WILLINGNESS-TO-PAY FOR HOME- AND COMMUNITY-BASED AGED CARE SERVICES IN CHINA: FINDINGS FROM ANHUI PROVINCE[1]

Technical Note

I. Introduction

Home- and community-based aged care services (HCBS) are favored universally by the elderly across countries and is considered more cost-effective than institutional care and helpful for containing aged care expenditures (Glinskaya and Feng, 2018). Following the 13th Five-Year Plan (FYP) for the Development of Aged Care Services and Building of Aged Care System, the Chinese government endeavors to better the three-tier aged care service system with home-based care as its bedrock, supported by community-based care, and supplemented by institutional care. The implication of such a service system is that a significant share of the aged care services is going to be provided at home or communities, and this makes financing HCBS a relevant policy issue for the vast majority of the elderly in the country.

Purchasing HCBS from service providers is inevitably on the rise as the consequence of both demand-side and supply-side factors in China. HCBS can be provided informally by co-resident or nearby family members or be purchased from informal/formal caregivers. From the demand side, the number of the elderly who need care is expected to spike with rapid aging in China[2], changes in family structure and economic development are eroding the availability of care from co-resident family members[3], and therefore, the demand for purchasing services from market is expected to increase. From the supply side, with the Chinese government decided that it will not assume responsibility for broad-based financing of aged care and will instead focus its limited resources on stimulating provision from private providers, private provision of aged care is going to play the major role in the aged care system going forward (Glinskaya and Feng, 2018).

This paper examines the prevalence of HCBS needs among the elderly, the preferences over various HCBSs, the willingness-to-pay (WTP) for them (including the highest price for which a consumer will purchase one unit of a product out of his/her own pocket), and the variation in these indicators across socio-economic characteristics of individuals based on a household survey that was designed specifically to assess the demand and supply of aged care services in Anhui Province, China. Unlike the existing literature on WTP that primarily focuses on institutional care or health care in China (e.g., Huang et al. 2018, Liu et al. 2014, Qian et al.

[1] This note is prepared by Yang Huang (Economist, World Bank Group), Yixing Zhang (Research Consultant, World Bank Group), Elena Glinskaya (Lead Economist, World Bank Group), Dewen Wang (Senior Economist, World Bank Group), Xiaowei Zhuang (Research Consultant, World Bank Group) and Linlin Hu, Associate Professor, Department of Health Policy and Management, School of Public Health, Peking Union Medical College.

[2] China is projected to take 30 years from an "aging society" to reach an over-60 elderly dependency ratio of 25, while the UK and the US both took 75 years to go through the same process (World Bank, 2016).

[3] Empirical evidence shows that the share of elderly above 65 co-residing with adult children has fallen from close to two-thirds in the early 1980s to roughly two-fifth by 2011 (Giles, et al., 2018).

2018, and Wang and Zhang, 2019), this paper is among the first attempts to measure the WTP of HCBS. Measuring WTP for aged care services is essential in assessing the affordability of aged care services to individuals and will inform policies to improve the adequacy of public financing in aged care sector and the sustainability of the financing model.

Methodologically, approaches to measuring WTP can be divided into two categories (1) results obtained from price-responses, which are referred to as *revealed preferences*, and (2) prices derived from self-reported responses in survey, which are referred to as *stated preferences* (see Breidert et al. 2006). In practice, the selection of a method for measuring WTP is usually restricted by the availability of data or by the constraints in terms of time and money that are required to collect the requisite data. In this paper, we measure the WTP for aged care services by using method (2), based on data from a survey that asked respondents to indicate prices that they are willing to pay for particular aged care services. This method has limitations, compared with method (1) which measured price-responses, and we suggest that future work focuses on designing an approach based on method (1).[4]

We start by providing a description of the data and showing some summary statistics of the sample in Section II; Section III first presents the care needs among the sample and WTP for disaggregated services, and then we analyze the socio-economic characteristics associated with numbers and types of the services the respondents are willing to pay for and the amount they are willing to pay for; and Section IV concludes.

II. Data Description

The data used for this paper is from a specific survey that was designed to investigate the demand for and the supply of aged care services in Anhui provinces in 2018. The survey consists of modules on the elderly living at home, the institutionalized elderly, and also aged care service providers. This paper exploited the module on the elderly living at home that covered 1,389 respondents above age 65 and the 147 corresponding familial caregivers in both urban and rural areas in three prefectures in Anhui province, namely, Anqing, Lu'an, and Suzhou. A table summarizing the sample source is available in Annex II.

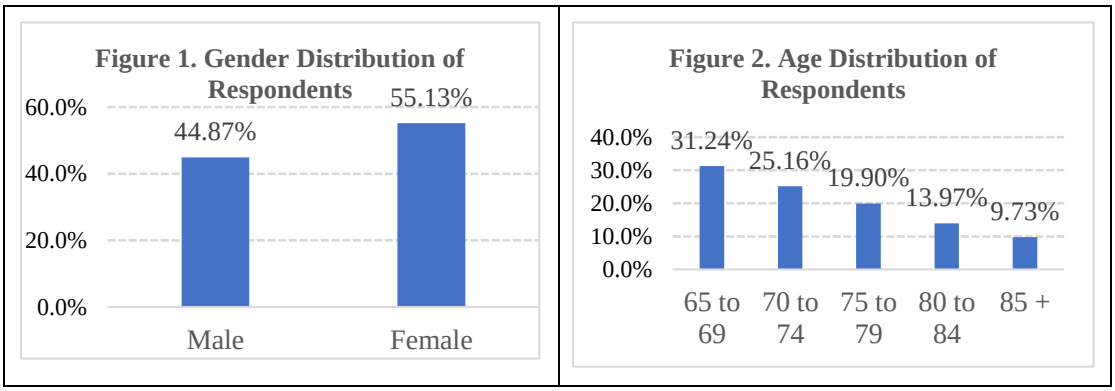
For each household, one member aged over 65 years was randomly selected as a respondent. Basic demographic information on the respondents, their health conditions and care provision status are collected. In addition, caregivers' demographics, income levels, health conditions and work status are also collected.

Socio-Demographic Characteristics of Respondents

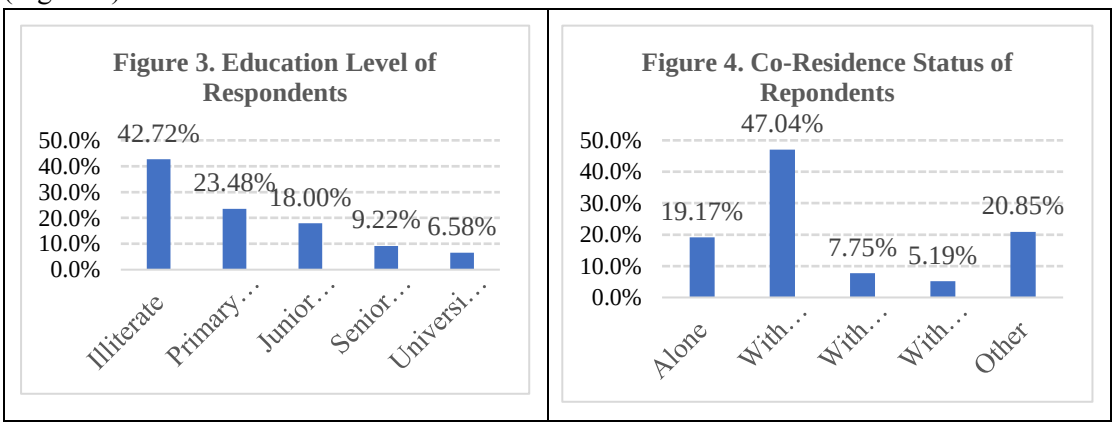
Among the sample, 55.13 percent are female, and 44.87 percent are male. The average age of the group is 74.23, 31.24 percent fall into the age range of 65-69, 25.16 percent of them are from the age range of 70-74, 19.90 percent of them are from 75-79, 13.97 percent of them are

[4] See Becker, DeGroot and Marschak (1964) for the theoretical underpinning of the *revealed preferences approach*.

from the age range of 80-84, and 7.93 percent accounts for 85 and above.



Educational level of the elderly in the sample is generally low: the illiteracy rate is 42.72 percent, 23.48 percent have primary education, 18 percent attended only junior high school, 9.22 percent reached senior high school, and only 6.58 percent have an education level beyond high school (Figure 3).



In terms of co-residence status (Figure 4), about 19.17 percent are living alone, 47.04 percent living with spouse only, 7.75 percent living with children only, 5.19 percent living with both spouse and children, and 20.85 percent living with other people.

Prevalence of Chronic Diseases and Functional Limitations Among Respondents

The majority of respondents (85.2 percent) have one or more chronic conditions.[5] With respect to disease incidence, hypertension ranks first followed by abnormal blood fat and heart disease. Variance analysis shows female elders tend to have significantly more chronic conditions than male elders (p=0.004), while there is no significant difference between urban and rural elders in number of chronic conditions(p=0.448).

[5] The survey documents whether the respondents have any of the 14 chronic diseases including hypertension, dyslipidemia, stroke, diabetes, cancer, chronic lung diseases, liver disease, heart attack, kidney disease, stomach or other digestive disease, psychiatric problems, memory-related disease, arthritis or rheumatism, and asthma.

Figure 5. Number of Chronic Conditions Among Respondents

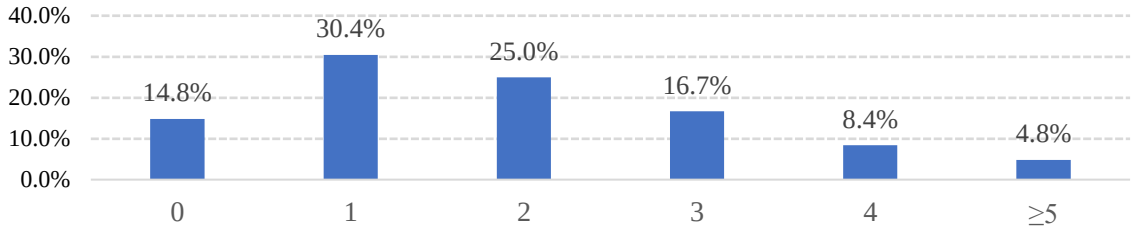
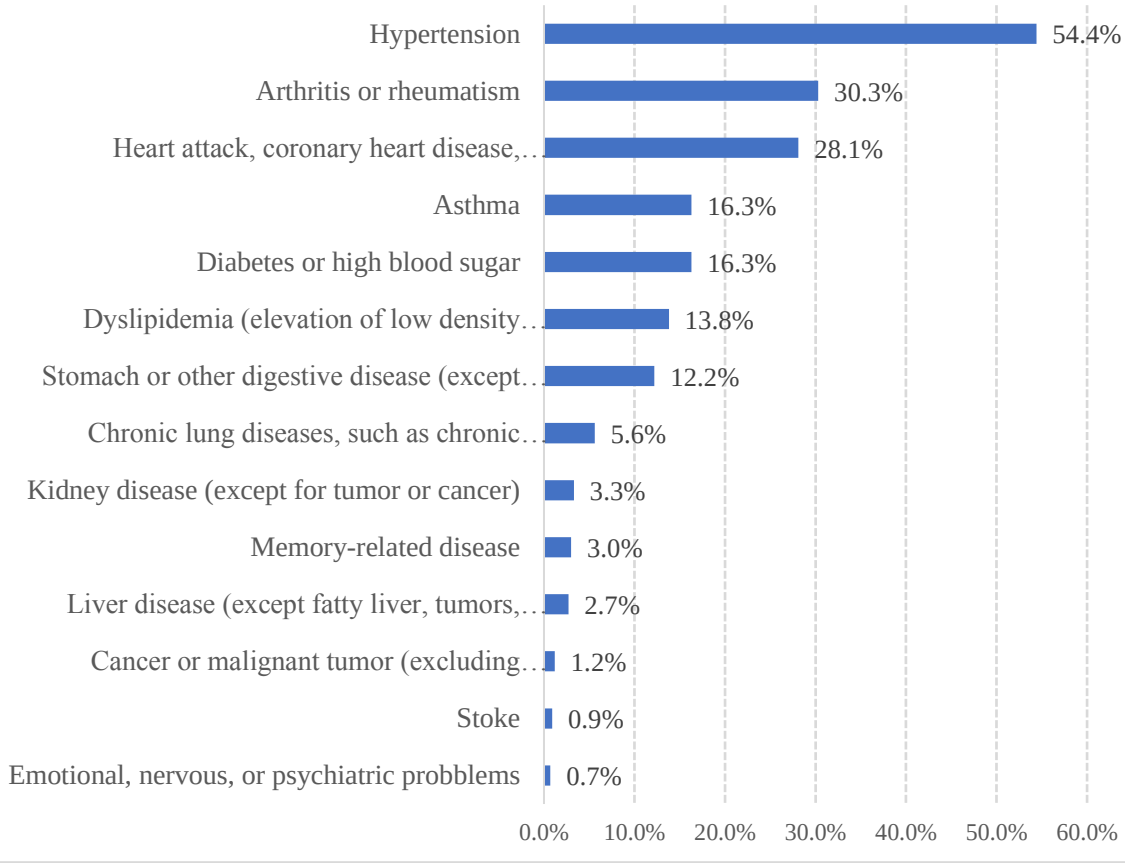


Figure 6. Share of Respondents with a Chronic Disease, by Type



The elder's functional status is assessed by the abilities in 6 Activities of Daily Life (ADL) and 8 Instrumental Activities of Daily Life (IADL). Based on international standards[6], we calculated the degree of disability for each respondent.

According to our calculation, 89.0 percent of the elderly people in the sample are not disabled, 5.6 percent are slightly disabled, and 4.2 percent are severely disabled. This result of disable rate is consistent with what some other surveys have found[7]. 90.4 percent of urban respondents

[6] According to international standards, in the 6 ADL items (eating, dressing, getting up and down the bed, going to the toilet, indoor walking, and bathing), elderly having no difficulties performing all activities will be defined as "not disabled", having difficulties performing 1-2 items will be defined as "slightly disabled"; having difficulties performing 3-4 items will be defined "moderately disabled ", and having difficulties performing 5-6 items will be defined as "severely disabled".

[7] Zhang and Wei (2015) calculated the disability rate of elder people aged over 60 to be 11.2% using

are not disabled and 87.5 percent of rural respondents are not disabled. The disability rate is significantly different between urban and rural respondents(p=0.059).

For IADL, the elders in this sample generally do well. Disability rates in washing clothes, cooking and floor sweeping are the top three highest (respectively 13.3 percent,13.1 percent and 11.3 percent).

Table 1. Functional Condition of Respondents, by Daily Activity

Daily activities	Can do it	Have difficulties in doing it	Can't do it
Dining	1333 (96.0%)	36 (2.6%)	20 (1.4%)
Get Dressed	1329 (95.7%)	37 (2.7%)	23 (1.7%)
Toilet Use	1319 (95.0%)	46 (3.3%)	24 (1.7%)
Get On Or Off The Bed	1314 (94.6%)	49 (3.5%)	26 (1.9%)
Indoor Walking	1283 (92.4%)	78 (5.6%)	28 (20%)
Bathing	1252 (90.1%)	82 (5.9%)	55 (4.0%)
Cooking	1207 (86.9%)	98 (7.1%)	84 (6.0%)
Wash Clothes	1204 (86.7%)	102 (7.3%)	83 (6.0%)
Sweep The Floor	1232 (88.7%)	83 (6.0%)	74 (5.3%)
Shopping	1239 (89.2%)	78 (5.6%)	72 (5.2%)
Go Up And Down Stairs	1235 (88.9%)	97 (7.0%)	57 (4.1%)
Make Calls	1279 (91.4%)	54 (3.9%)	65 (4.7%)
Self-Medication	1304 (93.9%)	48 (3.5%)	37 (2.7%)
Personal Finance Management	1302 (93.7%)	44 (3.2%)	43 (3.1%)

III. Meeting the Need for HCBS and Willingness-to-Pay Among the Elderly

Meeting the Need for HCBS

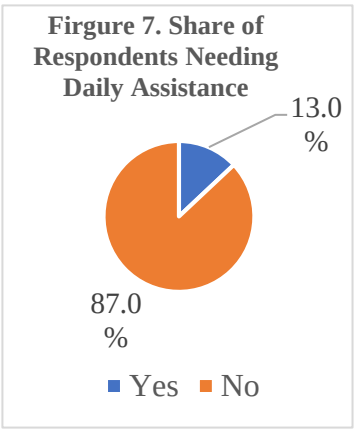
The respondents are asked to indicate their overall needs for a caregiver to assist in daily living activities (cooking, dining, bathing, get on or off the bed, indoor walking, toilet use, go up and down stairs, and shopping): 13 percent reported that they need assistance from caregivers (13.53 percent for the urban respondents and 12.31 percent for the rural ones).

Among those who claimed they need assistance (n=194), 41.2 percent reported being cared by spouses, 36.6 percent reported being cared by son and daughter-in-law, and 12.9 percent reported being cared by daughter and son-in-law. 75.3 percent of these elders (n=194) have non-paid caregivers.

Of those having non-paid care, half are cared 24 hours a day and 7 days a week. Length of non-paid care are mostly 2-5 hours per day. Average length of non-paid care per week is 91.44 hours (13.6 hours per day) for elderly who need care.

There are 11 elders who are using paid care, with average length of paid care per week to be 67.18 hours. The average costs for paid-care occurred during the recall period range from 140 to 5,600 RMB/month, with an average cost of 2,003.6 RMB/month.

merged data from 3 national surveys with standardized age structure and calculation method. See Estimating the level and duration of disability of the elderly in China: Based on the pooled data from multiple data sources. Population Research (in Chinese), Vol 39, No.5, 2015.



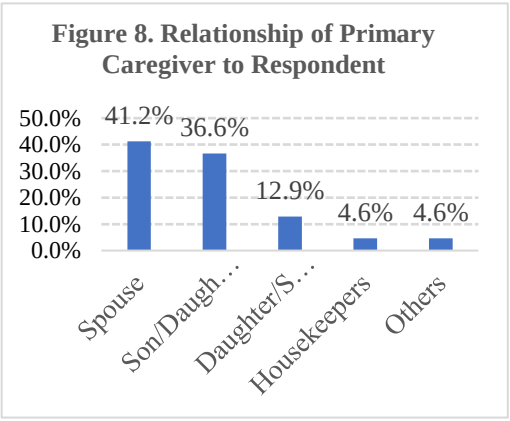


Table 2. Number of Providers and Hours Provided for Non-Paid Care, during the Last Month (n=194)

Items	Frequency	Percentage
Number of people providing non-paid care		
0	48	24.7%
1	122	62.9%
2	22	11.3%
3+	2	1.0%
Number of hours per week		
0	50	25.8%
2-7	5	2.5%
14-21	13	6.7%
28	12	6.2%
35-84	17	8.7%
168	97	50.0%

Table 3. Number of Hours Provided and Payment Amount for Paid Care, during the Last Month (n=11)

Items	Frequency	Percentage
Number of people providing paid care		
1	11	100%
Number of hours per week		
3	1	9.1%
14	1	9.1%
18	2	18.2%
28	1	9.1%
36	1	9.1%
48	1	9.1%
70	1	9.1%
168	3	27.3%
Payment（RMB/ month）		
140	1	9.1%
1100	2	18.2%
1500	3	27.3%
2000	2	18.2%
2600	1	9.1%
3000	1	9.1%
5600	1	9.1%

The respondents were asked whether they are satisfied with the current care for daily living. 87.1 percent reported they have no assistance or not clear, which is consistent with the previous question (87 percent reported they don't need assistance for daily living). In those who need care, 42.6 percent reported "completely satisfied" and 51.9 percent are "somewhat satisfied". Only 5.4 percent are totally not satisfied with the current care. With regard to affordability of care, noticeably 2.7 percent(n=39) in the total sample said they could not afford at all or have huge difficulties affording care. Among these people who could not afford care, 61.5 percent are urban and 38.5 percent are rural elders. Over half of them have a monthly household income lower than 1000 yuan, but they are mostly not disabled.

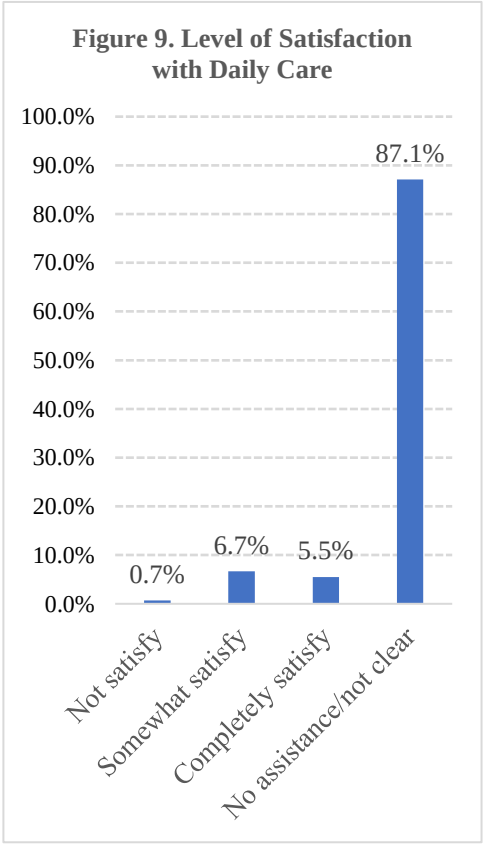


Figure 9. Level of Satisfaction with Daily Care

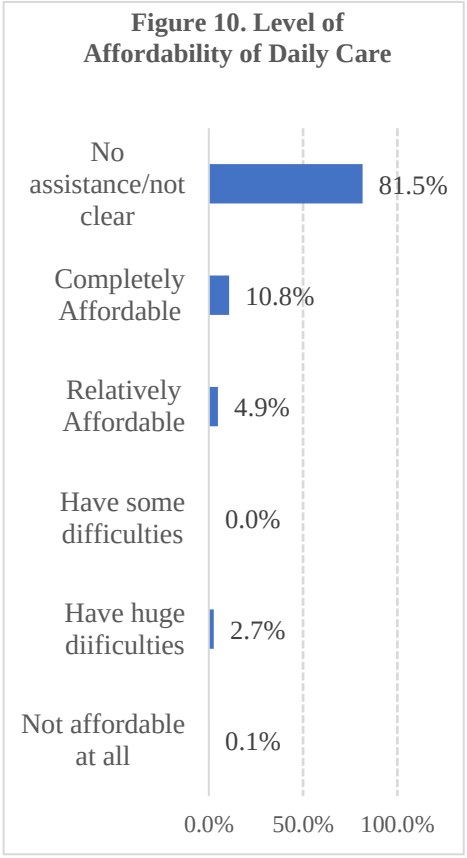
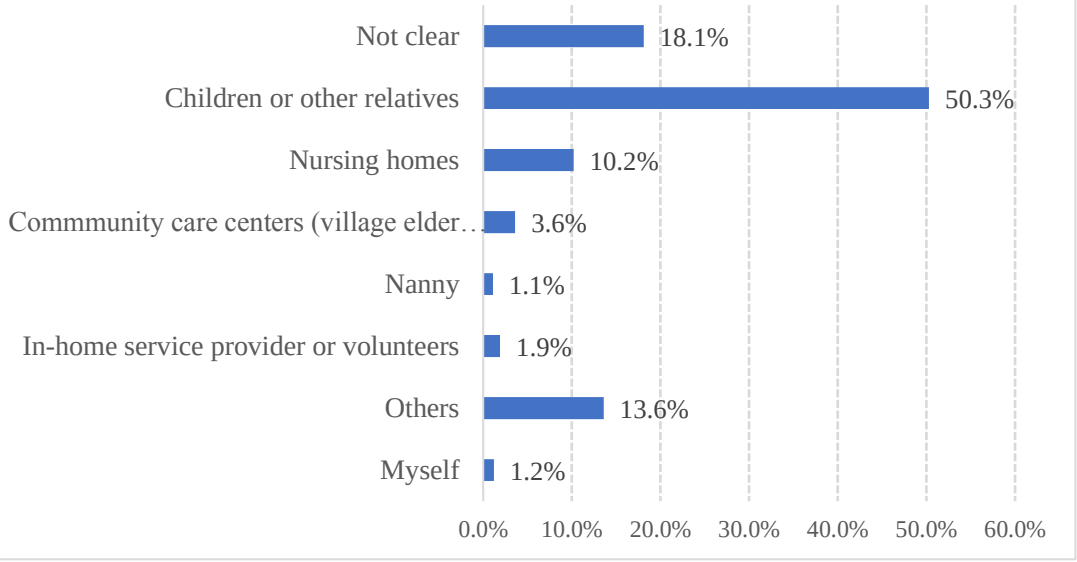


Figure 10. Level of Affordability of Daily Care

Figure 11. Preference for Type of Provider, if Disabled

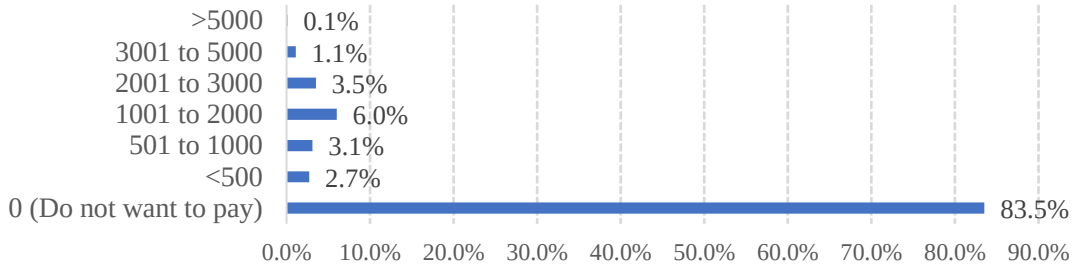


The preference of the elder's care need is detected by asking the question in case of being disabled, whom they want to take care of them. The result shows 50.3 percent want to be cared by their children or other relatives (43.2 percent for urban and 58.5 percent for rural elders), 10.2 percent want to live in nursing homes (13.1 percent for urban and 6.8 percent for rural elders) and 3.6 percent would choose community care centers (4.5 percent for urban and 2.6 percent for rural elders).

Willingness-to-Pay Among the Elderly

A large majority of the elderly do not want to pay for daily living assistance; the average willingness to pay is low (only 17 percent are willing to pay) and most of those who are willing to pay only want to pay 1001-2000 RMB per month.

Figure 12. Share of Respondents Willing to Pay for Daily Care, by Amount (RMB/month)



We further examine the individual characteristics associated with respondents' WTP for daily living assistance and the monetary value of how much they are willing to pay. Note that we do not intent to establish any causal interpretations between WTP and the variables. Some conjectures explaining the observed associations are discussed below, but further research is called for to verify the conjectures and deepen the understanding of the mechanisms behind.

Table 4. Share of Respondents Willing to Pay and Mean and Median Value, by Age

Age group	Willingness to pay=0, share	Willingness to pay>0, share	Mean Value of Willingness to pay	Median Value of Willingness to pay
65 to 69	81.26%	18.74%	1721.9	1500
70 to 74	85.17%	14.83%	1524.5	1500
75 to 79	86.40%	13.60%	1101.4	750
80 to 84	81.68%	18.32%	1757.1	1500
85 and above	81.95%	18.05%	1406.3	1500
All	83.40%	16.60%	1548.4	1500

Results show the average amount that respondents are willing to pay for daily living assistance is 1548.4 yuan (see table 4). The median value is 1500 yuan. Further, the youngest group of respondents, those aged 65 to 69, has the highest proportion (18.74 percent) willing to pay. People aged 80 to 84 have the highest mean value of willingness to pay (1757.1 yuan). Potential explanations to this nonlinear relationship between age and WTP may lie in the fact that the youngest are also the richest to afford age care, and the oldest are most in need of care. These two factors mingle with each other and drive the non-linear relationship observed.

Table 5. Share of Respondents Willing to Pay and Mean and Median Value, by Education Level

Education	Willingness to pay=0, share	Willingness to pay>0, share	Mean Value of Willingness to pay	Median Value of Willingness to pay
Illiterate	89.90%	10.10%	1444.9	1500
Primary school	82.87%	17.13%	1377.3	1500
Junior high school	75.61%	24.39%	1475.0	1500
Senior high school	74.60%	25.40%	1953.1	2500
University and above	76.67%	23.33%	1881.0	1500
All	83.40%	16.60%	1548.4	1500

As shown in table 5, people with at least a junior high school education are much more willing than less educated people to pay for aged care services, and are willing to spend more money as well. Moreover, while the shares of people willing to pay varies little among people with junior high school, senior high school, and university education, the monetary amount is significant lower for people with a junior high school education. Among all respondents, those who are illiterate are much less willing to pay (only 10.10 percent are willing to pay for services). There likely to be two reasons behind this strong correlation: (1) education is a proxy of income levels; and (2) education also has the potential to shape values regarding receiving aged care, but it certainly requires further research to verify these conjectures.

Table 6. Share of Respondents Willing to Pay and Mean and Median Value, by Number of Chronic Diseases

No. diseases	Willingness to pay=0, share	Willingness to pay>0, share	Mean Value of Willingness to pay	Median Value of Willingness to pay
0	78.00%	22.00%	1789.8	1500
1	84.76%	15.24%	1488.3	1500
2	84.88%	15.12%	1629.8	1500
3	83.26%	16.74%	1401.3	2500
4	82.14%	17.86%	1412.5	1500
5 and above	85.94%	14.06%	1250.0	750
All	83.40%	16.60%	1548.4	1500

People who do not suffer from chronic diseases have the highest willingness to pay for services (22.00 percent are willing to pay) and have the highest mean value (1789.8 yuan per month). By contrast, people with 5 and more chronic diseases are least willing to pay for services (14.06 percent are willing to pay) and spend the least amount on services (1250.0 yuan per month).

Table 7. Share of Respondents Willing to Pay and Mean and Median Value, by ADL/IADL Status

Number of ADL/IADLs Respondents Cannot Do Alone	Willingness to pay=0, share	Willingness to pay>0, share	Mean Value of Willingness to pay	Median Value of Willingness to pay
0	82.86%	17.14%	1600.5	1500
1 to 5	87.39%	12.61%	1232.1	1125
6 to 10	85.48%	14.52%	1416.7	750
11 to 14	83.87%	16.13%	1100.0	1500
All	83.40%	16.60%	1548.4	1500

Similarly, the healthiest people, who score 0 in ADL/IADL status (indicating there are no activities they cannot do alone), are most willing to pay for services (17.14 percent are willing to pay) and have the highest mean value (1600.5 yuan per month). On the other hand, people who score 1 to 5 in ADL/IADL status have the lowest willingness to pay for services (12.61 percent are willing to pay), and the unhealthiest people are willing to spend the least amount of money (1100.0 yuan per month). It is somewhat counterintuitive to see these negative correlations between number of chronic diseases/ADL status and WTP, but note that higher income levels can also be associated with better health status and drive the correlation.

Table 8. Share of Respondents Willing to Pay and Mean and Median Value, by Co-Residency Status

Co-residency Status	Willingness to pay=0, share	Willingness to pay>0, share	Mean Value of Willingness to pay	Median Value of Willingness to pay
Alone	87.40%	12.60%	1424.2	1500
With spouses	77.92%	22.08%	1656.7	1500
With Children	90.57%	9.43%	1175.0	1125
With spouses & children	84.51%	15.49%	1613.6	1500
Others	89.12%	10.88%	1282.3	1500
All	83.40%	16.60%	1548.4	1500

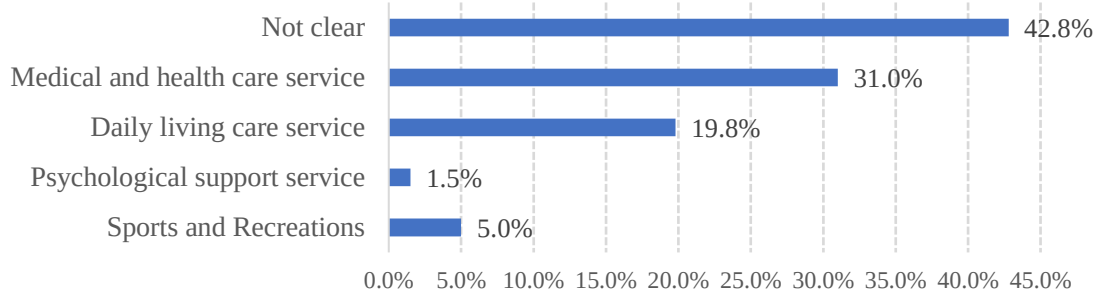
As shown in Table 8, people living with spouses (no children) are most willing to pay for services, in terms of both the share of respondents willing to pay and the monetary value. By contrast, people living with children (no spouses) are least willing to pay for services, in terms of both the share of respondents willing to pay and the monetary value. In between are people living with both spouses and children, who are more willing to pay than people living alone, and people living alone, who are more willing to pay than people living with others. The reasons behind the observed pattern may be due to a potential sorting mechanism behind the co-residence decision: people who need care but can not afford it may choose to live with their children or other relatives who can provide care; people who are healthy and can afford care choose not to leave with their children or others. Also, in China, people living alone in old ages are potentially the most vulnerable group with lower income levels, so they show less willingness to pay for aged care.

IV. Additional Attributes of HCBS Needs, Utilization, and Willingness-to-Pay

The needs of the elderly by disaggregated type of HCBS that go beyond daily living care services (daily living care services are included) are also investigated.

Firstly, broader categories of HCBS[8] that are most needed are surveyed (Figure 13). 42.8 percent of responses are not clear, and of the responses that are clear, medical care is reported to be the service most needed by the elderly (31 percent), followed by daily living care (19.8 percent), sports and recreation service (5.1 percent) and psychological support (1.5 percent).

Figure 13. HCBS Needed by Respondants, by Category



Secondly, the utilization of, and the needs and WTP (yes or no) for each disaggregated service under each category are documented.

We proceed to examine the average number of HCBS people are willing to pay for by individual socio-characteristics. We start by examining WTP by age. Findings show that people in the age range of 75-79 have the highest number of services they are willing to pay for, with an average of 1.357 services. People who are 85 and above has the lowest number of services they are willing to pay for, with only 0.97 on average, see table 11.

[8] We group all services by 4 categories: 1. Daily living care services; 2. Medical and health care services; 3. Phycological support services; and 4. Sports and recreations.

Table 11. Number of HCBS Respondents Are Willing to Pay for, by Age Group

Age group	65 to 69	70 to 74	75 to 79	80 to 84	85 and above
Ave. Number	1.162	1.233	1.357	1.241	.97

We then proceed examining WPT by education level.

Table 12. Number of HCBS Respondents Are Willing to Pay for, by Education Level

Education	Illiterate	Primary	Junior	Senior	University and above
Ave. Number	.805	1.265	1.476	1.579	2.411

As shown in table 12, the more educated people are, the greater number of services they are willing to pay for. People with a university degree or above have the highest number of services they are willing to pay for, 2.41 on average, while illiterate people are willing to pay for only one-third that amount, or 0.81 on average, possibly reflecting the lower incomes of these people.

Table 13. Number of HCBS Respondents Are Willing to Pay for, by Number of Chronic Diseases

No. diseases	0	1	2	3	4	5 and above
Ave. Number	1.150	1.121	1.221	1.291	1.188	1.688

Results show that even people without chronic diseases are willing to pay for services, although the more diseases respondents have, the greater the number of services they are willing to pay for. People with no disease are willing to pay for 1.15 services, which is slightly higher than the amount for people with only one disease. People with more than 5 diseases have the highest number of services they are willing to pay for (1.688), and it is significantly higher than other groups.

Table 14. Number of HCBS Respondents Are Willing to Pay for, by ADL/IADL Status

Number of ADL/IADLs Respondents Cannot Do Alone	0	1 to 5	6 to 10	11 to 14
Ave. Number	1.234	.748	1.468	1.355

The number of ADL/IADLs respondents cannot do alone isn't directly correlated with willingness to pay. People with 6 to 10 ADL/IADLs they cannot do have the highest number of services they are willing to pay for, 1.47, followed by people with 11 to 14, with 1.36. People without any functional problems (0 ADL/IADLs) have the third highest number of services they are willing to pay for (1.23). Meanwhile, people with 1 to 5 ADL/IADLs have the lowest number of services they are willing to pay for, only 0.75.

Table 15. Number of HCBS Respondents Are Willing to Pay for, by Co-residency Status

Living Status	Alone	With spouses	With Children	With spouses & children	Other
Ave. Number	1.042	1.32	0.887	1.549	1.154

As shown in table 15, people living with children-only report having the least number of services they are willing to pay for. People living with spouses (regardless of whether they live with spouses-only or with spouses and children together) report having the greatest number of services they are willing to pay for.

In terms of the attributes of HCBS, among the 8 items of daily living care (community dining, meal delivery, door-to-door hairdressing, door-to-door bathing, house cleaning, shopping

assistance, transportation assistance and routine safety check), the proportions of elderly responded that they "need" the service are all below 20 percent, with the highest to be house cleaning (17 percent) and lowest to be transportation assistance (12.4 percent).

The need for 8 medical services (emergency aid, home medical care, home nursing care, routine physical checkups, health education, NCD management, hospital visit assistance and rehabilitation) is generally higher, with the highest to be routine physical checkups (65.7 percent) and home medical care (28.4 percent).

Psychological service such as chatting is needed by 14.2 percent of the elderly, and recreational service is needed by 21 percent.

The current care utilization rate is all very low except for routine physical checkups, which is 69.5 percent, even higher than the proportion of respondents who report they need it.

The willingness to pay for these services are also investigated. The result showed that the proportion of respondents who are willing to pay for each service is generally below 10 percent, with only one exception which is home medical care, for which the willingness to pay is 11.8 percent.

Table 10 shows number of people who need a certain service but didn't receive it, which could be interpreted as unmet needs. Home medical care ranks the first(n=364), followed by emergency aid(n=303) and home nursing care(n=291). The willingness to pay among these people is generally higher than the whole sample, but is still considered low (around 20-30 percent).

Table 9. HCBS Utilization, Needs, and Willingness-to-Pay, by Type of Service

	Utilization		Need or not			Willing to pay	
	Yes	No	Do need	Neutral	Don't need	Yes	No
Elder dining service	5(0.4%)	1384(99.6%)	292(13.8%)	32(2.3%)	1166(83.9%)	78(5.6%)	1311(94.4%)
Meal delivery	14(1.0%)	1375(99.0%)	223(16.1%)	30(2.2%)	1136(81.8%)	86(6.2%)	1303(93.8%)
Hairdressing	11(0.8%)	1378(99.2%)	232(16.7%)	25(1.8%)	1132(81.5%)	92(6.6%)	1297(93.4%)
Bathing	0(0%)	1389(100%)	178(12.8%)	26(1.9%)	1185(85.3%)	66(4.8%)	1323(95.2%)
House cleaning	20(1.4%)	1369(98.6%)	236(17.0%)	25(1.8%)	1128(81.2%)	70(5.0%)	1319(95.0%)
Assist shopping	3(0.2%)	1386(99.8%)	189(13.6%)	24(1.7%)	1176(84.7%)	62(4.5%)	1327(95.5%)
Assist transportation	0(0%)	1389(100%)	172(12.4%)	28(2.0%)	1189(85.6%)	60(4.3%)	1329(95.7%)
Routine safety check	10(0.7%)	1379(99.3%)	176(12.7%)	29(2.1%)	1184(85.2%)	59(4.2%)	1330(95.8%)
Emergency aid	13(0.9%)	1376(99.1%)	316(22.8%)	22(1.6%)	1051(75.7%)	134(9.6%)	1255(90.4%)
Home medical care	36(2.6%)	1353(97.4%)	395(28.4%)	21(1.5%)	973(70.1%)	164(11.8%)	1370(98.6%)
Home nursing care	19(1.4%)	1370(98.6%)	305(22.0%)	22(1.6%)	1062(76.5%)	111(8.0%)	1278(92.0%)
Routine checkups	966(69.5%)	423(30.5%)	913(65.7%)	39(2.8%)	437(31.5%)	208(15.0%)	1181(85.0%)
Health lectures	87(6.3%)	1302(93.7%)	278(20.0%)	35(2.5%)	1076(77.5%)	90(6.5%)	1299(93.5%)
NCD management	13(0.9%)	1376(99.1%)	245(17.6%)	21(1.5%)	1123(80.8%)	92(6.7%)	1297(93.4%)
Hospital visit assistance	2(0.1%)	1387(99.9%)	211(15.2%)	19(1.4%)	1159(83.4%)	85(6.1%)	1304(93.9%)
Rehabilitation	1(0.1%)	1388(99.9%)	194(14.0%)	24(1.7%)	1171(84.3%)	81(5.8%)	1308(94.2%)
Chatting	43(3.1%)	1346(96.9%)	197(14.2%)	22(1.6%)	1170(84.2%)	51(3.7%)	1338(96.3%)
Recreation	87(6.3%)	1302(93.7%)	291(21.0%)	31(2.2%)	1067(76.8%)	64(4.6%)	1325(95.4%)

Table 10: Number of respondents who need but didn't receive a certain service item

	Number of people Need but didn't receive	Their willingness to pay	
		Yes	No
Elder dining service	189	32.8%	67.2%
Meal delivery	218	31.2%	68.8%
Hairdressing	222	30.6%	69.4%
Bathing	178	29.8%	14.0%
House cleaning	225	23.1%	76.9%
Assist shopping	187	25.7%	74.3%
Assist transportation	172	26.2%	73.8%
Routine safety check	167	27.5%	72.5%
Emergency aid	303	37.6%	62.4%
Home medical care	364	37.9%	62.1%
Home nursing care	291	32.6%	67.4%
Routine checkups	134	30.6%	69.4%
Health lectures	221	28.1%	71.9%
NCD management	232	31.5%	68.5%
Accompanying care	210	34.3%	65.7%
Rehabilitation	193	35.2%	64.8%
Accompanying chatting	162	22.2%	77.8%
Recreation	229	18.3%	81.7%

As shown in table 11, the most desirable service across all age groups is routine checkups. This service has the highest share of respondents willing to pay for it, ranging from 16.63 percent among people from 65 to 69 to 13.95 percent among people 70 to 74. Home medical care is the second most desirable service, and on average around more than 11 percent of people from all age groups are willing to pay for this service.

Table 16. Willingness-to-Pay for HCBS, by Type of Service and Age Group

Service	65 to 69	70 to 74	75 to 79	80 to 84	85 and above	All
Elder dining service	5.39%	5.23%	6.99%	4.71%	6.77%	5.71%
Meal delivery	5.39%	6.10%	7.35%	5.24%	9.02%	6.29%
Hairdressing	7.03%	4.94%	7.72%	5.76%	9.77%	6.73%
Bathing	5.15%	4.07%	5.88%	3.66%	5.26%	4.83%
House cleaning	4.68%	4.94%	5.51%	4.19%	7.52%	5.12%
Assist shopping	4.22%	4.36%	5.51%	3.66%	5.26%	4.54%
Assist transportation	4.22%	4.07%	4.78%	3.66%	6.02%	4.39%
Routine safety check	4.45%	4.07%	5.15%	3.14%	4.51%	4.32%
Emergency aid	11.01%	8.43%	9.93%	9.42%	9.77%	9.80%
Home medical care	14.05%	9.30%	11.40%	11.52%	14.29%	12.00%
Home nursing care	8.67%	6.98%	9.19%	6.28%	9.77%	8.12%
Routine checkups	16.63%	13.95%	15.44%	14.14%	14.29%	15.14%
Health lectures	7.03%	6.10%	7.35%	5.24%	6.77%	6.58%
NCD management	6.56%	6.98%	5.88%	6.28%	8.33%	6.66%
Accompanying care	5.85%	6.98%	5.51%	6.81%	6.06%	6.22%
Rehabilitation	5.85%	6.10%	7.35%	5.76%	5.30%	6.15%
Accompanying chatting	2.34%	4.65%	4.78%	2.62%	5.30%	3.73%
Recreation	3.75%	5.81%	5.15%	2.62%	6.82%	4.69%

Among people age 85 and above, the most desirable services are routine checkups, home medical

care, meal delivery, and hairdressing, which may be due to the declining physical function of respondents in this age range.

Only a few people are willing to pay for accompanying chatting, indicating that people prioritize urgent health needs over emotional needs. In addition, if the elderly stay at home, they have family members to spend time with or talk to, and hence there is no need for accompanying chatting.

Table 17. Willingness-to-Pay for HCBS, by Type of Service and Education Level

Service	Illiterate	Primary	Junior	Senior	University and above
Elder dining service	4.45%	6.23%	7.32%	5.56%	7.78%
Meal delivery	5.14%	5.92%	8.54%	7.94%	6.67%
Hairdressing	4.79%	7.17%	8.94%	10.32%	6.67%
Bathing	3.08%	4.98%	7.72%	7.14%	4.44%
House cleaning	3.60%	4.67%	6.91%	7.14%	8.89%
Assist shopping	2.91%	4.67%	6.50%	7.14%	5.56%
Assist transportation	2.91%	3.74%	6.50%	7.14%	6.67%
Routine safety check	3.08%	4.05%	6.10%	7.14%	4.44%
Emergency aid	8.39%	9.66%	12.60%	11.11%	10.00%
Home medical care	9.76%	12.77%	14.63%	13.49%	14.44%
Home nursing care	6.68%	8.41%	9.76%	9.52%	10.00%
Routine checkups	15.07%	14.33%	15.85%	16.67%	14.44%
Health lectures	5.31%	6.54%	7.32%	9.52%	8.89%
NCD management	4.97%	7.17%	6.91%	10.32%	10.00%
Accompanying care	4.29%	7.17%	6.91%	8.73%	10.00%
Rehabilitation	4.12%	6.85%	7.32%	9.52%	8.89%
Accompanying chatting	2.57%	4.36%	4.07%	7.14%	3.33%
Recreation	3.77%	4.67%	5.69%	7.94%	3.33%

Examining the most desirable services by education level shows that routine checkups remain the most desirable option for people from all kinds of education backgrounds. Home medical care ranks the second most appealing service. People with a university or above degree are most willing to pay for routine checkups (14.44 percent) and home medical care (14.44 percent), followed by emergency aid (10.00 percent), home nursing care (10.00 percent), NCD management (10.00 percent) and accompanying care (10.00 percent). People with less education showed less willingness to pay for services in general, but their willingness remains high when it comes to routine checkups. People with a high school education show the highest interest in checkups (16.67 percent), followed by people with a junior high degree (15.85 percent), people who are illiterate (15.07 percent), and people with a primary education (14.33 percent).

Table 18 shows the desirability of services by the number chronic diseases of respondents. People with no chronic disease demonstrate the most willingness to pay for services. 22 percent of them are willing to pay for routine checkups, followed by 17.50 percent of respondents willing to pay for home medical care, and 16.50 percent willing to pay for emergency aid. People with 5 chronic diseases or above are most willing to pay for routine checkups (15.63 percent), home medical care (12.50 percent), and emergency aid (10.94 percent). Compared to other groups, they show more interest in paying for health education and enjoy life more, with 7.81 percent of them happy to pay for health lectures, 7.81 percent of them willing to pay for recreation, and 6.25 percent willing to pay for accompanying care. Overall, people with 2 or 3 diseases are more willing to pay for services than people with either 1 disease or people with 4 diseases and above.

Table 18. Willingness-to-Pay for HCBS, by Type of Service and Number of Chronic Diseases

Service	0	1	2	3	4	5 and above
Elder dining service	9.00%	4.29%	5.81%	5.29%	6.25%	4.69%
Meal delivery	9.50%	5.00%	6.10%	6.17%	5.36%	7.81%
Hairdressing	10.00%	5.24%	6.69%	6.61%	7.14%	6.25%
Bathing	8.50%	4.05%	4.65%	3.52%	5.36%	3.13%
House cleaning	8.50%	3.81%	6.10%	3.52%	5.36%	3.13%
Assist shopping	8.00%	3.33%	4.36%	3.52%	6.25%	3.13%
Assist transportation	8.50%	3.33%	3.78%	3.52%	5.36%	3.13%
Routine safety check	8.50%	3.33%	3.49%	3.52%	5.36%	3.13%
Emergency aid	16.50%	8.10%	8.14%	8.81%	10.71%	10.94%
Home medical care	17.50%	10.24%	11.05%	11.01%	13.39%	12.50%
Home nursing care	12.50%	6.90%	7.56%	6.61%	8.93%	9.38%
Routine checkups	22.00%	12.62%	15.12%	14.98%	12.50%	15.63%
Health lectures	9.50%	6.19%	5.81%	5.29%	7.14%	7.81%
NCD management	11.50%	5.95%	5.83%	4.85%	7.14%	6.25%
Accompanying care	10.50%	5.48%	5.25%	4.85%	7.14%	6.25%
Rehabilitation	11.00%	5.24%	6.12%	4.41%	6.25%	3.13%
Accompanying chatting	4.00%	3.57%	3.50%	3.52%	5.36%	3.13%
Recreation	5.00%	4.29%	4.37%	4.41%	5.36%	7.81%

Looking at the desirability of services by ADL/IADL status, respondents with a score 11 to 14 in ADL/IADLs demonstrate a high willingness to pay for home medical care (17.74 percent) and routine checkups (17.74 percent), probably due to their increasing dysfunction. People with a score of 6 to 10 in ADL/IADLs, in addition to having a high interest in paying for home medical care (17.74 percent) and routine checkups (14.52 percent), are also very willing to pay for meal delivery (9.68 percent), NCD management (9.84 percent), and health lectures (9.68 percent).

Table 19. Willingness-to-Pay for HCBS, by Type of Service and ADL/IADL Status

Service	0	1 to 5	6 to 10	11 to 14
Elder dining service	5.74%	4.50%	6.45%	6.45%
Meal delivery	5.92%	7.21%	9.68%	8.06%
Hairdressing	6.36%	9.01%	9.68%	6.45%
Bathing	4.77%	4.50%	4.84%	6.45%
House cleaning	5.04%	4.50%	6.45%	6.45%
Assist shopping	4.33%	4.50%	6.45%	6.45%
Assist transportation	4.15%	4.50%	6.45%	6.45%
Routine safety check	4.15%	4.50%	4.84%	6.45%
Emergency aid	9.72%	8.11%	9.68%	14.52%
Home medical care	11.31%	12.61%	17.74%	17.74%
Home nursing care	7.77%	8.11%	9.68%	12.90%
Routine checkups	15.02%	15.32%	14.52%	17.74%
Health lectures	6.45%	4.50%	9.68%	9.68%
NCD management	6.36%	5.41%	9.84%	11.29%
Accompanying care	5.83%	6.31%	8.20%	11.29%
Rehabilitation	6.10%	4.50%	8.20%	8.06%
Accompanying chatting	3.53%	5.41%	3.28%	4.84%
Recreation	4.33%	6.31%	6.56%	6.45%

Table 20 shows the desirability of services by the type of co-residency status. Contrary to expectations, we do not see that elderly living alone are more willing to pay for services. Patterns noted above hold across the types of co-residency: people living alone demonstrate the most willingness to pay for home medical services and routine check-ups, just as people living with spouses and/or with adult children.

Table 20. Willingness-to-Pay for HCBS, by Type of Service and Co-residency Status

Service	Alone	With spouse	With Children	With spouse & children	Other
Elder dining service	4.96%	6.84%	1.89%	8.45%	4.56%
Meal delivery	5.34%	8.24%	3.77%	7.04%	3.51%
Hairdressing	6.87%	7.93%	3.77%	9.86%	4.21%
Bathing	4.20%	5.75%	3.77%	7.04%	3.16%
House cleaning	4.20%	6.53%	1.89%	7.04%	3.51%
Assist shopping	4.20%	5.75%	1.89%	4.23%	3.16%
Assist transportation	3.82%	5.60%	1.89%	4.23%	3.16%
Routine safety check	3.82%	5.44%	1.89%	4.23%	3.16%
Emergency aid	9.54%	10.58%	4.72%	11.27%	9.82%
Home medical care	10.69%	13.06%	5.66%	14.08%	12.63%
Home nursing care	6.49%	9.80%	3.77%	8.45%	7.37%
Routine checkups	9.92%	16.80%	14.15%	18.31%	15.79%
Health lectures	5.34%	7.93%	4.72%	8.45%	4.91%
NCD management	6.11%	8.10%	5.66%	7.04%	4.21%
Accompanying care	6.11%	7.48%	4.72%	5.63%	4.21%
Rehabilitation	4.96%	7.63%	2.83%	5.63%	5.26%
Accompanying chatting	3.44%	4.83%	0.94%	7.04%	1.75%
Recreation	3.82%	6.39%	1.89%	7.04%	2.11%

V. Key Findings and Discussion

To increase the coverage and quality of aged care services in China, an effective and sustainable public financing system needs to be established. A mix of public and private payments should be designed and implemented. This study showed that China's elderly are willing to pay for home-based care services, even though the monetary value of this willingness to pay is quite low. The most desirable services for which individuals are willing to pay are routine checkups, followed by home medical care, and then followed by emergency aid. These patterns are consistent across age and education groups as well as the presence or lack of chronic diseases and ADLs/IADLs. These and other findings below could guide further development of elderly care services and their delivery models.

- Willingness-to-pay and amount paid for home-based services are correlated with both age and education level. Younger elderly (those aged 65 to 69) are more willing to pay for services than the older elderly. At the same time, the oldest elderly (those aged 80 and above) are willing to pay the highest amount of money for services, possibly reflecting their need for more intensive care. There is also a strong positive association between willingness to pay and amount paid and education level. Possibly, because we are not measuring income directly, higher education is a proxy for higher income, in addition to measuring the true effect of education. In addition, the elasticity of willingness to pay and the amount paid with respect to education (and, possibly, income) is high.

- There is little correlation between willingness-to-pay and amount paid and the presence of

chronic diseases and/or ADL/IADLs. On average, elderly with or without diseases or functional limitations have the same willingness to pay for home-based services. However, among elderly who do have some chronic diseases and/or ADL/IADLs, there is some positive association between willingness-to-pay and the number of diseases and/or degree of functional limitation. The correlation between willingness-to-pay and the number of diseases is linear and positive, while the relationship between willingness-to-pay and the number of ADL/IADLs is concave. The presence of chronic diseases and/or functional limitations does not seem to be correlated with the amount of money that the elderly are willing to pay.

- The most desirable services for which individuals are willing to pay are routine checkups, followed by home medical care, and then followed by emergency aid. These patterns are consistent across age and education groups as well as the presence or lack of chronic diseases and ADLs/IADLs.

- The mean monetary value that the elderly are willing to pay for services is 1548.4 yuan, while the median value is 1500 yuan. This figure corresponds to the 6.5 percent of average (and 6.3 percent of median) disposable income per capita[9] in Anhui in 2018.

[9] See Anhui 2018 Statistic Bulletin.

References

[1] Becker GM, DeGroot MH, Marschak J (1964). "Measuring utility by a single-response sequential method". Behav Sci. 9 (3): 226–32.

[2] Breidert Christoph, Hahsler, Michael, and Reutterer (2006), "A Review of Methods for Measuring Willingness-to-Pay", Innovative Marketing, 2(4), 8–32.

[3] Huang Z, Liu Q, Meng H, Liu D, Dobbs D, Hyer K, et al. (2018) Factors associated with willingness to enter long-term care facilities among older adults in Chengdu, China. PLoS ONE 13(8): e0202225.

Annex 1: Sample characteristics

City	N	%	District/County	N	%	Street/Town	N	%	Coummunity/Village	N	%
Anqing	401	28.9%	Yingjiang District	201	14.5%	Xiaosu Street	101	7.3%	Shuangjing	52	3.7%
									Xiling	49	3.5%
						Yicheng Street	100	7.2%	Nanshui Huizu	50	3.6%
									Wuyue	50	3.6%
			Yixiu District	200	14.4%	Dalongshan Town	98	7.1%	Zongpu	53	3.8%
									Liaoyuan	45	3.2%
						Daqiao Street	102	7.3%	Bamao	50	3.6%
									Yeci	52	3.7%
Luan	407	29.3%	Jinan District	208	15.0%	Dongshi Street	105	7.6%	Jianghuai	53	3.8%
									Qilizhan	52	3.7%
						Sanliqiao Street	103	7.4%	Jinyu	52	3.7%
									Luoxingmiao	51	3.7%
			Yuan District	199	14.3%	Gulou Street	51	3.7%	Qingan	51	3.7%
						Taohuawu Street	50	3.6%	Xialongzhao	50	3.6%
						Xiaohuashan Street	98	7.1%	Heshun	48	3.5%
									Xiangzhang	50	3.6%
Suzhou	581	41.8%	Lingbi County	209	15.0%	Fengmiao Town	107	7.7%	Hongguang Village	52	3.7%
									Houzhu Village	55	4.0%
						Yangtong Town	102	7.3%	Huangjia Village	52	3.7%
									Qiumiao Village	50	3.6%
			Xiao County	171	12.3%	Huangkou Town	62	4.5%	Yangge Zhuang	9	0.6%
									Zhu Zhuang	53	3.8%
						Shengquan Town	109	7.8%	Guo Zhuang	53	3.8%
									Yuanxin Zhuang	56	4.0%
			Yongqiao District	201	14.5%	Beiguan Street	101	7.3%	Huiyuan	51	3.7%
									Jiaochang	50	3.6%
						Nanguan Street	100	7.2%	Guanyuan	50	3.6%
									Yizhong	50	3.6%