

人生最期 5 年における介護保険サービス費の軌跡
—全国介護レセプトを用いて—

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研究要旨

介護保険サービスの利用は人生最期に多く利用しているが、介護保険サービス費（以下：介護費）の軌跡に関するエビデンスは乏しい。本研究では、人生最後の 5 年における介護費の軌跡を分析することを目的とした。結果、以下の 4 つの軌跡が現れた。1）一貫して低い(58.5%) 2）最期 1 年から増加する(9.8%) 3）継続増加した後減少する（8.8%） 4）一貫して高い（22.9%）。また、全介護費の 8 割は一貫して高い群が消費したことが分かった。本研究の結果は、介護費の削減に関する政策を立てる際には、一貫して高い群に着目した方が効率的であることを示した。

A. 研究目的

Our study employed national data by linking Vital Statistics and LTCI claims that cover the entire population of citizens aged ≥ 70 who died in 2017. The aim of this study was to identify distinct trajectories of LTC expenditure in the last five years of life and to examine whether these distinct trajectories vary according to cause of death.

B. 研究方法

Data and study population

The death certificate data from a survey of vital statistics in Japan were used to

obtain data for decedents who had died in 2017. To ensure that all decedents were eligible for LTC coverage during the five years of the follow-up period (i.e. ≥ 65 years in 2012), decedents who were aged ≥ 70 years at death were included, as LTCI services are offered in Japan to those aged 65 and older. Among decedents, we identified LTC beneficiaries by probabilistically linking with LTCI claims using a set of identifiers: sex, birth month/year, date of death (ineligibility date in LTC claims), and the municipality of residence. Notably, the claims cover all LTC beneficiaries in Japan and provide

detailed information on types of LTC services, the amount of care granted, and the associated payments. Finally, 1,124,335 decedents who were aged ≥ 70 years and had died in 2017 were included in data analyses.

(倫理面への配慮)

本研究で用いるデータは、筆者らが受領する以前に個人を特定できる情報は削除されており、個人情報保護されている。また本研究は筑波大学医学医療系倫理委員会の承認（承認日：2018年10月19日、承認番号：1324）を得て実施した。

Outcome

Monthly LTC expenditure for decedents who satisfied the inclusion criteria was expressed in Japanese thousand yen (equivalent to 9.5 US dollars on 30th July 30, 2020).¹

Leading Causes of death

The leading cause of death was obtained from the death certificate data based on the underlying cause of death and was defined according to the International Classification of Disease, 10th edition (ICD-10): cancer C00-C97; heart disease I01-I02, I05-I09, I20-I25, I27, I30-I5; cerebrovascular disease I60-I69, pneumonia J12-18, age-related physical debility R54.^{2,3} These selected diseases are listed as the top 5 leading causes of death among older people in Japan, according to the Ministry of Health Labor and Welfare, Japan.³ We added dementia and Alzheimer disease (ICD-10 code: F01-F03, G30) given that Alzheimer's disease has been a leading causes of death in the UK⁴ and among top 6 of leading causes in the US since 2015.²

Statistical analysis

A group-based trajectory model was used to categorize distinct trajectories of LTC expenditure in the last five years of life.^{5,6} Because LTC expenditure data were highly skewed, we employed a natural logarithm to normalize expenditure data.⁷ The Bayesian information criterion and average posterior probability value were used to select the number of trajectory group and the functional form of trajectory models (linear, quadratic or cubic). Each trajectory group was required to include at least 5% of participants. Subsequently, we conducted a descriptive analysis to review the distribution of decedents' characteristics by distinct trajectories. We further used multinomial logistic regression to investigate if spending trajectories vary by causes of death. Data management and analyses were performed using Stata, Version 15 (StataCorp, College Station, TX).

C. 研究結果

LTC expenditure trajectories among LTC services users

Among 1,124,335 decedents, four distinct trajectories of LTC expenditure in the last five years of life were identified: persistently low, late increase, progressive increase then late decrease, and persistently high (Figure 1). More than half of decedents (58.5%) had a persistently low expenditure over the last five years of life. Approximately 9.8% of decedents showed a late increase trajectory where LTC expenditure was very low up to two years before death and then increased dramatically. The progressive increase then late decrease trajectory (8.8% of decedents) exhibited a steady increase of

LTC expenditure with a peak at 1.5 years before death and a decrease until the end of life. Lastly, 22.9 percent of decedents had a persistently high LTC expenditure throughout the entire five years before death.

There was a considerable difference in total LTC expenditure in the last five years of life across the distinct trajectories (Figure 2). The mean total expenditure was highest among decedents in the persistent high trajectory group (11286 thousand yen), followed by progressive increase then late decrease spenders (5070 thousand yen). For late increase spenders the LTC expenditure increased rapidly in the last two years of life, the total expenditure (1663 thousand yen) was 7.1% of persistently high spenders. More than half of persistently low spenders did not use LTC services (median expenditure is 0).

D. 考察

In this nationwide longitudinal study, we identified four distinct trajectories of LTC expenditure in the last five years of life and demonstrated that these trajectories varied according to leading causes of death. More than 80% of total LTC expenditure in the last five years of life was spent by decedents with a persistently high LTC expenditure trajectory (22.9% of decedents). Moreover, deaths due to dementia and age-related physical debility were associated with the persistently high spenders.

Our findings indicate that a five-year follow-up is more appropriate for assessment of the peak period of LTC expenditure compared to the last twelve months of life. Given that it is well-

known that health expenditure skyrockets during the year of death, LTC expenditure in only the last year of life was analyzed as a part of health care expenditure in previous studies.¹²⁻¹⁴ However, we observed that the peak period of LTC expenditure differed across the four distinct trajectories and approximately 31.7% of decedents (i.e., Persistently high spender and progressive increase then late decrease spenders) exhibited steadily decreased LTC expenditure in the last year of life. Furthermore, we identified that LTC expenditure begins to increase at approximately four and half a years before death for progressive increase then late decrease spenders. Hence, when allocating budgetary resources for LTC, a long-term view of 5 years is more appropriate than shorter timelines.

The LTC expenditure in the last five years of life differed considerably among the four distinct trajectories. Although only 22.9% of decedents had a presently high LTC expenditure trajectory, 80.7% of the total LTC expenditure was spent by this group. To be specific, the average LTC expenditure of persistently high spenders was more than twice than the progressive increase then late decrease spenders and fourteen times higher than late increase spenders. An indicator of the financial protection named catastrophic health expenditure, represents that out-of-pocket payments on health during the past 12 months were more than 10% of their total income.⁸ The persistently high spenders are more likely to experience a high burden of LTC cost because the percentage of the out-of-pocket payment for LTC in

income was approximately 15.1%. This was calculated by dividing average annual out-of-pocket payment (sum of copayments and premium) on LTC for persistently high spenders by average annual income per household member with persons aged ≥ 65 years in 2016 (i.e., (11286 thousand JPY /5years*10%copayment+66 thousand JPY)/1928 thousand JPY⁹).

3. その他
なし

E. 結論

This study identified four distinct LTC expenditure trajectories in the last five years of life among older people in Japan. More than 80% of LTC expenditure was spent by persistently high spenders (22.9% of total decedents). Ongoing discussions of budget allocation and reducing LTC expenditure should focus on persistently high spenders (i.e., Those with persistently high LTC expenditure throughout the last five years of life). Furthermore, age-related physical debility and dementia were drivers for persistently high LTC expenditure. Therefore, budget allocation for LTC at the end of life should be combined with data on health conditions.

F. 研究発表

1. 論文発表
なし
2. 学会発表
なし

G. 知的財産権の出願・登録状況（予定を含む）

1. 特許取得
なし
2. 実用新案登録
なし

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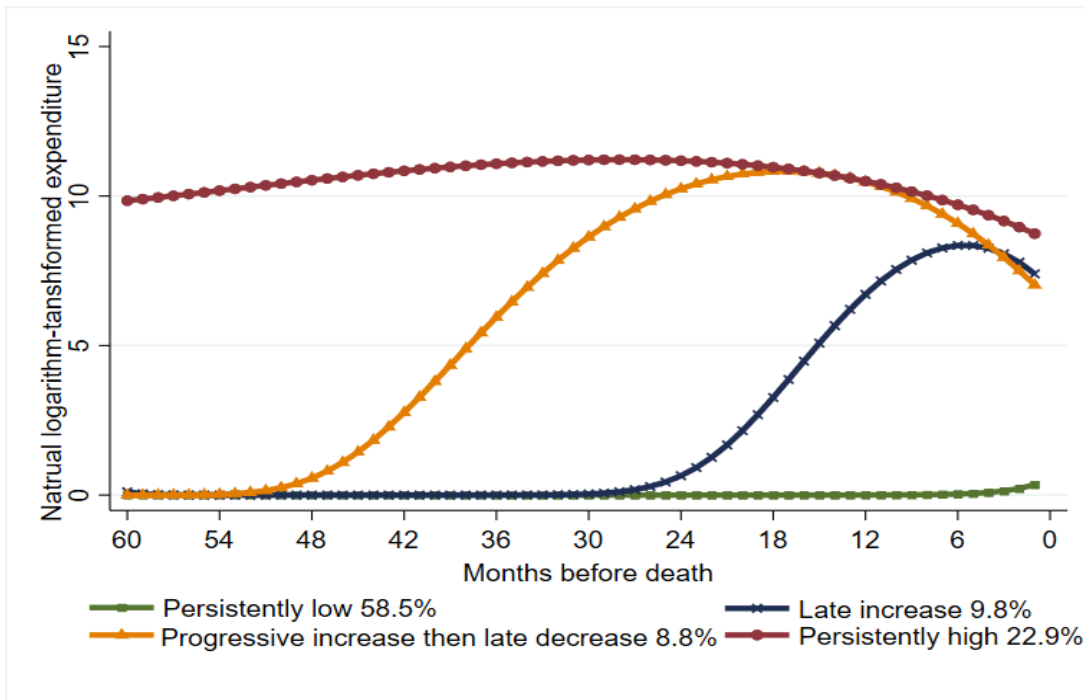


Figure 1. Trajectories of LTC expenditure in the last five years of life.

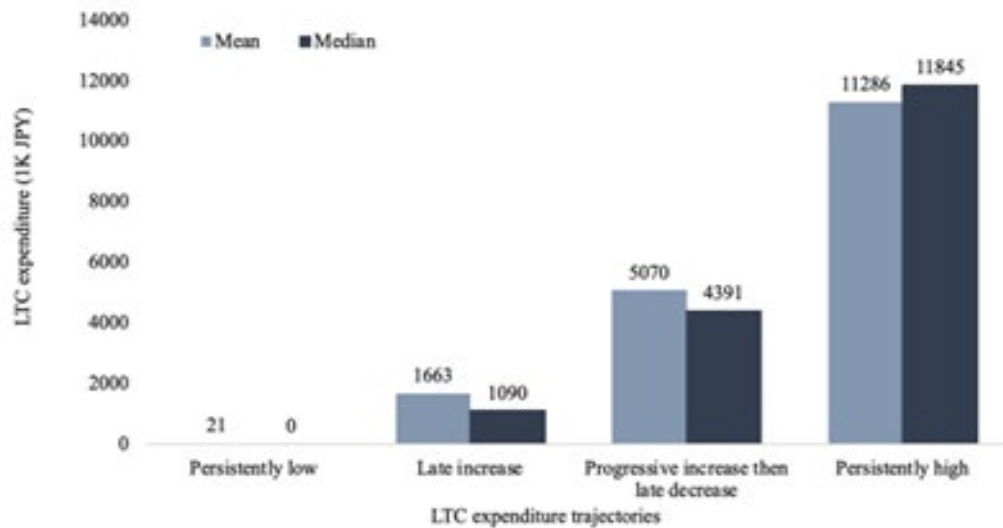


Figure 2. Mean and median total LTC expenditure in the last five years of life according to distinct trajectories.