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Original Study

The Association Between Relocations and Health Outcomes in Nursing Home Residents: A Retrospective Cohort Study

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A B S T R A C T

Objectives: The aim of this study was to investigate the effect of relocations on mood, cognition, functional status, and mortality across diverse nursing homes.
Design: A retrospective study with data from the Dutch InterRAI-LTCF routine care cohort.
Setting and Participants: Long-stay nursing home residents aged 65 years and older (n = 8603) from 167 nursing home facilities, of whom 1250 participants relocated at least once.
Methods: We included observations from 2004 through 2019 (excluding relocations in the COVID-19 period) and residents with at least 1 regular assessment. Residents who were first relocated to a hospice were excluded. We used pooled logistic regression with inverse probability weighting to analyze short- and long-term relationships of relocation with mood, cognition, functional status, and mortality, adjusted for confounders. Short term was defined as the first postrelocation assessment or the first 3 months for mortality.
Results: In the short term, we found an adjusted hazard ratio (HR) of 1.11 (95% CI, 0.98-1.26) for decreased mood, 1.29 (95% CI, 1.13-1.47) for impaired cognition, 1.88 (95% CI, 1.65-2.14) for impaired activities of daily living, and 1.03 (95% CI, 0.80-1.33) for mortality. In the long term, we found similar HRs, except for mortality (HR, 0.88; 95% CI, 0.78-1.00).
Conclusions and Implications: Relocations across nursing homes were associated with an increased risk for more activities of daily living dependency and cognitive impairment. Further research is warranted to determine the role of reversed causation. The risk for decreased mood and mortality was comparable between relocated and nonrelocated residents.

Relocations of long-term care residents within and between nursing homes are a common occurrence.[1–6] Relocations may happen for individual reasons, such as changing health care needs or preferences, whereas group relocations result from facility closures or renovations.[7–10] Reported rates vary across countries and contexts. In the Netherlands, approximately 27% of residents experience an individual relocation annually, whereas 9% are involved in group relocations. Most of the individual relocations take place in the first 4 months.[1] In the United States, individual relocation rates range from 6.5% to 8.0% per year, and around 5 to 16% of facilities close, merge, or relocate each year.[2,5,6]

Relocations within and between nursing homes can have a major impact on residents. Several studies have examined the effects of relocations on physical and psychological health and reported mixed results. While some studies reported no change in physical health and mortality, other studies identified an increased risk of antibiotic use, falls, hospitalization, and more deaths.[11–14] Reports on the psychological effects of relocations across nursing homes are also mixed. Some studies indicate a positive impact, such as a decrease in

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psychiatric symptoms (eg, depression or anxiety) and behavioral issues.[15,16] Other studies report no change in mental health, cognition, nonsocial behavior, or agitation.[11,14,17,18] In addition, some findings suggest a negative impact, including an increase in new antidepressant prescriptions, which may reflect reactive mood disorders, and relocation trauma affecting 30% of residents.[13,19] Residents may feel stressed, confused, or struggle with adjusting.[10,12,16,20]

To the best of our knowledge, there are no recent reports of the effect of relocations on the functional status of nursing home residents. Studies that examined this effect were conducted before 2000 and in the United States. Since then, many care homes in the Netherlands have closed in response to new laws, and the criteria for placement in a nursing home have become stricter.

The methodologies of prior studies regarding the physical and psychological health effects of relocations may explain the variation in findings. Designs varied from longitudinal and prospective quasi-experimental intervention studies to interview studies. Only a few studies included a prerelocation assessment[12,15–19] or used a comparison group of nonrelocated residents.[12–14,16] The latter is important, since all nursing home residents experience health deterioration. Most studies were performed in just 1 or 2 care institutions[11–13,15] or had small sample sizes with at most 35 relocated residents.[10,16,17,20] The duration of follow-up also varied considerably, ranging from 2 weeks[17] to 1 year postrelocation,[20] with most studies assessing outcomes around 3 months after relocation.[11,13–15,19]

All in all, a growing body of research has examined health outcomes after relocation, but few studies have applied methods that allow for a more rigorous interpretation of these associations. Therefore, the aim of this study was to investigate the effect of relocations on mood, cognition, functional status, and mortality compared with nonrelocation across nursing homes.

Methods

Setting and Study Sample

We performed a retrospective cohort study in Dutch nursing home residents using data from the InterRAI-LTCF database. In the Netherlands, nursing home care is part of a publicly funded long-term care system and is provided under the Long-Term Care Act (WLZ) for older adults with substantial physical and/or cognitive impairments requiring 24-hour care.[21,22] Since the introduction of the Social Support Act (WMO) in 2015, long-term care policy has increasingly emphasized aging in place, resulting in nursing home admission being largely restricted to individuals with complex and intensive care needs.[23] Dutch nursing homes typically consist of psychogeriatric wards for residents with dementia or other cognitive disorders and somatic wards for residents with primarily physical care needs.[22]

The InterRAI-LTCF database was built after the implementation of the interRAI observation instrument in long-term care facilities across the Netherlands and Belgium as of 2004. The overarching aim of the interRAI LTCF instrument was to improve the quality of life of individuals with vulnerable health conditions by supporting decision-making with reliable and structured information. Residents were assessed with the interRAI-LTCF assessment instrument within 6 weeks of admission and roughly every 6 months thereafter until death or discharge from care, as part of routine care.

Data collection complied with European Union legislation. Between 2014 and 2017, an opt-out procedure was used, allowing residents to object to the use of their data in research (around 0.1% of residents). Since 2017, informed consent has been obtained. Data of participants are deidentified and transferred to the interRAI-LTCF database at Amsterdam University Medical Centers—location VU. Each resident had a unique identifier in the database, which did not change after relocation. The VU Ethics Committee granted approval for the use of data for research.

The database for the current study included 12,785 residents across 226 facilities (each comprising 1-34 wards) at the time of data extraction in February 2023. The study sample included residents aged 65 years and older residing in long-term care facilities across the Netherlands who were admitted for long-term care rather than short-term purposes such as geriatric rehabilitation. Due to practical limitations in accessing mortality data, Belgian facilities were excluded from the analysis. To avoid changes in relocation patterns and outcomes because of COVID-19, we included observations from 2004 to 2019. Residents without at least 1 regular assessment (as opposed to a brief interim update intended to monitor changes) or whose first relocation was to a hospice (department) were also excluded.

Measurements

Determinant

In this study, we included relocations between wards (in a facility), facilities (in an organization), or long-term care organizations. Relocations were identified using 3 types of variables. First, the "admitted from" field in the initial assessment indicated relocation from another long-term care facility. Second, changes in "facility number" and "ward number" between assessments signaled relocations across facilities; these data fields were complete for 89% of residents. Third, the "discharged to" field identified relocations to another long-term care facility. Complete data on ward and facility, or relocation information in the "admitted from" and "discharged to" fields, were considered to provide full certainty regarding relocation of the resident. Exact dates of relocation were unavailable. To avoid analyzing the effect of multiple relocations ($\sim$10% of relocation cases), only the first known relocation per resident was considered.

Outcomes

We investigated the following outcomes: mood, cognition, functional status, and mortality. Mood, cognition, and ADL were measured with ordinal scales, and we used them as such in the unadjusted analysis (see below). As they showed nonnormal distributions, they were dichotomized for the pooled logistic regression analyses.

Mood was assessed with the Depression Rating Scale (range, 0-14), which is based on 7 observed symptoms, such as making negative comments, crying, or tearfulness.[24] Using the validated cutoff to inform the dichotomization, the score was dichotomized into low ($\leq$2) and high/clinically relevant ($\geq$3).[24]

Cognition was assessed with the Cognitive Performance Scale (0-6), where 0 indicates intact cognitive performance and 6 very severe cognitive impairment. The Cognitive Performance Scale has been validated against the Mini-Mental State Examination.[25] In a nursing home population, we considered (borderline) intact cognition ($\leq$1) as clinically not impaired in contrast to impaired cognition ($\geq$2).

Functional status was assessed with the ADL Capacity Hierarchy scale (0-6), where 0 indicates no impairment and 6 total dependence.[26] If the resident was independent or only supervision was required ($\leq$1), we assumed the resident was relatively independent in contrast to residents with limited impairment to total dependence ($\geq$2). Mortality data up to 1 year after the last interRAI-LTCF assessment were retrieved from Statistics Netherlands.

Covariates

Four authors with methodological and content knowledge (M.C.S., E.C.d.H., W.D., and H.J.L.) reviewed which variables in the interRAI data set could affect both the risk of relocation and the outcomes.

They then examined the frequency distributions of these potential confounders and made the final selection of covariates that were included in the models of each outcome.

Gender and age were included as baseline covariates for all outcomes. Age was provided in 5-year intervals to ensure anonymity, and we used the lower bound as a categorical variable. Several health-related characteristics were treated as time-dependent covariates to reflect changes in residents' health status over time. Cognition, dementia, and frailty were added as time-dependent covariates for all outcomes. For mood, additional time-dependent covariates included mood, aggressive behavior, communication, and abnormal thought processes. For ADL, ADL was added. These covariates were updated at each assessment and were used in the estimation of the inverse probability weights. This approach allowed us to account for time-varying confounding, where changes in health status over time may have influenced both the likelihood of relocation and subsequent health outcomes.

The Communication Scale (range, 0-8) reflects the ability to communicate and comprehend information, with scores $\geq$3 indicating moderate to severe impairment.[27] The Aggressive Behavior Scale (range, 0-12) was categorized to limit the number of categories into none (0), moderate (1-2), severe (3-5), and very severe aggressive behavior ($\geq$6).[28] Frailty was assessed using a 36-item Frailty Index, calculated as the proportion of health deficits present.[29] Abnormal thought process was dichotomized as present or not, based on whether symptoms had been observed in the last 3 days. Dementia was considered present if either Alzheimer's disease or another form of dementia was recorded as a diagnosis or being actively treated or monitored.

Analysis

Descriptive statistics were used to present the baseline characteristics of the study sample and compare relocated with nonrelocated participants. Relocation status was defined at the end of the study follow-up. We reported the percentage of females, mean age (in 5-year intervals; standard deviation), baseline dementia, and median follow-up duration (interquartile range [IQR]). Follow-up duration was defined as the period from the first available assessment until death, relocation to a nonparticipating nursing home, or up to 1 year after the last available interRAI-LTCF assessment, whichever occurred first. Facility and ward counts were also presented.

Initial explorative analyses were conducted without covariate adjustment, providing a crude overview of associations. In a subsample of relocated residents with both pre- and postrelocation assessments, bar charts were used to visualize changes in ordinal scores for mood, cognition, and ADL. To test for statistically significant deterioration in the ordinally scaled scores, we applied the Wilcoxon signed rank test with effect size r. A P value $< .05$ was considered statistically significant. In addition, we calculated a crude risk ratio with 95% CI to compare mortality rates between relocated and nonrelocated residents at censoring.

To account for potential confounders, we performed pooled logistic regression with inverse probability weighting (IPW) to estimate associations between relocation and the health outcomes in both the short and long term.[30] IPW addressed time-varying confounding, and relocations occurred at varying time points during follow-up. Also, IPW does not introduce selection (collider) bias because of changes in health and relocation leading to attrition. Stabilized weights were calculated for censoring and relocation status and were truncated at the 99th percentile to limit the influence of extreme values (Supplementary Table 1). After relocation, weights were set to 1. In addition, we accounted for within-resident clustering to obtain robust estimations of the 95% CI. Except for age and gender, we did not condition on the covariates in the outcome model. This approach allows estimation of the marginal effect of relocation; that is, it avoids inappropriate adjustment for potential mediators.

Due to variation in assessment timing, the data set was restructured into monthly intervals, with values from the last assessment imputed forward. As the exact dates of relocation were unavailable, relocation status was changed from nonrelocated to relocated from the month prior to the first postrelocation assessment onward. This ensured correct attribution of confounder effects on relocation status, while avoiding misclassification of outcomes as confounders. Residents were censored at their last assessment in a participating nursing home, at death, or at the end of the follow-up period. For the short-term analyses of mood, cognition, and ADL, relocated residents were additionally censored at their first postrelocation assessment. For short-term mortality, censoring occurred 3 months after the relocation status changed to relocated, consistent with prior studies. All relocated residents were included in both the short-term and long-term analyses; the only difference between these analyses is the amount of follow-up data contributed by each resident because of the censoring rules.

If the primary analysis yielded a statistically significant association, a sensitivity analysis was conducted in a subsample of 7646 residents for whom we had full certainty regarding the occurrence of relocation. No additional analyses were conducted for nonsignificant findings to avoid data-driven significance seeking. Analyses were performed in R (version 2024.12.1) using RStudio (RStudio Team, 2023).

Results

We had a study sample of 8603 Dutch residents (Figure 1), residing in 167 different facilities comprising 1 to 12 wards.

At baseline, the mean age of the study sample was 81.8 years (Table 1), and 70.0% of the study sample was female. Initial assessments showed that 48.4% of the relocated residents had dementia vs 44.6% of the nonrelocated residents. The median follow-up duration was 29 months (IQR, 13-53) among relocated residents, compared with 12 months (IQR, 9-18) for those who did not relocate.

Effects on Health Outcomes

Figure 2 presents bar charts for the subsample of relocated residents with both a pre- and postrelocation assessment comparing changes in scores for mood, cognition, and ADL. Scores remained unchanged in 62.4%, 73.6%, and 69.6% of residents, respectively. A statistically significant deterioration between pre- and postrelocation assessment was observed for mood, cognition, and ADL ($P \leq .01$, $P \leq .01$, and $P \leq .01$) (Table 2). In the total study population, the crude risk ratio of mortality was 1.39 (95% CI, 1.29-1.51) for the relocated group compared with the nonrelocated group.

Table 3 shows the hazard ratios (HRs) of the pooled logistic regression analyses. No statistically significant difference in the risk of decreased mood was observed between relocated and nonrelocated residents in either the short- or long-term analyses. A statistically significantly higher risk of impaired cognition was present, with HRs of 1.27 (95% CI, 1.11-1.45) and 1.26 (95% CI, 1.07-1.49) for the short- and long-term, respectively. The sensitivity analysis in persons with certain relocation yielded HRs that were slightly higher: HR, 1.36 (95% CI, 1.19-1.55) and HR, 1.32 (95% CI, 1.11-1.56). In addition, relocated residents had a statistically significantly higher risk of impaired ADL compared with nonrelocated residents, with an HR of 1.86 (95% CI, 1.63-2.13) and 1.68 (95% CI, 1.43-1.97) for the short- and long-term, respectively. In the sensitivity analyses, the respective HRs were higher at 2.02 (95% CI, 1.76-2.31) and 1.73 (95% CI, 1.47-2.05), respectively.

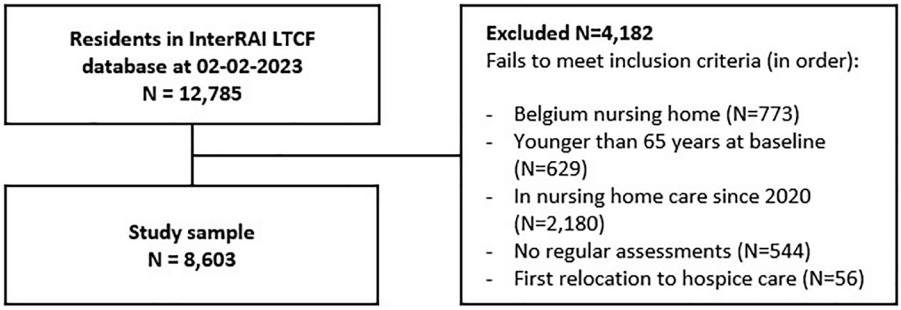

Fig. 1. Selection of study sample.

No statistically significant difference in the risk of dying was observed between relocated and nonrelocated residents in the short-term analysis; the long-term analysis showed a nonsignificant HR of 0.88 (95% CI, 0.78-1.01). The short-term effect on mood and long-term effect on mortality did not change in magnitude in both the truncated and nontruncated analyses. However, statistical significance was reached only in the analyses without truncation at the 99th percentile.

Discussion

Our retrospective cohort study showed that the risks of decreased mood and mortality remained comparable between relocated and nonrelocated residents of nursing homes in both the short and long term. In contrast, relocations across nursing homes were associated with an increased risk of ADL dependency and cognitive impairment across both time frames.

Health Outcomes

In unadjusted analyses, we observed that mood, cognition, and ADL scores remained unchanged in approximately two-thirds of residents between pre- and postrelocation assessments. Among residents whose scores changed, which is the subpopulation that is included in the Wilcoxon signed rank test, unadjusted analyses showed a statistically significant deterioration in these outcomes. An American study—also without adjustment for potential confounding—reported no change in depressive symptoms and cognition postrelocation compared with prerelocation.[11] Furthermore, relocated residents in our study had a higher crude risk of mortality compared with nonrelocated residents. A previous Swedish study also reported a higher unadjusted risk of mortality,[12] but an Irish study reported no difference in unadjusted mortality 90 days postrelocation.[13] The unadjusted effects we found may align with the deterioration in mood, cognition, and ADL that is observed in relocated residents in daily care and attributed to relocation. Our adjusted findings suggest that these observations might be explained by the natural course of health deterioration in nursing home residents.

After adjusting for confounding and comparing with a comparison group, we did not find a statistically significant increased risk of decreased mood anymore. Most previous quantitative studies also found no lasting effect in mood after controlling for confounders[15,18] or when comparing with a control group,[12] although one of the studies reported a short-term change in mood 2 weeks after relocation.[18] Since we could not determine the exact date of relocation, and because of the relatively long intervals between assessments, it is highly likely that such short-term effects will be missed. In addition, qualitative research has described various (short-term) experiences and emotional responses following relocation, including sadness, uncertainty, difficulty in settling in, and feelings of loss, deception, and fear.[10–12,20] Interestingly, an Irish study has reported more new antidepressant prescriptions in the relocation group both before and after relocation, compared with nonrelocated residents.[13] Due to substantial missing data on medication use, we were unable to adjust for this in our analyses.

After adjustment, we did not find a statistically significant increased risk of mortality in the short-term either, although a nonsignificant protective effect was observed in the long term. A previous study from the United States also found no difference at 30 and 90 days after relocation, adjusted for confounding.[14] The potentially protective long-term trend in mortality among relocated residents may partly be explained by the possibility that individuals with a higher life expectancy are more likely to be relocated, or by residual

Table 1
Sample Characteristics

Characteristics	Relocated Group (n = 1250)	Nonrelocated Group (n = 7353)	All Residents (n = 8603)
Sex, % females	70.4	69.9	70.0
Age at baseline, years ± standard deviation	81.5 (6.7)	81.8 (7.3)	81.8 (7.3)
Age categories, %			
65-69	2.5	3.8	3.6
70-74	7.0	8.2	8.0
75-79	17.9	13.9	14.5
80-84	26.2	23.6	24.0
85-89	27.3	28.3	28.2
90-95	16.2	16.6	16.6
≥95	3.0	5.5	5.0
Dementia at baseline, %	48.4	44.6	45.2
Median duration of follow-up, months (IQR)			
Total	29 (13-53)	12 (9-18)	12 (9-23)
Before relocation	7 (1-19)	NA	NA
After relocation	13 (7-30)	NA	NA

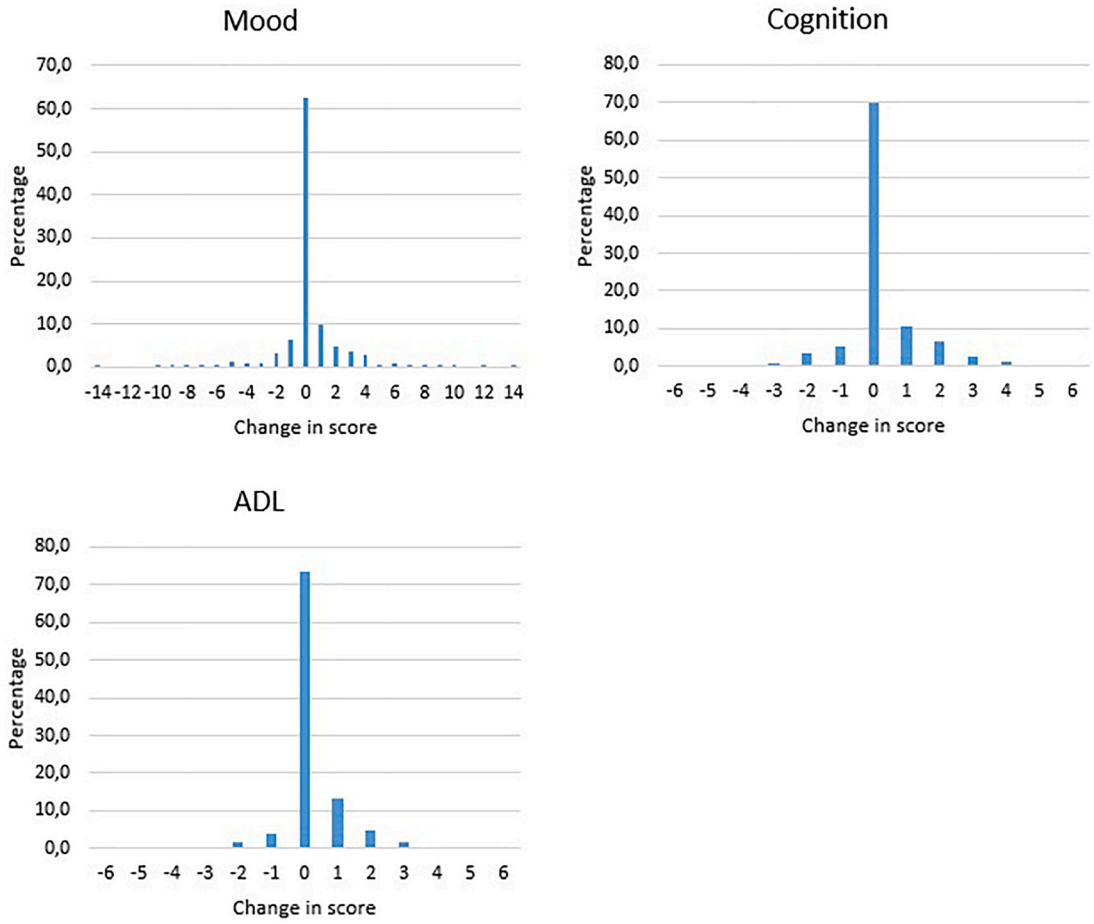

Fig. 2. Bar charts of changes in score between postrelocation and prerelocation for mood, cognition, and ADL; negative scores indicate improvement, as the postrelocation score is lower than the prerelocation score.

confounding, as we were unable to account for all potential confounders.

In contrast, we found a statistically significant increased risk for impaired cognition and ADL in both short term and long term after adjusting for confounding and comparing with a control group. A controlled but unadjusted Swedish study also reported no differences in cognition over time between relocated and nonrelocated residents.[12] The increased risk for impaired ADL is an important and new finding, as there appear to be no recent reports of the effect of relocations across nursing homes on functional status. However, it cannot be ruled out that the observed effect for cognition and ADL in our study is partly because of reverse causation.[31] A deterioration in cognition or ADL may have been a reason for relocation, but if this decline occurred after the last prerelocation assessment, it would only have been captured in the postrelocation measurement.

There is no straightforward explanation why relocation would affect cognitive impairment and ADL dependency but not mood and mortality. Relocation is often considered a significant life event, and it may lead to a decline in cognitive functioning, and this, in turn, to increased ADL dependency. It is therefore important to determine the magnitude of the effect of relocation on cognition and to assess whether reverse causation may be present. In addition, we may have missed temporary effects on mood. These would need to be investigated further with more closely spaced measurements in relocated and nonrelocated residents.

Table 2
Wilcoxon Signed Rank Test

Health Outcomes	*r*	*P* Value
Mood (n = 1010)	0.24	≤.01
Cognition (n = 1008)	0.47	≤.01
ADL (n = 1012)	0.38	≤.01

|r| interpretation: <0.1 no effect/very small effect; 0.1 small effect; 0.3 medium effect; and 0.5 large effect.

Strengths and Limitations

A key strength of this study is the use of a large database of standardized interRAI assessments, enabling analysis of health effects of relocations across nursing homes in a natural long-term care setting. The routine care sample enhances external validity by capturing nearly all residents of the participating facilities. The inclusion of a nonrelocated group allowed comparison with the relocated residents over time, accounting for natural health decline. In addition, the use of IPW helped address time-varying confounding, varying relocation timing, and potential selection bias because of attrition based on changes in health and relocation.

Despite its strengths, the interRAI-LTCF database has limitations. We could not distinguish between individual and group relocations, which may differ in impact because of varying underlying reasons. The exact date of relocation was unknown, introducing variability in short-term analyses and possibly diluting effects. The average 6-month interval between assessments limited our ability to align

Table 3
Adjusted Risk of Health Outcomes After Relocation

Outcome	Time Frame	Primary Analyses		Sensitivity Analyses*	
		HR (95% CI)	*P* Value	HR (95% CI)	*P* Value
Depression risk	Short term	1.12 (0.99-1.27)	.07	—	—
	Long term	1.03 (0.88-1.20)	.69	—	—
Impaired cognition	Short term	1.27 (1.11-1.45)	≤.01	1.36 (1.19-1.55)	≤.01
	Long term	1.26 (1.07-1.49)	≤.01	1.32 (1.11-1.56)	≤.01
Impaired ADL	Short term	1.86 (1.63-2.13)	≤.01	2.02 (1.76-2.31)	≤.01
	Long term	1.68 (1.43-1.97)	≤.01	1.73 (1.47-2.05)	≤.01
Death	Short term	1.05 (0.81-1.35)	.73	—	—
	Long term	0.88 (0.78-1.01)	.06	—	—

*Sensitivity analysis restricted to the subgroup of 7646 residents, for which we have full certainty regarding the occurrence of relocations.

measurements closely with the relocation event, which may have affected the detection of immediate effects and contributed to reversed causation. In addition, although interRAI captures a wide range of clinical information, some potentially relevant factors—such as ward type or treatment goal—were not available, possibly resulting in residual confounding.

Another limitation is related to differences in time between assessments. If the data collection protocol of interRAI was followed, the usual period of 6 months between assessments was shortened to <6 weeks in case of relocation. Given the degenerative diseases of most nursing home residents, a shorter follow-up time implies that they deteriorated less. Moreover, the decline occurring between the last assessment and death was systematically missed. Hence, the effect of relocation on ADL and cognition could have been underestimated.

Finally, the Dutch nursing home setting differs from that in other countries. In the Netherlands, nursing home admissions often follow an acute health or social crisis, which may limit immediate placement in a preferred or optimally matched ward. As a result, subsequent individual relocations within nursing homes are relatively common and primarily driven by care needs and bed availability.[32] Relocation from poorer to better quality nursing homes seems more common in the United States context. Future studies should examine how broader policy developments may influence the health consequences of relocations within nursing homes.

Conclusions and Implications

This study showed that relocations across nursing homes were associated with an increased risk for ADL dependency and cognitive impairment. Clinically relevant depressive symptoms and mortality remained comparable between relocated and nonrelocated residents. Given the individual variability in health responses to relocation, it is recommended that care teams remain vigilant and implement preventive strategies to reduce risks related to mood, cognition, ADL, and mortality. Further research is recommended and should include measurement of mood, cognition, and ADL shortly before relocation to determine the role of these parameters in relocation decisions and consequences.

Ethical Approval

The VU Ethics Committee granted approval for the use of the interRAI-LTCF database for research.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work, the authors used M365 Copilot Chat for editing purposes. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

Disclosure

The authors declare no conflicts of interest.

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Supplementary Data

Supplementary data related to this article can be found online at https://doi.org/10.1016/j.jamda.2026.106311.

References

1. Schreuder MC, Joling KJ, Groen WG, et al. The frequency and types of resident relocations in Dutch nursing homes: a nationwide cohort study of electronic health record data. *Eur Geriatr Med*. 2024;15:1949–1956.
2. Feng Z, Lepore M, Clark MA, et al. Geographic concentration and correlates of nursing home closures: 1999-2008. *Arch Intern Med*. 2011;171:806–813.
3. Netten A, Darton R, Williams J. *The Rate, Causes and Consequences of Home Closures*. Personal Social Services Research Unit; 2002.
4. Jolley D, Jefferys P, Katona C, Lennon S. Enforced relocation of older people when care homes close: a question of life and death? *Age Ageing*. 2011;40:534–537.
5. Chang C-H, Park P, Bynum JPW, Montoya A. Nursing home to nursing home transfers during the early COVID-19 pandemic. *J Am Med Dir Assoc*. 2023;24:441–446.
6. Castle NG. Relocation of the elderly. *Med Care Res Rev*. 2001;58:291–333.
7. de Boer B, Caljouw M, Landeweer E, et al. The need to consider relocations WITHIN long-term care. *J Am Med Dir Assoc*. 2022;23:318–320.
8. Hughes K, Feng Z, Li Q, Segelman M, Oliveira I, Dey JG. Rates of nursing home closures were relatively stable over the past decade, but warrant continuous monitoring. *Health Aff Sch*. 2023;1:qxad025.
9. Verhees LHF, Banning LCP, Stalman H, Koopmans R, Gerritsen DL. Transferring people with dementia to severe challenging behavior specialized units, an in-depth exploration. *Aging Ment Health*. 2023;28:1–10.

10. Schreuder MC, Landeweer EGM, Perry M, Zuidema SU. Consortium tR. The impact of relocations within nursing home care on long-term care residents according to stakeholders: a qualitative study. *Scand J Caring Sci*. 2025;39:e13317.
11. Capezuti E, Boltz M, Renz S, Hoffman D, Norman RG. Nursing home involuntary relocation: clinical outcomes and perceptions of residents and families. *J Am Med Dir Assoc*. 2006;7:486–492.
12. Falk H, Wijk H, Persson LO. Frail older persons' experiences of interinstitutional relocation. *Geriatr Nurs*. 2011;32:245–256.
13. Mello S, O'Connor KA. Morbidity and mortality following relocation of highly dependent long-term care residents: a retrospective analytical study. *J Gerontol Nurs*. 2016;42:34–38.
14. Thomas KS, Dosa D, Hyer K, et al. Effect of forced transitions on the Most functionally impaired nursing home residents. *J Am Geriatr Soc*. 2012;60:1895–1900.
15. Haddad KE, de Souto Barreto P, Gerard S, Prouff A, Vellas B, Rolland Y. Effect of relocation on neuropsychiatric symptoms in elderly adults living in long-term care. *J Am Geriatr Soc*. 2018;66:2183–2187.
16. Hodgson N, Freedman VA, Granger DA, Erno A. Biobehavioral correlates of relocation in the frail elderly: salivary cortisol, affect, and cognitive function. *J Am Geriatr Soc*. 2004;52:1856–1862.
17. McFadden SH, Lunsman M. Continuity in the midst of change: behaviors of residents relocated from a nursing home environment to small households. *Am J Alzheimers Dis Other Demen*. 2010;25:51–57.
18. Brouwers M, de Boer B, Groen WG, et al. Depressive signs and daily life of residents when relocating from a regular to an innovative nursing home. *J Am Med Dir Assoc*. 2024;25:105298.
19. Montoya A, Park P, Bynum J, Chang CH. Transfer trauma among nursing home residents: development of a composite measure. *Gerontologist*. 2024;64:gnad085.
20. Ibrahim K, Baron S, Lathlean J, Bridges J, McGrath N, Roberts HC. Moving our care home: a qualitative study of the views and experiences of residents, relatives and staff. *Int J Old People Nurs*. 2022;17:e12466.
21. Verpleeghuizen en zorginstellingen. Website, Rijksoverheid. 2026. Accessed April 9, 2026. https://www.rijksoverheid.nl/onderwerpen/verpleeghuizen-en-zorginstellingen
22. Het leven in een verpleeghuis. Report. 2019. Accessed April 9, 2026. https://www.scp.nl/publicaties/publicaties/2021/02/19/het-leven-in-een-verpleeghuis
23. Alders P, Schut FT. The 2015 long-term care reform in the Netherlands: getting the financial incentives right? *Health Policy*. 2019;123:312–316.
24. Burrows AB, Morris JN, Simon SE, Hirdes JP, Phillips C. Development of a minimum data Set-based depression rating scale for use in nursing homes. *Age Ageing*. 2000;29:165–172.
25. Morris JN, Fries BE, Mehr DR, et al. MDS cognitive performance scale. *J Gerontol*. 1994;49:M174–M182.
26. Morris JN, Fries BE, Morris SA. Scaling ADLs within the MDS. *J Gerontol A Biol Sci Med Sci*. 1999;54:M546–M553.
27. Guthrie DM, Davidson JGS, Williams N, et al. Combined impairments in vision, hearing and cognition are associated with greater levels of functional and communication difficulties than cognitive impairment alone: analysis of interRAI data for home care and long-term care recipients in Ontario. *PLoS One*. 2018;13:e0192971.
28. Perlman CM, Hirdes JP. The aggressive behavior scale: a new scale to measure aggression based on the minimum data set. *J Am Geriatr Soc*. 2008;56:2298–2303.
29. Abey-Nesbit R, Bergler U, Pickering JW, Nishtala PS, Jamieson H. Development and validation of a frailty index compatible with three interRAI assessment instruments. *Age Ageing*. 2022;51:afac178.
30. Hernán MÁ, Brumback B, Robins JM. Marginal structural models to estimate the causal effect of zidovudine on the survival of HIV-positive men. *Epidemiology*. 2000;11:561–570.
31. Sattar N, Preiss D. Reverse causality in cardiovascular epidemiological research. *Circulation*. 2017;135:2369–2372.
32. CIZ. Web page. Accessed April 9, 2026. www.ciz.nl