

Pattern of Length of Stay in Swedish Residential Care among Residents with and without Cognitive Impairment between 2015 and 2023: A Longitudinal Population-Based Study



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RESEARCH

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ABSTRACT

Context: Length of stay (LOS) is a metric for evaluating the utilization of residential care and informing future long-term care policies. Decreases in LOS have previously been observed in the Swedish setting. However, whether this trend has continued is unexplored.

Objectives: To examine changes in residential care LOS between 2015 and 2023 among persons with and without cognitive impairment, and to assess the effects of socio-demographic factors, cognitive impairment, and activities of daily living (ADL) on LOS.

Methods: Persons ≥ 65 years who moved into residential care between 2015 and 2023 in Stockholm municipality (N = 18,805). Data on residents' characteristics, moving-in date, and date of death were retrieved from the longitudinal SNAC Stockholm Eldercare study. Hazard regression was used to assess factors associated with LOS, and Laplace regression was used to examine changes in LOS from the 10th to the 50th percentiles.

Findings: Most residents moving in were women, aged 86 years, and requiring extensive daily support. Cox regression showed that older age, male gender, lower income, greater ADL needs, and no cognitive impairment predicted shorter stays and higher death risk. LOS declined for cognitively impaired residents in the 40th and 50th percentiles.

Limitations: Cognitive status was assessed before moving in and not measured during stay. The definitions of LOS vary across studies, which complicates comparisons.

Implications: Most people who moved into residential care were cognitively impaired, leading to longer stays. This should be considered for future care resources allocation. Population ageing and rising cognitive impairment will increase the need for residential care.

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BACKGROUND

In Sweden, the share of the population that is eighty years and older increased from 5.3% in 2012 to 6.5% in 2024 and is expected to increase to 9.4% by 2050 ([Statistiska Centralbyrån, 2024](#)). This demographic shift will intensify the demand for accessible, affordable, and appropriate social care services, making their provision a critical area for policy in the future ([European Commission, 2017](#)). With advancing age, the accumulation of impairments such as chronic conditions, functional limitations, and cognitive difficulties contributes to loss of intrinsic capacity, which is associated with increases in social care needs ([Rachet-Jacquet et al., 2023](#); [Slavina, 2018](#)). Within social care systems, residential care is a crucial resource providing around-the-clock care and support in residential settings that accommodate the care needs of a very frail population ([Gaugler et al., 2007](#)). Indeed, as previous studies have observed, older age, poor self-reported health, functional limitations, cognitive difficulties, and polypharmacy (five or more prescription drugs) are associated with residential care admissions ([Collingridge Moore et al., 2019](#); [Collingridge Moore et al., 2020b](#); [Luppa et al., 2010](#)). Additionally, a systematic review that included population-based studies from the United States, Europe, Canada, Australia, and Hong Kong highlighted that having a dementia diagnosis was the strongest predictor of residential care admission ([Luppa et al., 2010](#)). In view of the global forecasted growth in the number of people living with dementia ([Nichols et al., 2022](#)), it is crucial for future care planning and budgeting to understand length of stay (LOS) in residential care, as this elucidates the pattern of utilization and is a determinant of expenditure ([Collingridge Moore et al., 2019](#); [Xu and Yan, 2025](#)).

In Sweden, government spending on social care for older adults is among the highest in OECD countries, accounting for 3.4% of GDP in 2019, of which two-thirds was spent on municipal residential care ([European Commission, 2021](#)). The Swedish social care system is politically governed and organized, and mostly financed through taxes collected by the 290 municipalities. The provision of municipal social care services is in accordance with the Social Services Act, which stipulates that older adults are entitled to care based on needs regardless of age, sex, or socio-economic resources ([Sveriges Riksdag, 2001](#)). The Act serves as a legal framework ensuring a general right to assistance but does not include detailed regulations or specific rights. However, the assistance should be of good quality and given in ways that ensure a ‘reasonable level of living’ ([Sveriges Riksdag, 2001](#)). In Sweden, as in many countries, the organization and provision of social care services for older adults are guided by ageing in place policies, which aim to maintain older adults’ capacity to live in their own homes and communities as they age ([European Commission, 2021](#);

[Wiles et al., 2012](#)). These policies contribute to delaying or preventing admission to residential care, which is politically appealing because home-based services are comparably less costly ([Kok et al., 2015](#)).

THE ORGANIZATION OF MUNICIPAL SOCIAL CARE IN SWEDEN

Access to municipal social care services is a single-entry system, where older adults with care needs can apply for home care services or residential care placements from their municipality. After the initial application, the municipality will provide an individualized set of services based on the older adult’s care needs and goals. Home care includes domestic services (cleaning, laundry, meal preparation, and safety alarms) and personal care services that address needs related to activities of daily living (ADL) such as bathing, toileting, eating, and getting dressed, as well as transferring to and from bed. Additional available services for people living in ordinary housing include day care and transportation.

Municipal needs assessors (*biståndshandläggare*) carry out an assessment to determine which services should be granted according to the applicant’s care needs ([Sveriges Riksdag, 2001](#)). Municipalities provide care services based on the conclusions of this assessment. However, due to the high degree of autonomy in the 290 municipalities, there are no standardized eligibility criteria regulating the type or quantity of care granted. Generally, residential care admissions are only approved when increases in the quantity of home-based care are determined to be insufficient to address care needs.

Residential care in Sweden (*särskilt boende/vård- och omsorgsboende*, i.e., special housing) typically consists of private rooms/apartments with communal areas and care staff available around the clock. The provision of facilities is a municipal responsibility and can be managed by either the municipal management or private operators under municipal contracts, or one of the choice systems. In Stockholm’s choice system, the base reimbursement is the same regardless of provider (with specified VAT-related adjustments for private operators). Responsibility for care is shared across sectors; the municipality is responsible for social care and for health and medical care in residential care up to the level of registered nurses and rehabilitation professionals, while Region Stockholm is responsible for physician-delivered care.

Residential care admission often follows a period of escalating care needs due to declining health and mobility, or progression of dementia ([Sun et al., 2021](#)). Notably, in the Swedish context, there are many older adults who wish to move into residential care but have not been granted a placement ([von Berens et al., 2024](#)). In recent years, numerous municipalities have reported shortages in residential care placements ([Werkelin Ahlin and Svenska kommunalarbetsförbundet, 2017](#)). Since 2000, the coverage of municipal residential care

has decreased substantially in Sweden, despite the population aged ≥ 65 years increasing by 44% between 2002 and 2024. This reflects a long-term shift towards supporting older adults to remain in ordinary housing with home-based services and higher admission thresholds. In addition, some older facilities have been decommissioned when renovations were considered too costly (Socialstyrelsen, 2023a). Between 2014 and 2023, the decrease in the proportion of people living in residential care was greatest among those ≥ 80 years (12.8% to 10.2%) as compared with the overall group ≥ 65 years (4.2% to 3.8%) (Socialstyrelsen, 2024). Moreover, the time between application and admission has increased among those granted a placement, though waiting times vary widely between municipalities (Jeppsson et al., 2020; Socialstyrelsen 2023b). Consequently, those who move into residential care tend to have increasingly greater care and support needs (von Berens et al., 2024).

LENGTH OF STAY IN RESIDENTIAL CARE

Length of stay in residential care is usually defined as how long a resident resides in a care facility, before being discharged home or dying. Insights into LOS in residential care are essential for care planning, as they can provide an understanding of the profile of residents and service utilization as well as the resources that will be needed in the future as the population continues to age (Collingridge Moore et al., 2020a; Collingridge Moore et al., 2019). A systematic review examining the factors associated with variation in residential care LOS found that resident characteristics such as older age, male sex, cancer diagnosis, and poor physical functioning were associated with shorter LOS (Collingridge Moore et al., 2019). On the other hand, previous studies have observed that residents with dementia or cognitive impairment had longer LOS in residential care (Gaugler et al., 2007; Luppá et al., 2010). Further, a cross-sectional country-comparison study observed that 42% of residents died within the first year of admission in several European countries (Collingridge Moore et al., 2020b). There have been previous studies set in Sweden, such as a cohort study comparing the five-year survival of cohorts of care home residents in 2000 and 2007, which observed that individuals were older and frailer when admitted, and that LOS after admission had shortened (Sund Levander et al., 2016). Another study observed that among those with the shortest LOS in residential care had decreased further, as indicated by a decrease in the 10th percentile between 2006 and 2012 (Schön et al., 2016). These studies were limited in terms of sample size and did not consider the effect of individual characteristics prior to admission on LOS in residential care. Moreover, these findings may not reflect current realities considering policy changes, systemic shocks such as the COVID-19 pandemic, and the composition of the older population.

AIM

In Sweden, admission to municipal residential care is needs-assessed and prioritization is strongly influenced by requirements for round-the-clock supervision and functional dependency. Therefore, cognitive impairment is a key characteristic in the pathway to residential care admission, and ADL support needs are an important measure of care needs at entry that should be accounted for when analysing LOS. This study aims to examine changes in residential care LOS from 2015 to 2023 among residents with and without cognitive impairment, and to assess the association between cognitive impairment and LOS, adjusting for age, sex, income group, and ADL-related care needs at admission.

METHODS

This study is based on data from the SNAC Stockholm Eldercare study (SNAC SE), which is part of the Swedish National Study on Ageing and Care (Meinow et al., 2019). SNAC SE is a longitudinal register-based study including all municipal decisions concerning eldercare granted in accordance with the Social Services Act (SoL) to individuals aged ≥ 65 years in the municipality of Stockholm.

STUDY POPULATION

The study population included all people ≥ 65 years who received a decision and moved into a municipal residential care facility (N = 18,805) between January 2015 and December 2023.

OUTCOME

LOS was measured as the number of days between the moving-in date and date of death for the individuals who died during the period 2015–2023 (n = 13,981), or December 31, 2023, for those who were alive at the end of the study period.

CO-VARIATES

Information to measure cognitive impairment and the number of ADLs that residents required support with was based on the assessment performed by the municipal needs assessor when admission to residential care was granted (Meinow et al., 2019). Cognitive impairment was assessed using a shortened version of the Berger scale, which is a system for rating the severity of senility (Berger, 1980). The Berger scale's categorizations are as follows: no memory problems (Berger 0); slight memory problems/sometimes being disorientated and confused (Berger 1); moderate memory problems, obvious problem, often being disorientated and confused (Berger 2–4); or severe memory problems, completely forgetful, suffering from constant disorientation and confusion (Berger 5–6). For the purposes of this study, cognitive

impairment was dichotomized based on the Berger score into individuals with cognitive impairment (Berger 1–6) and those without cognitive impairment (Berger 0).

The number of ADLs residents required support with was based on the Katz index, which includes bathing/showering, dressing, using the toilet, transferring, and eating (Katz, 1983). The number of activities that individuals required support with was categorized as 0–1 activities, 2–3 activities, and 4–5 activities.

Additional co-variables were specified a priori to adjust for resident case-mix at admission using variables that are central to Swedish needs assessment and consistently available at the time of admission. Education, marital status, and housing tenure were not consistently available at admission and could not be included. Information on age, sex, income, and date of death were based on data from national population registers (retrieved by the municipality) and are factors that are consistently associated with mortality and may reflect social gradients in health among residents.

ANALYSIS

The study population was described according to socio-demographic characteristics and need measures at the time point when residential care admission was granted by the municipality. The outcome LOS is susceptible to right censoring, which occurs if the final discharge is not due to death, such as the resident remaining in residential care after the end of the observation period. Cox proportional hazards models were used to estimate the factors associated with residential care LOS; models were adjusted for cognitive impairment, age group, sex, income quartile, and ADL group. The final model included an interaction between year of admission and cognitive impairment to assess time trends and predicted hazard ratios (HRs) during the observation period. The proportional hazards assumption was tested using Schoenfeld residuals and visually assessed with Kaplan–Meier survival curves (see Figure S1).

Laplace regression models were used to examine changes in LOS from the 10th percentile (shortest) to the 50th percentile (median) between 2015 and 2023. The Laplace regression was chosen as the error terms follow an asymmetric distribution; it allows for right censoring and produces informative coefficients that can be interpreted as number of days (Bottai and Zhang, 2010). Model 0 was adjusted for year of admission to estimate the average change in LOS, as the year of admission and move-in indicates the social care resources available in the municipality and the needs assessment criteria at that time. Model 1, adjusted for year of admission, age in years, and sex, was stratified by cognitive impairment. The predicted values were used to illustrate the relationship between LOS and year of admission. Those missing a measure of cognitive impairment status ($n = 591$) were

excluded from the Cox and Laplace regression analysis. All data management and analysis were performed in STATA version 15.1.

RESULTS

Table 1 presents the socio-demographic composition and care needs of the ($N = 18,805$) older adults who moved into residential care in Stockholm municipality between 2015 and 2023. The average age when moving in was 85.8 yrs and 64% were female, and 65% required help with completing 4–5 ADLs prior to moving in. There were slight variations in the composition of residents based on year of admission, such as the fact that 80% of residents moving in had cognitive impairments in 2023 compared to 77% of residents in 2015. There was a gradual reduction in the number of older adults moving in during the study period (see Supplementary Table S1). Among those without cognitive impairments ($n = 3,483$), residents were comparatively older (87.7 yrs vs 85.5 yrs), with more being ≥ 95 years (22% vs 10%) and a slightly greater share were in the lowest income quartile (26% vs 23%). Moreover, residents with cognitive impairments had a longer LOS on average compared to those without (662 days vs 580 days). Those missing a measure of cognitive impairment were on average younger (83.5 yrs), 33% were in the lowest income quartile, and most (84%) required support with 4–5 ADLs.

Table 2 presents LOS in terms of time to death in residential care stratified by year of admission. Overall, during the observation period, 74.4% of the study population died during their care home stay. Among those who moved in ($n = 1,947$) during 2015, most had died (95%) by the end of the observation period, compared to 32% of those that moved in during 2023. Between 2015 and 2023, $n = 13,981$ persons died during their care home stay, and most deaths occurred within a year of moving in, with 20.7% occurring in < 60 days and 31.2% of deaths occurring 61–365 days after the move-in date.

COX REGRESSION

The estimates from the Cox proportional hazard models examining the factors associated with residential care LOS are presented in Table 3. Those with cognitive impairments had a 12% lower risk of death during their stay compared to those without cognitive impairments (Model 2). Older age was associated with higher HR, with those aged 75–84 years having a 55% higher risk of death at a given point during their stay compared to those aged 65–74 years. Among those aged 95 years and older, the risk of death was nearly three times higher (HR: 2.83, CI: 2.63 to 3.05) compared to those aged 65–74 years. Female residents had a 36% lower risk of death during their care home stay compared to male residents,

	TOTAL	WITHOUT COGNITIVE IMPAIRMENT	WITH COGNITIVE IMPAIRMENT	MISSING
	N = 18,805	n = 3,483	n = 14,731	n = 591
Age in years	85.8 (8.2)	87.7 (8.9)	85.5 (7.9)	83.5 (9.7)
Age groups				
65–74 yrs	12.0%	11.1%	11.7%	22.8%
75–84 yrs	29.1%	22.0%	31.0%	25.5%
85–94 yrs	47.0%	45.1%	47.6%	42.1%
95+ yrs	11.9%	21.9%	9.7%	9.5%
Sex				
Men	36.2%	32.7%	36.9%	41.3%
Women	63.8%	67.3%	63.1%	58.7%
Income groups				
Group 1 (lowest)	24.1%	26.3%	23.3%	32.7%
Group 2	25.5%	25.6%	25.5%	24.7%
Group 3	25.6%	24.7%	26.0%	21.8%
Group 4 (Highest)	24.8%	23.6%	25.2%	20.8%
Number of Activities of Daily Living				
0–1 activities	14.3%	18.4%	13.5%	9.5%
2–3 activities	21.2%	17.0%	22.8%	6.9%
4–5 activities	64.5%	64.5%	63.7%	83.6%
Died during 2015–2023	74.3%	78.8%	73.3%	74.8%
Length of stay, number of days (LOS)				
Mean (std)	646.9 (655.2)	580.1 (661.3)	662.1 (649.8)	662.1 (149)
10th percentile (shortest)	31	20	37	26
50th percentile (median)	438	325	466	387

Table 1 Description of municipal care home residents by cognitive impairment.

*(%) proportion.

	TOTAL	2015	2016	2017	2018	2019	2020	2021	2022	2023
TOTAL RESIDENTS	n = 18,805	n = 1,947	n = 2,409	n = 2,234	n = 2,169	n = 2,126	n = 1,916	n = 2,183	n = 2,134	n = 1,687
Residents who died during their stay	n = 13,981	n = 1,839	n = 2,240	n = 2,003	n = 1,898	n = 1,771	n = 1,365	n = 1,353	n = 979	n = 533
% of deaths	74.40%	94.50%	93.00%	89.70%	87.50%	83%	71.20%	62.00%	45.90%	31.60%
Time to death		n(%)	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)
<60 days	20.7%	206 (11.2%)	439 (19.6%)	348 (17.4%)	350 (18.4%)	353 (19.9%)	323 (23.7%)	294 (21.7%)	297 (30.3%)	277 (52%)
61–365 days	31.2%	480 (26.1%)	600 (26.8%)	465 (23.2%)	521 (27.4%)	603 (34.0%)	430 (31.5%)	510 (37.7%)	502 (51.3%)	256 (48%)
366–830 days	23.3%	400 (21.7%)	462 (20.6%)	443 (22.1%)	516 (27.2%)	406 (22.9%)	385 (28.2%)	464 (34.3%)	180 (18.4%)	
>831 days	24.8%	753 (41.0%)	739 (33.0%)	747 (37.3%)	511 (27.0%)	409 (23.1%)	227 (16.6%)	85 (6.28%)		
Residents who survived until study end	n = 4,824	n = 108	n = 169	n = 231	n = 271	n = 355	n = 551	n = 830	n = 1,155	n = 1,154

Table 2 Description of the outcome length of stay in terms of time to death and survival to end of the observation period, between 2015 and 2023.

*Percentages are calculated among residents who died during follow-up in each admission year; residents still alive at end of follow-up are not included in the denominator for these percentages.

	MODEL 0		MODEL 1		MODEL 2		MODEL 3	
	HR	CI 95%	HR	CI 95%	HR	CI 95%	HR	CI 95%
Cognitive impairment								
Without/cognitive impairment	ref		ref		ref		ref	
With cognitive impairment	0.82	(0.79 to 0.86)	0.88	(0.84 to 0.92)	0.88	(0.85 to 0.92)	0.88	(0.85 to 0.92)
Age groups								
65–74 yrs			ref		ref		ref	
75–84 yrs			1.42	(1.33 to 1.52)	1.53	(1.44 to 1.64)	1.52	(1.42 to 1.62)
85–94 yrs			1.89	(1.76 to 2.00)	2.17	(2.04 to 2.31)	2.11	(2.00 to 2.25)
95+ yrs			2.49	(2.23 to 2.58)	2.83	(2.63 to 3.05)	2.76	(2.56 to 2.98)
Sex								
Men					ref		ref	
Women					0.64	(0.62 to 0.67)	0.65	(0.63 to 0.68)
Income groups								
Group 4 (highest)					ref		ref	
Group 1 (lowest)					1.22	(1.16 to 1.29)	1.22	(1.16 to 1.28)
Group 2					1.18	(1.13 to 1.24)	1.19	(1.13 to 1.24)
Group 3					1.12	(1.07 to 1.17)	1.12	(1.07 to 1.17)
Activities of daily living								
0–1 activities							Ref	
2–3 activities							1.14	(1.07 to 1.21)
4–5 activities							1.39	(1.39 to 1.54)
Log Likelihood	-121491		-121101		-120820		-120669	

Table 3 Estimates from the Cox proportional hazard regression model examining socio-demographic and need factors associated with length of stay.

*N = 18,214, Failures = 13,539, time at risk = 111773338. *HR = Hazard Ratio, CI = Confidence Interval, *Ref = indicating reference category.

***Model 0** = cognitive impairment, ***Model 1** = cognitive impairment + age group + sex, ***Model 2** = cognitive impairment + age group + sex + income group, ***Model 3** = cognitive impairment + age group + sex + income group + activities of daily living.

indicating that women have a longer LOS. Lower income groups had a higher risk of death during their stay compared to the highest income group (group 4), with those in the lowest income group (group 1) having a 22% higher risk of death during their stay. In Model 3, needing help with 2–3 ADLs had a 14% higher risk of death and those needing help with 4–5 ADLs had a 39% higher risk compared to those needing help with 0–1 ADLs.

Figure 1 shows the predicted HRs of death among persons with and without cognitive impairments in a given year of admission. These results are based on the included interaction between year of admission to move-in and cognitive impairment, adjusted for sex, age group, income quartile, and ADLs. Care home residents without cognitive impairments had higher adjusted HRs of death during their stay for each observation year after 2015, compared to those with cognitive impairment who moved in during 2015.

LAPLACE REGRESSION

The estimates from the Laplace regression models assessing changes in percentiles of LOS adjusted for year of admission, age, and sex stratified by cognitive impairment are presented in Supplementary Table S2 and illustrated in Figure 2.

Among residents with cognitive impairment, LOS decreased significantly over time in the 20th, 30th, 40th, and 50th percentiles (Supplementary Table S2), while no significant changes were observed among residents without cognitive impairment. There was an average decrease in LOS of -7.5 days per year (CI: -12.7 to -2.4) observed at the 40th percentile, as demonstrated by the purple line, and at the 50th percentile there was an average decrease in LOS of -14.4 days per year (CI: -20.0 to -8.8), demonstrated by the pink line in Figure 2. The cumulative change in LOS among those with cognitive impairments between

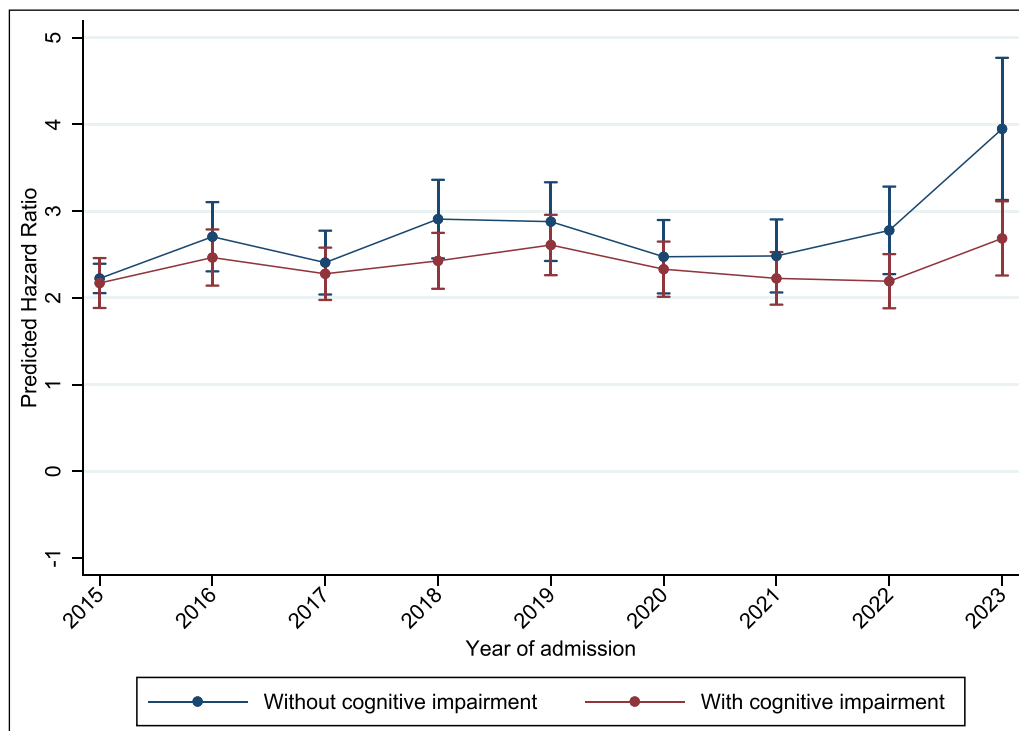


Figure 1 Predicted HRs of death during residential care stays among those with and without cognitive impairment in a given year of admission (reference category: older adults without cognitive impairment who moved into municipal residential care facilities in 2015).

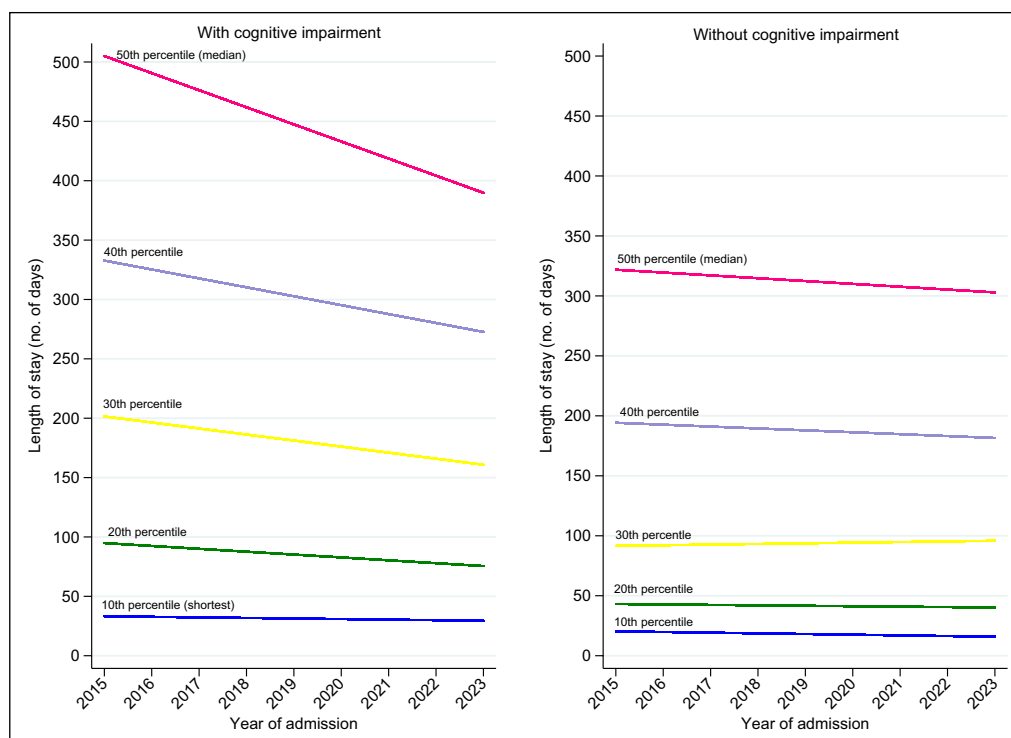


Figure 2 Estimates from the Laplace regressions stratified by cognitive impairment adjusted for age, sex, and year of admission, assessing changes in marginal predicted care home length of stay (i.e., the number of days between moving-in and death or observation end) from the 10th (shortest) to the 50th (median) percentiles between 2015 and 2023.

2015 and 2023 was -60.1 days (CI: -101.2 to -18.9) at the 40th percentile and -115.1 days (CI: 159.8 to -70.5) at the 50th percentile (calculated from Table S2 as the annual change multiplied by eight years (2023–2015); see Table S2). There were slight decreases

in LOS observed among residents without cognitive impairments. However, these changes in LOS were not significant across the 10th to 50th percentiles, as illustrated in Figure 2, where the lines representing the percentiles remain relatively flat.

DISCUSSION

This study aims to examine changes in LOS in municipal residential care between 2015 and 2023 among those with and without cognitive impairment, and assess the effects of the socio-demographic and need factors underlying municipal decisions on residential care admission. Between 2015 and 2023, newly moved-in residents were mostly women, aged 86 years, and required support to complete ADLs. The Cox regression showed that older age, male sex, lower income, greater ADL needs, and absence of cognitive impairment were associated with shorter LOS and higher risk of death in residential care.

Although cognitive impairment is often associated with a higher likelihood of admission to residential care, this does not imply shorter LOS after admission, as we have seen in this study. In a needs-assessed system with strong ageing in place policies, such as in Sweden, cognitive impairment combined with supervision needs and safety concerns may precipitate admission while these residents are still relatively physically robust compared to those admitted primarily due to advanced somatic frailty. Conversely, residents without cognitive impairment might receive support in their own homes for longer with extensive home care and home health care, and admission may therefore occur at a later stage when physical dependency is very high, or during the palliative phase of life. This interpretation aligns with the descriptive results from this study, as residents without cognitive impairment were older and more frequently in the highest ADL need category at admission, and, moreover, a higher proportion of deaths occurred among these residents during follow-up.

This study observed a significant decrease in residential care LOS between 2015 and 2023 among residents with cognitive impairment between the 40th and 50th percentiles. On the other hand, there were no significant changes in LOS observed among residents without cognitive impairment. There are limited studies comparing differences in LOS based on cognitive impairment status. One previous study set in a single city district of Stockholm municipality between 2006 and 2012 observed a decrease in LOS among persons with the shortest LOS (Schön et al., 2016). This study observed no significant change among residents with the shortest stay (i.e., the 10th percentile) between 2015 and 2023. Changes in median survival time might reflect changes in policies regulating the provision of residential care or the eligibility criteria used to determine admission, or could indicate the preferences of older adults to postpone moving into residential care until a later stage (Sund Levander et al., 2016). A previous Swedish study comparing the five-year survival of care home residents who moved in in 2000 and 2007 found that residents were older, more dependent, and had shorter survival

in 2007 than in 2000, with shifts in causes of death from stroke and chronic obstructive pulmonary disease in 2000 to dementia and heart failure in 2007 (Sund Levander et al., 2016). Likewise, a Canadian population-based cohort study assessing the survival of care home residents associated with severe functional and cognitive impairment between 2013 and 2018 found that residents with dementia at admission survived longer than those without dementia, while severe loss of functional abilities and extensive dependence on support with ADLs was associated with shortened survival (Hakimjavadi et al., 2025). Changes in the profile of residents in terms of a greater share being cognitively impaired when admitted are likely to influence the need for residential care in the future.

Taken together, these findings suggest that LOS trends over time may reflect changes in admission thresholds and needs assessment practices, which affect who is admitted and at what stage of need, i.e., the socio-demographic and clinical case-mix of residents entering residential care. In this context, this study observed that lower income was associated with a higher mortality risk after adjustment for measured need, indicating that socio-economic differences in outcomes may persist within residential care. However, the data used for this study do not allow for the examination of the mechanisms underlying this income gradient (e.g., comorbidity burden, prior care pathways, social support, or care processes), and these pathways should therefore be investigated in future research.

Insights into residential care LOS provide an understanding of residents' needs and inform future care planning, as those with longer LOS will require extended support with ADLs, chronic disease management, mobility, and mental stimulation. However, those with shorter LOS may require more end-of-life support and palliative care services (Gomes et al., 2013, Luppa et al., 2010). In this study, a fifth of all deaths among residents occurred within 60 days of moving in and over half occurred within 365 days of moving in. These results are in line with a previous study, which found that the first 90 days after moving to residential care were associated with the highest risk of dying or hospitalization (Collingridge Moore et al., 2020b). This possibly reflects older adults delaying moving into residential care until they are highly frail, have complex co-morbidities, or are in a palliative stage (Collingridge Moore et al., 2019). Supporting this, a comparative study set in six European countries found that 32–63% of long-term care residents died within one year (Collingridge Moore et al., 2020b), and proximity to death has previously been identified as a strong predictor of moving to a care home (Forma et al., 2009). Further, increases in shorter stays in residential care underscore the importance of increasing availability of end-of-life care in residential care facilities. In Sweden, general and specialized palliative care is available to all

regardless of diagnosis or age (Henoeh *et al.*, 2016). Although residential care facilities employ registered nurses and there are routine visits from primary care doctors, the provision of health and medical care is primarily the responsibility of regional authorities in Sweden. This division results in limited coordination between the health and social care systems, which can lead to variation in access to palliative care in municipal residential care settings (Ludvigsson *et al.*, 2025). A Swedish study based on interviews with a random sample of assistant nurses working in municipal residential care reported that they were obliged to provide end-of-life care to residents despite not having appropriate training (Holmberg *et al.*, 2019).

The ageing in place policies pursued over recent decades in Sweden have in part contributed to the decline in the proportion of older adults living in municipal residential care. Severe cognitive impairment remains the strongest predictor of being admitted to residential care, regardless of ADL needs, as physical limitations are managed through home-based care services (von Berens *et al.*, 2024). Individuals with severe cognitive impairment were more likely to receive residential care admission, even without mobility limitations, as this group may pose a risk to themselves, making their living situation unsustainable. From a care planning and policy perspective, these results suggest that the case-mix of residents, particularly the high proportion admitted with cognitive impairment, and their longer LOS have direct implications for residential care capacity and staffing, and the organization of dementia-competent care. On the other hand, those without severe cognitive impairment had a lower probability (<10%) of admission, irrespective of physical ability. This may indicate that physically frail individuals are admitted later in the trajectory, which has implications for end-of-life care needs in residential care and for the adequacy of home-based services.

As the population ages, government spending on social care is projected to increase to meet rising demand (Rachet-Jacquet *et al.*, 2023). Care home placements are increasingly expensive for municipalities to provide, with the average national cost per resident rising from 870,023 SEK in 2018 to 1,034,490 SEK in 2022 (Kolada, 2019). Ageing in place policies may align with older adults' preferences to remain in their own home as long as possible. At the same time, such policies can also be viewed as cost containment strategies, as providing care and support in an older person's home is less costly compared to admission into a care home (Kok *et al.*, 2015; Slavina, 2018). Even though cost-effectiveness is one of the guiding principles for the provision of social care services for older people, this must be balanced with meeting needs and providing high-quality services. The increase in the number of individuals aged ≥ 80 years in Sweden in the coming two decades will make it increasingly difficult for municipalities to operate

within sustainable budgets (Werkelin Ahlin and Svenska kommunalarbetareförbundet, 2017), particularly as a third of municipalities in Sweden have reported experiencing shortages in the supply of residential care placements to meet the local demand (Socialstyrelsen, 2023b). In recent decades, there has been a decrease in the number of residential care placements, although this decline has recently stalled (Socialstyrelsen, 2024).

STRENGTHS AND LIMITATIONS

The use of SNAC-SE is a strength as it contains detailed information on the individual characteristics of all individuals moving into a municipal care home as well as the date of the decision, and the moving-in date (Meinow *et al.*, 2019), while national registers provide information on the use of care services on a monthly basis but do not contain any information on indicators of care needs (Meyer *et al.*, 2022). Additionally, the use of the Laplace regression is a strength as the coefficients are informative (e.g., number of days), and assessing percentiles is more appropriate for data with skewed distribution and can accommodate right-censored data (i.e., care home residents that did not die during the study period) (Bottai and Zhang, 2010). Cognitive impairment was measured using the Berger scale prior to admission. Using the Berger scale is a strength, as it can capture those without a formal clinical diagnosis (Berger, 1980). Prevalence can be underestimated if based only on those that meet the clinical criteria to be formally diagnosed (Yu *et al.*, 2025). The limitations of this study that should be considered are that the study population only included older adults in Stockholm municipality, which has implications for the generalizability of these findings. Further, the 290 municipalities in Sweden have a high degree of autonomy in terms of organization and financing of social care services. Although previous studies set in different countries have had similar findings, the variation in LOS observed in this study is subject to residential care admission and ageing in place policies within Sweden and may not be applicable in other contexts.

The study period includes the COVID-19 pandemic. Descriptively, admissions decreased in 2020 and the proportion dying within 60 days after admission was somewhat higher among the 2020 admission cohort compared with 2019, which could reflect pandemic-related disruption to admissions together with increased short-term mortality risk. However, this study was unable to quantify the impact of the COVID-19 pandemic as there was a lack of information on COVID-19 outbreaks, vaccination, or facility-level measures. Moreover, the models estimate overall time trends rather than a discrete pandemic effect; therefore, we cannot quantify the impact of the COVID-19 pandemic on LOS.

Variables such as education, marital status, housing tenure, and ethnicity/migration background have been examined in previous studies but were not available

(or not consistently captured at the time admission was granted) in our data and could therefore not be included. This is a limitation, as these factors may influence pathways to admission, acceptability and use of formal care services, and health status at entry, and thereby LOS. In addition, our data did not include facility-level characteristics of residential care homes (e.g., size/number of beds, ownership/management, staffing levels including registered nurses and care personnel, or quality indicators). Such factors may influence LOS but could not be examined in the present study.

Our measure of care needs at admission was limited to basic ADLs and did not include instrumental activities of daily living (IADLs) or other dimensions of need such as supervision and safety needs, behavioural and psychological symptoms, or emotional support. These aspects may be particularly important for residents with cognitive impairment and may partly explain admission among individuals with relatively low ADL dependency. In addition, we lacked measures of social networks, social support, and loneliness (e.g., number of visits), which may influence pathways to admission and outcomes and could not be examined in relation to LOS. Future studies should incorporate broader need measures where available.

Finally, how the measure of LOS is operationalized and analysed varies greatly between studies, as there is no standardized definition (Collingridge Moore *et al.*, 2020a; Collingridge Moore *et al.*, 2020b; Hoben *et al.*, 2019; Steventon and Roberts, 2012; Xu and Yan, 2025). Further, there are difficulties in assessing changes in LOS over time, given that residents can be admitted on a temporary to long-term basis.

In conclusion, this study observed differences in the residential care LOS according to the assessed cognitive impairment upon admission, as those with cognitive impairment had longer LOS. However, there was a significant decline in the median LOS observed between 2015 and 2023. These findings underscore the importance of continued research investigating the evolving dynamics of LOS in residential care, and how the pattern of utilization evolves alongside the care needs of the ageing population. Most people who move into residential care have some form of cognitive impairment, which may lead to longer stays. The prevalence of cognitive impairment is also expected to increase as the population ages. More residential care will therefore be needed, which should be considered when allocating care resources in the future.

DATA ACCESSIBILITY STATEMENT

The datasets generated and analysed during the current study are available from the corresponding author upon reasonable request.

ADDITIONAL FILE

The additional file for this article can be found as follows:

- **Supplementary Material.** Figure S1 and Tables S1, S2. DOI: <https://doi.org/10.31389/jltc.488.s1>

ETHICS AND CONSENT

Ethical permission was obtained from the Swedish Ethical Review Authority Board (Dnr 2025-01579-02; Dnr 2005-01579.02).

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COMPETING INTERESTS

The authors have no competing interests to declare.

AUTHOR CONTRIBUTIONS

MD, ÅvB, JA, and BM conceived the idea for the project. MD, BM, JA, and ÅvB came up with the study design and analysis approach. BM and ÅvB constructed the dataset used, MD performed the statistical analysis, and MD drafted the text. ÅvB, JA, and BM commented on the text. All authors read and approved the manuscript.

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