior Housing Model Comparison	28

5.2	Analysis of Selected Senior Housing Projects	30
5.2.1	The Cardinal at North Hills (US)	30
5.2.2	Humanitas (Netherland)	32
5.2.3	VCAN Senior Jade Tower (Upscale CCRC, Shanghai, China)	36
5.2.4	Greentown Wu Zhen Ya Yuan (Idealism, China, 2013)	38
5.2.5	Steinacker Residential Complex (Intergenerational Living, Zurich, Switzerland)	41
5.3	Comparison and Conclusion	45
5.4	Interpretation of Cross-referenced Data Provided by Surveys and Case Studies	47
CHAPTER 6 PERSONAL EXPERIENCE		49
6.1	Xin Shi Jie Community (Wuchang, Hubei, China)	49
6.2	Chang Yao Xin Yuan Residential Community (Yichang, Hubei, China)	50
6.3	Cha Gang Residential Community (Wuchang, Hubei, China)	51
CHAPTER 7 INTERVIEWS AND SURVEY		52
7.1	Development of Survey and Interview Questions and Focuses	52
7.2	Findings from Interviews and the Survey	53
7.2.1	The Desire to Live Close to Family	53
7.2.2	Necessity of Being Exposed to Different Generations	56
7.2.3	Willingness to Pay for Ideal Layout	57
7.2.4	Community Activities Are Highly Important	59
7.2.5	Lack of Knowledge and Confidence in the Current Elderly Care Market	63
7.2.6	Less Important Aspects	64
7.2.7	Dissatisfaction with Current Housing	67
7.2.8	Expectations for Future Senior Living	69
7.2.9	Suggestions for the Senior Care Market	70
CHAPTER 8 TAKEAWAY AND CONCLUSION		72
8.1	Suburban Living vs. Urban Living	72
8.2	Senior-friendly Intergenerational Community vs. Age-qualified Senior Community	73
8.3	Xin Shi Jie Community Discussion	75
8.4	Design Concepts and Solutions	80
8.4.1	Advances in Technology Involvement	80
8.4.2	Third-party Licensed Care Service Corporations	81
8.4.3	Flexible Choices for Living and Community Activities	82
CHAPTER 9 FURTHER RESEARCH DIRECTION AND CONCLUSION		85
APPENDIX 1		86
APPENDIX 2		90
LIST OF FIGURES		91
REFERENCES		92

## CHAPTER 1 INTRODUCTION

There are two main fertility policies that have contributed to changes in the demographics of China, namely the one-child policy that had been in effect since the mid-1980s, and the two-child policy, which replacing the previous policy in December 2011. The generation of Chinese born between the late 1980s and early 2000s is becoming adults and faces the great burden of supporting their parents and raising a family with two children. According to predictions by the United Nations Population Division, by 2050, the proportion of China's population over 65 years old will increase to 30.8% of the country's total population.<sup>1</sup>

Through the end of 2016, there were more than 80 mid-to large-scale real estate enterprises in China involved in senior housing projects. Some estate enterprises have even set up customized senior housing management departments. Not only residential firms but also insurance companies have started to promote insurance within the senior care market.

### 1.1 Three Main Types of Senior Housing

Senior housing in China has a residential typology designed for the elderly that is suitable for their mental health and physical abilities to provide housing, entertainment, cleaning, dining and healthcare amenities. This type of residence is comprehensively managed. There are three main types of senior housing.

#### *1. Government-run nursing homes*

---

<sup>1</sup> Gong, Sen, Yanfeng Ge and Stein Kuhnle. 2016. *China National Human Development Report 2016 - Social Innovation for Inclusive Human Development*. Beijing: China Publishing Group Corporation. [http://hdr.undp.org/sites/default/files/reports/2783/undp-ch-\\_nhdr\\_2016\\_en.pdf](http://hdr.undp.org/sites/default/files/reports/2783/undp-ch-_nhdr_2016_en.pdf).



This type of nursing home is mainly designed for seniors in low-income families with financial difficulties. The government is responsible for all housing and facility construction, as well as community operation and staff management.<sup>2</sup>

### 2. *Government-invested, estate-operated senior housing*

The government chooses and allocates land and invests in the infrastructure of senior housing community. When it comes to operation and management, the government recruits and hires people in the market.

### 3. *Social-operated private senior housing*

Since the government encourages society to organize and operate elderly care facilities in urban communities, there is an increasing number of private elderly daycare centers, elderly activity centers, and senior housing communities that provide services such as centralized dining, healthcare, bathing, leisure, and home care for the elderly in need.<sup>3</sup>

## 1.2 **Justification for this Research**

*From a social perspective:*

Facing the rapid increase of the elderly population has caused heated social concerns. National and local governments have published welfare policies to ensure the quality of life for seniors and future seniors after their retirement and to encourage society to support senior care systems for the community.

*From a seniors' needs perspective:*

---

<sup>2</sup> Tao, Liqun, Lili Wang and Fengli Ma. 2008. "Analysis on Senior Housing Development in China" *Ministry of Civil Affairs of the People's Republic of China Policy Research Center*. Accessed August 22, 2018. <http://zyzx.mca.gov.cn/article/yjcg/shfl/200807/20080700018701.shtml>

<sup>3</sup> 2015. "Ten ministries and commissions encourage private capital to participate in the development of old-age service industry." *Ministry of Human Resources and Social Security of the People's Republic of China*. Accessed August 22, 2018. [http://www.mohrss.gov.cn/SYrlzyhshbzb/dongtaixinwen/buneiyaowen/201502/t20150227\\_152642.htm](http://www.mohrss.gov.cn/SYrlzyhshbzb/dongtaixinwen/buneiyaowen/201502/t20150227_152642.htm).

The elderly population has been rising at the rapid rate of 3.2% every year. This population demographics change will result in high demand for senior living and senior care in the housing market.

In the past, seniors have turned to nursing homes for a solution for life after retirement.

However, due to a lack of funds and staff, some nursing homes hardly ensure the basic health of elderly, not to mention mental health and quality of life. They offer a sick care system instead of providing a healthcare system. People would rather stick to their own apartments. Seniors have the right and mental need to be in charge of their lives.

*From a future development perspective:*

Senior living communities has great potential in the housing market over the next decades. It is a significant topic and needs to be urgently studied to gain insights into how people view aging and how future generations will live and be cared for in senior housing and communities.

### **1.3 Significance of this Research**

Seniors have the physical and mental need to be exposed to green spaces, a shared public environment and financially affordable housing. This research looks for highly applicable senior housing solutions that can keep people connected as they age and provide possible solutions to the housing market and reduce the burden of housing costs to deliver benefits that include the well-being of the economy, environment and society.

## **CHAPTER 2 PROBLEM STATEMENT**

### **2.1 Problems to Be Addressed**

Due to the increasing elderly population and increased lifespan in China in recent years, which will continue to increase, there will be a dramatic growing demand in senior housing in the next few decades. With the development of society and technology, views of aging have developed and changed through time from an eastern cultural background. This will not only influence the mental and physical health of both seniors and other generations but will also contribute to changes in needs and people's preference for senior living choices. Meanwhile, ageism, a decrease of the ratio of the working population, the pension burden for one-child families, and problems in empty-nest families cause social isolation and inefficiency in getting medical treatment for seniors all contribute to heated social concerns. Most current senior housing models are barely suitable for the next generations and future seniors. With the desire of living close to family and a lack of confidence in or knowledge of existing senior housing options in the market, most people want to remain in their own apartments for senior living and usually find it too late to turn to professional agencies for help when they are frail.

### **2.2 Thesis Statement**

This thesis explores the future possibility and potential of a senior housing model that could be integrated based on an existing community complex in an urban context in Wuhan, China. This study aims to analyze the framework of the senior housing model, which provides human services as well as the physical infrastructure needed by seniors and their families for the well-being and high quality of life of future seniors.

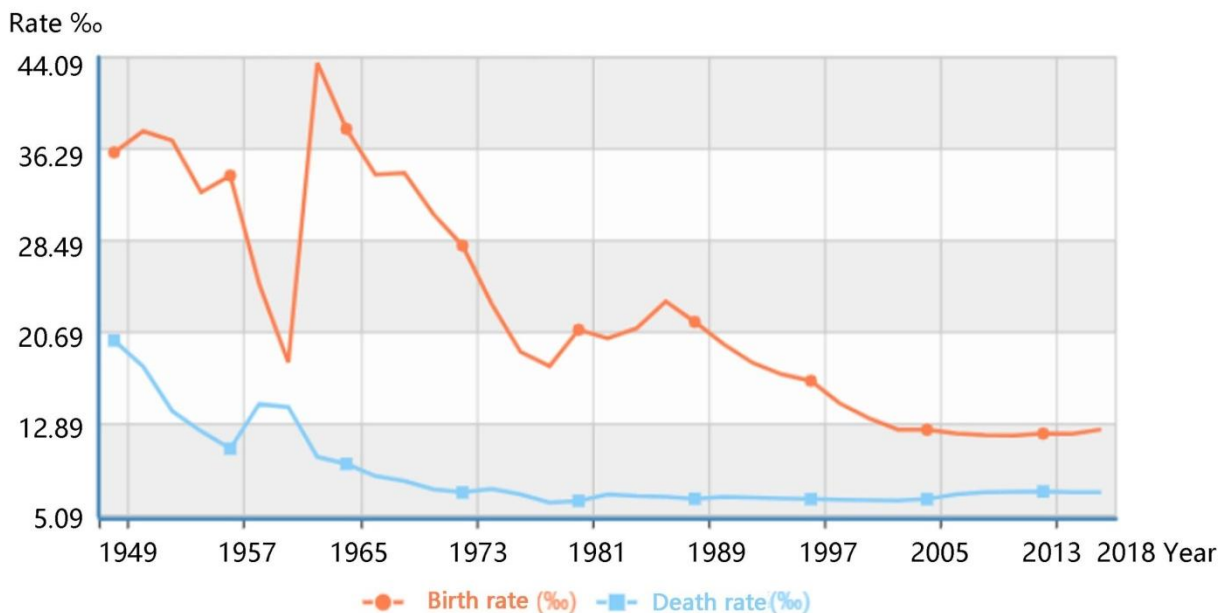
## CHAPTER 3 LITERATURE REVIEW

### 3.1 Introduction

#### 3.1.1 Elderly Population

The number of people around the world who are aged 80 years old and over is predicted to increase dramatically from 14.5 million to 394.7 million from 1950 to 2050 (United Nations).

The birth rate in China peaked in 1963 (43.6%) and has dropped since 1982 (22.3%), a trend that continues to the present (2017: 12.4%).



Data from National Bureau of Statistics

FIGURE 1: Birth rate and death rate in China from 1949 to 2017

Period	Major influence
1953-1956	With the first five-year plan and the Great Remodeling Revolution, China entered the primary stage of socialism.
1953-1957	The first generation of post-war baby boomers contributed to an increase of 10 million seniors per year.
1962-1973	The second generation of post-war baby boomers contributed to an

	increase of 13 million seniors per year (The baby boomer peak started in 1965 and continued to 1973). <sup>4</sup>
--	--

By the end of 2017, there were 158.3 million people aged over 65 years in China, accounting for 11.4% of the total population (National Bureau of Statistics). It is expected that the number of people in China aged over 60 years will reach 400 million by 2050, accounting for more than 30% of the total population<sup>4</sup>. According to news on Cnhubei, a 2018 report on the analysis of the population aging situation in Wuhan released by the Wuhan Municipal Civil Affairs Bureau, the number of people over 65 years old in the city reached 12.4 million at the end of 2018, indicating Wuhan has entered a "deep aging" period.<sup>5</sup>

### 3.1.2 Increased Lifespan

Life expectancy, considered an important and objective indicator for the pursuit of happiness of a person by Eckhard and Insa, implies environmental, living and working conditions, as well as the availability and quality of health care provisions and the pension system of a region.<sup>6</sup>

With the development and improvement of living conditions, education and accessibility to health care, there have been increases in life expectancy worldwide in the past century, which has contributed to older populations in most countries around the world. The increase in the

---

<sup>4</sup> Zhang, Jing. 2017. "Aging has a close relationship with you." In *80 Hou De Yang Lao Shi Ye: Yang Lao Chan Ye Shang Ye Mo Shi Yu Kua Jie Chuang Xin*, edited by 80 Hou De Yang Lao Shi Ye Union, 3-22. Beijing: Zhong Guo Jing Ji Chu Ban She.

<sup>5</sup> 2019. "Wuhan entered the deep aging for the first time: the number of seniors over 65 years old reached 1,242,500, accounting for 14.06% of the total population." *CNHubei*. Accessed February 28, 2019. <http://m.cnhubei.com/p/10125755.html>.

<sup>6</sup> Feddersen, Eckhard, and Insa Lütke. 2009. *Living for the elderly: A design manual*. Basel: Boston.

number of older people has occurred more rapidly in developing countries compared to developed countries.<sup>7</sup>

According to the Health China 2030 Planning Outline, the life expectancy of the average Chinese person will be 77.3 years in 2020 and will increase to 79 years in 2030.<sup>8</sup>

### 3.1.3 Growing Need for the Senior Care Industry

The process of aging in China will continue at least until 2050 and thus the demand for the pension market will increase in the next few decades because of the insufficiency of family pensions. Based on data from the National Working Commission on Aging, consumer demand in China's pension market is about 3 trillion Yuan at present, and market demand will rise to 5 trillion Yuan in 2050.<sup>9</sup>

Elderly people in urban areas in China already have financial advantages that afford certain consumption levels. They also have higher standards for senior communities in terms of the living conditions and amenities provided. Depending on savings and endowment insurance, they seek consumption related to living, entertainment and cultural activities.<sup>10</sup> The *Blue Book of Health Industry: Annual Report on China's Health Industry Development (2018)*, released on December 28, 2018, points out that the number of people aged 60 and over in China will reach 438 million in 2050, with total consumption of the elderly population being 61.26 trillion Yuan,

---

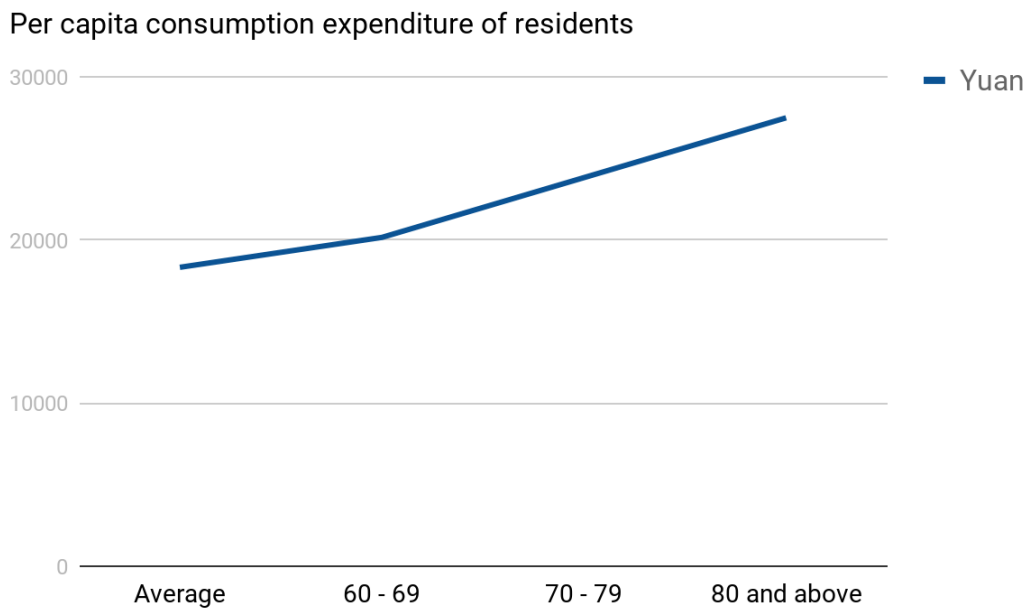
<sup>7</sup> Bergman, Howard, Sathya Karunanathan, Luis M. G. Robledo, Jenny Brodsky, Piu Chan, Maria Cheung, and Pascal Bovet. 2013. *Understanding and meeting the needs of the older population: A global challenge*. Canadian Geriatrics Journal : CGJ 16 (2): 61.

<sup>8</sup> 2016. "Healthy China 2030" Planning Outline." *State Council of the People's Republic of China*. Accessed February 26, 2019. [http://www.gov.cn/zhengce/2016-10/25/content\\_5124174.htm](http://www.gov.cn/zhengce/2016-10/25/content_5124174.htm).

<sup>9</sup> Zhang, Jing. 2017. "Pension opportunity for 80 Hou." In *80 Hou De Yang Lao Shi Ye: Yang Lao Chan Ye Shang Ye Mo Shi Yu Kua Jie Chuang Xin*, edited by 80 Hou De Yang Lao Shi Ye Union, 23-40. Beijing: Zhong Guo Jing Ji Chu Ban She.

<sup>10</sup> Zhang, Huazheng. 2017. "Current situation and future of Pension Industry." In *80 Hou De Yang Lao Shi Ye: Yang Lao Chan Ye Shang Ye Mo Shi Yu Kua Jie Chuang Xin*, edited by 80 Hou De Yang Lao Shi Ye Union, 43-74. Beijing: Zhong Guo Jing Ji Chu Ban She.

which may be more than eight times the total consumption of the elderly in 2020.<sup>11</sup> Based on the research of the China Health and Retirement Longitudinal Study (CHARLS) in 2011, the average living expenses of an elderly person in China is about 11,800 Yuan, which is 1.15 times the consumption per capita of all residents in the same year. Further, from trends of changes in consumption levels, along with the continuous improvement of economic development and the social security system, the purchasing power of the elderly in China will continue to increase. In addition, the consumption level of the elderly is expected to increase.<sup>12</sup>



Data from 21 Caijing

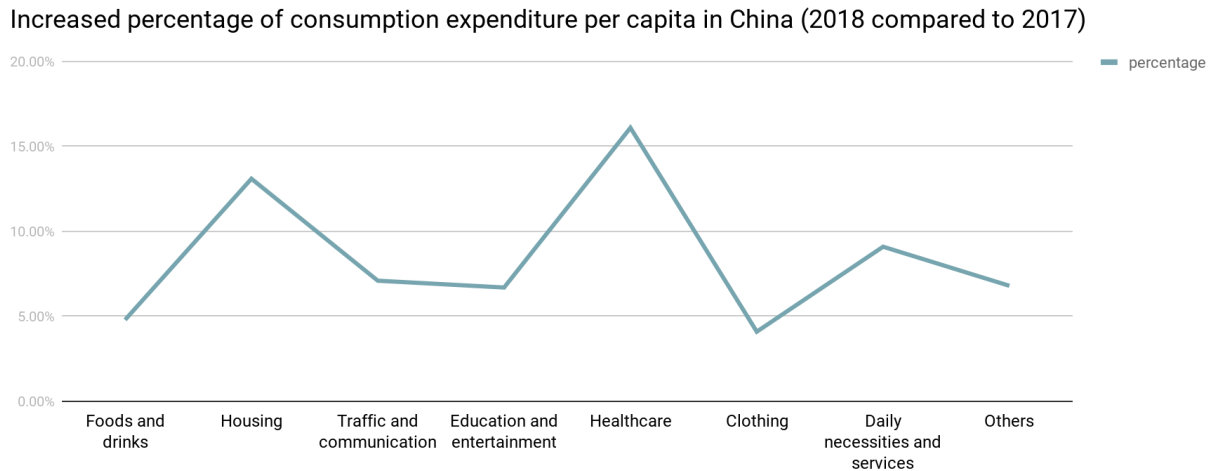
FIGURE 2: Per capita consumption expenditure of residents from average to older age groups in 2017

According to the most recent report of Chinese residents' income and consumption expenditure in 2018 by the National Bureau of Statistics, the consumption expenditure of residents per capita for 2018 is 19,853 Yuan, which increased 6.2% over 2017, considering change in the price

<sup>11</sup> Zhang, Chewei, and Fuxing Song. 2018. *Blue Book of Health Industry: Annual Report on China's Health Industry Development*. Beijing: Social Sciences Academic Press, 2018.

<sup>12</sup> Ding, Jun. 2018. "Don't underestimate the elderly! The report said that the consumption level of the elderly is higher than the per capita level..." *21Caijing*. Accessed December 30, 2018. <https://m.21jingji.com/article/20181228/herald/e854df69b2cc5ee9b1130a74cd6eba81.html>.

factor.<sup>13</sup> Among all the increased categories, healthcare increased the most at 16.1% more than 2017.



Data from National Bureau of Statistics

FIGURE 3: Increased percentage of consumption expenditure per capita in China (2018 compared to 2017)

### 3.2 Current Situation of the Pension Industry and Related Policies in China

*Work Policy and Practice for Senior Leadership*, by the State Tobacco Monopoly

Administration, mentions that the government and central political committee are highly concerned the treatment of senior leadership. Aging has become a serious phenomenon that will bring challenges and new possibilities to the country and its people. With the increase of the average lifespan as well as the ability and pressure to continuing working, the delay of retirement has become inevitable. In this condition, the pension industry requires more attention and effort. The difficulties include but are not limited to: 1) The number of seniors is increasing over time. 2) Senior leadership is distributed in different locations, even in different cities, especially after retirement. 3) The health and living conditions of seniors varies by individual. For retired senior

<sup>13</sup> 2019. "Residents' income and consumption expenditure in 2018." *National Bureau of Statistics*. Accessed February 2, 2019. [http://www.stats.gov.cn/tjsj/zxfb/201901/t20190121\\_1645791.html](http://www.stats.gov.cn/tjsj/zxfb/201901/t20190121_1645791.html).



leadership, a state-owned company will arrange staff visiting activities and provide pension and welfare, which covers most life expenses, medical costs and nursing costs after retirement.<sup>14</sup>

The Health China 2030 Planning Outline by the State Council of the People's Republic of China promotes the development of the medical and health service system for the elderly and encourages the extension of medical and health services into communities and families. For senior care agencies, cooperation with professional medical institutions supports health, including providing treatment for the elderly, rehabilitation treatment, and daily care. For some chronic diseases and mental health conditions, it suggests integrating healthcare with home-based and community-based senior care for better health management and disease prevention. Further improvement of policies should focus on ensuring older people have easier access to essential medicines and providing welfare for disabled seniors or seniors with financial difficulties.<sup>15</sup>

In the *13th Five-Year National Aging Career Development and Pension System Construction Plan* by the State Council, the target indices for specific categories in the pension industry since the 12th Five-Year Plan in 2011 are summarized. The new plan is aimed at building a sustainable pension system to insure the country against an aging population.<sup>16</sup> The People's Government of Hubei Province published *Implementation Opinions of the Hubei Provincial People's Government on Accelerating the Development of the Aged Care Service Industry* in June of 2014. This document lays out plans that by 2020, a pension service system will be built on a home-based, community-based, and institution-supported senior care system with complete functions,

---

<sup>14</sup> 2018. *Work Policy and Practice for Senior Leadership*. State Tobacco Monopoly Administration and China National Tobacco Corporation

<sup>15</sup> 2016. "Healthy China 2030" Planning Outline." *State Council of the People's Republic of China*. Accessed February 26, 2019. [http://www.gov.cn/zhengce/2016-10/25/content\\_5124174.htm](http://www.gov.cn/zhengce/2016-10/25/content_5124174.htm).

<sup>16</sup> 2017. "Notice of the State Council on Printing and Distributing the Plan for the Development of the Aged Career and the Construction of the Aged System in the Thirteenth Five-Year Plan" *State Council*. Accessed February 28, 2019. [http://www.gov.cn/zhengce/content/2017-03/06/content\\_5173930.htm](http://www.gov.cn/zhengce/content/2017-03/06/content_5173930.htm).

excellent services and standardized of operation at a moderate scale, covering 90% of urban communities and 60% of communities in rural areas. Community living care service centers and elderly activity centers should meet the standards as well. Working opportunities in the pension industry are also expected to increase to provide 4.5 million job positions by 2020.<sup>17</sup>

### **3.3 Senior Life and Views of Aging from an Eastern Perspective**

Five thousand years of history and culture have influenced Chinese people to have a strong sense of responsibility to respect and care for their parents. Confucius once said that filial piety is one of the virtues to be held above all else. He explained three aspects of filial piety in the Analects of Confucius, including physical care, mental care and moral inheritance. It is children's obligation to support their parents, care for them, allow their preferences and ideas, and make them feel happy and proud.

In the article titled "What determines the preference for future living arrangements of middle-aged and older people in urban China", Dijuan Meng and colleagues collected data from the CHARLS 2011-2012 national baseline survey of middle-aged and elderly people. The study found that the most popular preference for future living conditions was live close to their children in the same community or neighborhood. This preference was even stronger among people who were separated, divorced or widowed compared to living independently. For the 2,264 participants in the study, the average age was 59.9 years, and the majority (91.3%) preferred to live with their children or live in the vicinity of their children. Further, 87.6% of the participants were satisfied with life, although 73.7% had no access to community-based elderly

---

<sup>17</sup> 2014. "Implementation Opinions of the Hubei Provincial People's Government on Accelerating the Development of the Aged Care Service Industry." *Hubei Provincial People's Government*. Accessed 28 Feb. 2019. [http://www.hubei.gov.cn/govfile/ezf/201407/t20140724\\_1032701.shtml](http://www.hubei.gov.cn/govfile/ezf/201407/t20140724_1032701.shtml).

care services. The average score of the degree of handicap access in communities was 2.92 ( $\pm 1.6$ ), indicating that the community/neighborhoods that people lived in were relatively inaccessible.<sup>18</sup>

Similar research was done to discover people's attitudes considering elderly care and relationships between generations. A recent international meeting was conducted by Jiangsu Province Moral Development Think-tank and Southeast University on the topic of ethical consensus and human moral development. In the Chinese Ethics Development Database and Research Report published after the meeting, 53.3% of people believed that the most ideal senior life is to live with children. Even more, 51.6% of people considered sending parents to nursing homes to be an unfilial action.<sup>19</sup>

It is clear that an individual person easily has stronger moral responsibility than other social and ethical concerns. Society and individuals have strong concerns when it comes to the elderly care industry in China.

### **3.4 Social Concerns about Aging**

#### **3.4.1 Ageism**

As defined by World Health Organization, ageism is “the stereotyping, prejudice, and discrimination against people on the basis of their age”. Attitudes of people toward seniors and aging are complicated, and ageism can be positive or negative. Negative attitudes include associating aging with negative characteristics like illness, disability, lack of energy and high

---

<sup>18</sup> Meng, Dijuan, Guihua Xu, Ling He, Min Zhang, and Dan Lin. 2017. “What determines the preference for future living arrangements of middle-aged and older people in urban China?” *PLoS One* 12 (7).

<sup>19</sup> Cai, Shuwen, Li Liu. 2018. “Half of the people consider sending parents to nursing homes to be unfilial, current society's new moral and ethical value is forming” *Xinhua Newspaper Network*. Accessed December 1, 2018. <http://js.xhby.net/system/2018/12/01/030901537.shtml>.

dependency. Positive attitudes, on the other hand, suggest paying extra attention and having respect for seniors out of pity, which will cause negative impacts in some circumstances.<sup>20</sup>

Ageism has critical impacts on people's actions, views of aging and mental health conditions, not only in older generations but also in teenagers. Based on the positive feedback process, seniors faced with ageism usually tend to feel lonely, and they are less willing to take advantage of services and are highly dependent on others for help, all of which contribute to people's ageism toward older generations.<sup>21</sup>

### 3.4.2 Empty-nester family problems

“Empty nesters”, defined by Liang et al., refers to elderly people who live with their spouses or alone after their young adult children have moved out. Empty nesters are vulnerable in terms of their health issues and have raised social concerns.<sup>22</sup> It is estimated that by 2020, the number of elderly people over the age of 60 will increase to around 255 million, and the number of elderly living alone and empty-nesters will increase to 118 million.<sup>23</sup> A survey sponsored by the National Bureau of Aging conducted in 2013 and published in 2014, selected 10 cities, including Beijing, Shanghai, Guangzhou and Shenzhen. The survey researched the home-based senior service situation and development and the needs of seniors, mainly those aged 60 and over and some aged 50 to 59 years. In addition to 10,036 valid individual questionnaires that were

---

<sup>20</sup> Tornstam, Lars, Sociologiska institutionen, Humanistisk-samhällsvetenskapliga vetenskapsområdet, Uppsala universitet, and Samhällsvetenskapliga fakulteten. 2006. “The complexity of ageism: A proposed typology.” *International Journal of Ageing and Later Life* 1(1): 43-68.

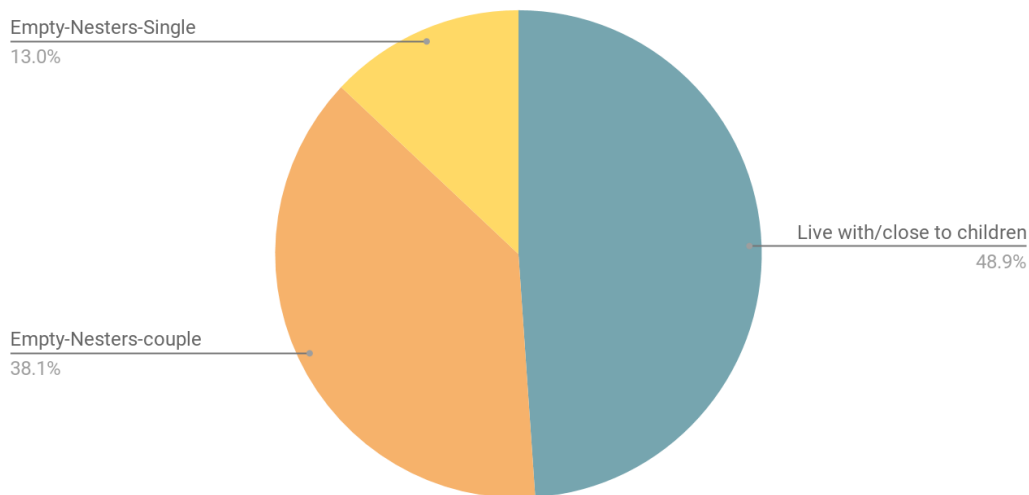
<sup>21</sup> Coudin, Geneviève, and Theodore Alexopoulos. 2010. “‘Help me! I'm old!’ how negative aging stereotypes create dependency among older adults.” *Aging & Mental Health* 14 (5): 516.

<sup>22</sup> Liang, Ying, Xueting Niu, and Peiyi Lu. 2017. “The aging population in china: Subjective well-being of empty nesters in rural Eastern China.” *Journal of Health Psychology*: 135910531771759.

<sup>23</sup> 2017. "Notice of the State Council on Printing and Distributing the Plan for the Development of the Aged Career and the Construction of the Aged System in the Thirteenth Five-Year Plan" *State Council*. Accessed February 28, 2019. [http://www.gov.cn/zhengce/content/2017-03/06/content\\_5173930.htm](http://www.gov.cn/zhengce/content/2017-03/06/content_5173930.htm).

returned, 61 questionnaires administered to home-based care services facilities were collected. Overall, 75.2% of the respondents had spouses, and 21.1% were widowed. Respondents had an average of 1.96 children, and 84.1% of the 50-59 age group had only one child. In this survey, there as a high rate of empty-nester families at 51.1%, of which 38.1% were couples and 13% lived on their own. The proportion of seniors over 80 years living alone is even higher, at 29.1%.<sup>24</sup>

#### Percentage of Empty-Nesters-Family



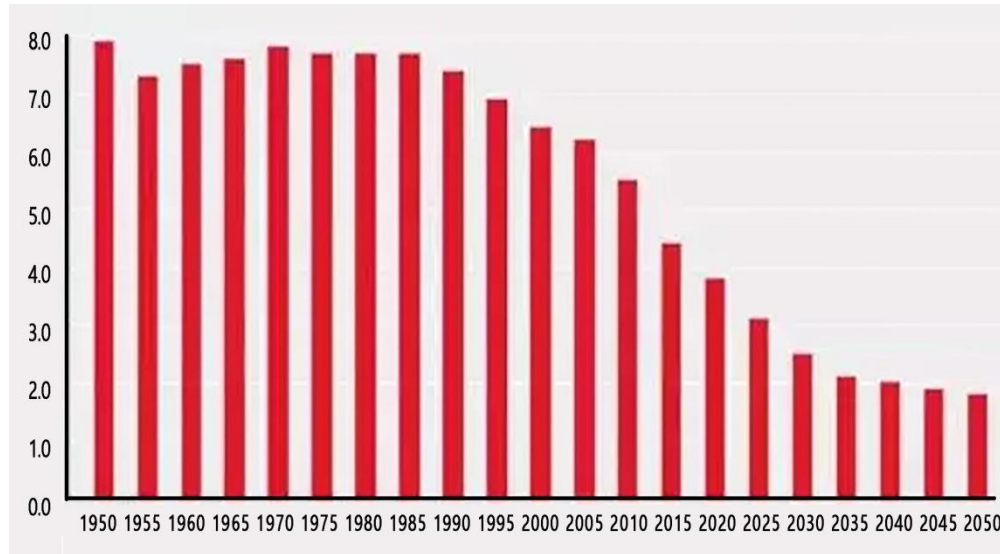
Data from National Bureau of Aging

FIGURE 4: The percentage of empty-nester families in a survey on the status of home-based senior care for 10,000 elderly people in 10 cities in China

---

<sup>24</sup> 2014. "Home Care - A survey report on the status of elderly living in ten cities." *360doc*. Accessed February 19, 2019. [http://www.360doc.com/content/14/1125/06/13458305\\_427837940.shtml](http://www.360doc.com/content/14/1125/06/13458305_427837940.shtml).

### 3.4.3 Decreased Working Population Ratio



Data from Yin Fa Zhongguo

FIGURE 5: The ratio of the past and future working population (15-59 years old) to the elderly (over 60 years old) in China from 1950 to 2050

Ratio of the past and future working population (15-59 years old) to the elderly (over 60 years old)					
Country	2000	2040	Country	2000	2040
USA	3.9	2.3	15 countries of the European Union	2.8	1.5
China	6.4	2.0	Singapore	6.4	1.5
Korea	6.2	1.5	Japan	2.7	1.1

Data from 21 Yin Fa Zhongguo

FIGURE 6: The ratio of the working population (15-59 years old) to the elderly (over 60 years old) in the world in 2000 and 2040

The two charts above show data from Yin Fa Zhongguo, which was calculated based on the assumed constant fertility rate of 1.8 in China by the United Nations<sup>25</sup>. It is clear in the charts that the ratio of the working population to the elderly in China has decreased from 1985 up to the present. This trend of a continuous drop will continue over the next few decades until 2050.

<sup>25</sup> Mu, Guangzong. 2016. *The Graying of China: From the Universal Two-child Policy to Successful Aging*. Beijing: Zhongguo Min Zhu Fa Zhi Chu Ban She.

Combined with the data in Figure 5 and Figure 6, the working population ratio will also drop dramatically in other countries similarly. The pension crisis will be a global issue in 2040. Zhang explained that the working population ratio will be 2.0 in 2040, which means that two working people will support one senior while raising children. He stated concerns about the burden of living expenses while paying for a future pension. For this reason, even with the working ratio of 5.5 at present, the pension account is running empty. When the ratio drops from 5.5 to 2 in 2040, the working population will pay three times the current pension, not to mention raising children and increasing living expenses.<sup>26</sup>

#### **3.4.4. Pension for Only-child Families**

##### *Number of children vs. quality of the child-parent relationship*

In a study on the association between personality and loneliness by Bei Wang and Xinqi Dong, as quoted in a prior quantitative study by Dong, Zhang and Chang in 2015, low perceived filial piety was found to be associated with the loneliness of older parents. However, one of the surprising findings of Wang and Dong is that loneliness was not correlated with having more children. A reasonable inference from the researchers based on this finding is that the number of children is not equal to the quality of the child-parent relationship. Since the data were drawn from a population study of Chinese elderly in a Chicago-based project, Wang and Dong discussed that the lack of a satisfying child-parent relationship for the aging immigrant Chinese population may contribute to them feeling lonely.<sup>27</sup>

---

<sup>26</sup> Zhang, Jing. 2017. "Aging has a close relationship with you." In *80 Hou De Yang Lao Shi Ye: Yang Lao Chan Ye Shang Ye Mo Shi Yu Kua Jie Chuang Xin*, edited by 80 Hou De Yang Lao Shi Ye Union, 3-22. Beijing: Zhong Guo Jing Ji Chu Ban She.

<sup>27</sup> Wang, Bei, and Xinqi Dong. 2018. "The association between personality and loneliness: Findings from a community-dwelling Chinese aging population." *Gerontology and Geriatric Medicine* 4 : 2333721418778181.

### 3.4.5 Needs of Seniors Change over Time

As Li and Zhang explained, health risk factors, lifestyle changes and environmental threats have increased due to the rapid urbanization in China. China is undergoing a nutrition transition and is facing the health issues caused by decreased physical activity and increased preference of digital screens.<sup>28</sup>

#### *Nutrition and wellness*

Seeking wellness has a long history in China in Taoism, which refers to supporting life, enhancing physical fitness, and preventing diseases through various methods. With the improvement of living conditions for seniors, more people are concerned about not only physical health but also wellness and mental health needs. Li introduced the idea of wellness and suggested some beneficial solutions for how to improve wellness according to the season, including activities like tea, planting, literature, singing, drawing, Taiji, and other outdoor activities.<sup>29</sup> Yuet-Wan Lok et al. shared knowledge of how nutrition can contribute to successful aging. According to the authors, nutrition interacts with the aging processes in many ways, and adopting a healthy diet and lifestyle can help with health conditions and prevent chronic diseases.<sup>30</sup>

#### *Choice and value*

Seniors are no longer satisfied with standard single-functioning uses provided by traditional senior care housing and want to shape their own environment and, more importantly, keep to the ability to choose what they like. “The next generation of seniors will be far more value-

---

<sup>28</sup> Cheng, Sheung-Tak, Iris Chi, Helene H. Fung, Lydia W. Li, Jean Woo, and SpringerLink. 2015. *Successful aging: Asian perspectives*. 2015th ed. Dordrecht: Springer Netherlands.

<sup>29</sup> Yixuan Li. “Pension and cross-border exploration” In *80 Hou De Yang Lao Shi Ye: Yang Lao Chan Ye Shang Ye Mo Shi Yu Kua Jie Chuang Xin*, edited by 80 Hou De Yang Lao Shi Ye Union, 75-232. Beijing: Zhong Guo Jing Ji Chu Ban She.

<sup>30</sup> Kris Yuet-Wan Lok, Ruth Suk-Mei Chan, and Jean Woo. “The Role of Nutrition in Successful Aging.” In *Successful aging: Asian perspectives*, edited by Sheung-Tak Cheng, 231-250. Dordrecht: Springer Netherlands.



conscious.” Every generation is deeply influenced by the period, with influence extending to fashion, technology use, and lifestyles.<sup>31</sup> Further, many active seniors chose to continue working and living in the city to have the same array of choices they are used to. There is a growing trend in China of seniors attending university. According to state news agency Xinhua, there were 7 million elderly students enrolled in China’s universities in 2017. It is predicted that there will be senior universities in every city, 50% of towns and 30% of villages by 2020.<sup>32</sup>

### **3.5 Aging Collectively Rather than Aging Individually**

#### **3.5.1 Aging in Place**

Aging in place is the “the ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level” defined by the U.S. Centers for Disease Control and Prevention. People can age in place and rely on community-based services and family to meet their need for healthcare and services because of the ability to remain healthy longer. Consequently, people turn to senior housing and care operations later when they are older and frail.<sup>33</sup>

Paula Span mentioned in her article the interview she had with Vicki Freedman, an epidemiologist at the University of Michigan’s Institute for Social Research. Freedman shared her finding that people in assisted living got outside more often than those in their own homes with similar demographic characteristics and health conditions. With interviews and research

---

<sup>31</sup> Eastman, Perkins, and ProQuest (Firm). 2013. *Building type basics for senior living*. 2nd ed. Hoboken, N.J: Wiley. 124-148.

<sup>32</sup> Thirani Bagri, Neha. 2017. "China's seniors are lining up to go back to college." *Quartz*. Accessed April 10, 2019. <https://qz.com/978805/chinas-seniors-are-lining-up-to-go-back-to-college/>.

<sup>33</sup> Eastman, Perkins, and ProQuest (Firm). 2013. *Building type basics for senior living*. 2nd ed. Hoboken, N.J: Wiley. 124-148.

findings, Span reached the conclusion that the health conditions of seniors as well as their living environment and geography all contribute to whether seniors are stuck at home and rarely leave and have few connections to the outside world. Span also indicated that people's preference of aging in place might "help imprison them".<sup>34</sup>

### **3.5.2 Social Isolation and Loneliness**

#### *Living alone vs. loneliness*

Living alone does not indicate the feeling of loneliness. Many seniors who live alone also have highly active social lives.<sup>35</sup> Based on data from a study conducted in North Wales, Wenger et al. refined the model of isolation and loneliness. The resulting model indicates that there is higher potential and that it is common for people who are socially isolated to feel lonely because of three particular objective aspects of social isolation: "widowhood, living alone and support network type." On the other hand, subjective variables of loneliness like "self-assessed poor health and low morale" may exacerbate social isolation.<sup>36</sup>

#### *Age and loneliness*

As reviewed by Wegner et al., Wilkes says in *Social Isolation and Loneliness in Old Age* that loneliness is a serious problem in older age groups<sup>37</sup>. However, Wilson and Moulton found in their national survey of 4,610 U.S. residents aged over 45 years in 2010, that loneliness is

---

<sup>34</sup> Span, Paula. 2015. "At home, many seniors are imprisoned by their independence." New York: New York Times Company.

<sup>35</sup> Larson, R., J. Zuzanek, and R. Mannell. 1985. "Being alone versus being with people: Disengagement in the daily experience of older adults." *Journal of Gerontology* 40(3): 375-81.

<sup>36</sup> Wenger, G. Clare, Richard Davies, Said Shahtahmasebi, and Anne Scott. 1996. "Social isolation and loneliness in old age: Review and model refinement." *Ageing and Society* 16(3): 333-58.

<sup>37</sup> Wenger, G. Clare, Richard Davies, Said Shahtahmasebi, and Anne Scott. 1996. "Social isolation and loneliness in old age: Review and model refinement." *Ageing and Society* 16(3): 333-58.

prevalent among the elderly population but decreases with age.<sup>38</sup> Another finding from the study results given by Cacioppo in 2006 and M. Simon in 2014, in the study by Wang and Dong, is that high neuroticism and/or low conscientiousness are more likely contribute to loneliness instead of age. Wang and Dong also found no significant relationship between age and loneliness.<sup>39</sup>

### *Elderly orphan problem*

Elderly orphans, considered a unique subset of older adults by Carney et al., do not take the initiative to make medical plans for the future when they are independent individuals and still live on their own. Isolated and without available help from their family or caregivers, elderly orphans usually have difficulties very late as they age and become frail.<sup>40</sup>

In a review paper by Montayre et al., two shared characteristics of elder orphans are documented as: 1) Elderly orphans are not represent as being frail while aging, and this develops due to risk factors in their life circumstances and 2) Elderly orphans are noted to be “both community and independent dwellers in their own homes”. The authors also suggest that the most important issue associated with providing support and care for elderly orphans is to protect and allow them to maintain their dignity and to avoid “potential or misinterpreted discrimination and stigmatization.”<sup>41</sup>

---

<sup>38</sup> Anderson, Gretchen. 2010. *Loneliness among older adults: A national survey of adults 45*. Accessed February 10, 2019. [https://assets.aarp.org/rgcenter/general/loneliness\\_2010.pdf](https://assets.aarp.org/rgcenter/general/loneliness_2010.pdf).

<sup>39</sup> Wang, Bei, and Xinqi Dong. 2018. “The association between personality and loneliness: Findings from a community-dwelling Chinese aging population.” *Gerontology and Geriatric Medicine* 4 : 2333721418778181.

<sup>40</sup> Carney, Maria T., Janice Fujiwara, Jr Emmert Brian E, Tara A. Liberman, and Barbara Paris. 2016. “Elder orphans hiding in plain sight: A growing vulnerable population.” *Current Gerontology and Geriatrics Research*: 4723250-11.

<sup>41</sup> Montayre, Jed, Jasmine Montayre, and Sandra Thaggard. 2018. “The elder orphan in healthcare settings: An integrative review.” *Journal of Population Ageing*: 1-18.

### *Social isolation and health*

Social isolation, found by Sorkin et al. in their research on an elderly sample group, has been linked to an increased risk of adverse health outcomes, including coronary disease.<sup>42</sup> In Seeman's article on the relationship between social ties and health, low social support is identified as the risk of both poor physical and psychological health for older adults. The writer also points out that there is an association between higher social integration and lower mortality risk. In addition, according to the research, evidence suggests that the environment of social ties has important influences on health and the quality of social ties potentially defines positive or negative effects on health.<sup>43</sup>

A positive relationship between age and trust is shown by Poulin and Haase, namely that trust increases across the aged population and higher trust may be a resource to well-being, especially for older generations.<sup>44</sup> As John Thacker stated in an article on housing as a social context for aging, "We cannot be healthy alone...Health is local and place-based." Quality social relationships are essential for healthy aging, and longevity studies suggest that "solutions for aging are as much social as they are medical."<sup>45</sup> In a study of social relationships and mortality risk by Holt-Lunstad et al. based on data across over 30,000 individuals followed for an average period of 7.5 years, results indicate that participants with adequate and stronger social

---

<sup>42</sup> Sorkin, Dara, Karen S. Rook, and John L. Lu. 2002. "Loneliness, lack of emotional support, lack of companionship, and the likelihood of having a heart condition in an elderly sample." *Annals of Behavioral Medicine* 24(4): 290-8.

<sup>43</sup> Seeman, Teresa E. 1996. "Social ties and health: The benefits of social integration." *Annals of Epidemiology* 6(5): 442-51.

<sup>44</sup> Poulin, Michael J., and Claudia M. Haase. 2015. "Growing to trust: Evidence that trust increases and sustains well-being across the life span." *Social Psychological and Personality Science* 6(6): 614-21.

<sup>45</sup> University of Arkansas Community Design Center. 2017. *Houses for aging socially: Developing third place ecologies*. Novato, California: ORO Editions.

relationships have a 50% greater likelihood of survival, compared to people with weak or insufficient social relationships.<sup>46</sup>

### *Intergenerational relationships*

In gerontology programs for undergraduate students, attitudes of students working with elderly adults vary.<sup>47</sup> Overall, intergenerational activities create opportunities for seniors and younger generations to connect with each other, help younger generations learn more about aging, and decrease ageism. An interesting finding by Bousfield and Hutchison in 2010 is that improvements in positive attitudes toward seniors depend on the quality of intergenerational contact, not the time or frequency of contact.<sup>48</sup> Through intergenerational communication, when young students were encouraged to learn about aging, they got first-hand information from seniors and had authentic close relationships with older adults. Except for the negative aspects of aging, some members of older generations reflect a positive lifestyle and are wise and open-minded. These experiences benefit younger students by encouraging them to recognize seniors, care for them and influence them to choose a healthy lifestyle to ensure successful aging in the future.<sup>49</sup>

---

<sup>46</sup> Holt-Lunstad, Julianne, Timothy B. Smith, and J. Bradley Layton. 2010. "Social relationships and mortality risk: A meta-analytic review." *PLoS Medicine* 7(7): e1000316.

<sup>47</sup> Van Dussen, Daniel J., and Robert R. Weaver. 2009. "Undergraduate students' perceptions and behaviors related to the aged and to aging processes." *Educational Gerontology* 35(4): 342-57.

<sup>48</sup> Bousfield, Catherine, and Paul Hutchison. 2010. "Contact, anxiety, and young people's attitudes and behavioral intentions towards the elderly." *Educational Gerontology* 36(6): 451-66.

<sup>49</sup> Henkel, Linda A. 2006. "Increasing student involvement in cognitive aging research." *Educational Gerontology* 32(7): 505-16.

### 3.6 Current Senior Housing Models in China

According to the Code for the Design of Residential Buildings for the Aged by the People's Republic of China, which outlines industry standards, safety of the elderly should be guaranteed and they should have easy access to all services. The design of their place of residence should reflect adaptability to the health, self-care and other care needs of the elderly and improve the quality of living. These include senior care agencies, community-based senior care, home-based senior care and senior resort centers.

#### 1. Senior care agencies

Senior care agencies provide private or public nursing homes with assisted living and memory care that offers long-term care insurance. These can be independent legal entities or a department or branch affiliated with a medical institution, an enterprise, a social organization, or a comprehensive social welfare institution. In October 2018, the General Office of the State Council proposed cancelling the establishment of licenses for senior care institutions.<sup>50</sup>

#### 2. Community-based senior care

Community-based senior care is one way to support the elderly in a community. It refers to elderly care services based on the family as the core, and the community as the basis, including housekeeping services and spiritual comfort, elderly shopping centers and service centers, senior dining halls, activity centers and senior education.<sup>51</sup> Continuing care retirement communities and multigenerational communities are two popular examples of community-based senior care system.

---

<sup>50</sup> 2018. "Notice of the General Office of the State Council on Printing and Distributing the Implementation Plan for Improving the Mechanism of Promoting Consumption (2018-2020)." *State Council*. Accessed April 10, 2019. [http://www.gov.cn/zhengce/content/2018-10/11/content\\_5329516.htm](http://www.gov.cn/zhengce/content/2018-10/11/content_5329516.htm).

<sup>51</sup> Zhang, Jing. 2017. *80 Hou De Yang Lao Shi Ye: Yang Lao Chan Ye Shang Ye Mo Shi Yu Kua Jie Chuang Xin*. Beijing: Zhong Guo Jing Ji Chu Ban She

### 3. *Home-based senior care*

Home-based senior care refers to family-centered senior services for the elderly living at home that helps them solve daily living difficulties. There are two main strategies of home-based care services, either through professional service delivered to seniors' homes or day service centers for the elderly established in a community.<sup>52</sup>

### 4. *Senior resort centers (senior care in tourist centers)*

A large number of elderly people in the northern cities of China have begun to move south for the winter to avoid the cold weather. However, Zhang Qi, the director of the Women's Studies Association of Heilongjiang Province, believes that from a medical point of view, the trend of moving to senior resort centers in warmer climates for the winter can change the long-term adaptation of the body and may adversely affect the health of the elderly.<sup>53</sup> A large group of seniors moving to Hainan even caused water shortage issues for local people during the winter of 2018.<sup>54</sup>

---

<sup>52</sup> Qing, Lianbin. 2014. "Home care is a way to support the country's social conditions." *PeopleCN*. Accessed April 10, 2019. <http://opinion.people.com.cn/n/2014/1226/c1003-26278528.html>

<sup>53</sup> 2012. "Experts remind: "migrant birds" pension is not suitable for all seniors." *Xinhuaabaoye*. Accessed March 10, 2019. <http://news.xhby.net/system/2012/10/24/014999693.shtml>.

<sup>54</sup> Gongrenribao. 2019. "A large number of old people go to Hainan for winter." *Xinhuanet*. Accessed March 10, 2019. [http://www.xinhuanet.com/politics/2019-01/27/c\\_1124047838.htm](http://www.xinhuanet.com/politics/2019-01/27/c_1124047838.htm).

## **CHAPTER 4 METHODOLOGY**

This chapter describes the methodology and research approach used to develop findings of the research and senior project evaluations. It explains the research flow, which includes documentary analysis, case studies, on-site observation, a questionnaire and interviews. Cross-referencing the data provided by case studies, interviews and questionnaires, along with context analysis, led to the research findings.

### **4.1 Research Methodology and Approach**

Through documentary analysis of current conditions as well as the needs and social concerns of seniors, case studies of successful seniors housing projects, interviews with seniors and different generations in Wuhan, and online surveys, this study aims to look for future possible solutions for a sustainable community complex for human services as well as the physical infrastructure needed by seniors and their families. A mixture of qualitative and quantitative methods for collecting and analyzing data is used in this research.

#### **4.1.1 Documentary Analysis**

The documentary analysis method is used for an academic literature review. First of all, this study uses background theories on the elderly population, increased lifespans, and the growing need for the senior care industry. This is followed by an assessment of the current situation of the pension industry and related policies and regulations in China, especially in Hubei province, as well as a study of senior life and views of aging from an eastern perspective, a review on the increased needs of seniors and growing social concerns regarding senior care, and finally an overview of current senior housing models in China and conclusions from the literature review.



### **4.1.2 Case Study Analysis**

After exploring the academic theories and policy guidelines, cases are analyzed through different methods. Case studies and interviews are used to explore the evaluation system for senior housing community projects for further design decision considerations. A qualitative and quantitative mixed approach is applied to collect data and analyze the findings. The literature review method is used for understanding and evaluating existing senior housing projects that are successful. A comparison study is used to compare and contrast the differences of existing senior housing models to generate important criteria for senior housing projects. Criteria generated from case study research are further developed by interpreting the results of cross-referencing data from interviews and questionnaires. Further, the framework for selecting design considerations and identifying the relative weighting for sustainable development and design criteria is analyzed.

### **4.1.3 On-site observation**

The fieldwork strategy used a mixed methods approach to study the relationships and social attributes of seniors' behavior in communities. The perceptual approach of the on-site observation method, which is mainly walk-by observation, was carried out to collect data on how seniors use their housing and community spaces for living and social interaction. Observation in this research is a part of quantitative and qualitative research to determine how seniors act in the physical environment, how they spend time, and why some senior communities are more successful and vibrant than others. During on-site observation, the interview method was also applied to gather more information on how seniors in existing housing feel about their living environment and whether they are satisfied with current conditions.

#### **4.1.4 Survey and interviews**

Information was collected from people from different generations and different fields through questionnaire surveys and interviews. This method works with the on-site observation method to enhance understanding of seniors and their social interaction behaviors.

Questionnaires are the most common tools to use in a survey because it is easy to find specific group of respondents from different backgrounds. Questionnaires designed and delivered through online survey websites allow quick responses and further engagement and can collect large amounts of data from a large sample of participants with different age group generations.

This research focuses on looking into the future and exploring future senior housing for the next generation, so it is important that the questionnaire results be evaluated based on age groups.

Data was analyzed to form a framework for evaluating the efficiency of senior housing projects.

In-depth interviews with people from different generations on their views about aging and their ideal senior housing after retirement were carried out during on-site observation.

## CHAPTER 5 CASE STUDIES

The senior housing industry in Wuhan, China is still in its infancy and needs improvement compared to successful senior housing projects in urban areas and big cities in China and overseas. It is valuable to study different operating models of senior housing as well as proposed future senior housing typologies created by scholars and designers in the field. The development and operating system of the senior housing industry has an inseparable relationship with the history of a city, as well as the economic development and traditional culture of people. To understand and establish an evaluation system to determine the success of senior housing projects, it is important to analyze the development and cases in Chinese and overseas markets.

### 5.1 Current Senior Housing Model Comparison

Among the senior housing models in China, senior care services can be distributed into two main categories or analysis, namely senior housing and senior care services that apply to housing. In the following chart, no specific project was studied, but the overall advantages and disadvantages are listed to compare the similarities and differences of different current senior housing models.

Current Senior Housing Models in China			
Category	Type	Advantages	Disadvantages
Senior housing options provided by senior care agencies	Public nursing home	<ul style="list-style-type: none"><li>- Government invested</li><li>- Equal welfare</li><li>- Plenty of volunteer resources</li><li>- For low-income elderly people</li></ul>	<ul style="list-style-type: none"><li>- Lack of choices</li><li>- Low living quality</li><li>- Weak mental health care</li></ul>
	Mid-range to high-end senior community	<ul style="list-style-type: none"><li>- Great service and living conditions</li><li>- Gentle care system</li></ul>	<ul style="list-style-type: none"><li>- High cost</li><li>- Requires a lot of maintenance,</li></ul>

		<ul style="list-style-type: none"> <li>- and health insurance system</li> <li>- Good location/walkability</li> </ul>	<ul style="list-style-type: none"> <li>- labor, and management</li> </ul>
Senior housing options provided within the community	Senior community in a suburban area	<ul style="list-style-type: none"> <li>- Affordable</li> <li>- Natural environment access</li> <li>- High privacy</li> </ul>	<ul style="list-style-type: none"> <li>- Lack of transportation</li> <li>- Insufficient facilities</li> <li>- Isolated</li> </ul>
	Multigenerational community	<ul style="list-style-type: none"> <li>- Provides the chance to live with family</li> <li>- High independence</li> </ul>	<ul style="list-style-type: none"> <li>- Only for active seniors</li> <li>- Price and quality varies according to location and developer</li> </ul>
Other senior care services within housing	Home-based care services	<ul style="list-style-type: none"> <li>- Provides specific home care services</li> <li>- On-demand basis, does not provide a lot of amenities but they are built into the and monthly cost of living, seniors can order what they need.</li> </ul>	<ul style="list-style-type: none"> <li>- Lack of community engagement</li> <li>- Aging in place becomes aging alone</li> </ul>
	Senior resort center	<ul style="list-style-type: none"> <li>- Great views/environment</li> <li>- Hotel management</li> </ul>	<ul style="list-style-type: none"> <li>- High cost</li> <li>- Temporary holiday choice</li> </ul>

In addition to studying the above-mentioned housing models, five representative examples of senior housing projects from different countries, each representing a specific type, are further analyzed.

## 5.2 Analysis of Selected Senior Housing Projects

### 5.2.1 The Cardinal at North Hills (US)

The Cardinal at North Hills was opened in January 2017 by Kisco Senior Living, which has 25 years of experience in developing and managing retirement communities. The Cardinal community offers a full continuation of services to residents, from independently living individuals to those require assisted living, memory support and skilled nursing care.<sup>55</sup>



FIGURE 7: Cardinal at North Hills. Source: <https://lifeatthecardinal.com/>.

Category	Characteristic
Housing Model Type	Upscale continuing care retirement community
Location	Located in the vibrant North Hills Midtown District of Raleigh. <ul style="list-style-type: none"><li>● Access to public transportation</li><li>● Surrounded by multi-use amenities within accessible distance, including dining, shopping, and entertainment.</li><li>● Close to family</li></ul>

<sup>55</sup> "The Cardinal at North Hills | A Kisco Community." The Cardinal. Accessed April 1, 2019. <https://lifeatthecardinal.com/>.

<p>Amenities and Services</p>	<ul style="list-style-type: none"> <li>● Clubhouse with covered verandas overlooking a courtyard and gardens</li> <li>● Dining in upscale, casual, private and pub-style settings and gourmet cuisine</li> <li>● Library, computer center, media room and lecture hall</li> <li>● Art studio and woodworking shop</li> <li>● On-site salon and spa with private massage rooms</li> </ul>
<p>Design Characteristics</p>	<p>Designed with concrete and steel construction (Everything under one roof)</p> <ul style="list-style-type: none"> <li>● High privacy</li> <li>● Private reserved-space underground parking garage</li> <li>● Living units connected to the clubhouse, dining and health-care building.</li> </ul>
<p>Living Characteristics</p>	<p>A full continuum of care</p> <ul style="list-style-type: none"> <li>● Provides four options for living for all seniors with different health conditions <ul style="list-style-type: none"> <li>○ 165 independent living apartments</li> <li>○ 27 assisted living apartments</li> <li>○ 18 specialized assisted living units for Alzheimer’s and related cognitive challenges</li> <li>○ 15 Medicare-certified private nursing units</li> </ul> </li> </ul>



FIGURE 8: Cardinal at North Hills Floor Plan at Garden Level. Source: <https://lifeatthecardinal.com/>.

## 5.2.2 Humanitas (Netherlands)

Humanitas is a nonprofit association and one of the main social services and community building organizations of the Netherlands. Founded in 1945 directly after the Second World War, Humanitas provides support to the impoverished population of the Netherlands and supports people that temporarily cannot manage on their own. Humanitas intergenerational living was born from a single experiment when CEO Gea Sijpkens suggested inviting a student to live at the care home. The improvement in mood and culture within the Humanitas community is remarkable, and it is not only a replicable healthcare model but a whole new approach to community building.

The problem with the post-war model of care is that it was conceived of with a very small population of older people in mind. People can come out but people have no will to come in because they do not know what is inside. The principle of Humanitas is to be a good neighbor. The concept of a good neighbor and the project's influence are not limited to the boundary. People in the neighborhood are welcomed to come into the Humanitas community and see that everything is really nice.<sup>56</sup>

Social isolation and loneliness among the elderly are killers, and contact with younger people is good for the health of the elderly. Humanitas takes an intergenerational approach and brings younger people into the life of elderly people as well as the outside world, with joy and excitement. Patrick Stoffer, a young man in his final year of a facilities management degree, said that his time living in Humanitas gave him a different perspective and changed him for the better.<sup>57</sup>

---

<sup>56</sup> Yates, Emily, and Emily Yates. 2017. "Humanitas: Not Just a Ground-breaking 'healthcare Model' but a Whole New Approach to Community Design" *Medium*. Accessed July 28, 2018. <https://medium.com/meaning-conference/humanitas-not-just-a-ground-breaking-healthcare-model-but-a-whole-new-approach-to-community-21a8dea0d0b1>.

<sup>57</sup> Ford, Peter. 2016. "How adding youth to a dutch old age home is improving life for all." *The Christian Science Monitor* 2016.





FIGURE 9: Humanitas Dining Hall. Source: <https://inhabitat.com/>



FIGURE 10 (left): Humanitas Dining Hall. FIGURE 11 (right): Humanitas communal vegetable and flower gardens  
Source: <https://medium.com/meaning-conference/>.

Category	Characteristics
Housing Model Type	Public nursing home with intergenerational living
Location	Over 15 different apartment complexes in the Netherlands
Amenities and Services	<ul style="list-style-type: none"> <li>● Buddy projects for immigrants</li> <li>● Chat services addressing loneliness</li> <li>● Parenting support groups for people dealing with grief and loss</li> <li>● Communal vegetable and flower gardens, where residents of the low-income neighborhood surrounding the center are always welcomed</li> <li>● Museum and library</li> </ul>

	<ul style="list-style-type: none"> <li>● Hair salon</li> <li>● Convenience store</li> </ul>
Design Characteristics	<p>Humanist values</p> <ul style="list-style-type: none"> <li>● Equality (of volunteers and clients)</li> <li>● Responsibility (for oneself and others in society)</li> <li>● Independence (activities are geared toward ensuring that clients can regain control of their lives)<sup>58</sup></li> </ul>
Living Characteristics	<p>Cohousing</p> <ul style="list-style-type: none"> <li>● Students can live at Humanitas Deventer for free if they spend 30 hours with the elderly each month. Many of the students have formed profound relationships with their elderly neighbors and even become close friends<sup>59 60</sup> <ul style="list-style-type: none"> <li>○ Cost-cutting reforms of the Netherlands' care homes</li> <li>○ Rent-free rooms for students</li> </ul> </li> <li>● Brings the outside world in and wards off the negative effects of aging</li> <li>● Students can teach the elderly social media and internet skills and the elderly have many life experiences to share.<sup>61</sup></li> </ul> <p>Free of charge</p> <ul style="list-style-type: none"> <li>● Available to anyone irrespective of age, ethnicity, lifestyle and sexual orientation</li> </ul>

<sup>58</sup> "About Humanitas." Home. Accessed September 18, 2018. <https://www.humanitas.nl/over-ons/about-humanitas/>.

<sup>59</sup> Cooke, Lacy. 2016. "New Dutch Housing Model Lets Students Stay at a Senior Living Home for Free." *Inhabitat*. Accessed October 18, 2018. <https://inhabitat.com/dutch-housing-model-lets-students-stay-at-a-senior-living-home-for-free/>.

<sup>60</sup> Reed, Carey. 2015. "Dutch Nursing Home Offers Rent-free Housing to Students." *PBS*. Accessed November 20, 2018. <https://www.pbs.org/newshour/world/dutch-retirement-home-offers-rent-free-housing-students-one-condition>.

<sup>61</sup> Tiffany R. Jansen Feed Tiffany R. Jansen. 2017. "This Nursing Home Is Also a College Dorm." *CityLab*. Accessed November 22, 2018. <https://www.citylab.com/equity/2015/10/the-nursing-home-thats-also-a-dorm/408424/>.

### 5.2.3 VCAN Senior Jade Tower (Upscale CCRC, Shanghai, China)

Jade Tower provides housing and services for older adults with a full continuum of care. Perfect facilities and equipment, and a selection of entertainment platforms, accompanied by activities, bring an unparalleled post-youth life to the elderly.<sup>62</sup>

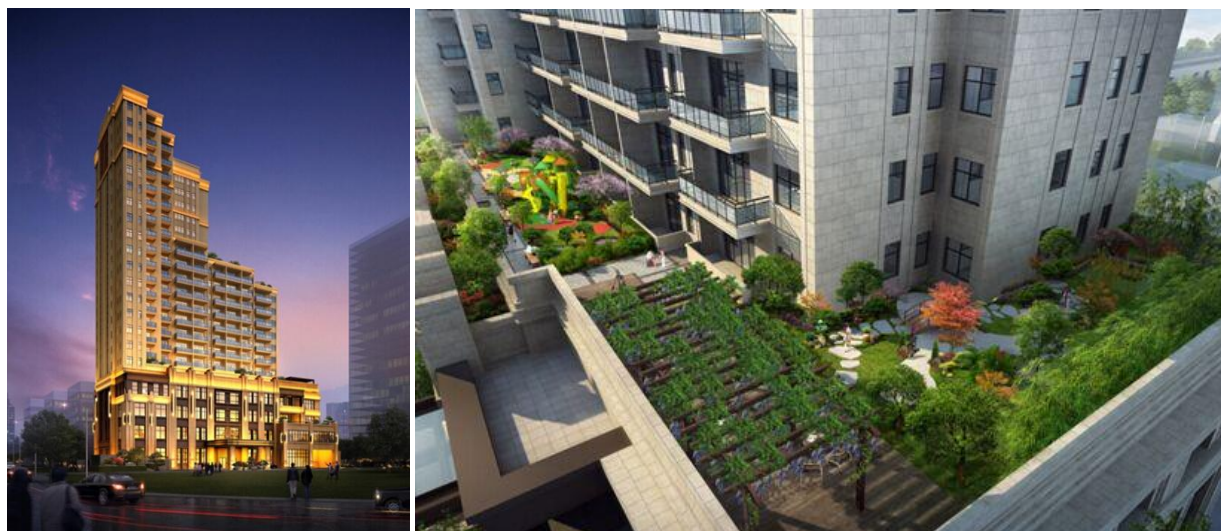


FIGURE 12 (left): VCAN Senior Jade Tower. FIGURE 13 (right): VCAN Roof garden  
Source: <http://www.jadetowerccrc.com/>.

Category	Characteristics
Housing model type	Upscale high-rise senior housing
Location	<ul style="list-style-type: none"> <li>● Enjoy the top life in Shanghai</li> <li>● Next to Zhongshan Park</li> </ul>
Amenities and services	<ul style="list-style-type: none"> <li>● 24-hour services, including house cleaning, home care and other emergency care</li> <li>● 24-hour medical care service (4th floor)</li> <li>● Healthy lifestyle management</li> <li>● Social and entertainment <ul style="list-style-type: none"> <li>○ 1st floor: billiard room, fitness room, audio and video hall, beauty salon</li> <li>○ 2nd floor: internet surfing room, library, classrooms, chess room, game room (Xbox)</li> </ul> </li> <li>● Senior education: painting, calligraphy, handmade art,</li> </ul>

<sup>62</sup> "Jadetower." Accessed September 18, 2018. <http://www.jadetowerccrc.com/>.

	<p>photography, baking, planting</p> <ul style="list-style-type: none"> <li>● Healthy diet: professional nutrition education (2nd floor)</li> <li>● Green channel for medical treatment that connects to surrounding hospitals</li> <li>● Rehabilitation care (3rd floor)</li> <li>● Roof garden</li> </ul>
Design characteristics	<p>Lifestyle</p> <ul style="list-style-type: none"> <li>● The living environment tries to restore a classic lifestyle by providing a classic environment for seniors, such as a reading club, ballroom, and English corner, and encouraging the elderly to build their own interests. This is accompanied by watching movies, watching dramas and other foreign-related activities to provide high-quality and exciting social experiences for the elderly.</li> </ul>
Living characteristics	<p>Living units</p> <ul style="list-style-type: none"> <li>● 143 living units for active senior people (5th to 21st floor)</li> <li>● The 3rd floor is a rehabilitation care for elderly people who have a variety of basic diseases, cannot take care of themselves, and have long-term or short-term professional care needs.</li> </ul>





FIGURE 14: VCAN Senior Jade Tower analysis. Source: <http://www.jadetowerccrc.com/>. Author

#### 5.2.4 Greentown Wu Zhen Ya Yuan (Idealism, China, 2013)

Greentown Wu Zhen Ya Yuan locates in the town of Wu Zhen, which is a National 5A Scenic Spot. Weiping Song, CEO of Greentown Wu Zhen Ya Yuan, claims that the goal of this project is to provide an ideal living environment that is a dream factory for older generations and hopefully to further influence how all generations view aging.

Wu Zhen Ya Yuan provides various fully finished senior housing units from 600 to 1,500 sq. ft., along with medical and nursing care, commercial services, and educational services to meet the demands of the elderly as much as possible.<sup>63</sup>



FIGURE 15-16: Greentown Wu Zhen Ya Yuan. Source: <http://www.yuanshihui.cn/>

Category	Characteristics
Housing model type	Senior resort center (idealism)
Location	In the town of Wu Zhen <ul style="list-style-type: none"> <li>● Connected to the main street</li> <li>● Access to public transportation</li> <li>● Great view of scenic spots</li> </ul>
Amenities and services	<ul style="list-style-type: none"> <li>● Commercial district for small businesses</li> <li>● Upscale hotel</li> <li>● Transportation stations</li> <li>● Senior education, including Taiji, Chinese opera and handmade art (with a classroom, sports hall, auditorium and exhibition hall)</li> <li>● International pension center</li> <li>● Rehabilitation hospital and medical garden</li> </ul>
Design characteristics	Traditional Chinese architecture elements with Jiangnan garden design <sup>64</sup>
Living characteristics	Idealism senior care

<sup>63</sup> Zhao, Hui. 2013. "Greentown Wu Zhen Ya Yuan: Idealistic pension industry." Accessed September 18, 2018. <http://www.chinagreentown.com/article/1481/>.

<sup>64</sup> Wan, Rentao. 2018. "Depth reveals the benchmark of China's pension real estate – Wu Zhen Ya Yuan." *Jinritoutiao*. Accessed September 24, 2018. <http://www.yuanshihui.cn/detail/ac9504398317e90140bd51ff>.



- Combination of healthcare, senior care and leisure tourism
- Cooperation with Hangzhou Normal University provides access to teaching resources and educational experiences
- Medical system was inspired by Germany's medical park's business model and management philosophy<sup>65</sup>



FIGURE 17: Greentown Wu Zhen Ya Yuan site analysis. Source: <http://www.yuanshihui.cn/>. Author

<sup>65</sup> Qunshuo, 2013. "A new model of Chinese pension: Greentown Wu zhen Ya Yuan." *Yicai*. Accessed September 24, 2018. <https://www.yicai.com/news/2843759.html>.



FIGURE 18-19: Greentown Wu Zhen Ya Yuan. Source: <http://www.yuanshihui.cn/>.



FIGURE 20: Greentown Wu Zhen Ya Yuan Senior Education. Source: <http://www.yuanshihui.cn/>. Author

### 5.2.5 Steinacker Residential Complex (Intergenerational Living, Zurich, Switzerland)

Steinacker Residential Complex, completed in 2004, comprises five freestanding buildings on 1.15 hectares overlooking Lake Zurich. This complex looks toward the future and the changing structure of society. Maximal use of the site helps the project's economic viability.



A variety of people at different life stages are able to live in this complex: families with children, couples, singles, and the elderly. All types of people are accommodated in each building.

This project is located on a site overlooking Lake Zurich. The buildings are laid out in such a way that a spatial connection is created between them along with their interior and exterior spaces.<sup>66</sup>



layout flexibility.



units per floor: two units, three units, four units.

FIGURE 21-22: Steinacker Residential Complex. Source: <http://sieplcoatesstudio.weebly.com/>.

Category	Characteristics
Housing model type	Intergenerational community
Location	Overlooking Lake Zurich <ul style="list-style-type: none"> <li>● Surrounded by high-quality housing</li> <li>● Well-developed external landscapes</li> <li>● Good views toward Lake Zurich and nature</li> </ul>
Amenities and services	<ul style="list-style-type: none"> <li>● Outdoor play space</li> <li>● Children's nursery</li> <li>● Residential care group</li> </ul>

<sup>66</sup> "STEINACKER RESIDENTIAL COMPLEX." Sustainable Inter-Generational Living. Accessed January 18, 2019. <http://sieplcoatesstudio.weebly.com/steinacker-residential-complex.html>.

<p>Design characteristics</p>	<p>Flexible floor plan</p> <ul style="list-style-type: none"> <li>● The floor plans and the arrangement of the rooms are based on the column grid of the load-bearing structure.</li> <li>● Four apartments are located around a central staircase core on each floor.</li> <li>● Every unit, corridor and entryway is barrier-free and accessible for wheelchairs.</li> <li>● Two units may be combined into a larger one depending on the situation.</li> </ul>
<p>Living characteristics</p>	<p>Intergenerational living</p> <ul style="list-style-type: none"> <li>● Provides housing for all age groups of people</li> <li>● Needs of older generations are included so elderly people can live with their family.</li> </ul>

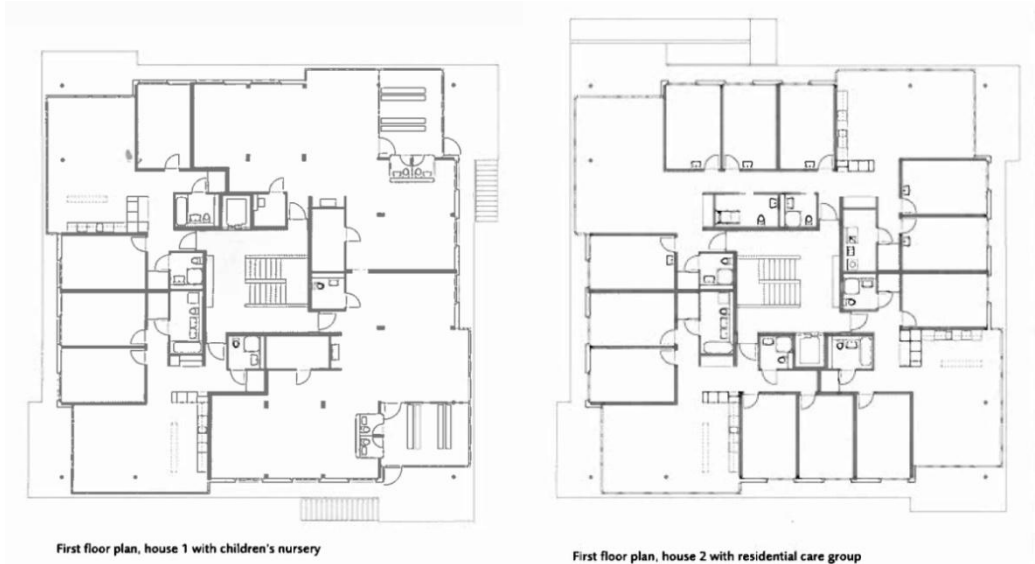


FIGURE 23-24: Steinacker Residential Complex Floor Plans. Source: Feddersen, Eckhard, and Insa Lütke. 2009. Living for the elderly: A design manual. Basel: Boston.

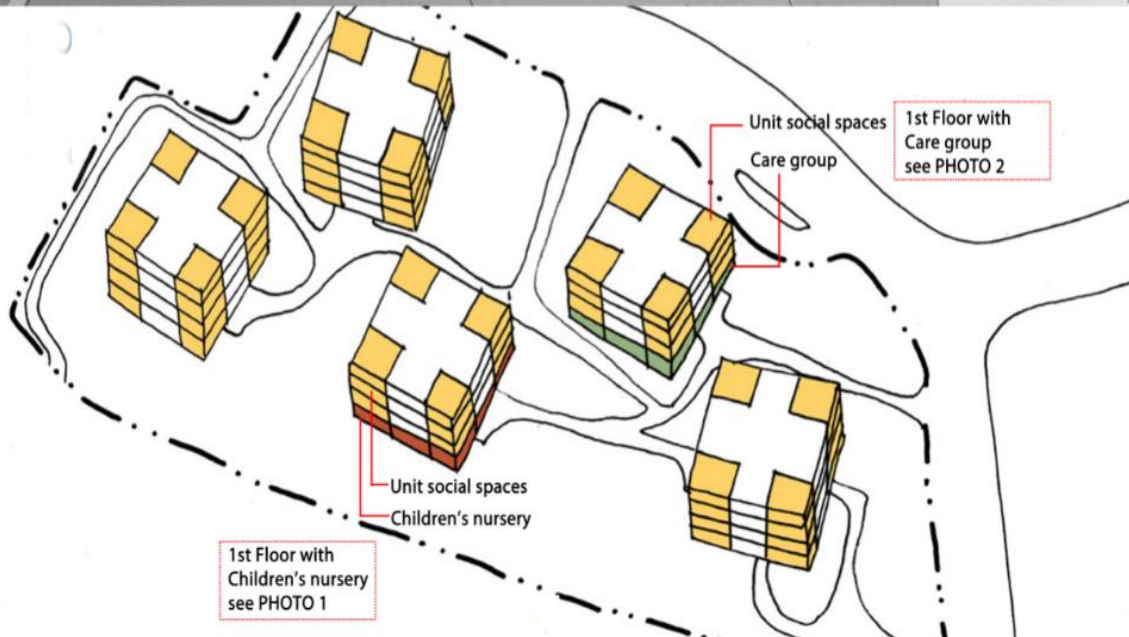
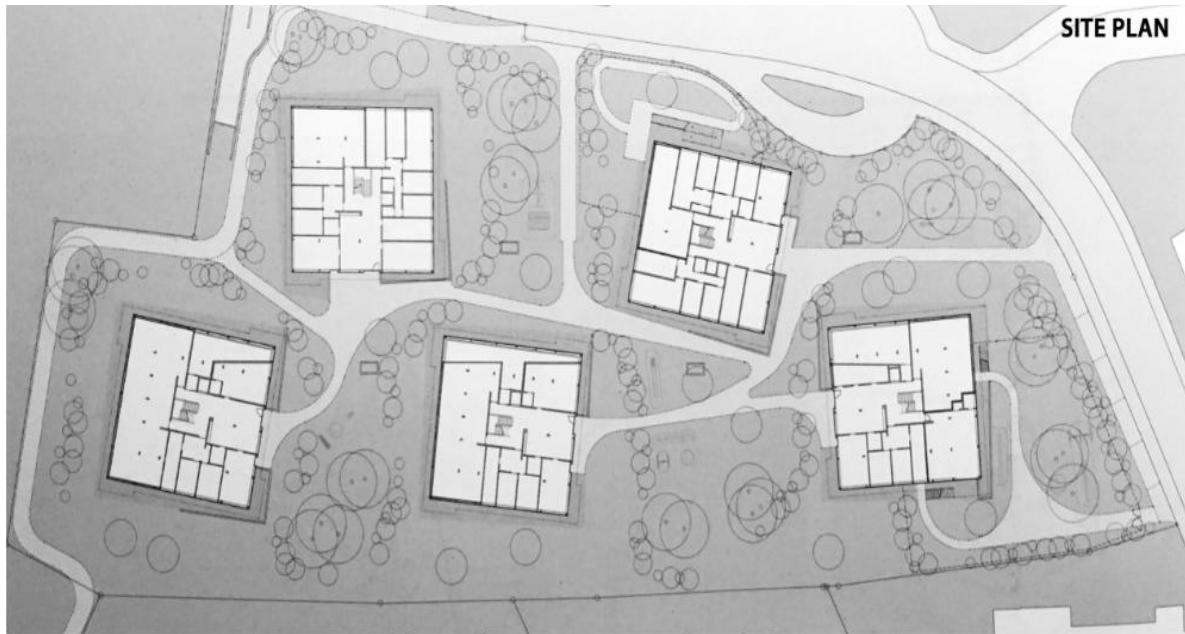


FIGURE 25-26: Steinacker Residential Complex. Source: Feddersen, Eckhard, and Insa Lüdtké. 2009. Living for the elderly: A design manual. Basel: Boston.

### 5.3 Comparison and Conclusion

Project Name	Location	Type	Characteristics
The Cardinal at North Hills	North Carolina, US	High-end senior community	<ul style="list-style-type: none"> <li>● Continuum of care with four options for seniors living with different conditions</li> <li>● Provides plenty of upscale community spaces and various amenities</li> <li>● Living units are connected to all services under one roof</li> </ul>
Humanitas	Netherland	Public nursing homes with intergenerational living	<ul style="list-style-type: none"> <li>● Free of charge and available to any senior</li> <li>● Focus on senior mental health by providing chat services, buddy projects and support groups</li> <li>● Cohousing with college students</li> </ul>
VCAN Senior Jade Tower	Shanghai, China	High-end, high-rise senior housing	<ul style="list-style-type: none"> <li>● 24-hour services, including home care and medical care</li> <li>● Healthy lifestyle management and personalized services</li> <li>● Classic lifestyle reminds people of their youth</li> </ul>
Greentown Wu Zhen Ya Yuan	Wu Zhen, China	Senior resort center (idealism)	<ul style="list-style-type: none"> <li>● In the town with a National 5A Scenic Spot</li> <li>● Combination of healthcare, senior care and tourism</li> <li>● Cooperation with local university</li> </ul>
Steinacker Residential Complex	Zurich, Switzerland	Intergenerational community	<ul style="list-style-type: none"> <li>● Flexible floor plans provide an opportunity for units to be combined for more needs</li> <li>● Provides housing for all age groups of people</li> <li>● Elderly people can live with their families</li> </ul>

## **Similarities**

### *1. Located in dense areas*

All five cases are located in dense urban areas that have been previously highly developed with access to public transportation and surrounding various uses in the city. Because they are in walkable areas, these senior housing projects promote a healthy lifestyle for seniors by encouraging pedestrian accessibility and allowing them to continue being part of society.

### *2. Quality views or access to nature*

Nature plays a significant role in seniors' health, and being close to nature is an instinct of all generations. Greentown Wu Zhen Ya Yuan has the advantage of being located in a National 5A Scenic Spot, so people there have the opportunity to see beautiful scenes in nature and traditional Chinese architecture elements with Jiangnan garden design. Steinacker Residential Complex overlooks Lake Zurich. According to the layout, the southwest side of the housing units has a direct view to the lake, and the northeast side looks toward nature. While for the projects like the Cardinal at North Hills and Humanitas, whose sites have less green lands or natural elements for people to enjoy, these two communities provide garden spaces for people to gather. VCAN Senior Jade Tower, which is a high-rise residential building, instead of using the limited land on the grounds, provides multiple accessible roof gardens for seniors. Providing either quality views or access to nature, all the projects focus on bringing nature closer to seniors for their physical and mental health.

### *3. Provide professional medical care*

All the projects are fairly successful in terms of medical care because they not only ensure the daily needs and care of seniors but also provide a professional medical group for seniors as the basic standard. From these five projects, it is clear that medical care could be tied into senior

living in multiple ways, including: 1) full services that include assisted living, memory support and nursing care provided by the community, 2) a separate medical facility on-site with direct access, such as a hospital, and 3) residential care groups. Either way, the convenience of getting treatment on-site is ensured in these senior projects. Further, not only physical health conditions but also mental health conditions are a concern, and a healthy lifestyle is promoted.

#### *4. Promote social engagement opportunities*

Community spaces with various functions are provided so people can interact socially. The Cardinal at North Hills and VCAN Senior Jade Tower are upscale residential communities and offer the widest range of choices for shared living spaces (e.g., dining areas, salon and spa) and provide senior residents with a choice of activity spaces based on their interests (e.g., library, computer center, entertainment areas, art studios). Greentown Wu Zhen Ya Yuan, unlike other projects that have specific community spaces for senior residents directly connected to housing units, has a larger site that includes a large-scale commercial district for small businesses and a senior education campus on-site within walking distance. Humanitas and Steinacker Residential Complex have longer histories and have taken an intergenerational approach to meet the mental needs of seniors and provide them with spaces to connect with younger people, such as having meals together in the dining areas, chat services and care groups.

## **5.4 Interpretation of Cross-referenced Data Provided by Surveys and Case Studies**

### **Asian influence**

Medical care is the most mentioned topic when evaluating senior housing, according to interviews and questionnaire results. Most people are concerned about whether healthcare is

convenient and efficient. Among the five cases, the two projects in China seem to focus more on medical care support. House doctor visits are not popular in China, and people generally go to hospitals or clinics for health support and treatment. Greentown Wu Zhen Ya Yuan has an independent upscale hotel on-site and the VCAN Senior Jade Tower provides 24-hour medical care for residents.

Based on all the case studies, analysis of advantages and disadvantages, there is a large market for home-based senior-friendly communities that provide support from services and agencies.

## CHAPTER 6 PERSONAL EXPERIENCE

Based on research on the basic background of conditions for the elderly in China, as well as physical and mental needs of seniors discussed in the literature review chapter and existing conditions of different senior care housing solutions in the case study chapter, it can be concluded that the living environment, including space arrangement and convenience, is important. To be involved in physical environment, to understand the existing actual living conditions of seniors in Wuhan and how people actually feel about aging, three residential communities were visited to conduct on-site observation and interviews.

### 6.1 Xin Shi Jie Community (Wuchang, Hubei, China)

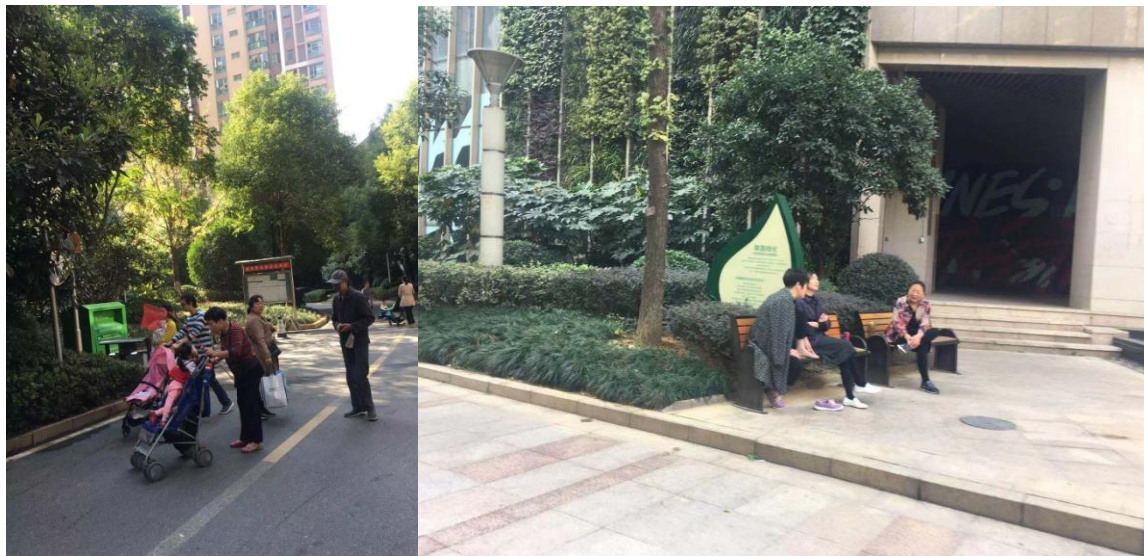


FIGURE 27-28: Xin Shi Jie Community. Source: Author's photo

Xin Shi Jie community, built in 2011, is a relatively new, mixed-use community located in the central business district of Wuhan. It provides residential housing as well office units, business areas, an upscale shopping center and small shops, cultural entertainment activities, recreation, and other amenities for its residents.



At 10 AM on a weekday morning, it was still pretty alive in the community. It was observed that a lot of older adults were walking and playing with their young grandchildren in the community. It is very common in Chinese families for grandparents to help take care of their grandchildren, especially while the parents work on weekdays.

Other older adults sat on a bench in front of a landscape, having conversation with their friends and enjoying the cozy day. Due to lack of community spaces for seniors, the bench seems to be the best spot for them to gather and kill time.

## 6.2 Chang Yao Xin Yuan Residential Community (Yichang, Hubei, China)



FIGURE 29-30: Chang Yao Xin Yuan Community. Source: Author's photo

Chang Yao Xin Yuan Community is typical of traditional residential communities in Hubei built around 2000. People are used to responding to problems in a limited environment and try to make everything possible. There is a lack of proper management and maintenance of the landscaping in the community, and some small green spaces close to living units are used by residents to plant vegetables and flowers. Larger areas of shared green spaces in the center of the community were left vacant.

### 6.3 Cha Gang Residential Community (Wuchang, Hubei, China)



FIGURE 31: Cha Gang Residential Community. Source: Author's photo

Cha Gang community is a residential block inside Wuhan University. It was built in the late 1990s, originally for the convenience and welfare for professors and faculty members of Wuhan University. It is a typical university residential housing that blends into the university environment and benefits from all the services the university provides, including university-affiliated education, dining halls, the university hospital, and other business functions like a food market and banks. Retired faculty members can choose to stay in Cha Gang Community since they are familiar with the environment and have access to all the services provided by the university, although living conditions are not as satisfying. Along with the lively vibe of university students, seniors gather to play Chinese chess with friends and enjoy the day. For them, simple seating with tables under an umbrella provided by a local small business is a perfect spot to play chess.

## **CHAPTER 7 INTERVIEWS AND SURVEY**

### **7.1 Development of Survey and Interview Questions and Focuses**

Since the topic of future senior living in China involves research related to human subjects, training from the Collaborative Institutional Training Initiative (CITI Program) for research with human subjects was completed as part of requirements by Rochester Institute of Technology before developing the survey questions.

Through site visits to three residential communities, interesting phenomena and results regarding people's preferences for living were found through observing the changes in the surroundings people made through time. The relationship between people and the living environment develops interactively.

In addition to personal experiences during site visits, after gaining a basic awareness of the environment, six people were interviewed to increase understanding. Interviewees were selected from different age groups and backgrounds.

Finally, to have a larger sample group for design guidelines, 18 survey questions were developed to address the findings from previous documentary studies and analyses. After submitted it for review and approval from the Institutional Review Board at RIT, the questionnaire was posted on the Wenjuanxing website to gather answers online. A total of 122 valid questionnaires were collected, including 95 from respondents in Hubei province and 27 from respondents in 12 other provinces in China. Among the 122 completed questionnaires collected, 47.5% respondents were male and 52.5% were female. Since this research focuses on people's views on aging and future housing possibilities for seniors on the next generation, the questionnaire was mainly targeted at

participants 25-40 years old, which account for 54.1% of the respondents. Details for all other groups are shown in the charts below.

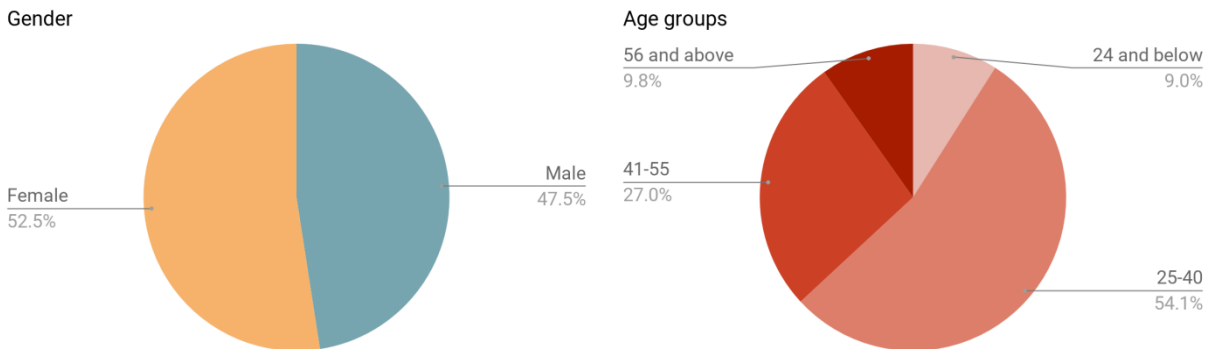


FIGURE 32 (left): Gender percentages of respondents. FIGURE 33 (right): Age percentages of respondents. Source: Author

## 7.2 Findings from Interviews and the Survey

### 7.2.1 The Desire to Live Close to Family

It is interesting to see who people want to live with when they become elderly. When people are asked about their ideal senior living situation, respondents from all age groups gave similar answers about their preference. Out of 122 participants, only 8.2% of people would choose to live alone. The most popular choice at 63.9% was living with their partner. One of the interviewees, who has two years of study abroad experience and had just returned home, noted that the desire to live with family grows even strong after two years of being away and that the relationship between relatives is irreplaceable and steadfast. From the interview, three interviewees aged below 30 years and had lived with their grandparents indicated they still remember that period and hope to remain close to their grandchildren. One of respondent, who was the first child in her family, said that a good grandparent-grandchild relationship benefited her family a lot. She honestly believes that her grandparents were more experienced with children's education than her parents and helped a lot when she was little and her parents were

busy with work. She mentioned that she is very proud of her interests and skills in Chinese traditional crafts, which she developed under the influence of her grandfather. An interviewee who is close to retirement lives in the place where she works and has plans to move to her children’s house after retirement. In an interview, one retired senior indicated that he lived alone and another stated he lived with his wife. However, both hoped to live with or closer to their children and grandchildren. Because their children are in different cities and because they are not used to either the living style or the environment of the new city, they chose to stay in a familiar environment and gather together during festivals.

What is your ideal senior living?

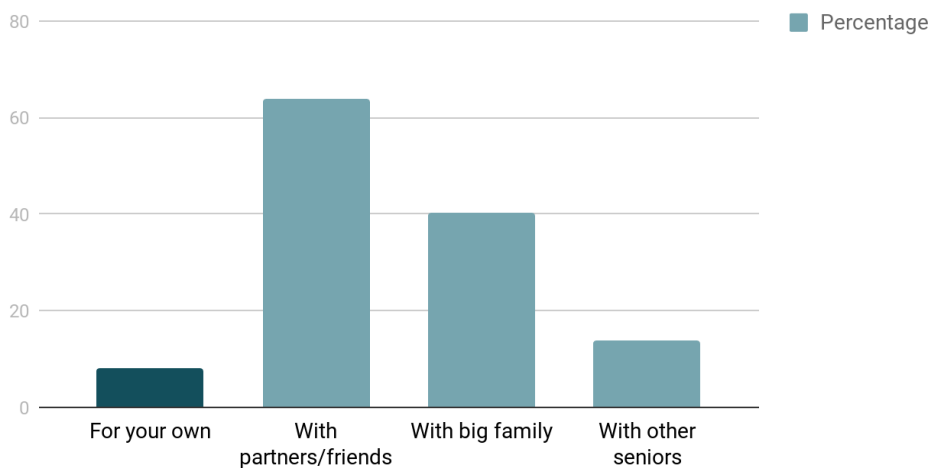


FIGURE 34: Percentage of people’s ideal senior living type. Source: Author

With the finding that most people, especially seniors, want to be close to family, it was also considered important in the survey to find out a comfortable distance for people. In terms of moving to a community, a survey of CHARLS conducted from 2011-2012 by Dijuan Meng and colleagues found that the most popular choice for retirement living was to be with one’s children in the same community or neighborhood. The results from this interview and survey are similar to Meng et al.’s results from the CHARLS survey. The most popular choices are to live on close

floors in the same building (27.5%) or in different buildings in the same community (33%). In addition, it is clear that different age groups have different living preferences in terms of whether they would live with their family (shown in the following chart).

Age group/ choice	In the same house with family	On the same floor with family	On close floors in the same building with family	In different buildings in the same community with family	In different communities	Count
24 and below	0 (0)	2 (18.18%)	4 ( <b>36.36%</b> )	3 (27.27%)	2 (18.18%)	11
25-40	4 (6.06%)	10 (15.15%)	22 (33.33%)	26 ( <b>39.39%</b> )	4 (6.06)	66
41-55	8 (24.24%)	9 (27.27%)	5 (15.15%)	10 ( <b>30.30%</b> )	1 (3.03%)	33
56 and above	3 ( <b>25.00%</b> )	2 (16.67%)	2 (16.67%)	2 (16.67%)	3 ( <b>25.00%</b> )	12
Total	15 (12.30%)	23 (18.85%)	33 (27.5%)	<b>41 (33.61%)</b>	10 (8.20%)	122

Living preference if you live with the family

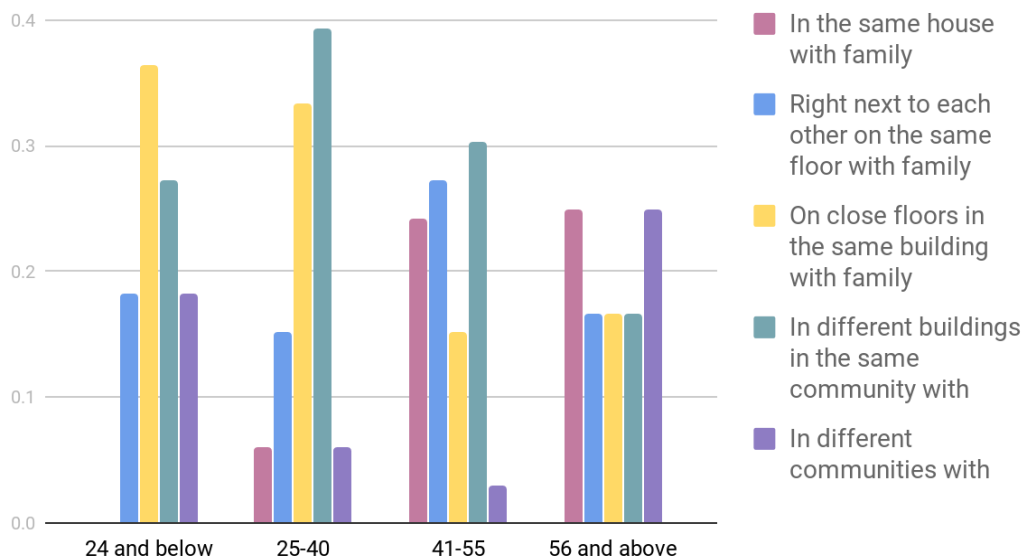


FIGURE 35: Living preference if living with family. Source: Author

## **7.2.2 Necessity of Being Exposed to Different Generations**

During the interviews, one point with which two people were concerned and brought to attention is that they would enjoy living with other generations rather than staying only with older adults. One interviewee is an undergraduate student who grew up in a single family house in the countryside. Being so young, he has no specific plans for his future senior life. Recalling his meaningful childhood with his parents and grandparents, he emphasized that his only request is to live with not only older adults but also younger generations. While imagining his senior life, he said that he wishes to play chess with friends of his age and have community activities with younger friends. Another interviewee, on the other hand, is enjoying his retirement life. He was a university professor and still lives in residential housing on campus. His child and grandchild are abroad, and he and his wife tried to visit them and stay abroad a few years ago. However, because of the language barrier and differences in habits, customs and food, they finally chose to go home. He mentioned that a lot of senior parents of his age who have children abroad gather in the community for entertainment and to have a connection with younger people. In this case, the campus life indeed eases missing their children. He is very satisfied with the familiar campus life. To have activities with the younger generation and even simply observing the vibrant lives of younger people enhances his sense of belong and brings happiness to him. Inspired by the vigorous spirit of young people, the interviewee considers to live with a positive attitude and is open to making new friends with people of all generations.

### 7.2.3 Willingness to Pay for Ideal Layout

A cross analysis was done for the question of what people are willing to pay for their ideal senior housing layout. This multiple-choice question asked people to choose the desired number of bedrooms in their apartment and had a space for people who choose to give out their own answer. The three floor plans below are examples of one- to three-bedroom apartment layouts. Among the idealistic younger generation, those aged 24 years and below, the most popular choice was a three-bedroom apartment (54.55%) for senior living. For older generations, who are more realistic and have concerns about the affordability and maintenance of a larger space, their choices are similar with most stating the ideal layout would be a two-bedroom apartment.

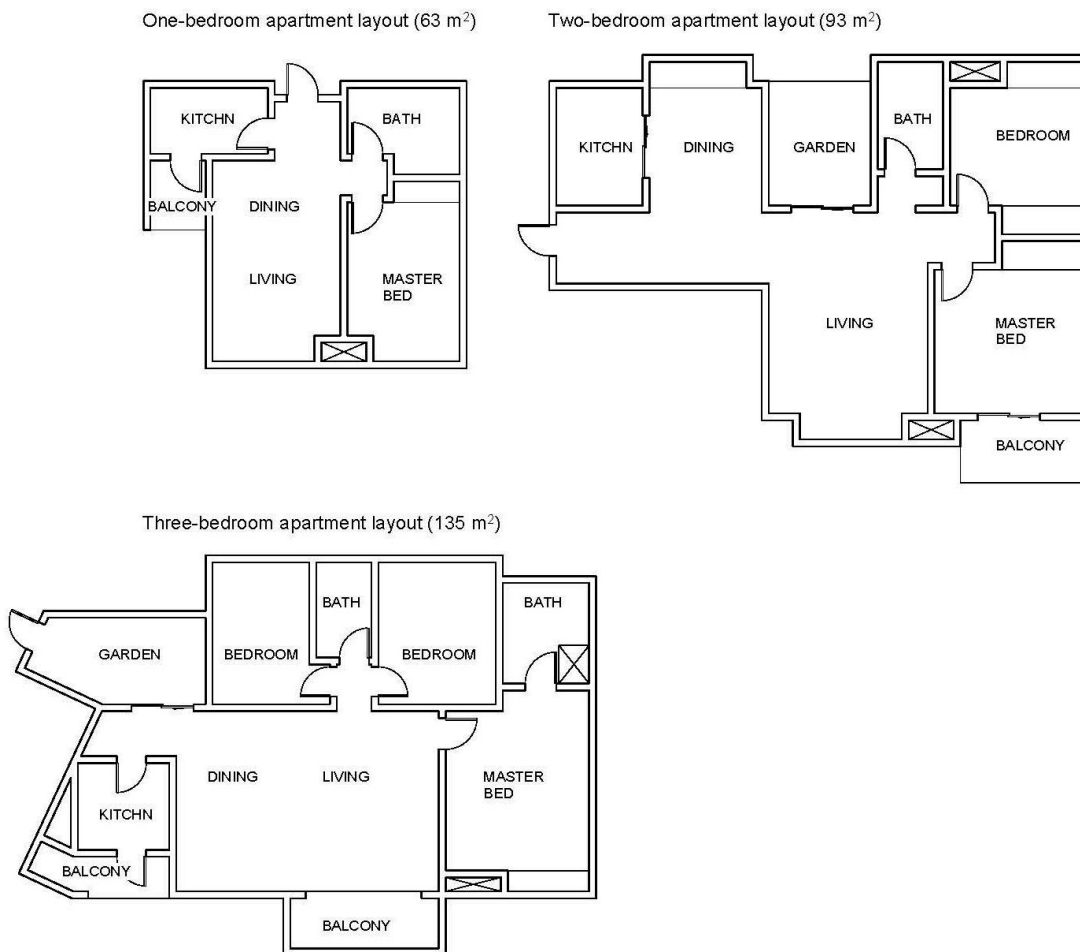


FIGURE 36-38: Bedroom layouts. Source: Author



Age\Choice	One-bedroom	Two-bedroom	Three-bedroom	Others	Count
24 and below	2 (18.18%)	3 (27.27%)	6 ( <b>54.55%</b> )	2 (18.18%)	11
25-40	7 (10.61%)	33 ( <b>50.00%</b> )	25 (37.88%)	12 (18.18%)	66
41-55	2 (6.06%)	19 ( <b>57.58%</b> )	8 (24.24%)	<b>10 (30.30%)</b>	33
56 and above	4 (33.33%)	6 ( <b>50.00%</b> )	3 (25.00%)	0 (0)	12
Total	15 (12.30%)	<b>61 (50.00%)</b>	42 (34.43%)	24 (19.67%)	122

Ideal layout that you will be willing to pay

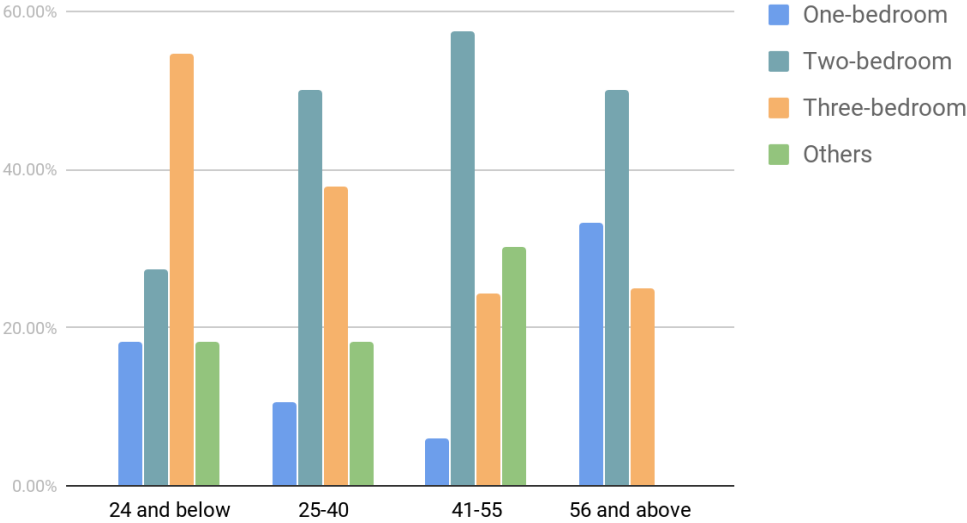


FIGURE 39: Ideal layout that people would be willing to pay. Source: Author

Another interesting finding is that among the 12 valid answers, many people chose to give their own answer, with 10 of the 12 stating they wanted a shared single house with a garden space. It is clear that for people below 56, there is a growing percentage of people who are exploring for more types of senior housing as they age. One interviewee explained that a single house might be too expensive for her but she would be willing to share a house with her friends, with each person renting or owning a part of the house. She also suggested that in addition to private living

spaces within the house, multiple shared public spaces with different functions should also be provided in the house or nearby in the community so that her family and friends can choose to stay.



FIGURE 40-41: Rendering of Chinese-style single house for seniors. Source: <http://www.sizuo.com/>.

#### **7.2.4 Community Activities Are Highly Important**

Two multiple-choice questions were included to examine people's preferences for community activities, including indoor and outdoor activities. The results are shown below in two charts. For inside community activities, it is obvious that most female participants, 73.44%, have great enthusiasm for activities related to handmade crafts. Another popular community activity category is literature and art for both males and females. Male participants also like chess games in which they can participate with their friends and compete with each other.

Gender\ Category	Literature and Art: Music Literature Drawing	Handmade: Cooking Weaving Woodworking	Chess: Chinese Chess Bridge Mahjong	Science: Nutrition Medical Health Science	Others
Male	33 ( <b>56.90%</b> )	12 (20.69%)	31 ( <b>53.45%</b> )	18 (31.03%)	6(10.34%)
Female	35 ( <b>54.69%</b> )	47 ( <b>73.44%</b> )	20 (31.25%)	22 (34.38%)	5 (7.81%)
Total	68 (55.74%)	59 (48.36%)	51 (41.80%)	40 (32.79%)	11(9.02%)

Indoor community activity preference

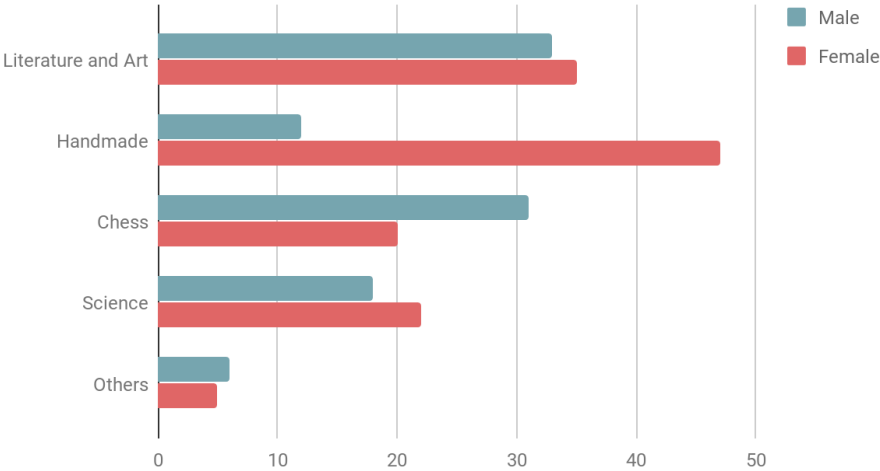


FIGURE 42: Indoor community activity preferences. Source: Author

Preferences for outdoor community activities are surprising similar, and the two most frequently chosen community activity categories are planting and exercise for both males and females.

While planting received more vote among females than exercise, the results for males show the opposite trend. Still, the overall preferences of people clearly indicate that being exposed and involved with nature and living a healthy life are general goals. It is worth noting that only three people out of 122 indicated that they prefer not to attend outdoor community activities while 97.5% of respondents were are willing to participate. Among the other answers that people chose are digital games like esports, outdoor movies, and traveling together as a.

Gender\ Category	Planting: Community Garden Vegetables	Entertainment: Dancing	Exercise: Walking Fitness Equipment	Ball games	Others	Not to participate
Male	27 ( <b>46.55%</b> )	5 (8.62%)	43 ( <b>74.14%</b> )	16(27.59%)	2(3.45%)	2(3.45%)
Female	45 ( <b>70.31%</b> )	19 (29.69%)	36 ( <b>56.25%</b> )	10(15.63%)	7(10.94%)	1(1.56%)
Total	72 ( <b>59.02%</b> )	24 (19.67%)	79 ( <b>64.75%</b> )	26 (21.31%)	9(7.38%)	3(2.46%)

Outdoor community activity preference

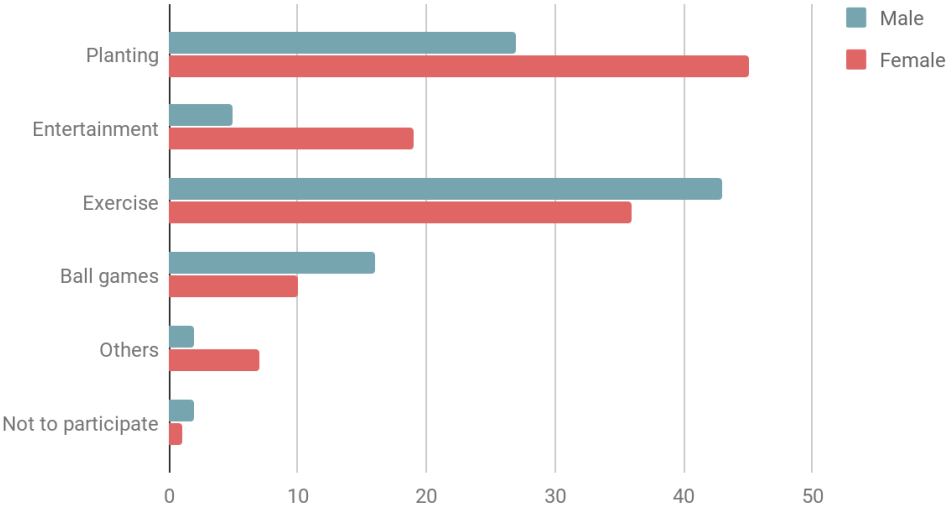


FIGURE 43: Outdoor community activity preferences. Source: Author

As for raising pets, people aged 41 to 55 years, who will retire in a decade, have less intention to raise pets than other age groups. For people who already have pet(s), it can be clearly seen that people are more likely to own pets as they age. It is becoming popular among younger generations to have pets or to plan to have pets in a short time. Two interviewees who just graduated from school mentioned that after being exposed online and to their friends’ pets, they would love to have pets in a few years after work and life has settled down or to move close to a

pet-friendly cafe. One interviewee even said that pets have taken over social media and it seems like every cool person has at least one cat.

According to a 2018 white paper on the pet industry in China, people born after the 1980s and 1990s account for 75% of dog and cat owners in the country. The findings from the same paper indicate that raising pets is becoming a new fashion in younger generations.

Age\Choice	Have pet(s)	Plan to have pet(s) in a short time	Plan to have pet(s) after retirement	No plans	Count
24 and below	0 (0)	7 (63.64%)	0 (0)	4 (36.36%)	11
25-40	9 (13.64%)	18 (27.27%)	11 (16.67%)	28 (42.42%)	66
41-55	7 (21.21%)	0 (0)	2 (6.06%)	24 (72.73%)	33
56 and above	3 (25.00%)	1 (8.33%)	2 (16.67%)	6 (50.00%)	12
Total	19 (15.57%)	26 (21.31%)	15 (12.30%)	62 (50.82%)	122

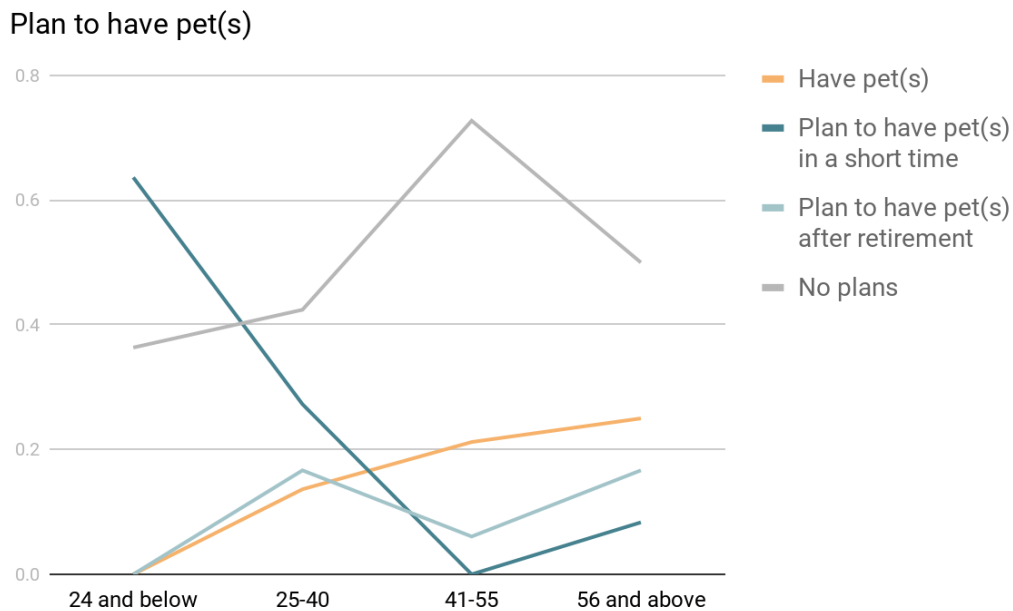


FIGURE 44: Willingness to have pets. Source: Author

### **7.2.5 Lack of Knowledge and Confidence in the Current Elderly Care Market**

According to the interviews and survey, it is clear that people have very strong prejudice regarding the senior care housing market, especially public and private nursing homes. Most people have no knowledge of government-published senior care policies and do not care about them. One of the interviewees, who had volunteer experience during her college years, had a bad impression of public nursing homes. According to her, the few nursing homes she went to years ago had a poor living environment and concerning sanitary conditions. Due to a lack of money and resources, the seniors there were not happy and were treated as patients. As for other senior care projects, she considers unsuccessful projects to be the reason that investors only promote projects for senior living while having no knowledge of how life actually is for seniors. Another interviewees who is over 75 years old, and he would rather stick to his current situation of living alone and had no interest in any nursing homes. His children are working in other cities and can only gather at his place during festivals. The interviewee himself, with little knowledge of newly built nursing homes in the market, believes they cost a lot. He enjoyed his simple everyday life, with all the fun of eating, hanging out with old friends in the community and walking around. Further, the interviewee really believed that nursing homes are irresponsible and offer no freedom to seniors, a statement with which most people agree.

Even worse, some people feel embarrassed to live in a nursing home due to the stereotype that only people who are old and unable to take care of themselves and have no one to take care of them live in nursing homes. Older adults living in nursing homes have high potential to experience the stigma of people thinking that their children are irresponsible and unfilial. In addition, the conditions of existing nursing homes in the market are concerning for many people. Expensive and professional nursing homes are often unaffordable, while affordable nursing

homes are usually barely satisfying. One interviewee believed that living in a nursing home would not provide a healthy lifestyle because life there would be too organized and boring, and that seniors there lack freedom, with the only variable in their daily life infrequent visitors. Another interviewee had three years of work experience at a private nursing home in Shanghai. She was originally from Hubei province but moved to Shanghai 10 years ago and away from her family since the city had more developed nursing homes at the time and could provide her a better salary. She has a caring personality and was very patient while taking care of the elderly. However, without professional medical education or a license, she could only work as a housemaid and not as nursing staff. Her daily work was taking care of five elderly people, usually three people that required assistance with all activities and two semi-active seniors. The detailed duties included helping the elderly to have meals, cleaning living units and doing laundry. According to her, the living unit of each senior was very limited, and their living conditions were hardly satisfying with very few basic facilities and only rare visitors. The interviewee herself shows her dissatisfaction and claimed that private nursing homes should take more responsibility to take care of senior people rather focusing on making profit from this industry.

### **7.2.6 Less Important Aspects**

#### *Geographic location*

Unexpectedly, all interviewees had no preference regarding city location and did not consider the city to be a criteria related to senior living. Wuhan, which has a humid subtropical climate with abundant rainfall, has extremely cold winters and hot summers. In interviews, when people were asked whether they wish to be in another city with a mild climate for senior living, all six

interviewees said no. The undergraduate student who has just started his professional study and had no plans for his future life yet, believed that he would choose a city to live where he could have the best career options rather than a comfortable climate and would bring his whole family to settle in that city after retirement. Another interviewee explained that she would be happy to spend a nice cool summer and travel with family and friends in other cities but did not want to live in another city. She said that the city location is the least important consideration compared to distance from other family members. She also stated she is comfortable with and accustomed to the climate in Wuhan. Another interviewee mentioned that she hopes to be engaged and busy after retirement, and Wuhan has a mature culture for the drama shows that she is interested in compared to other tourism cities. Other interviewees agreed that the thermal comfort of building interiors has improved over time, so there is no problem with living in Wuhan after retirement. To them, although Wuhan has extreme weather conditions a few days a year, it has lots of cultural, historical, economic, and human aspects that attract people to stay, and they all consider Wuhan to be an ideal city for senior living.

#### *Floor location*

Besides geographic location, another criteria, floor location, is also less relevant when considering senior housing, as long as it is physically accessible for the elderly. When people are asked to rank the criteria in the survey that play the most significant role, they name the orientation of housing the most important, followed by layout and then floor location (A detailed ranking from 1 to 3 is shown below, with 3 being the most important criterion). As for the preference of floor location, given a mid- to high-rise residential building, most people would choose a lower to mid-range level. Overall, 12.3% of participants prefer higher levels close to the top while 14% of people do not care about the floor location if elevators are provided. This



preference applies to participants of all age groups, including people aged 56 and over. This finding suggests that senior housing in mid- to high-rise residential buildings is a possible solution and that people are not very concerned about the floor location of their apartments. Orientation and apartment layout are more important aspects to people considering senior housing.



FIGURE 45: Ranking of criteria of senior housing. Source: Author

Floor choice	Count	Portion
Lower levels (1st to 3rd)	49	40.16%
Higher levels (close to top)	15	12.3%
Mid-range levels	60	49.18%
Does not matter	18	14.75%

## Floor location preference

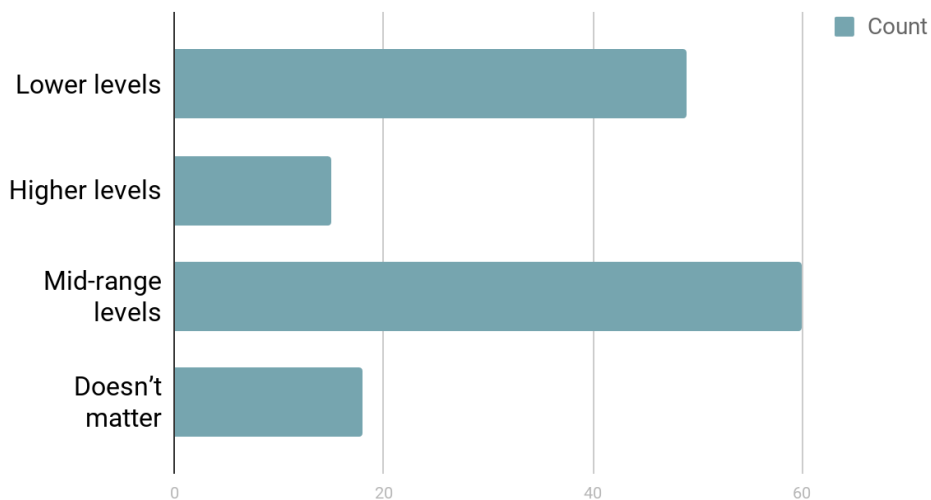


FIGURE 46: Floor location preference. Source: Author

### 7.2.7 Dissatisfaction with Current Housing

Common residential communities have many weaknesses for elderly people requiring continuous care and assisted living. The most frequently mentioned sources of dissatisfaction in both the interviews and survey are the lack of accessible design, difficulty getting medical care, and a lack of community activities.

Although there are many sources of dissatisfaction and missing amenities in an average residential community, some people would still choose to stay in their existing situation because they believe it would be inconvenient to move to senior housing if they would want to live with their younger children.

When people are asked if they would stick to their own apartment or move to a senior-friendly community after retirement, 52.46% of all the participants would love to move to a community with senior care and senior housing while the rest would stick to their own apartments. From cross analysis of this question, for people over 56 who are used to their current living situation,

only 36.36% would choose to move into a community with senior care plug-in services after retirement. It is understandable that for their age, moving would be more difficult. As mentioned, older generations would sacrifice themselves for the convenience of their children. In contrast, it is clear that there is an increasing trend toward people choosing a senior-friendly community as they grow older, especially among people aged 41 to 55 years. This is the generation that will retire in the next decades.

Age \ Choice	Stick to existing apartment	Move to senior-friendly community	Count
24 and below	7 (63.64%)	4 (36.36%)	11
25-40	32 (48.48%)	34 (51.52%)	66
41-55	12 (36.36%)	21 (63.64%)	33
56 and above	7 (58.33%)	5 (41.67%)	12
Total	58 (47.54%)	64 ( <b>52.46%</b> )	122

Whether stick to their own apartment or move to senior-friendly community

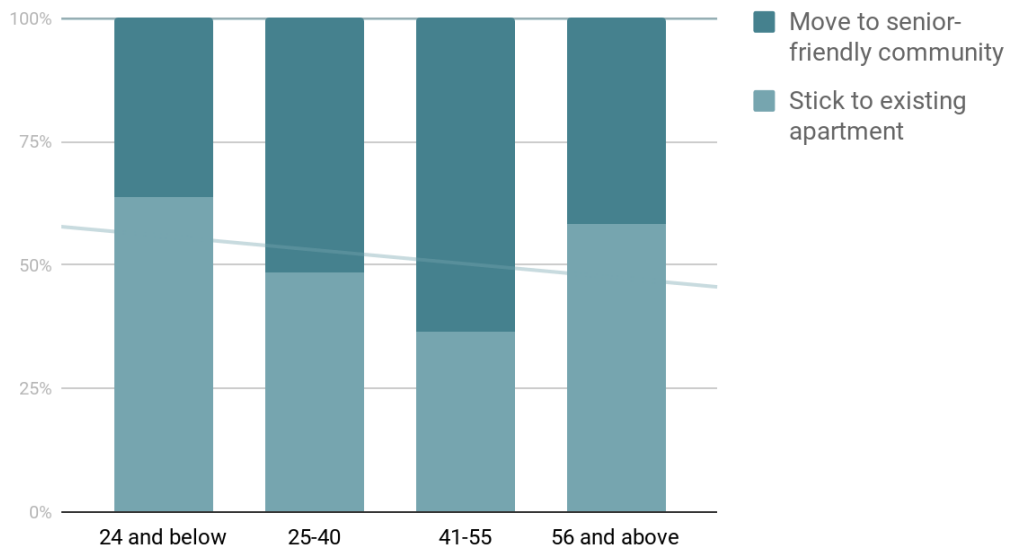


FIGURE 47: Sticking to own apartment or moving to a senior-friendly community. Source: Author

Some people would sacrifice themselves to stay with their family and set up their homes in a more supportive way, which happens more among groups of older people. One interviewee mentioned that the existing living conditions may no longer meet the physical needs of her parents in the coming years, but they still enjoy living there because of the mental satisfaction, emotionally security from familiarity with the environment, and support from neighbors and friends. In this way, mental suitability can overcome some physical difficulties in certain circumstances.

### 7.2.8 Expectations for Future Senior Living

In both the interview and survey, people were asked to answer an open question, namely what are their expectations for future senior living. This question was set as an open question so that people would have the opportunity to fill in their own answer rather than making a difficult choice between fixed answers. People’s expectations and needs are actually similar in some respects, even in different age groups, and can be analyzed by the following aspects. The most frequently mentioned expectations were: 1) Medical care service, 2) Landscapes in the community and 3) Spaces for social life.

<b>Expectations</b>	
Convenience and Accessibility	Transportation <ul style="list-style-type: none"> <li>● Community location</li> <li>● Access to public transportation</li> <li>● Access to surrounding amenities</li> </ul>
	Convenience of Living <ul style="list-style-type: none"> <li>● Accessible design (elderly design code)</li> <li>● Smart technology application</li> <li>● Private living spaces</li> <li>● Efficient heating system</li> </ul>

Social interactions	<ul style="list-style-type: none"> <li>● Be in touch with old friends, have the ability to move in with friends</li> <li>● Have interaction with different generations</li> <li>● Provide public spaces for social activities</li> <li>● Spiritual support</li> </ul>
Environment	Living Environment <ul style="list-style-type: none"> <li>● Orientation and day lighting</li> <li>● Ventilation</li> </ul>
	Community Environment <ul style="list-style-type: none"> <li>● Safety insurance</li> <li>● Landscape</li> <li>● Senior care and respect atmosphere</li> </ul>
Service	Elderly Care Service <ul style="list-style-type: none"> <li>● Medical care</li> <li>● Nursing care</li> <li>● Fitness</li> <li>● Continuing care for the elderly</li> <li>● Emergency system for healthcare</li> <li>● Accessible public restrooms in the community</li> </ul>
	Community Service <ul style="list-style-type: none"> <li>● Dining</li> <li>● Commercial businesses or shops</li> <li>● Entertainment</li> </ul>

**7.2.9 Suggestions for the Senior Care Market**

When people were asked to give suggestions to existing senior care in the market using an open question at the end of the survey, this was aimed at determining people’s needs and expectations for senior living in the future. However, given the provision of basic life needs, would focused more on a higher quality of life and mental needs in their answers. Compared to the previous question, valid answers gathered from this question comprise a wider range of aspects. Not including the aspects mentioned in the previous questions about expectations, the rest are listed below.

<b>Suggestions</b>	
Sense of safety	<ul style="list-style-type: none"> <li>● Safe community</li> <li>● Sense of peace</li> <li>● Build trust within the community</li> </ul>
Ability to choose	<ul style="list-style-type: none"> <li>● Choose to attend different activities</li> <li>● Choose to be in different community spaces</li> <li>● Flexibility of living</li> </ul>
Technology application	<ul style="list-style-type: none"> <li>● Keep up with the times</li> <li>● High-tech services</li> <li>● Provide senior education</li> <li>● Intelligent home applications</li> </ul>
Culture	<ul style="list-style-type: none"> <li>● Mix of different cultural backgrounds</li> <li>● Develop a good senior care culture within the community</li> </ul>
Health	<ul style="list-style-type: none"> <li>● Mental health</li> <li>● Health advisory</li> <li>● Nutrition knowledge sharing</li> <li>● Regular health visits and medical examinations</li> </ul>
Social life	<ul style="list-style-type: none"> <li>● Social involvement</li> </ul>

## CHAPTER 8 TAKEAWAY AND CONCLUSION

### 8.1 Suburban Living vs. Urban Living

For this research, Xin Shi Jie community was chosen as the research subject because it is a similar residential community in Wuhan. Xin Shi Jie community is a guarded residential community in a high-density urban context and has advantages over other discontinuous housing in residential blocks and suburban apartment communities for the following reasons:

#### *Walkability*

A walkable community ensures that seniors can still use amenities they are accustomed within walking distance through safe pedestrian access. In high-density areas in the city, there are enough people for more businesses and more frequent public transportation, as well as public spaces.

#### *Amenities available in the city*

Instead of moving into a new isolated environment in a suburban area, seniors can have the same range of choices they are used to in the city, with the number and type of amenities provided in an urban living environment significantly more than in a suburban living environment.

#### *Staying close to family*

Since there are plenty of working opportunities in the city to attract young adults and allow them to stay, seniors can be in the same city as their adult children. Seniors have more chances to stay close to their family, and more grandparents-grandchildren relationships can develop and grow.

#### *Close relationships with universities*

Being in the city, where most universities are located, research on aging can be conducted more efficiently. On the other hand, seniors can participate in different events with college students.

Further, seniors can also benefit from the resources of universities to help them keep learning and stay fit.

## **8.2 Senior-friendly Intergenerational Community vs. Age-qualified Senior Community**

### *Intergenerational communication*

During the Senior Living Innovation Forum in June 2018, when asked about the future living environment of seniors in 2030, John Cochrane, CEO of HumanGood, answered that seniors are going to be much more involved, with an active management role rather than a passive role. Instead of being concerned what is provided for them, what people are doing with them is also significant. He envisioned a mixed income intergenerational urban development, with starred restaurants that are on the ground floor open to everyone, walk-in traffic from the street, and great cultural activities and events.

From the literature review, research by Van Dussen et al. shows evidence of the benefits of intergenerational activities for younger generations to learn more about aging and decrease ageism and for creating opportunities for more connection for seniors. Interviewees also explained their desire to be exposed to different generations of people when they are seniors. Intergenerational communities ensure that seniors can live close to their family within the same community. From the survey, a high percentage (more than 90%) of people prefer to live with their family in the same community. Among all participants, the most popular choice for all age groups is to live within different buildings in the same community as their family (33.61%).



*Remain engaged in the community and sense of belong*

People are not only always seeking to meet their needs and desires but also searching for hopes and aspirations no matter what age they are. Home-based, senior-friendly communities, with the support of services and agencies, is a possible solution. Loren Shook, founder and CEO of Silverado, explained during the Senior Living Innovation Forum that human connection is all that matters. Marketing should focus on not only care and hospitality but also the living experience and quality of life. Asked what the senior living experience is, he answered that it is purposeful living and life engagement, meaning that seniors get to do things are important to them and meanwhile are connected with a purpose that is important to them and connected to family and loved ones. “When you are connected to a cause that is bigger than yourself, that you can work with or for, you are active and you can get around even if you have inhibitions or problems.”<sup>67</sup>

---

<sup>67</sup> Group, Influence. 2018. "Exploring the Future of Senior Housing | Senior Living Innovation Forum." *YouTube*. Accessed January 18, 2019. <https://www.youtube.com/watch?v=Qu1eo92Q-sA>.

### 8.3 Xin Shi Jie Community Discussion

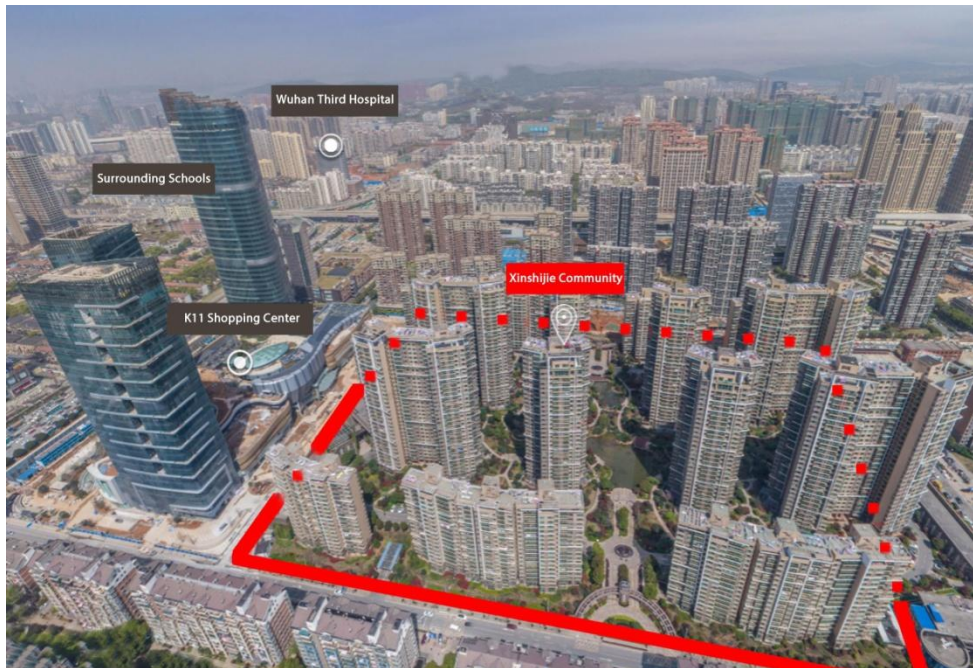


FIGURE 48: Xin Shi Jie community bird's eye view. Source: <https://guangguxinshijie.fang.com/>.

Xin Shi Jie Community	
Category	Characteristics
Housing Model Type	Guarded residential community
Location	Located in central business district of Wuhan <ul style="list-style-type: none"> <li>● Access to public transportation, including multiple bus routes, Wuhan metro, and streetcars</li> <li>● Surrounded by multi-use amenities within an accessible distance and other residential communities</li> </ul>
Amenities and services	<ul style="list-style-type: none"> <li>● Gym and a swimming pool</li> </ul>
Design characteristics	Guarded community <ul style="list-style-type: none"> <li>● High privacy</li> <li>● High safety</li> <li>● Private reserved-space underground parking garage</li> <li>● Surface parking around buildings in the community</li> </ul> Landscape design <ul style="list-style-type: none"> <li>● Provides residents with a close connection to nature through a combination of landscapes and ponds</li> </ul>

	<ul style="list-style-type: none"> <li>● A circular driveway around buildings at the perimeter of the community forms a circular path for people to walk, and pedestrian paths cross and connect different buildings</li> </ul>
Living characteristics	<p>Flexible living choices from one-bedroom to three-bedroom apartments</p> <ul style="list-style-type: none"> <li>● Potential to be intergenerational community once with senior care service</li> </ul>

In this part of the research, Xin Shi Jie community is studied through site analysis. Then, its characteristics are analyzed to determine whether it has the potential for senior care services to be applied and which aspects can be improved so it can be turned into a senior-friendly community that meet the needs of senior residents.

Site map:

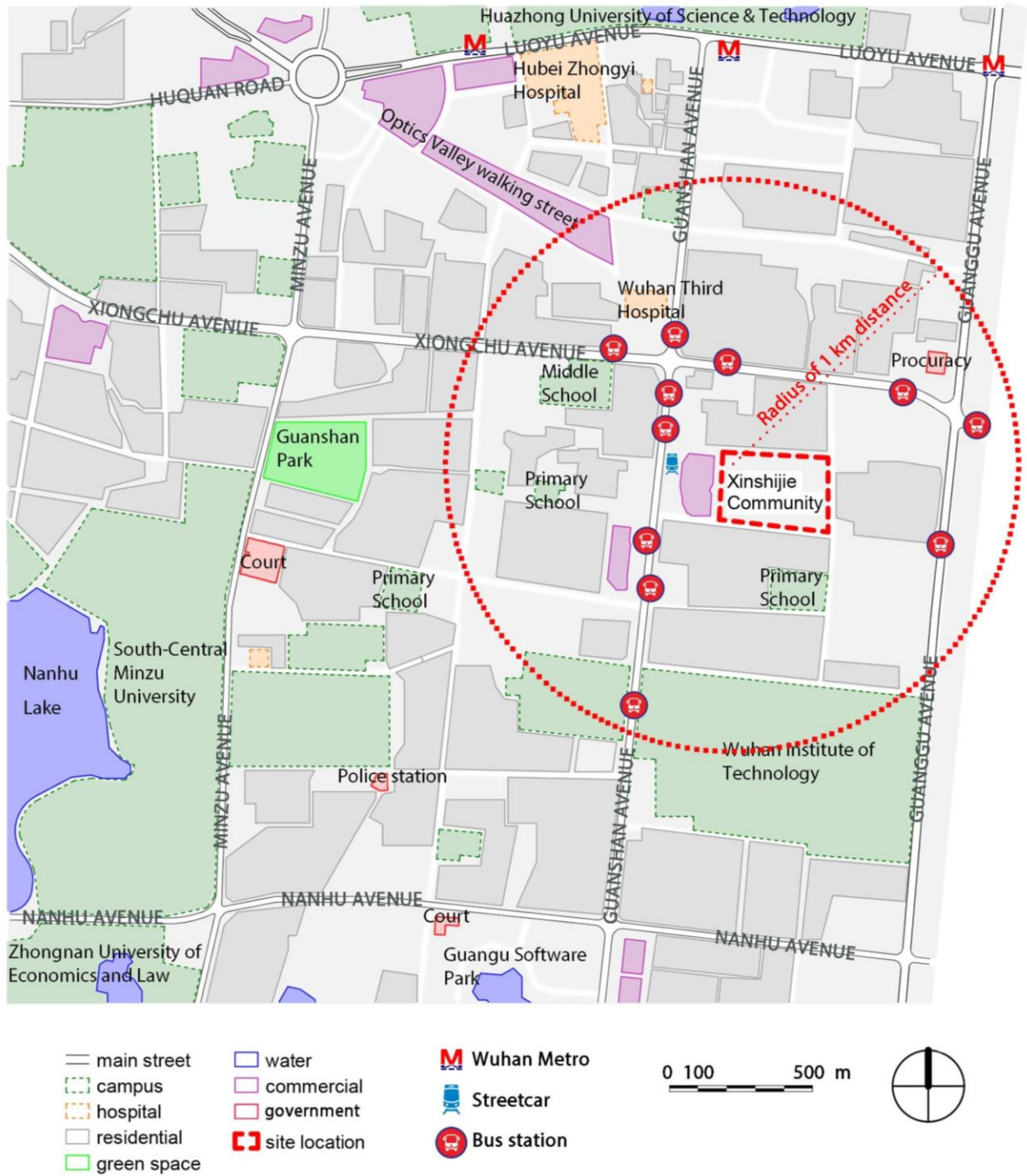


FIGURE 49: Surrounding amenities analysis. Source: Author

There are public transportation systems available on-site, including several bus routes and streetcar routes on the west side. The metro line is also near, with the nearest subway station 1.6 kilometers away within walking distance.

Surrounding amenities are listed below and shown on the site plan.

- a. Public: schools (kindergarten, middle school, high school, university) and health facilities (hospital, medical center)
- b. Commercial: shopping center, restaurant, bank, bookstore, supermarket
- c. Residential: residential community

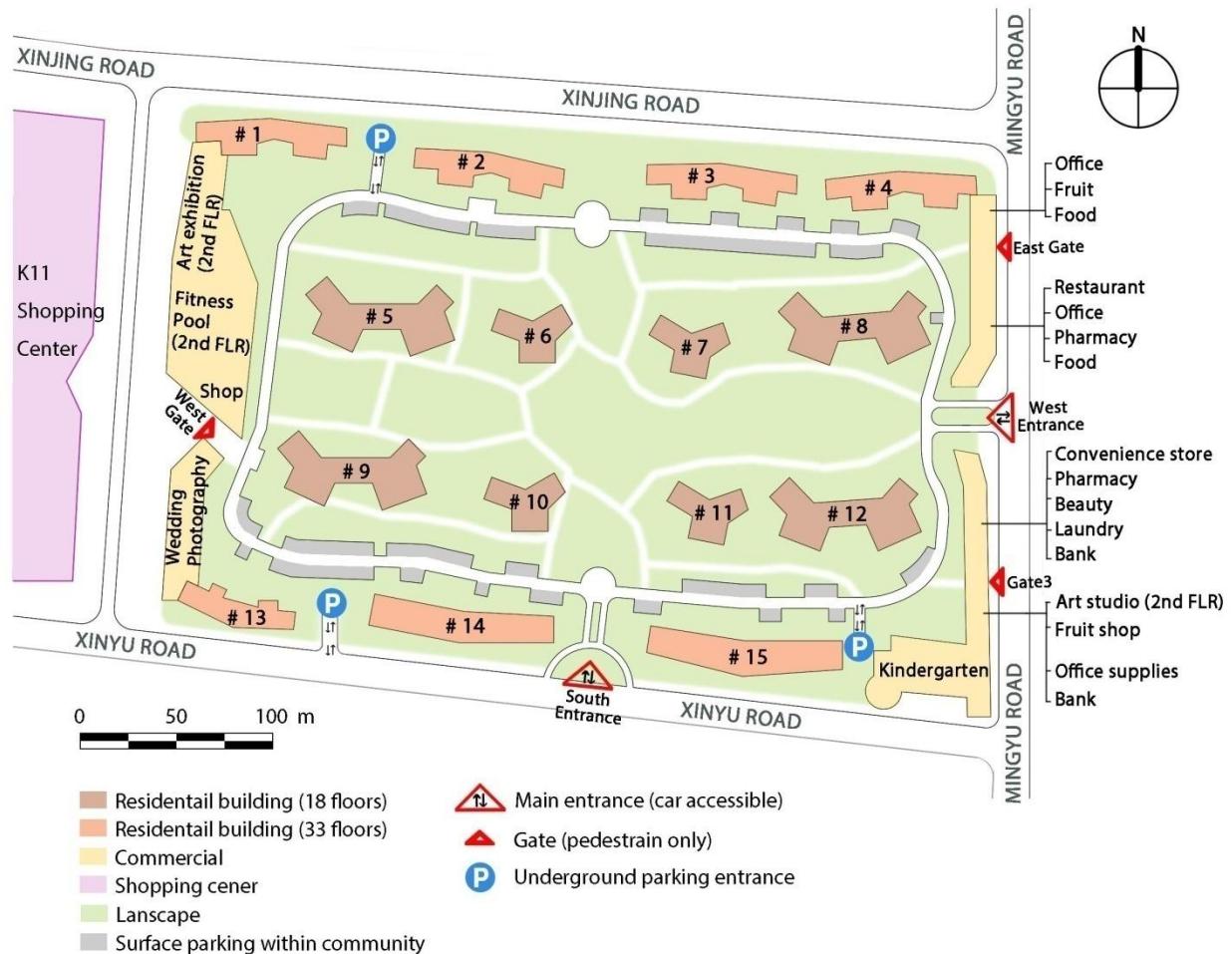


FIGURE 50: Community site map. Source: Author

*a. Quality views and access to nature:*

Located in a dense urban context, Xin Shi Jie community, like many surrounding residential communities, is not close to natural green areas. The nearest park is Guanshan Park, which is 2 kilometers away within walking distance to the site. However, Xin Shi Jie community has its own green space for residents. Landscapes that combine plants and ponds in the community form a natural environment so people could have a view from inside to outside. Pedestrian paths to each residential building are designed to respond to the surrounding landscapes.

*b. Senior care services*

All buildings have an elevator to ensure accessibility, but there is a lack of medical care within the community. However, residents in Xin Shi Jie community can have medical treatment from local hospitals located one kilometer away, including Wuhan Third Hospital and some small clinics. Still, additional professional medical care in the community is needed for seniors and to provide instant help during an emergency.

*c. Social engagement opportunities*

Community Spaces		Community Activities
Exterior spaces	<ul style="list-style-type: none"> <li>● Green spaces, water ponds, landscapes</li> <li>● Plaza space in front of the west gate</li> <li>● Children playground</li> </ul>	<ul style="list-style-type: none"> <li>● Square dancing</li> <li>● Gathering, walking</li> <li>● Playground</li> </ul>
Interior spaces	<p>Commercial (open to public)</p> <ul style="list-style-type: none"> <li>● Convenience store</li> <li>● Food, fruit, restaurant</li> <li>● Laundry, beauty salon</li> <li>● Pharmacy</li> </ul> <p>Fitness (community member accessible)</p> <ul style="list-style-type: none"> <li>● Fitness center and pool</li> </ul> <p>Culture and Education (open to public)</p> <ul style="list-style-type: none"> <li>● Art exhibition</li> <li>● Kindergarten</li> </ul>	<ul style="list-style-type: none"> <li>● No specific interior community spaces</li> <li>● Exercise equipment for older people is located on the ground floor open to the outside</li> </ul>

## 8.4 Design Concepts and Solutions

### 8.4.1 Advances in Technology Involvement

Technology can be applied to home care in multiple ways, including smart phone usability and online services, home robots, and intelligent touch screens at home and in other buildings.

Seniors can be monitored at home remotely and call for help by simply touching a screen.

Seniors should not be thought of as frail or slow-reacting, as they can actually function well and do anything with the help of technology.

On Panel 3 - Innovations and Technology: the Future of Senior Living in 2017, Laurel Riek, an associate professor of computer science and engineering, explained how robots could be used in the context of helping the elderly in four ways: 1) medication management such as managing the medications that seniors take throughout the day, 2) physical support such as rehabilitation tasks, 3) locomotion, mobility and physical manipulation, and 4) cleaning and other house maintenance tasks. Instead of replacing people, she claimed that robots are designed to fill in care gaps efficiently and ease the care process provided by caregivers. Other than robots, another technology related senior is also popular care, namely telehealth, which can assist doctors with seniors and help the elderly connect with others, especially family members. Elizabeth Ecker, MSJ Editor of Senior Housing News, mentioned a community in Northern California that is using technologies and other on-demand platforms, so that the people who live in the community can order things they need or the community can facilitate the ordering of services and amenities, including a handyman on demand and laundry services on an on-demand basis rather than building these into the monthly cost of living in the community.<sup>68</sup>

---

<sup>68</sup> Calit2ube. 2017. "Panel 3 - Innovations and Technology: The Future of Senior Living." *YouTube*. Accessed February 11, 2019. <https://www.youtube.com/watch?v=IjFF9rmLZxY>.



From the survey results, people do hope to keep up with the times through high-technology services or intelligent home applications when they become seniors. Technology involvement solves care gaps and helps seniors in many aspects, and also follows their hope of keeping connected and knowledgeable.

#### **8.4.2 Third-party Licensed Care Service Corporations**

Most dissatisfaction with current living conditions for senior living, both in interviews and the survey, is difficulty in getting medical care. Elderly care services that include medical care, nursing care, fitness, and emergency care are the most frequently mentioned care systems by survey participants. Due to the development of nutrition and the improvement of living conditions, more people are concerned about living well, in addition to mental and physical health. Overall, 32.09% of people mentioned on the survey that they are interested in science classes that teach nutrition, medical health and science.

On a panel for Models of Senior Living at a symposium at the UC San Diego Center for Healthy Aging in June 2017, Patricia Will, founder and CEO of Belmont Village, shared her experience that when she entered the senior care industry 20 years ago, there were very strong lines between senior care product types, either memory care or independent living. In general, currently, since senior adults have different needs at different times, those dividing lines seem to blur and assisted living combines multiple different care programs. If a community is not licensed to provide care services, a third-party service can cooperate to provide medical experts and support



services, including memory care, control of Alzheimer's disease, and skilled nursing. She advised providing multiple services under one roof, at home or in a community.<sup>69</sup>

With the cooperation of professional care services provided by licensed third-party caregivers, a community can offer and manage health advisories, share nutrition knowledge, provide regular health visits and medical examinations for residents, and monitor the health conditions of seniors.

### **8.4.3 Flexible Choices for Living and Community Activities**

#### *Living Options*

Xin Shi Jie community offers flexible living options from one-bedroom to three-bedroom apartments. From the answers of participants, a two-bedroom apartment is the most popular choice for senior living. Another proposed solution by participants is a shared single house with garden space. It is clear that there is a growing percentage of people exploring more types of senior housing. This cohousing idea, either through buying or renting, has a lot of potential and many possibilities. There are many examples of college students actually paired with aging residents to share a home in the community. In recent years, there have been some popular Chinese television shows that feature cohousing, and audiences are fascinated by the socialization that occurs between the residents living there together.

#### *Community Activity Options*

Popular community spaces mentioned by participants in surveys and interviews are: plaza/garden/planting, exercise, chess, literature and art, and handmade/pet cafe/public restrooms.

---

<sup>69</sup> Calit2ube. 2017. "Panel 1- Models of Senior Living." *YouTube*. Accessed March 6, 2019. <https://www.youtube.com/watch?v=Qlq2X5nxkFE>.

Patricia Will from Belmont Village also mentioned that pets have a place in senior communities because they bring richness and purpose to the lives of not only seniors but also the neighborhood and community.

As for community space locations, a multi-center community is a possible layout choice. To have services in the center at different locations would shorten the routines of everyday living and activity. In addition, green pedestrian paths between several service centers would help meet the physical needs of seniors with memory issues. Balcony spaces could be added for planting, storage and sunshine spots.

In the book *Houses for Aging Socially*, University of Arkansas Community Design Center developed three middle-scale housing solutions that introduce the idea of “third place fabrics” as the glue between the public and private. One of the three solutions is the Hyper-porch (shown in the following figure). The Hyper-porch, as a third place other than those for living and working, is transformed from a porch to a social infrastructure that people in the community could attach their homes to and use for a variety of purposes. People can share meals and use the porch as the street of living spaces, and professional home care can be plugged in laterally.



FIGURE 51-52: Hyper-porch layout and rendering. Source: Housing for an increasing aging society

Margaret Wyld, CEO of Promatura Group, expressed her dislike of using the word “senior”.

According to her, the community provided for older adults should be a great place to live, not a

great place to age. Even those with health issues who may not be able to live well, people can still have a good life and function well with help. “Aging is happening to everybody and we should be focusing on living...and how to help people live better as they live longer where people can feel whole, see hope and future”. Livability of their residence, a sense of control, and friendship are the three most important things people value. She shared her vision for a future living environment for the older generation. Above all, there should be an end to ageism. Her vision of a community is customer centric and provides a variety of lifestyles, meeting needs from leisure to a purposeful life. Age-qualified and all-age sessions exist in the same building with sectors in the building where services can be provided. Integrating all ages together in one area will help lift spirits.

## **CHAPTER 9 FURTHER RESEARCH DIRECTION AND CONCLUSION**

This research studied the social concerns of seniors regarding the development of society and technology with views of aging as the background. It also analyzed successful senior housing projects to form important criteria for an evaluation system of senior housing.

Through on-site observations and interviews, information on how seniors in existing housing feel about their living environment and whether they are satisfied with current conditions was studied.

Survey questions addressed people's preference and expectations for senior living, resulting in nine main findings. Based on an existing community complex in an urban context in Wuhan, China, this thesis analyzed the characteristics of a chosen residential community and explored the future possibility and potential of senior care services and activity spaces that could be integrated. A senior-friendly intergenerational community in an urban environment has the potential to be ideal for senior living with technology involvement, a third-party licensed care service corporation, and flexible choices for living and community activities.

In conclusion, this thesis attempted to analyze the framework for a senior housing model that satisfies the core social and physical needs of seniors and their families for the well-being and high quality of life for future seniors. How to integrate senior care services through architectural methods and specific design solutions requires further research and analysis.

## APPENDIX 1

### FUTURE SENIOR LIVING SURVEY

Imagine that we have retired and started our senior life, what kind of house would you stay in and enjoy your senior living? There are 18 questions in this survey, which are developed based on the research of future senior living. All of your answers will only be used for thesis analysis, and your privacy will be protected. To propose a more suitable and comfortable senior housing solution, your answers are precious. If you are willing to share more of your ideas about senior living, feel free to contact me via email: fs1122@g.rit.edu. Thank you for your time and participation!

1. Choose your city

\_\_\_\_\_

2. Gender

- Male
- Female

3. Your age group

- 24 or less
- 25-40
- 41-55
- 56 or above

4. What is your occupation?

\_\_\_\_\_

5. How long is your work experience?

- 0-5
- 5-15

- 15-30
  - over 30
  - \_\_\_\_\_
6. What is your ideal senior living? (Multiple choices)
- For your own
  - With your partners/friends
  - With your big family (including parents/partner/children)
  - With other seniors (senior community)
7. Which is the ideal layout that you will be willing to pay? (Multiple choices)
- One-bedroom
  - Two-bedroom
  - Three-bedroom
  - Others\_\_\_\_\_
8. If you would live with your family, which one would you prefer?
- In the same house with family
  - Right next to each other on the same floor in the same building with family
  - On close floors in the same building with family
  - In different buildings in the same community with family
  - In different communities with family
9. For senior housing, which one do you think plays more significance? (Ranking)
- Orientation
  - Layout
  - Location
  - Others\_\_\_\_\_
10. For your senior living, which floor would you prefer in a mid-to-high rise residential building? (Elevator provided) (Multiple choices)
- Lower levels (1<sup>st</sup> to 3<sup>rd</sup>)
  - Higher levels (close to the top)
  - Mid-range levels
  - Doesn't matter

11. If the community provides indoor activities, which ones would you be interested in? (Multiple choices)

- Literature and Art (Music/Literature/Drawing)
- Handmade (Cooking/Weaving/Woodworking)
- Chess (Chinese Chess/Bridge/Mahjong)
- Science (Nutrition/Medical health/Science)
- Other\_\_\_\_\_

12. If the community provides outdoor activities, which ones would you be interested in? (Multiple choices)

- Planting (Community Garden/Vegetables)
- Entertainment (Dancing)
- Exercise (Walking/Fitness Equipments)
- Ball games
- Others\_\_\_\_\_
- No willing to participate

13. Do you have pet(s) or planning to have pet(s)?

- Have pet(s)
- Plan to have pet(s) in a short time
- Plan to have pet(s) after retirement
- No plans

14. For your senior daily meals, which one would you prefer? (Multiple choices)

- Cook for yourself at home
- Call for delivery
- Community dining hall
- Restaurants outside of the community

15. Would you want to stick to your own apartment now or move to the senior-friendly community after retirement?

- Current living
- Move to a senior-friendly community

16. What are your dissatisfactions about your current housing for senior living?

---

17. What are your expectations of future senior housing?

---

18. Do you have any suggestions of senior care in the market? (Senior community/Nursing homes/Home-based care service/Community-based care service)

---



## **APPENDIX 2**

### **INTERVIEW QUESTIONS**

#### **General Questions:**

1. What is your age?
2. What is your occupancy? Or what is your previous occupancy before retirement?
3. What age do you think people should live in senior housing?
4. Are you aware of senior welfare policies?
5. What would you do as a hobby after retirement?
6. Are you planning to stay in the city or move to other places for your senior living? Why?
7. Have you ever been to senior housing? What is your impression of senior housing in the market?
8. Do you have experience of living with your grandparents? Or do you have experience of living with your grandchildren? How would you describe it?
9. What are your dissatisfactions about your current housing?
10. What are your expectations for your house in the future?

#### **Specific Questions:**

1. Where did you work as nursing staff and how long was your working experience?
2. What was your daily work at nursing homes?
3. How did people pay for living in the nursing homes?
4. How would you describe the elderly living conditions in nursing homes?
5. How often do the elderly have visitors (children, grandchildren, and other relatives)?
6. What activities do the elderly usually have in nursing homes?

## LIST OF FIGURES

- FIGURE 1: Birth rate and death rate in China from 1949 to 2017  
FIGURE 2: Per capita consumption expenditure of residents  
FIGURE 3: Increased percentage of consumption expenditure per capita  
FIGURE 4: The percentage of empty-nester families in a survey  
FIGURE 5: The ratio of the past and future working population to the elderly  
FIGURE 6: The ratio of the working population to the elderly  
FIGURE 7: Cardinal at North Hills.  
FIGURE 8: Cardinal at North Hills Floor Plan at Garden Level  
FIGURE 9: Humanitas Dining Hall  
FIGURE 10: Humanitas Dining Hall.  
FIGURE 11: Humanitas communal vegetable and flower gardens  
FIGURE 12: VCAN Senior Jade Tower.  
FIGURE 13: VCAN Roof garden  
FIGURE 14: VCAN Senior Jade Tower analysis  
FIGURE 15-16: Greentown Wu Zhen Ya Yuan  
FIGURE 17: Greentown Wu Zhen Ya Yuan site analysis  
FIGURE 18-19: Greentown Wu Zhen Ya Yuan  
FIGURE 20: Greentown Wu Zhen Ya Yuan Senior Education  
FIGURE 21-22: Steinacker Residential Complex  
FIGURE 23-24: Steinacker Residential Complex Floor Plans  
FIGURE 25-26: Steinacker Residential Complex.  
FIGURE 27-28: Xin Shi Jie Community  
FIGURE 29-30: Chang Yao Xin Yuan Community  
FIGURE 31: Cha Gang Residential Community  
FIGURE 32: Gender percentages of respondents.  
FIGURE 33: Age percentages of respondents.  
FIGURE 34: Percentage of people's ideal senior living type  
FIGURE 35: Living preference if living with family  
FIGURE 36-38: Bedroom layouts  
FIGURE 39: Ideal layout that people would be willing to pay  
FIGURE 40-41: Rendering of Chinese-style single house for seniors  
FIGURE 42: Indoor community activity preferences  
FIGURE 43: Outdoor community activity preferences.  
FIGURE 44: Willingness to have pets.  
FIGURE 45: Ranking of criteria of senior housing  
FIGURE 46: Floor location preference.  
FIGURE 47: Sticking to own apartment or moving to a senior-friendly community  
FIGURE 48: Xin Shi Jie community bird's eye view  
FIGURE 49: Surrounding amenities analysis  
FIGURE 50: Community site map  
FIGURE 51-52: Hyper-porch layout and rendering

## REFERENCES

- Gong, Sen, Yanfeng Ge and Stein Kuhnle. 2016. *China National Human Development Report 2016 - Social Innovation for Inclusive Human Development*. Beijing: China Publishing Group Corporation. [http://hdr.undp.org/sites/default/files/reports/2783/undp-ch-\\_nhdr\\_2016\\_en.pdf](http://hdr.undp.org/sites/default/files/reports/2783/undp-ch-_nhdr_2016_en.pdf).
- Tao, Liqun, Lili Wang and Fengli Ma. 2008. "Analysis on Senior Housing Development in China" *Ministry of Civil Affairs of the People's Republic of China Policy Research Center*. Accessed August 22, 2018. <http://zyzx.mca.gov.cn/article/yjcg/shfl/200807/20080700018701.shtml>.
2015. "Ten ministries and commissions encourage private capital to participate in the development of old-age service industry." *Ministry of Human Resources and Social Security of the People's Republic of China*. Accessed August 22, 2018. [http://www.mohrss.gov.cn/SYrlzyhshbzb/dongtaixinwen/buneyaowen/201502/t20150227\\_152642.htm](http://www.mohrss.gov.cn/SYrlzyhshbzb/dongtaixinwen/buneyaowen/201502/t20150227_152642.htm).
2019. "Wuhan entered the deep aging for the first time: the number of seniors over 65 years old reached 1,242,500, accounting for 14.06% of the total population." *CNHubei*. Accessed February 28, 2019. <http://m.cnhubei.com/p/10125755.html>.
2017. Department of Economic and Social Affairs Population Division (DESA). *World Population Ageing DESA*, United Nations.
- Regnier, Victor. 2018. *Housing Design for an Increasingly Older Population: Redefining Assisted Living for the Mentally and Physically Frail*. Hoboken, NJ: John Wiley & Sons.
- Zhang, Jing. 2017. *80 Hou De Yang Lao Shi Ye: Yang Lao Chan Ye Shang Ye Mo Shi Yu Kua Jie Chuang Xin*. Beijing: Zhong Guo Jing Ji Chu Ban She
- Fedderson, Eckhard, and Insa Lüdtké. 2009. *Living for the elderly: A design manual*. Basel: Boston.
- Bergman, Howard, Sathya Karunanathan, Luis M. G. Robledo, Jenny Brodsky, Piu Chan, Maria Cheung, and Pascal Bovet. 2013. *Understanding and meeting the needs of the older population: A global challenge*. *Canadian Geriatrics Journal* : CGJ 16 (2): 61.
2016. "Healthy China 2030" Planning Outline." *State Council of the People's Republic of China*. Accessed February 26, 2019. [http://www.gov.cn/zhengce/2016-10/25/content\\_5124174.htm](http://www.gov.cn/zhengce/2016-10/25/content_5124174.htm).
- Zhang, Huazheng. 2017. "Current situation and future of Pension Industry." In *80 Hou De Yang Lao Shi Ye: Yang Lao Chan Ye Shang Ye Mo Shi Yu Kua Jie Chuang Xin*, edited by 80 Hou De Yang Lao Shi Ye Union, 43-74. Beijing: Zhong Guo Jing Ji Chu Ban She.

Zhang, Chewei, and Fuxing Song. 2018. *Blue Book of Health Industry: Annual Report on China's Health Industry Development*. Beijing: Social Sciences Academic Press, 2018.

Ding, Jun. 2018. "Don't underestimate the elderly! The report said that the consumption level of the elderly is higher than the per capita level..." *21Caijing*. Accessed December 30, 2018. <https://m.21jingji.com/article/20181228/herald/e854df69b2cc5ee9b1130a74cd6eba81.html>.

2019. "Residents' income and consumption expenditure in 2018." *National Bureau of Statistics*. Accessed February 2, 2019. [http://www.stats.gov.cn/tjsj/zxfb/201901/t20190121\\_1645791.html](http://www.stats.gov.cn/tjsj/zxfb/201901/t20190121_1645791.html).

2018. *Work Policy and Practice for Senior Leadership*. State Tobacco Monopoly Administration and China National Tobacco Corporation

2017. "Notice of the State Council on Printing and Distributing the Plan for the Development of the Aged Career and the Construction of the Aged System in the Thirteenth Five-Year Plan" *State Council*. Accessed February 28, 2019. [http://www.gov.cn/zhengce/content/2017-03/06/content\\_5173930.htm](http://www.gov.cn/zhengce/content/2017-03/06/content_5173930.htm).

2014. "Implementation Opinions of the Hubei Provincial People's Government on Accelerating the Development of the Aged Care Service Industry." *Hubei Provincial People's Government*. Accessed 28 Feb. 2019. [http://www.hubei.gov.cn/govfile/ezf/201407/t20140724\\_1032701.shtml](http://www.hubei.gov.cn/govfile/ezf/201407/t20140724_1032701.shtml).

Meng, Dijuan, Guihua Xu, Ling He, Min Zhang, and Dan Lin. 2017. "What determines the preference for future living arrangements of middle-aged and older people in urban China?" *PLoS One* 12 (7).

Cai, Shuwen, Li Liu. 2018. "Half of the people consider sending parents to nursing homes to be unfilial, current society's new moral and ethical value is forming" *Xinhua Newspaper Network*. Accessed December 1, 2018. <http://js.xhby.net/system/2018/12/01/030901537.shtml>.

Tornstam, Lars, Sociologiska institutionen, Humanistisk-samhällsvetenskapliga vetenskapsområdet, Uppsala universitet, and Samhällsvetenskapliga fakulteten. 2006. "The complexity of ageism: A proposed typology." *International Journal of Ageing and Later Life* 1(1): 43-68.

Coudin, Geneviève, and Theodore Alexopoulos. 2010. "'help me! I'm old!' how negative aging stereotypes create dependency among older adults." *Ageing & Mental Health* 14 (5): 516.

Liang, Ying, Xueting Niu, and Peiyi Lu. 2017. "The aging population in china: Subjective well-being of empty nesters in rural Eastern China." *Journal of Health Psychology*: 135910531771759.

2014. "Home Care - A survey report on the status of elderly living in ten cities." *360doc*. Accessed February 19, 2019. [http://www.360doc.com/content/14/1125/06/13458305\\_427837940.shtml](http://www.360doc.com/content/14/1125/06/13458305_427837940.shtml).

Mu, Guangzong. 2016. *The Graying of China: From the Universal Two-child Policy to Successful Aging*. Beijing: Zhongguo Min Zhu Fa Zhi Chu Ban She.

Wang, Bei, and Xinqi Dong. 2018. "The association between personality and loneliness: Findings from a community-dwelling Chinese aging population." *Gerontology and Geriatric Medicine* 4 : 2333721418778181.

Cheng, Sheung-Tak, Iris Chi, Helene H. Fung, Lydia W. Li, Jean Woo, and SpringerLink. 2015. *Successful aging: Asian perspectives*. 2015th ed. Dordrecht: Springer Netherlands.

Eastman, Perkins, and ProQuest (Firm). 2013. *Building type basics for senior living*. 2nd ed. Hoboken, N.J: Wiley. 124-148.

Thirani Bagri, Neha. 2017. "China's seniors are lining up to go back to college." *Quartz*. Accessed April 10, 2019. <https://qz.com/978805/chinas-seniors-are-lining-up-to-go-back-to-college/>.

Span, Paula. 2015. "At home, many seniors are imprisoned by their independence." New York: New York Times Company.

Larson, R., J. Zuzanek, and R. Mannell. 1985. "Being alone versus being with people: Disengagement in the daily experience of older adults." *Journal of Gerontology* 40(3): 375-81.

Wenger, G. Clare, Richard Davies, Said Shahtahmasebi, and Anne Scott. 1996. "Social isolation and loneliness in old age: Review and model refinement." *Ageing and Society* 16(3): 333-58.

Anderson, Gretchen. 2010. *Loneliness among older adults: A national survey of adults 45*. Accessed February 10, 2019. [https://assets.aarp.org/rgcenter/general/loneliness\\_2010.pdf](https://assets.aarp.org/rgcenter/general/loneliness_2010.pdf).

Wang, Bei, and Xinqi Dong. 2018. "The association between personality and loneliness: Findings from a community-dwelling Chinese aging population." *Gerontology and Geriatric Medicine* 4 : 2333721418778181.

Carney, Maria T., Janice Fujiwara, Jr Emmert Brian E, Tara A. Liberman, and Barbara Paris. 2016. "Elder orphans hiding in plain sight: A growing vulnerable population." *Current Gerontology and Geriatrics Research*: 4723250-11.

Montayre, Jed, Jasmine Montayre, and Sandra Thaggard. 2018. "The elder orphan in healthcare settings: An integrative review." *Journal of Population Ageing*: 1-18.

Sorkin, Dara, Karen S. Rook, and John L. Lu. 2002. "Loneliness, lack of emotional support, lack of companionship, and the likelihood of having a heart condition in an elderly sample." *Annals of Behavioral Medicine* 24(4): 290-8.

Seeman, Teresa E. 1996. "Social ties and health: The benefits of social integration." *Annals of Epidemiology* 6(5): 442-51.

Poulin, Michael J., and Claudia M. Haase. 2015. "Growing to trust: Evidence that trust increases and sustains well-being across the life span." *Social Psychological and Personality Science* 6(6): 614-21.

University of Arkansas Community Design Center. 2017. *Houses for aging socially: Developing third place ecologies*. Novato, California: ORO Editions.

Holt-Lunstad, Julianne, Timothy B. Smith, and J. Bradley Layton. 2010. "Social relationships and mortality risk: A meta-analytic review." *PLoS Medicine* 7(7): e1000316.

Van Dussen, Daniel J., and Robert R. Weaver. 2009. "Undergraduate students' perceptions and behaviors related to the aged and to aging processes." *Educational Gerontology* 35(4): 342-57.

Bousfield, Catherine, and Paul Hutchison. 2010. "Contact, anxiety, and young people's attitudes and behavioral intentions towards the elderly." *Educational Gerontology* 36(6): 451-66.

Henkel, Linda A. 2006. "Increasing student involvement in cognitive aging research." *Educational Gerontology* 32(7): 505-16.

Jiang, Zhao-Ping, and Zong-Kui Zhou. 2013 "Characters, Mechanism, and Intervenes of Ageism." *Advances in Psychological Science* 20(10): 1642-650.  
doi:10.3724/sp.j.1042.2012.01642.

Iversen, Thomas Nicolaj, Lars Larsen, and Per Erik Solem. 2009. "A conceptual analysis of ageism." *Nordic Psychology* 61 (3): 4-22.

Dominguez, L. J., A. Galioto, A. Ferlisi, A. Pineo, E. Putignano, M. Belvedere, G. Costanza, and M. Barbagallo. 2006. "Ageing, lifestyle modifications, and cardiovascular disease in developing countries." *The Journal of Nutrition, Health & Aging* 10(2): 143.

Mock, Steven E., and Richard P. Eibach. 2011. "Aging attitudes moderate the effect of subjective age on psychological well-being: Evidence from a 10-year longitudinal study." *Psychology and Aging* 26(4): 979-86.

Evans, Isobel E. M., David J. Llewellyn, Fiona E. Matthews, Robert T. Woods, Carol Brayne, Linda Clare, CFAS-Wales research team, and on behalf of the CFAS-Wales research team. 2018. "Social isolation, cognitive reserve, and cognition in healthy older people." *PLoS One* 13(8): e0201008.

2018. "Notice of the General Office of the State Council on Printing and Distributing the Implementation Plan for Improving the Mechanism of Promoting Consumption (2018-2020)." *State Council*. Accessed April 10, 2019. [http://www.gov.cn/zhengce/content/2018-10/11/content\\_5329516.htm](http://www.gov.cn/zhengce/content/2018-10/11/content_5329516.htm).

Qing, Lianbin. 2014. "Home care is a way to support the country's social conditions." *PeopleCN*. Accessed April 10, 2019. <http://opinion.people.com.cn/n/2014/1226/c1003-26278528.html>.

2012. "Experts remind: "migrant birds" pension is not suitable for all seniors." *Xinhua*. Accessed March 10, 2019. <http://news.xhby.net/system/2012/10/24/014999693.shtml>.

Gongrenribao. 2019. "A large number of old people go to Hainan for winter." *Xinhuanet*. Accessed March 10, 2019. [http://www.xinhuanet.com/politics/2019-01/27/c\\_1124047838.htm](http://www.xinhuanet.com/politics/2019-01/27/c_1124047838.htm).

"The Cardinal at North Hills | A Kisco Community." The Cardinal. Accessed April 1, 2019. <https://lifeatthecardinal.com/>.

Yates, Emily, and Emily Yates. 2017. "Humanitas: Not Just a Ground-breaking 'healthcare Model' but a Whole New Approach to Community Design" *Medium*. Accessed July 28, 2018. <https://medium.com/meaning-conference/humanitas-not-just-a-ground-breaking-healthcare-model-but-a-whole-new-approach-to-community-21a8dea0d0b1>.

Ford, Peter. 2016. "How adding youth to a dutch old age home is improving life for all." *The Christian Science Monitor* 2016.

"About Humanitas." Home. Accessed September 18, 2018. <https://www.humanitas.nl/over-ons/about-humanitas/>.

Cooke, Lacy. 2016. "New Dutch Housing Model Lets Students Stay at a Senior Living Home for Free." *Inhabitat*. Accessed October 18, 2018. <https://inhabitat.com/dutch-housing-model-lets-students-stay-at-a-senior-living-home-for-free/>.

Reed, Carey. 2015. "Dutch Nursing Home Offers Rent-free Housing to Students." *PBS*. Accessed November 20, 2018. <https://www.pbs.org/newshour/world/dutch-retirement-home-offers-rent-free-housing-students-one-condition>.

Tiffany R. Jansen Feed Tiffany R. Jansen. 2017. "This Nursing Home Is Also a College Dorm." *CityLab*. Accessed November 22, 2018. <https://www.citylab.com/equity/2015/10/the-nursing-home-thats-also-a-dorm/408424/>.

"Jadetower." Accessed September 18, 2018. <http://www.jadetowerccrc.com/>.

Zhao, Hui. 2013. "Greentown Wu Zhen Ya Yuan: Idealistic pension industry." Accessed September 18, 2018. <http://www.chinagreentown.com/article/1481/>.

Wan, Rentao. 2018. "Depth reveals the benchmark of China's pension real estate – Wu Zhen Ya Yuan." *Jinritoutiao*. Accessed September 24, 2018. <http://www.yuanshihui.cn/detail/ac9504398317e90140bd51ff>.

Qunshuo, 2013. "A new model of Chinese pension: Greentown Wu zhen Ya Yuan." *Yicai*. Accessed September 24, 2018. <https://www.yicai.com/news/2843759.html>.

"STEINACKER RESIDENTIAL COMPLEX." Sustainable Inter-GenerationalLiving. Accessed January 18, 2019. <http://sieplcoatesstudio.weebly.com/steinacker-residential-complex.html>.

Group, Influence. 2018. "Exploring the Future of Senior Housing | Senior Living Innovation Forum." *YouTube*. Accessed January 18, 2019. <https://www.youtube.com/watch?v=Qu1eo92Q-sA>.

Calit2ube. 2017. "Panel 3 - Innovations and Technology: The Future of Senior Living." *YouTube*. Accessed February 11, 2019. <https://www.youtube.com/watch?v=JfF9rmLZxY>.

Calit2ube. 2017. "Panel 1- Models of Senior Living." *YouTube*. Accessed March 6, 2019. <https://www.youtube.com/watch?v=Qlq2X5nxkfE>.