CONTENTS
Introduction
The Qingdao LTC Program
Correlates of Recipient Exits from LTC Services in the Qingdao Program
Conclusion and Policy Challenges
References

Abstract—This article documents the Qingdao Long-term Care Medical Insurance (LTCMI) program and analyzes its recipient demographics, costs of program expansion and potential drivers of costs. About 10% of the program’s clients received institutional care, while the rest received care at home or in other residential locations. More than 60% of recipients were aged 80 years and older. Analysis of exit (mostly due to mortality) patterns of clients from the Qingdao long-term care system suggests that exit rates were correlated with being older than 80 years at the time of joining, gender, types of long-term care being received (institutional or residential) and entry-level activities of daily living scores. The beneficiary recipient structure of the Qingdao LTC system suggests that under current per unit costs, expanding coverage to all would only cost about 0.1% of Gross Domestic Product in China. Such a system will not only provide frail elderly people with long-term medical care services, but also greatly relieve the pressure on hospitals caused by aging patients, and systematically distribute medical resources in the long run, thus contributing to its sustainability.

INTRODUCTION
Long-term care (LTC) policies represent the new frontier of public response to demographic change and economic development. What used to be primarily a family responsibility is now the subject of systematic policy focus. Aging populations, along with advances in medical technology, smaller families, increasing longevity and changes in the labor market are driving this shift, along with an increase in the population for whom LTC is most relevant—the “oldest old.”

While high-income economies have made some headway in developing LTC policies, in emerging economies, LTC policy remains undeveloped. But many of these countries are aging rapidly and witnessing an unprecedented scattering of families due to large-scale urbanization and regional
migration. In China, traditional models of family care are beginning to break down in the face of the world’s largest migration—from rural to urban regions—which has inevitably reduced the informal care available to older people. Already, there are some 23 million Chinese older than 80 years, and even this number is projected to rise rapidly, to 130 million by 2050.1

National policy attention is only now turning to LTC policy in China. Recent government policy documents (No. 80 of the Ministry of Human Resources and Social Security, June 2016, and No. 200 of the Ministry of Civil Affairs, July 2016) both encouraged piloting of LTC systems. Currently, most patients (young and old) are treated in hospitals, either as outpatients (where informal home support is available) or as inpatients. Medical care and LTC are completely separated.2 This is a situation reminiscent of Japan in the late twentieth century, before the introduction of its LTC insurance policy.3,4

It is standard practice in China that new policy ideas and interventions are trialed at provincial, city, or the county level before national guidelines are adopted. In anticipation of the upcoming demand for LTC, some cities and provinces in China are piloting LTC programs, of which the Qingdao LTC project is one important example. Located in Shandong Province, Qingdao is already demographically old by Chinese standards, with some 20% of its population older than 60 years. Set up in 2006, the pilot is the first of its kind in China, and represents one of the guideline models recommended by the national government in June 2016. In general, LTC insurance aims to cover clients (and their families) against the financial risk associated with experiencing a disability sufficiently severe to require continuing care, either in an institutional or in a residential location. Costs, in time and money, can be very high. In particular, long periods in institutional care can be very expensive. The nature of LTC insurance varies enormously across countries and systems.5 In Qingdao, medical expenses associated with LTC are funded by a separate public insurance fund established for this purpose, along with institutional care where that is required, analogous to, but distinct from, hospital care. Nursing care is separately supplied on a means-tested basis.

Notwithstanding the level of importance ascribed to the Qingdao system by national, regional, and local governments, a clear description of its development and current features is not available, and no comprehensive analysis of its utilization patterns or costs has been undertaken thus far. This article aims to fill this gap. LTC in China has already received some research attention.6-9 However, previous work has tended to approach LTC from only the demand side. Data from the Qingdao program, however, provide an opportunity to gain insights into supply side issues and costs. As well as documenting and contextualizing the initiative, this article exploits a unique dataset made available by the Qingdao authorities, which allows for calculation of costs and the implications of expanded coverage. This makes an exploration of factors that influence LTC system costs possible for the first time.

The article has two objectives:

1. To document the Qingdao LTC program and assess the cost implications of expanded coverage under the program; and
2. To analyze factors likely to influence LTC costs, especially the contribution of disability patterns, age, gender, activities of daily living (ADL) status and the location where care is provided under the program.

This article is unique in that it is based on an LTC program that has been implemented in China with analysis underpinned by administrative data from the program. Previous studies10,11 have relied mostly on self-reported survey data. The next section describes the LTC program of Qingdao, followed by data analysis. The final section concludes by discussing the implications of the Qingdao initiative.

THE QINGDAO LTC PROGRAM

Qingdao is the capital city of Shandong province in China, with an annual disposable income of RMB 32,885 per capita in 2015, which is above the national average (of RMB 21,966). Like the rest of China, there is considerably heterogeneity in older adult incomes in Qingdao. Former employees who receive enterprise employee pensions receive an average retirement income of RMB 31,860 per annum, while retirees who were self-employed receive less. These two groups total 600,000 people. Retired non-employee residents (about one million) received an average of only RMB 1560 in 2015.12 Irrespective of incomes, it is difficult for older adults to cover the cost of a nursing home, which typically charges between RMB 1000 and RMB 400013 per month. The Qingdao situation is typical in China, and frail older adults cannot afford institutional LTC. The central government has therefore encouraged local governments to launch pilot models to fill the gap with some public support, either by public transfers or social insurance.

Qingdao runs one of the 15 LTC programs recognized as pilot programs by the central government. The LTC program is managed by two provincial administrative government agencies: the Bureau of Human Resources and Social Security, which launched an innovative LTC Medical Insurance
policy (starting in 2006); and the Bureau of Civil Affairs, which manages personal care assistance services to communities and homes. In practice, these agencies complement each other in delivering LTC.

In China, medical care has traditionally been tied to hospitals. Usually there is no budget for medical care associated with LTC outside of a hospital setting. However, the Long-Term Care Medical Insurance (LTCMI) program permits medical care to be delivered outside a hospital environment. When the alternative is inpatient care, this results in savings on hospital accommodation costs. Where the alternative is outpatient care, medical care quality and convenience are improved, and coordination with home care support is facilitated. Insured medical services are available to all disabled, either in nursing institutions or in their own homes.

The Qingdao LTCMI was set up as part of the medical insurance program, since no local government has independent authority to establish any social insurance programs in China. It became feasible because of a surplus in the medical insurance fund. By 2012, in Shandong Province, the total medical insurance fund reserve was RMB 41.6 billion, while the total outlay in the same year was RMB 32.2 billion.12 This made it fiscally feasible to transfer premiums from those accounts to LTC insurance. This separation of funding also allowed the separation of medical long-term nursing needs from the pool of medical insurance funds, providing a standard service structure to the whole population.

Motivation

Policy makers have long been concerned about the costs of caring for older people in existing medical facilities. Data from the National Health Survey undertaken by the Ministry of Health in 2008 showed that the hospitalization rate for people aged 65 years and older was 193.6 per 1000 people, higher than the national average of 70.8 per 1000 people.13, p.192 Quite a few older people were in intensive care, often as part of palliative care. The lack of palliative care institutions and rehabilitation services put great pressure on medical insurance expenses. This was the initial motivation: to mitigate medical expenses in acute care.

To give some sense of the increasing resources devoted to medical care, hospital beds increased from 4.72 beds per 1000 people in 2010 to 6.20 per 1000 people in 2015, and doctors from 2.32 to 3.35 per 1000 people.14, p.367 Currently, most top-grade hospitals are already fully occupied, although lower-grade hospitals have lower utilization rates. Officials were concerned that in the absence of an LTC system, the rapid growth of hospital beds, together with demographic aging, would induce “social hospitalization,” such as existed in Japan.

Anticipating growing demand from an aging population, the Chinese government has been encouraging both public and private sectors to build more nursing home beds. However, most of the so-called LTC beds are simply a motel-type bed for older people who are self-sufficient. There is a shortage of nursing staff as well. The Qingdao Daily Newspaper (Mar. 4 2016) reported that Qingdao had about 40,000 nursing home beds, but only about 3000 workers. Thus, only a small proportion of LTC beds have a high-level care service capacity. The LTC facilities with high-level care services are typically heavily subsidized by the government and financed by the traditional welfare system of Civil Affairs agencies. But there are limited places and very long waiting lists for these public welfare nursing homes. Private LTC facilities are so expensive that few people can afford them. In 2014, there were 34,463 beds for LTC facilities in Qingdao, but only 21,782 residents. Qingdao had about 90,000 disabled older residents in 2015. Local officials say that the low (63%) occupancy rate in nursing homes was mainly due to a lack of medical treatment facilities and affordability. The launch of LTCMI was partly aimed at enabling existing nursing homes to deliver affordable medical care to disabled older people.

Operation of LTCMI since 2012

The LTCMI was formally established on July 1, 2012, with the publication of Qingdao Document No. 91, by the Qingdao Human Resources and Social Security Bureau. The policy defined three pillars of service: Hospital high-care (24 hours a day) in either grade 2 or grade 3 hospitals; and care directed to residential institutions or individual homes. These services are provided at prices (per unit) set by the LTCMI. In 2012, for those eligible for nominated nursing homes or home care, the unit price was RMB 60 per day per head. For those in grade 2 and grade 3 hospitals, the unit price was RMB 170 and RMB 200 per bed, respectively (these prices are much lower than the prices per day of RMB 498 and RMB 1072 per day for normal beds (non-LTC) in grade 2 and grade 3 hospitals, respectively).

In 2015, a policy change further expanded service provision. In addition to hospital, nursing home, and home care services, which were mainly providing services to urban citizens, a fourth pillar “mobile clinic care” was added to take care of disabled older people with medical needs living in rural areas.

Policy reforms in 2015 also merged unit prices for high care provided by all qualified institutions, including both
grade two and grade three hospitals, which were set at RMB 170 per day in Qingdao. The nursing home service price was increased to RMB 65 per day per head, with recipients receiving medical services at least twice a week, and with each service lasting at least one hour. Home care was charged at RMB 50 per day, with similar requirements for nursing home providers. These three service types are mainly for the Urban Employee Medical Insurance beneficiaries. By contrast, mobile clinic services are provided by community center doctors and rural clinic doctors and subsidized by the LTCMI at between RMB 800 and RMB 1600 per year per client. Co-payments for these services were set at 10% of the prices for urban Employee Medical Insurance members, and 20% for rural and urban residents who contribute to high level of Basic Medical Insurance. For other urban and rural residents who contribute to low-level Basic Medical Insurance, the co-payment is set at 40%, which only allows for access to the mobile clinic type of service.

Between 2012 and 2016, about 40,000 recipients in Qingdao received services under the LTCMI with a total expenditure of RMB 1130 million, based on data from the Shandong Bureau of Finance. This is estimated to have saved some 20 million days of hospital bed services.

Service Model and Providers
LTCMI was designed to deliver medical services outside a hospital environment, redistributing health resources and utilization from top- to lower-grade hospitals/clinics. By the end of 2016, under the LTCMI policy, about 500 urban institutions had acquired qualifications to provide services to LTCMI recipients. Among them, 47 institutions, including nursing homes, are now qualified to provide high care services. Seventeen institutions provide special care to totally disabled recipients who need medical support to maintain life.

The four types of services covered by the LTCMI target four different groups of people in need. Hospital special care provides the necessary services to totally disabled people with high medical needs, with providers being mainly grade 2 and grade 3 hospitals. Lower grade hospitals are encouraged to transform their normal hospital beds into geriatric wards. By 2016, about 18 public hospitals had set up or transformed their operations to focus on geriatric services.

Nursing home care mainly focuses on hospice care; providers are special medical institutions for care of the elderly. By 2015, 71 nursing institutions were qualified to provide this type of service. Major hospitals can also establish partnerships with nursing homes and provide priority to older people with an emergency in addition to sending doctors to nursing homes or institutions to train the doctors and nurses there.

For home care and mobile clinics, community health centers are the major service providers. Institutions or clinics with General Practice (GP) doctors sign contracts with LTCMI institutions, and provide care accordingly. About 4000 community centers, including village clinics, are now extending their services to homes in rural or near-rural areas. Rural doctors provide services to disabled rural patients at their homes. Without LTCMI, most of the rural disabled could not afford to receive medical services regularly, and rural doctors would not get paid fairly to visit home patients.

In practice, the LTCMI agency signs a contract with service providers based on the number of clients who are approved by the assessment body. The LTCMI does not sign contracts with any individual. The service providers have discretion to adjust service provision in light of changing circumstances. Individuals pay only the specified co-payment.

Most Chinese patients prefer to go directly to the top-grade hospitals and emergency units when they become ill. In this context, LTCMI enables medical resources concentrated in top-grade hospitals to be reallocated to lower level hospitals, or other qualified institutions, at much lower cost to the Basic Medical Insurance system. It also enables primary level medical service providers (i.e., GPs at community centers and rural clinics) to provide more services, increasing efficiency in resource use.

Source of Funds and Fund Management
LTCMI is a city-level pooling insurance system, and it has two separate accounting systems: one for Urban Employment Medical Insurance members, and one for Rural and Urban Resident Basic Medical Insurance members. Before 2014, LTCMI fund sources included contributions from both medical insurance funds and fiscal transfers.

At the end of 2014, Qingdao Municipal Order No. 235 was issued, valid for five years, and changed the funding structure to rely solely on Basic Medical Insurance premiums. The order stipulated that up to 20% of the accumulated Qingdao Employee Basic Medical Insurance fund balance, about RMB 1980 million, be transferred to the LTCMI account. Every year, all Urban Employee Medical Insurance members, comprising about 3.85 million people, transfer 0.5% of their individual account premium, a quarter of their 2% individual account contribution, into the LTCMI account. This annual transfer totaled about RMB 500 million in 2015. Rural and urban residents, comprising about 4.92 million people, pay 10% of their
total medical contribution into the LTCMI account, a total of about RMB 300 million.\textsuperscript{15}

In 2015, through tender, the LTCMI introduced two insurance companies to manage the funds. The Qingdao branch of the PICC Health Insurance Company Limited manages the fund for the Employee Medical Insurance account, and China Life Qingdao manages the remaining funds, supporting rural and urban residents. Evaluation for service eligibility has been transferred to the insurance companies as independent certification institutions.

**Eligibility**

The LTCMI covers all members who join the Employee Medical Insurance system as well as rural and urban residents with Basic Medical Insurance. Members experiencing functional disability due to aging, disease, and disability can apply for institutional/hospital care or at-home care.

Scores are allocated to ten ADLs, with a maximum total score of 100, for evaluation of eligibility for LTC. These questions are the same as the Barthel Index ADLs.\textsuperscript{16} Lower scores indicate greater disability. Most eligible beneficiaries have ADLs of less than 55, in combination with some chronic disease or other medical conditions.

**Full Coverage LTCMI Cost Estimation**

In theory, the Qingdao LTCMI system covers the entire population of nine million in the city of Qingdao, although in practice service delivery is less than complete. What are the cost implications of coverage expanding to 100% of needy individuals? Local government officials estimate, based on distribution of ADL scores, that approximately 90,000 individuals would be eligible for LTCMI coverage in Qingdao. Table 1 reports our estimates of the total cost to the LTCMI system and household out of pocket spending of providing LTC services to these 90,000 individuals at current unit prices.

Annual LTCMI outlay is estimated to be RMB 762 million under full coverage at current unit prices. If this model were applicable to and extended to all of China, the resulting costs would amount to no more than 0.1% of its Gross Domestic Product.

The Qingdao government reported that in 2016, the cost of the institutional, residential, and nursing home care was about RMB 300 million, with an additional RMB 20 million for services provided via mobile clinics. Because the actual LTCMI expenditures are considerably less than the estimates reported in Table 1, the Qingdao LTCMI system appears to be falling considerably short of full-coverage.

**Social LTC Assistant Program**

The LTCMI system is complemented by a social care program administered by the city’s Bureau of Civil Affairs. The program is implemented at the district level (there are 10 districts in Qingdao City). In contrast to medical services, which are, in principle, available to all, support for social care is strictly means-tested, with both household financial resources and the family situation being considered.

Qingdao now provides 45 to 60 hours of home services per month to 7788 frail older people with no family support and poor financial status. The local government has also established 1244 “day care centers” and 236 community canteens which supply meals to 5000 older adults.\textsuperscript{[c]}

The current LTCMI does not cover elderly with dementia, unless they are ADL-qualified.\textsuperscript{17,18} The unmet needs that result are partly addressed by a day care center arrangement. The Qingdao Government subsidizes each day care center with RMB 50,000–100,000 as an initial operational fund. Some 30 pilot centers were chosen to

| Service          | Beneficiaries (000s) | Total Cost (millions) | OOP (millions) | LTCMI cost (millions) |
|------------------|----------------------|-----------------------|----------------|-----------------------|
| Institution (10%)| 9                    | 558                   | 112            | 447                   |
| Nursing Home (20%)| 18                   | 142                   | 28             | 114                   |
| Home Care (40%)  | 36                   | 219                   | 44             | 175                   |
| Mobile Clinic (30%)| 27                   | 32                    | 6              | 26                    |
| Total            | 90                   | \textbf{952}          | \textbf{190}   | \textbf{762}          |

\textbf{TABLE 1.} Estimates of the Costs of the Qingdao LTCMI Program Under Full Coverage (90,000 Recipients) (in RMB). Note: The allocation of beneficiaries across service types is based on the number in Annex 1, indicating about 10% of the recipients with ADLs = 0, needing institutional care; 19% of individuals with ADLs 5–15 needing nursing home care. This allocation provides full coverage for totally-disabled individuals. Out-of-pocket payments are assumed to be 20% for all service types and for all recipients, with different categories of eligible individuals being required to pay between 10% and 40% for various services; both nursing home and home care patients are assumed to receive care once every three days.
provide specialist services, and were granted some additional funding. For example, one of these facilities, the “Licang Memory Day Care Center,” which is operated by a private enterprise, provides care for more than 30 semi-disabled or totally disabled older adults with dementia. The recipients can choose day care, boarding care, or respite care services, and the local government spends RMB 250,000 to purchase the center’s services annually, based on the current service volume. These pilot centers were set up to encourage institutions to provide services to the more disabled older adults locally.

Further, a cash subsidy is available to the oldest old, regardless of disability status. The amount of subsidy varies from district to district. In Laoshan District, for example, every older adult between the ages of 80 and 89 years receives RMB 120 per month, increasing to RMB 220 per month for those in their nineties, and to RMB 800 per month for people aged 100 years or more. 

CORRELATES OF RECIPIENT EXITS FROM LTC SERVICES IN THE QINGDAO PROGRAM

Because the LTCMI program is still in its early phases, its coverage and costs will likely rise in future years. This section examines some of the factors that will likely influence the trajectory of program costs in the years to come.

Members’ mortality patterns, services received, and unit prices for service are essential to understanding the expenditure patterns of LTCMI. Current service items and prices are determined by local government agencies, based on their investigations and experience. What is unpredictable, therefore, is the mortality (or exit) rate of the program members. The analysis in this section is intended to serve as a guide to future drivers of cost, taking current unit service prices as fixed.

Our analysis is based on data from the beginning of the implementation of the policy in July 2012 through April 2014. The data comprise 23,828 individual observations, covering the entire client activity of the Qingdao LTCMI from July 2012 through 15 April 2014. In this period, 4454 individuals exited the system; officials confirm that in almost all cases, this indicated death.

The data include information on age, sex, ADLs at the time of entry into the program and days spent by each recipient in the system. We classified recipients into different ADL groups. Although some previous literature suggests that ADL scores in the range of 0–20 scores ought to be catalogued as “total” dependency and 21–60 as “severe dependence,” we group recipients differently by ADL scores, accounting for current LTCMI demographic characteristics. We categorize diseases into four groups (heart, cerebral, diabetes, and hypertension), along with a residual “others” category. General statistics are reported in Annex 1.

About 61% of the LTCMI recipients were female and 62% were aged 80 years and older. About 10% received institutional care while the rest received home care services. Of all disease types among recipients, about 36% were related to stroke. About 72% had ADLs equal to or less than 35 points (severely disabled), and about 10% have a zero score (totally disabled).

Logit Regression Analysis

We used a logit regression model to examine the factors associated with exits within 12 months (mortality) following admittance into the LTCMI program. The dependent variable in the model took the value 1 if the recipient exited (died) within 12 months of admission, and 0 if he or she remained in the program at the completion of 12 months (this was the usual length of the LTC contract). The explanatory variables included age, sex, ADL scores at the time of admission into the program, types of service received, and disease recorded. Table 2 reports the results, with the coefficient estimates reported as odd-ratios.

The exit probabilities are positively associated with age, but are only significant for the oldest old (80 years and older). Compared to females, the odds of males exiting the system (dying) were 47% higher; and compared to recipients with ADLs equal to zero, those with ADL scores in the range 5–15 had odds of exiting that were 30% lower, and those with ADL scores of 20 or more (less disabled) had odds that were 60% lower. Moreover, compared to LTCMI recipients in the institutional care group, individuals receiving services at home were less likely to exit.

As a check on our analysis, we noted that the Qingdao Bureau of Statistics Year Book 2010 reported the total death rate for the population aged 60 years and older as 3.3% in 2010. The LTCMI system exit rate (a proxy of death rate) for program service recipients in the same age group was about 23%, about seven times that of the general population in this age-group. This difference is due not only to differences in health status, but also to difference in the age-composition of the two populations (there are more people aged 80 years and older in the LTCMI system). Incidentally, the general population mortality rate among individuals aged 90 years and older is 22%, which is close to the exit rate among LTCMI service recipients.

Our analysis points to some straightforward implications for the likely costs incurred by the Qingdao LTCMI. First, because age is correlated with mortality after age 80 years for LTCMI members, the average age of LTCMI recipients...
will influence system costs. For instance, individual costs might be lower with higher mortality rates, or more program recipients will be possible under the same cost, all else unchanged. Introduction of age-based restrictions for entry into the program (entry restricted to higher ages) may therefore help curb program costs. Second, ADL scores at the time of admission into LTCMI are a key correlate of exit rates, followed by recipients’ gender and types of services receive. Using different criteria standards based on ADLs and gender could generate different scenarios of LTC system cost by influencing the exit rates and the number of people entering the program. At the same time, higher survival rates associated with improved medical services may increase the costs of the LTCMI system.

CONCLUSION AND POLICY CHALLENGES

LTC has been characterized as the new frontier of public policy related to aging. Emerging economies, with rapid aging, families scattered by internal labor migration and nascent social protection systems are especially vulnerable to shortfalls in LTC provision as population aging progresses.

This article documents and provides an initial analysis of a pilot LTC program in China, based in the city of Qingdao, consisting of some nine million people, covering both urban and rural districts. Qingdao has initiated a policy that targets disabled people who need LTC with medical conditions, and is integrated with social care services through a means-tested system. The program enables disabled older adults to receive health care and some social care at home or at their residential places at affordable cost, which greatly improves convenience.

A key future challenge is to improve equality in services provided under LTCMI to different sub-groups of beneficiaries. Currently, the Employee Medical Insurance members and the rural and urban resident members have two separate accounts. The former receives more comprehensive benefits and face only a 10% copayment. The latter, who are poorer, have limited access to institutional high care, and face a 20% or 40% copayment. Whether the two accounts could directly be merged into one to provide universal benefit to all residents is not obvious, but there may be an opportunity for added subsidies for the less well-off groups.

Another challenge is to integrate different systems run by different government agencies to provide support to frail, older individuals. Currently, LTCMI is mainly managed by the Health Bureau and the Social Security Bureau, while the Bureau of Civil Affairs administers social care. Another agency—the Disabled People’s Committee—also supports disabled people, including older individuals, in various ways. LTC support to older adults could potentially be

| Odds Ratio | Std. Err. | z     | P > z | [95% Conf. Interval] |
|------------|-----------|-------|-------|---------------------|
| ADLs group (base: ADLs = 0) |
| 5–15       | 0.6946    | 0.0588| -4.300| 0.0000              | 0.5883 0.8200 |
| 20–35      | 0.4152    | 0.0334| -10.930| 0.0000              | 0.3547 0.4861 |
| 40+        | 0.3920    | 0.0353| -10.390| 0.0000              | 0.3285 0.4678 |
| Age group (base: < age 60) |
| 60–69      | 1.1362    | 0.1724| 0.8400| 0.4000              | 0.8439 1.5298 |
| 70–79      | 1.1273    | 0.1474| 0.9200| 0.3590              | 0.8725 1.4566 |
| 80–89      | 1.3495    | 0.1698| 2.3800| 0.0170              | 1.0545 1.7271 |
| 90+        | 1.9753    | 0.2723| 4.9400| 0.0000              | 1.5075 2.5882 |
| Gender (base: female) |
| heart      | 0.7580    | 0.0676| -3.1100| 0.0000              | 0.6365 0.9028 |
| cerebral   | 0.6538    | 0.0463| -6.0000| 0.0000              | 0.5691 0.7512 |
| diabetes   | 0.5635    | 0.2017| -1.6000| 0.1090              | 0.2794 1.1364 |
| hypertension | 0.5879 | 0.0565| -5.5300| 0.0000              | 0.4870 0.7097 |
| comorbidity | 0.6698 | 0.0807| -3.3300| 0.0010              | 0.5288 0.8482 |
| Service type (base: institution) |
| 0.7526    | 0.0511    | -4.1800| 0.0000| 0.6588 0.8598 |
| 0.5673    | 0.1138    | -2.8300| 0.0050| 0.3830 0.8404 |

TABLE 2. Logit Regression Model Results for 12-Month Exit Patterns Among Members Admitted During the First 6 Months of the Qingdao LTCMI Program. Source: Authors’ estimates using administrative data from the Qingdao LTCMI program
more efficient if one government body administered all services.

With rapid growth in the numbers of “oldest old” that is forecast, models for effective provision of LTC are critically needed in China. This article reports the case of one pilot program, but the results look promising. If further assessment suggests that the Qingdao LTCMI program delivers increased and more equal coverage along with efficiency gains, this could be a useful model to emulate elsewhere in China.

DISCLOSURE OF POTENTIAL CONFLICTS OF INTEREST

No potential conflicts of interest.

FUNDING

The project is supported by the ARC Centre of Excellence in Population Ageing Research (CEPAR), ARC grant number CE11E0099 and ARC Grant LP150100347 in Australia. This research is also supported by a Major Project of the National Nature Science Foundation of China (grant number 71490733).

REFERENCES

[1] Lu, B, He W, Piggott J. Should China Introduce a Social Pension? J Econ Aging 2014; 4:76-87
[2] World Bank. Living long and prosper: aging in East Asia and Pacific. Washington, DC: World Bank East Asia and Pacifica Regional Report, International Bank for Reconstruction and Development / The World Bank; 2016
[3] Matsuda S, Yamamoto M. Long-term care insurance and integrated care for the aged in Japan. Int J Int Care 2001; 1(3):1-11.
[4] Mitchell, OS, Piggott J. Aged-care support in Japan: perspectives and challenges. NBER Working Paper Series 10882. 2004. Available at http://www.nber.org/papers/w10882.pdf
[5] Chomic R, Maclennan M. Aged care in Australia: part I—policy, demand and funding. Cepar Research Brief, 2014/01. Available at http://www.cepar.edu.au/media/127442/aged_care_in_australia_--part_1_--web_version_fin.pdf (accessed June 15, 2017)
[6] Ma J, Zhu ML, Xiao MZ, Song ZJ. China health expenditure and estimation of fiscal pressure. In: China national balance account studies. Beijing: Social Science Publishing House; 2012.
[7] Zhu ML, Jia QX. The analysis of demand for long term care and its insurance system constructing in China. Chinese Journal of Health Policy 2009; 2(7):32-38.
[8] Gu D, Dupre M, Sautter J, Zhu H, Liu YZ, Zeng Y. Frailty and mortality among Chinese at advanced ages. Journal of Gerontology: Social Sciences 2009; 64B(2):279-289
[9] Jin T. Long term care insurance: a very competitive insurance product in future China (长期护理保险: 中国未来极富竞争力的险种). Beijing: China Foreign Economics and Trade University Publishing House; 2006.
[10] Stineman MG, Xie D, Dan Q, Kurichi JE, Zhang Z, Saliba D, Henry-Sanchez JT, Streim J. All-cause, 1-, 5-, and 10-year mortality in elderly people according to activities of daily living stage. J Am Geriatr Soc 2012; 60(3):485-492.
[11] Feng Q, Hoenig HM, Gu D, Zeng Y, Purser JL. Effect of new disability subtype on 3-year mortality in Chinese older adults. J Am Geriat Soc 2010; 58(10):1952-1958.
[12] Bureau of Statistics. China statistic year book. Beijing: China Statistic Publishing House; 2013.
[13] Bureau of Statistics, China. Health statistics year book. Beijing: China Statistic Publishing House; 2012
[14] Qingdao Statistics Bureau. Qingdao year statistic book. Beijing: China Statistic Publishing House; 2015.
[15] Shandong Bureau of Finance Office. Shandong Qingdao established long term medical insurance system (in Chinese). 2017. Available at http://www.mof.gov.cn/xinwenlianzuo/shandongcaizhengxinxilianbo/201612/t20161201_2471088.htm (accessed June 15, 2017)
[16] Wade DT, Collin C. The Barthel ADL Index: a standard measure of physical disability? Int Disabil Stud 1988; 10(2):64-67
[17] Kane RL, Salsow MG, Brandude T. Using ADLs to establish eligibility for long-term care among the cognitively impaired. Gerontologist 1991; 31(1):60-66
[18] William J, Lyons B, Rowland D. Unmet long-term care needs of elderly people in the community; a review of the literature. Home Health Care Serv Q 1997; 16(1–2):93-119
[19] Lewis C, Shaw K. The (Original) Barthel Index of ADLs. Geriatrics 2008; 17(21):8. Available at http://rehab-insider.advanceweb.com/the-original-barthel-index-of-adls/
Annex 1. General Statistics of Qingdao LTCMI Data from July 2012 to March 2014, by ADL Groups. Source: Authors’ estimates, based on administrative data from the Qingdao LTCMI program.

| ADLs Groups | 0       | 5–15    | 20–35   | 40+     | All   |
|-------------|---------|---------|---------|---------|-------|
| All Recipients | 10%      | 19%     | 44%     | 28%     | 5%   |
| Age Categories | 170      | 235     | 478     | 398     | 5%   |
| Age <60 | 60–69 | 175   | 315     | 835     | 701   | 9%   |
| 70–79 | 473    | 933    | 2,464   | 1,826   | 24%  |
| 80–89 | 1,029  | 2,097  | 5,047   | 3,055   | 47%  |
| 90+ | 443    | 861    | 1,595   | 694     | 15%  |
| Gender | Male | 37% | 40%     | 38%     | 39%   | 39%  |
|         | Female | 63% | 60%     | 62%     | 61%   | 61%  |
| Institutional Care | 529 | 600 | 837 | 452 | 10% |
| Home Care | 1,761 | 3,841 | 9,582 | 6,222 | 90% |
| Disease Types | Hypertension | 439 | 1,050 | 3,087 | 2,223 | 29% |
|               | Heart | 298 | 750 | 2,242 | 1,777 | 21% |
|               | Cerebral | 1,197 | 2,000 | 3,666 | 1,830 | 36% |
|               | Diabetes | 154 | 265 | 776 | 626 | 8% |
|               | Others | 286 | 625 | 1,219 | 822 | 12% |
| Total Recipients | 2,290 | 4,441 | 10,419 | 6,674 | 23,824 |