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## Original Study

# Regional Supply of Nursing Home and Hospital Beds Determine Discharge Destination of Nursing Home Residents in Japan



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## A B S T R A C T

**Keywords:**

End-of-life care  
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**Objectives:** Japanese special nursing homes provide permanent residence to elderly people under the public long-term care insurance program. However, a quarter of discharges occur via death in hospital, and a fifth occur via admission to hospital. The objective was to identify factors associated with discharge destinations for residents of Japanese special nursing homes.

**Design:** A retrospective design for data collected in 2007, 2010, and 2013.

**Setting:** We used data from the Survey of Institutions and Establishments for Long-Term Care, which is a nationally representative cross-sectional survey that assessed discharge from special nursing homes in September every 3 years.

**Participants:** There were 2426 discharged residents included in the analysis.

**Measurements:** Discharge destination was categorized as death at facility, death in hospital, hospital admission, and another care setting. Multivariate multinomial logistic regression analysis was conducted with discharge destination as the dependent variable.

**Results:** Of the 2426 discharged residents included in the analysis, 874 (36.0%) were deceased at the facility, 773 (31.9%) were deceased in hospital, 652 (26.9%) were admitted to hospital, and 127 (5.2%) were admitted to another care setting. Residents of facilities in the regions with fewer nursing home beds or more hospital beds were more likely to be discharged via admittance to hospital or another care setting relative to being deceased at the facility.

**Conclusion:** The regional supply of nursing home and hospital beds could have affected end-of-life care locations for residents of special nursing homes. To promote end-of-life care in special nursing homes, regional supply of nursing home beds should be reinforced while controlling oversupply of hospital beds.

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The aging population has increased substantially in several countries, and end-of-life care for the elderly is a major challenge.<sup>1</sup> Nursing homes play an important role in providing end-of-life care for most frail elderly.<sup>2</sup> However, hospital transfer occurs when residents are young,<sup>3</sup> die because of pneumonia,<sup>3</sup> or reside in nursing homes in regions with higher numbers of acute hospital beds and fewer general practitioners.<sup>4</sup> Transferring dying residents to a hospital is associated with burdensome interventions and poor quality of life.<sup>5</sup>

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There has been an unprecedented increase in Japan's aging population. The elderly population reached 23% of the total population in 2010 and is expected to increase to 40% by 2060.<sup>6</sup> In 2000, the national government introduced the mandatory public long-term care insurance (LTCI) program for the elderly, which covers facility-, home-, and community-based care. Special nursing homes (SNHs), which accommodate stable individuals who require regular nursing care, are the only facilities offering permanent residence via the LTCI program.<sup>7</sup> The number of elderly people in permanent nursing homes per population in Japan is smaller (15 per 1000 elderly population in 2013)<sup>8</sup> relative to that in the United States (26 per 1000 in 2012).<sup>9</sup> Because of limited supply, there are long waiting lists for SNH placement. In March 2014, the Ministry of Health, Labor and Welfare (MHLW) reported that waiting lists included 523,584 elderly people.<sup>10</sup> Furthermore, SNHs provide less health care relative to other facilities,<sup>11</sup> because SNH management is restricted to local government and social welfare corporations. Therefore, dying nursing home residents are

frequently transferred to hospital.<sup>12</sup> Further, 26% of national SNH discharges occur via death in hospital (1494 of 5741 discharges in September 2013).<sup>13</sup>

In addition to transferring dying residents to hospital, 21.6% of SNH discharges occur via hospital admission (1241 of 5741),<sup>13</sup> whereby discharged residents have no prospect of returning to the home and receive end-of-life care in hospital. Hospital admission from Japanese nursing homes is more frequent relative to that in Western countries, such as Australia (1.5% in 2013).<sup>14</sup> However, no studies have examined factors associated with SNH discharge destinations including hospital.

This study aimed to identify factors associated with Japanese SNH residents' discharge destinations.

## Methods

### Design

We used data from the Survey of Institutions and Establishments for Long-Term Care (SIEL), a nationally representative cross-sectional survey of public LTCI services. A detailed description of the SIEL<sup>15–17</sup> and some SIEL data regarding SNH discharge were reported previously.<sup>17</sup> The SIEL, conducted by the MHLW, consists of facility and resident surveys conducted each October and every third September, respectively, to assess individuals who receive home-based nursing care or are discharged from, or reside in, LTCI facilities, which consist of SNHs, geriatric intermediate care facilities, and long-term medical care sanatoriums. With permission from the MHLW, we used discharge data from 2007, 2010, and 2013, because treatment information was not included in the 2000 and 2003 surveys. Since 2009, a private company has implemented the SIEL; therefore, response rates vary according to assessment year and type of LTCI facility: 100.0% in 2007, 91.4% in 2010, and 91.9% in 2013 for SNHs.

### Setting

The SIEL resident survey used 2-stage, stratified random sampling; 25% of the facilities were recruited, resident and discharge samples were selected from these facilities. Each facility's managing director rated residents discharged from the facility in September. SNH directors are required to have social work qualifications. Residents covered by respite care under LTCI home-care services were excluded from the SIEL resident survey.

### Participants

In total, 2540 resident-level questionnaires were collected from 1258 facilities in 311 health regions. The final sample consisted of 2426 residents with complete information, from 1226 facilities in 311 health regions. Included residents exhibited fewer discharges in 2010 ( $\chi^2[2] = 31.91, P < .001$ ), higher care requirement levels ( $t [110.81] = 3.01, P = .003$ ), higher numbers of hospitalized residents ( $\chi^2[2] = 8.37, P = .015$ ), lower financial capacity ( $\chi^2[1] = 52.13, P < .001$ ), and more residents with dementia as their primary disease ( $\chi^2[6] = 23.75, P = .001$ ) relative to excluded residents ( $n = 114$ ). Fewer included facilities had only single bedrooms ( $\chi^2[2] = 15.90, P < .001$ ) relative to excluded facilities ( $n = 32$ ).

### Measurements

The SIEL resident survey includes questions regarding discharged residents' primary diseases, discharge destinations, and characteristics. Facility characteristics were obtained from the SIEL facility survey. Regional characteristics were derived from national health and social care statistics (available at Portal Site of Official Statistics of Japan, e-Stat: <http://www.e-stat.go.jp/SG1/estat/eStatTopPortalE.do>).

Primary diseases were based on *International Classification of Diseases, 10th Revision* codes, and previous findings regarding care transition in the elderly population<sup>2,18</sup> and categorized into 7 categories: dementia, cerebrovascular diseases, other circulatory system diseases, nervous system diseases, malignant neoplasms, musculoskeletal diseases, and other diseases.

Discharge destinations were categorized into 4 categories: death at facility, death in hospital, hospital admission, and another care setting. The death at facility, death in hospital, another care setting, and hospital admission categories included decedents in SNHs; decedents transferred to hospital within the last month of life; residents transferred to other SNHs, geriatric intermediate care facilities, group homes, congregate housing (assisted living), and other care settings; and residents discharged to hospital with no prospect of hospital discharge, respectively.

Data regarding residents' age, sex, care requirements, cognitive impairment, previous care location, financial capacity, and medical procedures within the last month of the stay were collected. The public LTCI program guidelines state that clients should undergo regular certification of their care requirements, based on input regarding their disability level and primary disease from the primary attending physician. Levels of care required in residential facilities range from 1 to 5; higher levels indicate a higher estimated number of care minutes. Cognitive impairment levels range from 1 to 6: 1, no dementia symptoms; 2, independent in daily life; 3, independent with supervision; 4, some communication problems and requires personal care; 5, frequent communication problems and usually requires personal care; and 6, always requires medical care. This scale has demonstrated consistency with Mini Mental State Examination and Hasegawa Dementia Scale-Revised scores.<sup>19</sup> We assessed 16 medical procedures performed within the last month of the stay. Because 9 of these procedures were provided to approximately 1% of residents, only 7 were analyzed: infusion, bladder catheter, sputum suction, oxygen therapy, total parenteral nutrition, percutaneous endoscopic gastrostomy (PEG) tube feeding, and other tube feeding. Financial capacity indicated whether residents were exempt from paying tax, which demonstrated lower financial capacity, as exempt individuals receive limited incomes. The SIEL resident survey also included duration of stay; however, it was excluded from analysis, as it was omitted from numerous responses (393 of 2426, 16.2%).

Facility characteristics included ownership, number of beds, types of bedroom, and numbers of full-time equivalent physicians and nurses.

Regional data were obtained by summing municipal data for numbers of permanent nursing home beds per 1000 elderly population and hospital beds per 1000 population (hereinafter referred to numbers of permanent nursing home beds and numbers of hospital beds, respectively) in the health region. The prefectural government allocates health care resources according to region (secondary tier of medical care) and usually includes multiple municipalities. The total population and number of elderly individuals on March 31 each year were derived from the Basic Resident Register and Population (Ministry of Internal Affairs and Communications). The number of permanent nursing home beds on October 1 each year was derived from the SIEL. The number of hospital beds on October 1 each year was derived from the Survey of Medical Institutions (MHLW). Permanent nursing homes were SNHs under LTCI residential services.

### Ethical Considerations

Survey return implied consent; therefore, facilities were not required to sign consent forms. To preserve respondent anonymity, identification numbers were assigned to facilities and residents. The study was approved by the Tokyo Metropolitan Institute of Medical Science ethics review board (15–4).

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