A simulation study to shorten a long-term care period and to reduce national medical care expenditure in Japan

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We aimed to explore a target to shorten a period for long-term care defined by a difference between life expectancy and healthy life expectancy (long-term care period) while reducing national medical care expenditure in Japan. We constructed a system dynamics model with two aging chains of independent and dependent people aged 65 years or older separately by sex. Parameters were calibrated using reference data obtained from official statistics on population, the numbers of deaths, the number of dependent people and the medical care expenditure in 2005, 2010 and 2015. Life expectancy, healthy life expectancy and national medical care expenditure were projected to 2030 by four scenarios: 1) status quo, 2) reducing the transition rates from the independent to dependent state by 20% from 2015 to 2030, 3) reducing death rates by 20% from 2015 to 2030, and 4) a combination of 2) and 3). It was projected that long-term care period at age 65 would be the shortest in Scenario 2 and that medical care expenditure would be lower in Scenarios 1 and 2. In conclusion, transition rates from the independent to dependent state should be lowered to shorten long-term care period while suppressing the increase in medical care expenditure. Future studies should incorporate stocks of working populations and cost of long-term care to examine sustainability of social security of Japan.
Figure 1. Basic model structure

Scenario 1: Status quo,
Scenario 2: Reduction of the transition rates from independent to dependent state by 20% from 2015 to 2030,
Scenario 3: Reduction of the death rates by 20% from 2015 to 2030, and
Scenario 4: A combination of Scenario 2 and Scenario 3

Figure 2. Change of long-term care period at age 65 by scenario

Scenario 1: Status quo,
Scenario 2: Reduction of the transition rates from independent to dependent state by 20% from 2015 to 2030,
Scenario 3: Reduction of the death rates by 20% from 2015 to 2030, and
Scenario 4: A combination of Scenario 2 and Scenario 3

Figure 3. Change of national medical expenditure at ages 65 years or older by scenario

Scenario 1: Status quo,
Scenario 2: Reduction of the transition rates from independent to dependent state by 20% from 2015 to 2030,
Scenario 3: Reduction of the death rates by 20% from 2015 to 2030, and
Scenario 4: A combination of Scenario 2 and Scenario 3
References


