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Incidence and Risk Factors of Unplanned Emergency Department Transfers From Italian Nursing Homes: A Prospective Multicentre Cohort Study

Ines Basso¹  | Erika Bassi^{1,2}  | Francesco Musso³  | Giovanni Chilin⁴ | Nicole Bossoni⁵ | Isabella Santomauro⁶  | Lorenza Scotti¹ | Erica Busca¹  | Sara Campagna⁶  | Alberto Dal Molin^{1,2} 

¹Department of Translational Medicine, University of Piemonte Orientale, Novara, Italy | ²Health Professions Directorate, Maggiore della Carità University Hospital, Novara, Italy | ³Emergency Department, Maggiore della Carità University Hospital, Novara, Italy | ⁴DAIRI Department, Azienda Ospedaliero Universitaria SS Antonio e Biagio e Cesare Arrigo, Alessandria, Italy | ⁵Surgical Department, Mauriziano Umberto Hospital, Torino, Italy | ⁶Department of Public Health and Pediatrics, University of Torino, Torino, Italy

Correspondence: Basso Ines (ines.basso@uniupo.it)

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ABSTRACT

Aim: To estimate the incidence of unplanned transfers to the emergency department among nursing home residents and to identify resident and organizational factors associated with transfer risk.

Design: A 12-month prospective multicentre dynamic cohort study.

Methods: The study was conducted in nine nursing homes in a northern Italian region between July 2023 and June 2024. All long-stay residents aged 65 years or older were included and followed for up to 12 months.

Results: A total of 643 residents were included; 204 residents experienced at least one unplanned transfer, accounting for 271 events during follow-up. The incidence of first transfers was 4.47 per one hundred resident-months and varied across facilities. At the resident level, recent admission, a higher number of chronic conditions and dependence in eating were associated with a higher likelihood of transfer, whereas female sex was associated with a lower likelihood. At the organizational level, larger bed capacity was associated with a lower risk of transfer. In contrast, the presence of a physician on site and a higher ratio of general practitioners to residents per occupied bed were associated with increased transfer risk.

Conclusions: Unplanned transfers from nursing homes to the emergency department are frequent. Strategies to reduce transfers should address resident vulnerability and organizational characteristics.

Implications for the Profession and Patient Care: Nurses should recognize the early period after admission as a critical window for risk stratification and advance care planning and consider how resident vulnerability and organizational characteristics influence transfer patterns.

Impact:

- Prospective evidence on unplanned transfers from nursing homes in Europe is limited.
- Nearly one third of residents experienced at least one transfer, highlighting the importance of addressing multimorbidity, functional dependence and organizational features when planning prevention strategies.

Reporting Method: The study adheres to STROBE guidelines.

Patient or Public Contribution: No patient or public contribution.

Sara Campagna and Alberto Dal Molin should be considered co-last authors.

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KEY POINTS

- Unplanned ED transfers were common in Italian nursing homes, affecting nearly one-third of residents.
- Recent admission, multimorbidity and eating dependence were associated with higher transfer risk.
- Organizational characteristics, including facility size and medical care organization, were associated with transfer risk.
- The first months after admission are a critical period for enhanced surveillance and proactive care planning.

1 | Introduction

Nursing home (NH) residents represent one of the most vulnerable segments of the older population, with frailty prevalence ranging from 19% to 75.6% (Kojima 2015). Due to their advanced age and complex multimorbidity, they experience markedly higher unplanned emergency department (ED) transfer rates than community-dwelling older adults (Bogaisky and Dezieck 2015), with annual rates varying from 29% to over 62% across countries, care models and facility characteristics (Brucksch et al. 2018). While some unplanned ED transfers are clinically appropriate, many are associated with preventable adverse outcomes, including psychological distress, functional decline and increased mortality (Skains et al. 2023). Moreover, a substantial proportion of these transfers are considered potentially avoidable when timely, appropriate and adequately resourced care is delivered within the NH setting (Lemoyne et al. 2019).

Early identification of residents at increased risk of hospitalization is therefore a core nursing responsibility, as it enables proactive interventions to prevent unnecessary transfers and maintain continuity of care.

2 | Background

Nurses play a pivotal role in preventing unnecessary ED transfers by continuously monitoring residents' conditions, initiating timely assessments and coordinating care processes. This role is particularly crucial in NHs, where residents are vulnerable to rapid clinical deterioration and nurses often represent the first, and sometimes the only, clinical decision-makers on site (Pulst et al. 2021; Kada et al. 2017). Evidence from intervention studies shows that programs aiming to reduce avoidable transfers strengthen nurses' skills in recognizing and managing early deterioration, supported by education, structured assessment tools and decision-support systems that enhance timely detection, communication and on-site management (Basso et al. 2024).

Previous research has identified several resident individual characteristics associated with a higher risk of ED transfer, including male sex, younger age, preserved functional and cognitive abilities and higher comorbidity burden (Blackburn et al. 2021). In addition, both the period immediately following

NH admission (Fassmer et al. 2023) and the months preceding death (Hoffmann et al. 2019) are recognized as high-risk phases for ED transfer, likely reflecting increased clinical instability. At the organizational level, evidence is less consistent. Facility size and funding models show heterogeneous associations, whereas lower staffing levels (Min and Hong 2019; Marincowitz et al. 2022) and limited clinical resources have been linked to increased ED transfer risk (Liew et al. 2024).

Understanding how resident-level and facility-level factors interact is essential for identifying those at greatest risk and enabling care teams to act proactively rather than reactively. Such insight supports the identification of upstream causes of transfer and the development of targeted interventions, including enhanced clinical monitoring by general practitioners (GPs), improved on-site management capacity and more reliable access to essential supplies. Furthermore, comprehensive risk assessment can guide decisions regarding the initiation of limited advance care planning (ACP) discussions and the exploration of residents' and families' preferences, which are fundamental to promoting less aggressive and more comfort-oriented care (Pimsen et al. 2022).

Notably, most evidence on the characteristics and risk factors of unplanned ED transfers among NH residents comes from extra-European research, where healthcare systems, staffing models and long-term care structures differ substantially from the European context (Min and Hong 2019; Blackburn et al. 2021; Powell et al. 2024). Moreover, only a limited number of European studies have used a prospective design (Hallgren et al. 2016; Pulst et al. 2021; Bouzid et al. 2024), limiting generalizability and leaving important gaps in understanding the incidence and risk factors of ED transfers within European NH settings.

3 | Aim

This study is part of the research project *Enhance Understanding of the Unplanned Emergency Department Transfers among Nursing Home Residents* (UTED), which aims to improve knowledge of unplanned ED transfers among NH residents and to inform strategies to reduce potentially avoidable transfers.

The specific aim of this study is to estimate the incidence of unplanned ED transfers in Italian NHs and to identify resident- and organizational-level risk factors associated with such transfers.

4 | Methods

4.1 | Design

This is a 12-month multicentre dynamic cohort study and it is reported in accordance with the STROBE guidelines (von Elm et al. 2008).

4.2 | Study Setting and Sampling

In the Piedmont Region, nearly 700 NHs operate, with approximately 33,000 accredited beds (Piedmont Region 2025).

Accreditation represents a formal recognition by the regional health authority that allows facilities to receive public funding and admit residents whose care is partially or fully covered by the National Health Service. Within this integrated care model, medical services in NHs are provided by GPs, while nursing care is allocated based on the assessed care intensity of each resident. Residents are classified into six graded categories of increasing clinical complexity (from low to very high) through a standardized multidisciplinary geriatric assessment (Piedmont Region 2012). The number of nursing hours per day is then tailored to these categories, aligning resources with care complexity. Most Italian NHs lack on-site physicians; their presence depends on the proportion of residents with high care needs or the availability of specialized units, such as dementia care or vegetative state units.

The UTED study was conducted in 13 NHs located in a northern Italian region (Piedmont) between July 2023 and June 2024. For the present analysis, data from nine NHs were included, as only these facilities provided complete information on residents who were not transferred during the study period.

All long-stay residents, defined as individuals aged 65 years or older and admitted for more than 30 days, residing in the participating NHs between 1 July 2023 and 30 June 2024 were included. Each resident was followed from the start of the study period or from the date of NH admission, whichever occurred later, until death, transfer to another NH, or the end of the study period.

4.3 | Inclusion and/or Exclusion Criteria

Residents admitted for temporary stays or living in specialized units (e.g., units for chronic neurological conditions with high complexity or vegetative states) were excluded.

4.4 | Data Collection and Explanatory Variables

During the study period, a designated nurse in each facility was responsible for recording the occurrence of all unplanned ED transfers within 4 days of the event. An unplanned ED transfer was defined as an urgent, unscheduled transfer to the hospital, including both ED visits and hospital admissions (Fassmer et al. 2020). Monthly meetings were held between the research team and the designated nurse to monitor data collection and ensure consistency across facilities.

Nurses were asked to collect baseline residents' individual and clinical information, as well as organizational data, using a structured form. Resident-level variables included sex, age and recent admission to the NH (defined as admission within the previous 6 months) (Fassmer et al. 2023). Comorbidity burden was assessed using the Cumulative Illness Rating Scale–Geriatric (Parmalee et al. 1995), and the number of clinically relevant comorbidities was calculated by counting conditions with a severity score ≥ 2 on the scale (range 0–4). Cognitive impairment was assessed using the BANS-S score as a continuous variable to capture progressive decline, with a cut-off score of ≥ 17 , corresponding to a Mini-Mental State Examination score

of 5, indicative of severe cognitive impairment (van der Steen et al. 2006). To estimate independence or dependence in mobility, feeding and dressing, we utilized three specific items from the BANS-S scale. We dichotomized scores, categorizing 1 and 2 as 'independent' and scores of 3 and 4 as 'dependent', ensuring a robust, standardized classification of functional status. Polypharmacy was defined as the use of five or more medications (Masnoon et al. 2017).

At the organizational level, variables included ownership type (public vs. private accredited), resident turnover rate (calculated as the number of discharges and deaths divided by the number of observation days for each facility, and expressed per 100 resident-days), bed capacity and the use of fixed procedures for organizing transfers (Marincowitz et al. 2022). Staffing-related variables comprised the presence of a nurse during overnight shifts (yes/no); nurse turnover rate in the previous 12 months (calculated as the sum of nurses hired and those who left, divided by the average number of nurses); average nurse hours per resident-month (calculated as the total number of nursing hours worked during the previous month divided by the average number of residents in the same period); and the presence of an on-site NH physician (yes/no) (Min and Hong 2019; Marincowitz et al. 2022); GP-to-resident ratio per occupied bed, defined as the total number of GPs providing medical care within the facility divided by the average number of occupied beds.

Additionally, we calculated a *care intensity ratio*, defined as the number of residents with high or very high care intensity, based on the most recent multidisciplinary geriatric assessment available, divided by the average number of occupied beds. This ratio was used as a proxy for expected staffing and organizational standards, as higher care intensity levels require greater staffing and organizational resources under regional regulations (Piedmont Region 2012).

4.5 | Data Analysis

Residents' demographic and clinical characteristics were summarized using descriptive statistics. Categorical variables were reported as absolute frequencies and percentages, whereas numerical variables were expressed as medians and interquartile ranges (IQR), as they were not normally distributed according to the Shapiro–Wilk test and QQ-plot inspection.

First-event incidence rates of unplanned ED transfers were calculated by dividing the number of new first transfer events by the total resident-months of follow-up, multiplied by 100, both overall and by NH. Corresponding 95% confidence intervals (95% CIs) were computed, and Poisson regression was used to assess differences in first-event incidence rates across NHs.

To identify risk factors for unplanned ED transfers, univariable and multivariable Gill-Andersen models were fitted to estimate hazard ratios (HRs) and 95% CIs, accounting for repeated events within individuals and including NH as a random effect. Both resident-level and organizational factors were examined as potential risk factors. Given the large number of variables, a backward selection procedure was applied, retaining variables with a p -value ≤ 0.10 in the final model.

Several risk factors known from the literature to be associated with transfer risk were entered into the model regardless of statistical significance: sex, being newly admitted to the NH, number of comorbidities, polypharmacy, BANS-S score, eating dependence, facility bed capacity, GP-to-resident ratio per occupied bed, nurse turnover rate, average nurse hours per resident-month and availability of an on-site NH physician.

All tests were two-tailed, and the type I error level was set at 0.05. Analyses were performed using SAS v9.4 (SAS Institute, Cary, NC).

4.6 | Ethical Considerations

The study received ethical approval from the Ethics Committee of SS. Antonio e Biagio e Cesare Arrigo Hospital, Alessandria, Italy (ASO.UPO.23.01; protocol no. 12007/2023) on 8 May 2023 and was conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from residents or their legal representatives prior to participation. Data were collected in anonymized form and securely stored in REDCap at the time of collection.

5 | Results

5.1 | Characteristics of the Sample

Table 1 summarizes the characteristics of the participating NHs. Most NHs were privately accredited (78%), had a bed capacity of 50–100 residents (56%), and reported a median resident turnover rate of 0.17 (IQR: 0.10–0.37). The median care intensity ratio was 0.10 (IQR: 0.02–0.43). The average number of nurse hours per resident month was 8.7 (IQR 6–9.9), with a median nurse turnover rate of 2 (IQR 1.3–2), while three facilities provided overnight nurse coverage. Additionally, five NHs employed medical staff, with a median of 0.02 physician hours per resident per day (IQR: 0.03–0.06).

Table 2 reports the descriptive statistics of residents' individual and clinical characteristics measured at baseline. From these 9 NHs, a total of 643 residents were included in the analysis (mean of 71 residents per facility; range 22–192). Participants had a median age of 85 years (IQR 77–90) and were predominantly female (406; 63%). The median length of NH stay was 27.3 months (IQR 11–52.9 months), and over one-third (226; 35%) were newly admitted NH residents. Participants had a mean of four comorbidities (± 1.9) and were taking an average of eight medications (range 1–17). A substantial proportion of residents had severe cognitive impairment (263; 41%) and were functionally dependent in dressing (470; 77%), mobility (404; 66%) and eating functions (218; 36%).

5.2 | The Incidence of Unplanned Transfers

Two hundred and four residents (32%) experienced at least one transfer, for a total of 271 events. Most residents had a single transfer (77%), whereas 17% experienced two transfers and 6% experienced three or more. The median follow-up duration per

TABLE 1 | Organizational characteristics of the participating nursing homes.

	N = 9
	N (%)
Ownership type	
Private accredited	7 (77.78)
Public	2 (22.22)
Bed capacity	
< 50 beds	1 (11.11)
50–100 beds	5 (55.56)
> 100 beds	3 (33.33)
Overnight nurse coverage	3 (33.33)
Use of a fixed procedure to organize the transfer	4 (44.44)
On-site NH physician	5 (55.56)
Median (IQR)	
Resident turnover rate	0.17 (0.10–0.37)
GP-to-resident ratio per occupied bed	4 (2–14)
Care intensity ratio	10 (2–43)
Nurse turnover rate	2 (1.3–2)
The average number of nurse hours per resident month	8.7 (6.0–9.9)

resident was 11.7 months (IQR 3.2–12.0). Four NHs withdrew from the study before completing the 12-month follow-up period due to organizational constraints.

Overall, the first-event incidence rate of transfer was 4.47 per 100 resident-months (95% CI: 3.85–5.08). Rates varied significantly across NHs ($p < 0.0001$), ranging from 1.81 to 8.98 transfers per 100 resident-months (Table 3).

5.3 | Resident- and Organizational- Level Factors of Unplanned ED Transfers

According to the univariable analysis (Table 4), several resident- and organizational-level factors were associated with ED transfer risk. Females had a 27% lower risk of transfer compared to males (HR 0.73, 95% CI: 0.55–0.95), while newly admitted NH residents showed a 95% higher risk compared to residents with established stays. Each additional comorbidity increased the risk of transfer by 16% (95% CI: 1.08–1.24). Among specific comorbidities, statistically significant associations were observed for liver disease (HR 2.16, 95% CI: 1.36–3.45), respiratory disease (HR 1.93, 95% CI: 1.46–2.55), heart disease (HR 1.59, 95% CI: 1.23–2.07) and vascular disease (HR 1.43, 95% CI: 1.07–1.89). Residents with eating dependence also showed a 46% (95% CI: 1.11–1.91) increased risk of transfer compared to those without dependence.

TABLE 2 | Individual and clinical characteristics of nursing home residents.

	Transferred ^a		
	Never, N = 439	At least once, N = 204	All, N = 643
	N (%)	N (%)	N (%)
Individual factors			
Age, years			
65–74	85 (19.36)	43 (21.08)	128 (19.91)
75–84	130 (29.61)	63 (30.88)	193 (30.02)
> 85	224 (51.03)	98 (48.04)	322 (50.08)
Male sex	154 (35.01)	84 (40.78)	237 (36.86)
Being a newly admitted NH resident	148 (33.71)	78 (38.61)	226 (35.26)
Clinical factors			
Number of comorbidities, median (IQR)	4 (3–5)	4 (3–6)	4 (3–5)
Comorbidities			
Heart diseases	153 (34.85)	96 (47.06)	249 (38.72)
Hypertension	236 (53.76)	121 (59.31)	357 (55.52)
Vascular diseases	112 (25.51)	62 (30.39)	174 (27.06)
Respiratory diseases	87 (19.82)	67 (32.84)	154 (23.95)
Ear/nose/throat diseases	62 (14.12)	28 (13.73)	90 (14.00)
Upper gastrointestinal diseases	37 (8.43)	24 (11.76)	61 (9.49)
Lower gastrointestinal diseases	61 (13.90)	26 (12.75)	87 (13.53)
Liver diseases	11 (2.51)	16 (7.84)	27 (4.20)
Renal diseases	83 (18.91)	51 (25.00)	134 (20.84)
Genitourinary diseases	113 (25.74)	59 (28.92)	172 (26.75)
Musculoskeletal diseases	184 (41.91)	86 (42.16)	270 (41.99)
Neurological diseases	138 (31.44)	59 (28.92)	197 (30.64)
Endocrine/metabolic diseases	143 (32.57)	68 (33.33)	211 (32.81)
Psychiatric diseases	295 (67.20)	135 (66.18)	430 (66.87)
Polypharmacy (≥ 5 drugs)	361 (82.23)	172 (84.31)	533 (82.89)
BANS-S score, median (IQR)	15 (11–18)	16 (12–18)	15 (12–18)
BANS-S score ≥ 17	170 (38.72)	93 (46.04)	263 (41.03)
Functional dependence			
Dressing	317 (76.76)	153 (77.27)	470 (76.92)
Mobility	268 (64.89)	136 (68.69)	404 (66.12)
Eating	133 (32.20)	85 (42.93)	218 (35.68)

^aMissing data: being a newly admitted NH resident ($n = 2$); BANS-S Score ($n = 2$); eating dependence ($n = 30$), dressing dependence ($n = 30$), mobility dependence ($n = 30$).

Regarding organizational factors, living in a public NH, residing in a facility with more than 100 beds and having integration with an out-of-hours primary care service were all associated with a reduced transfer risk (by 65%, 44% and 70%, respectively)

compared to private accredited NHs, smaller facilities, and no out-of-hours care integration. Conversely, the use of a fixed procedure for organizing transfers and the availability of an on-site NH physician were associated with higher transfer risk

TABLE 3 | Overall and facility-level incidence rates of unplanned transfers.

	Beds, <i>N</i>	Observed residents, <i>N</i> (%)	Resident-month	Transfers <i>N</i>	First- event incidence rate per 100 resident-month	95% CI
Overall	747	643	4567	204	4.47	3.85–5.08
NH 1	52	65 (10.11)	497	26	5.23	3.22–7.24
NH 2	136	192 (29.86)	1354	61	4.51	3.37–5.64
NH 3	145	57 (8.86)	432	20	4.63	2.60–6.66
NH 4	60	29 (4.51)	206	8	3.88	1.19–6.57
NH 5	60	66 (10.26)	390	13	3.33	1.52–5.15
NH 6	120	95 (14.77)	885	16	1.81	0.92–2.69
NH 7	67	56 (8.71)	375	33	8.80	5.80–11.80
NH 8	21	22 (3.42)	172	4	2.33	0.05–4.60
NH 9	86	61 (9.49)	256	23	8.98	5.31–12.66

(increases of 45% and 65%, respectively). Additionally, a 10% increase in the resident turnover rate led to an 11% increase in transfer risk (95% CI: 1.04–1.19).

Table 5 reports the results of the multivariable model, which confirmed the associations between sex, recent NH admission, number of comorbidities, eating dependence, bed capacity, the availability of an on-site NH physician and the proportion of GPs assigned to residents per occupied bed, and the risk of transfer.

6 | Discussion

To our knowledge, this is the first prospective study to examine both the incidence and the risk factors of unplanned ED transfers from NHs in Italy.

Using a 12-month multicentre dynamic cohort design, we observed that nearly one in three residents experienced at least one unplanned ED transfer during follow-up, corresponding to a first-event incidence rate of 4.47 transfers per 100 resident-months, with substantial variation across facilities.

The observed rate indicates that unplanned ED transfers constitute a relatively common clinical pathway among residents of Italian NHs. In practical terms, approximately one out of every 22 residents experienced a first unplanned transfer each month, and nearly one third required at least one transfer over a 12-month period. From a resident-centred perspective, transition to ED care may represent a critical turning point, frequently associated with subsequent clinical deterioration, encompassing both functional decline and increased short-term mortality (Guion et al. 2021). Within this framework, estimating the first-event incidence rate provides a meaningful resident-level measure of the probability of entering such a potentially adverse trajectory.

Previous European studies have primarily reported event-based incidence rates including recurrent transfers. Although these measures are conceptually different from first-event rates,

cross-country comparisons remain informative. In Germany, the overall transfer burden appears considerable, with an incidence rate of 10 per 100 resident-months (Hoffmann and Allers 2017), while rates of 5.2 and 6.83 per 100 resident-months have been reported in Sweden and Denmark, respectively (Linder et al. 2025; Kristensen et al. 2023).

In our cohort, recurrent events accounted for approximately 25% of all transfers, indicating that the overall burden was largely driven by first transfers rather than repeated episodes within a small subgroup of residents. However, these findings should be interpreted considering the exclusion of residents living in highly specialized units for complex neurological conditions and those who need short-term admissions after a hospitalization, who are typically at greater risk of clinical instability and acute deterioration.

The risk of unplanned ED transfers was independently associated with both resident- and organizational-level factors, partially accounting for the variation in transfer rates observed across facilities.

In our analysis, individual risk factors played a prominent role, underscoring the importance of systematically identifying residents at higher risk of transfer to tailor monitoring intensity, proactive care planning and targeted preventive interventions aimed at reducing potentially avoidable ED transfers. Consistent with previous research, female residents were less likely to experience unplanned transfers than male residents. This finding aligns with a growing body of national and international evidence indicating sex-related differences in healthcare utilization and treatment intensity among older adults (Brucksch et al. 2018; Kristensen et al. 2023; Albanesi et al. 2024). These differences may reflect not only clinical characteristics but also social and contextual influences. For example, men are more likely to have partners who actively advocate for more intensive treatment approaches, including ED transfer (Fassmer et al. 2020). At the same time, the observed pattern may raise concerns about potential undertreatment among women, highlighting the need to consider gender-sensitive approaches in clinical decision-making within NHs.

TABLE 4 | Individual, clinical and organizational factors associated with transfers in the univariable analysis.

	Univariable models	
	HR	95% CI
Resident-level factors		
Age, years		
75–84 vs. 65–74	0.96	0.66–10.40
> 85 vs. 65–74	0.81	0.57–1.15
Sex (F vs. M)	0.73	0.55–0.95
Being a newly admitted NH resident (≤ 6 vs. > 6 months)	1.95	1.48–2.57
Number of comorbidities	1.16	1.08–1.24
Type of comorbidity (yes vs. no)		
Heart diseases	1.59	1.23–2.07
Hypertension	1.10	0.84–1.45
Vascular diseases	1.43	1.07–1.89
Respiratory diseases	1.93	1.46–2.55
Ear/Nose/Throat diseases	1.00	0.69–1.45
Upper gastrointestinal diseases	1.37	0.92–2.03
Lower gastrointestinal diseases	1.06	0.73–1.55
Liver diseases	2.16	1.36–3.45
Renal diseases	1.26	0.94–1.69
Genitourinary diseases	1.29	0.97–1.73
Musculoskeletal diseases	1.09	0.84–1.43
Neurological diseases	0.97	0.72–1.29
Endocrine/Metabolic diseases	1.08	0.81–1.42
Psychiatric diseases	0.89	0.68–1.18
Polypharmacy (≥ 5 vs. < 5 drugs)	1.34	0.94–1.89
Severe cognitive impairment (BANS-S score ≥ 17 vs. < 17)	1.18	0.91–1.54
Dressing dependence (yes vs. no)	1.03	0.75–1.41
Eating dependence (yes vs. no)	1.46	1.11–1.91
Mobility dependence (yes vs. no)	1.15	0.86–1.54
Organizational factors		

(Continues)

TABLE 4 | (Continued)

	Univariable models	
	HR	95% CI
Ownership (public vs. private accredited)	0.35	0.22–0.54
Bed capacity (> 100 vs. ≤ 100)	0.56	0.42–0.75
Overnight nurse presence	1.11	0.85–1.45
Use of a fixed procedure to organize the transfer (yes vs. no)	1.45	1.11–1.88
Availability of on-site NH physician (yes vs. no)	1.65	1.23–2.21
Resident turnover rate (increase of 10%)	1.11	1.04–1.19
GP-to-resident ratio per occupied bed	1.00	0.99–1.01
Care intensity ratio	1.00	0.99–1.00
Nurse turnover rate	1.03	0.97–1.11
Average nurse hour per resident month	1.01	0.96–1.05

Notably, residents admitted within the previous 6 months had a twofold higher risk of transfer compared with those with longer lengths of stay. The transition into a NH represents a period of heightened vulnerability, frequently characterized by clinical instability and functional decline (Fassmer et al. 2023). In addition, evidence from qualitative research indicates that poorly anticipated admissions are often experienced as disruptive life transitions, marked by the need to adapt to a new care environment, changes in care routines and the disruption of established social and relational networks (Koppitz et al. 2017). These transition-related stressors may exacerbate frailty, impair coping capacity, and reduce physiological and psychological resilience, thereby increasing the likelihood of ED transfers shortly after admission. This highlights the importance of structured admission protocols and early risk assessment to mitigate the heightened vulnerability associated with recent NH admission.

Our analysis showed that dependence on assistance with eating was associated with an increased risk of unplanned ED transfer. While eating dependence may represent a marker of advanced frailty and proximity to end of life (Vossius et al. 2018), it may also directly increase vulnerability to aspiration-related complications, particularly among residents with dysphagia, thereby precipitating acute clinical deterioration and subsequent ED transfer. These findings underscore the importance of ACP in this highly vulnerable population. Although ACP was not systematically assessed in our study, it remains underutilized in Italy and other Southern European countries (Bárrrios et al. 2023; Bouzid et al. 2024). Evidence suggests that ACP enables families to process prognostic

TABLE 5 | Resident- and organizational-level factors associated with transfers in the multivariable analysis.

		Multivariable model
	HR	95% CI
Resident-level factors		
Sex (F vs. M)	0.82	0.67–0.93
Being a newly admitted NH resident (≤ 6 vs. > 6 months)	1.97	1.61–2.39
Number of comorbidities	1.11	1.05–1.18
Polypharmacy (≥ 5 vs. < 5 drugs)	1.25	0.95–1.64
Severe cognitive impairment (BANS-S score ≥ 17 vs. < 17)	0.86	0.65–1.13
Eating dependence (yes vs. no)	1.48	1.12–1.96
Organizational factors		
Bed capacity (> 100 vs. ≤ 100)	0.24	0.12–0.49
Availability of on-site NH physician (yes vs. no)	1.42	1.06–1.91
Resident turnover rate (increase of 10%)	1.05	1.00–1.10
GP-to-resident ratio per occupied bed	1.03	1.01–1.06
Nurse turnover rate	0.95	0.86–1.04
Average nurse hour per resident month	0.98	0.94–1.03

information and make informed, value-congruent decisions, facilitating a shift toward comfort-oriented goals of care rather than aggressive treatment approaches (Gonella et al. 2022). In this context, ACP may support timely transitions to comfort-focused nutrition care, where the emphasis shifts from maintaining nutritional targets to prioritizing comfort, dignity and quality of life in the face of progressive decline.

Transfer patterns are shaped not only by resident individual vulnerability but also by organizational characteristics. In our study, a lower risk of unplanned ED transfers was observed in larger facilities, which may be attributable to the broader range of resources and services they provide. In the Italian context, larger NHs more frequently host specialized units for residents with dementia or chronic neurological conditions, who typically require more intensive care, as well as higher skill-mix standards and in-house pharmacy services (Piedmont Region 2012).

The presence of an on-site NH physician was associated with a higher risk of unplanned ED transfer. In our study, on-site physicians provided time-limited care, equivalent to approximately 1 min and 12 s per resident per day, which may have constrained their ability to manage acute events on site and to effectively

improve care quality. Although this association warrants further investigation, it is plausible to hypothesise that the care models adopted were characterized by limited, fragmented or episodic physician input, primarily focused on consultative support rather than comprehensive and continuous care, and may therefore have been insufficient to prevent the escalation of acute events and reduce reliance on emergency services. Moreover, it is possible that facilities employing on-site physicians care for residents with greater clinical complexity, which may partially explain the observed association.

Notably, a higher GP-to-resident ratio per occupied bed was associated with a slight increase in the risk of ED transfer. Because this ratio reflects the number of GPs relative to the number of occupied beds, a higher value may indicate a greater number of physicians rotating within the NH, potentially resulting in increased organizational complexity and affecting the timeliness of on-site management in cases of clinical deterioration.

Overall, our findings indicate that physician commitment in NHs should extend beyond nominal presence to encompass sustained on-site involvement, accessibility, continuity of care and familiarity with residents' clinical trajectories and preferences (Katz and Dash 2025). While further research is needed to clarify the underlying mechanisms, strengthening structured medical engagement may represent a key lever for improving on-site clinical management and optimizing transfer decisions.

Interestingly, nursing staff measures were not associated with unplanned ED transfers. As individual nurse characteristics, such as clinical experience, specific competencies in recognizing clinical deterioration, decision-making autonomy, and familiarity with residents were not assessed, aggregated staffing indicators may have been insufficient to capture the nursing practice elements most relevant to transfer prevention (Spilsbury et al. 2011). In addition, limited variability in staffing models across facilities may have resulted in a ceiling effect, reducing the ability to detect meaningful associations between nursing staff measures and transfer risk.

Together, these factors suggest that commonly used structural staffing indicators may inadequately reflect the complex, time-sensitive, and context-dependent contributions of nursing care to the management of acute deterioration in NH settings. Rather than relying solely on structural resources, efforts to reduce unplanned ED transfers may benefit from strengthening the processes through which acute deterioration is recognized and managed. Consistent with this perspective, Munene et al. (2025) demonstrated that implementing structured clinical assessment pathways incorporating early recognition tools, standardized decision support and enhanced communication between long-term care facilities and emergency services was associated with significant reductions in emergency department transfers and hospital admissions.

6.1 | Strength and Limitations of the Work

The multicentre cohort approach allowed for standardized and systematic data collection across facilities and enabled a

temporal assessment of clinical events, thereby strengthening the robustness of incidence estimates and the identification of associated risk factors.

Nevertheless, several limitations should be acknowledged. First, four NHs withdrew before completing the 12-month follow-up, reducing the total observation time and potentially leading to an underestimation of transfer incidence. Second, while the use of a first-event incidence rate provides a clinically meaningful estimate of the probability of ED transfer at the resident level, not estimating an event-based rate prevented a direct assessment of the overall burden of recurrent hospital transfers and may limit comparability with previous studies. Finally, ACP and other potentially modifiable organizational and contextual factors, such as staff training and competencies, organizational culture and on-site resource availability, were not measured. The absence of these variables may have resulted in residual confounding and limited a more comprehensive understanding of the mechanisms underlying transfer decisions.

6.2 | Recommendations for Further Research

Further research should examine the appropriateness of unplanned ED transfers by distinguishing clinically necessary events from those potentially preventable and by directly investigating the mechanisms through which such transfers may be avoided within the Italian context. This in-depth exploration could inform policymakers and healthcare planners in developing targeted strategies to strengthen NH care and reduce unnecessary hospitalizations. Attention should be given to the potential contribution of advanced geriatric nursing practice in the early identification and on-site management of clinical deterioration, including timely assessment, decision-making support and coordination of care. Evaluating the impact of advanced nursing roles on continuity of care and reliance on emergency services may provide valuable evidence to inform workforce planning and role development in NH settings.

6.3 | Implications for Policy and Practice

The findings of this study have important implications for both clinical practice and organizational policy in NHs. The identification of key resident-level risk factors, particularly recent admission, multimorbidity and dependence in eating, highlights the need for structured risk stratification strategies early in the care trajectory. The first months following NH admission emerge as a critical window requiring enhanced clinical surveillance, timely multidimensional assessment and the early initiation of ACP to prevent potentially avoidable transfers.

At the organizational level, the observed associations with facility size and GP availability suggest that governance arrangements and the distribution of medical responsibility within facilities may substantially influence transfer patterns. In particular, models that promote structured medical engagement may facilitate longitudinal knowledge of residents' health status, preferences and trajectories of decline. Such continuity may support proactive monitoring, more timely clinical

decision-making, and shared goal setting with residents and families, thereby strengthening the capacity of NHs to manage clinical deterioration on site and potentially reducing avoidable ED transfers.

Within this context, nurses are strategically positioned to play a leading role in preventing unplanned hospital transfers. Strengthening nurses' competencies in early recognition of clinical deterioration, decision-making and coordination of on-site care may represent a key leverage point for improving care continuity. Investment in advanced geriatric nursing roles could further support timely assessment, escalation management and interdisciplinary collaboration, contributing to more proactive, resident-centred care pathways.

Overall, reducing unplanned hospital transfers requires an integrated approach that combines targeted clinical interventions for high-risk residents with organizational strategies aimed at reinforcing nursing capacity, continuity of care and alignment with residents' goals and preferences.

7 | Conclusion

Unplanned ED transfers are common among Italian NH residents and are driven by both resident vulnerability and organizational characteristics. Early identification of high-risk residents, structured medical engagement and stronger continuity-based primary care models may be critical to reducing avoidable transfers and improving on-site management of acute deterioration.

Author Contributions

Ines Basso: conceptualization, methodology, writing – original draft. **Erika Bassi:** methodology, writing – review and editing. **Francesco Musso:** data curation, writing – review and editing. **Isabella Santomauro:** writing – review and editing. **Lorenza Scotti:** formal analysis, writing – review and editing. **Nicole Bossoni:** investigation. **Chilin Giovanni:** writing – review and editing. **Erica Busca:** methodology, writing – review and editing. **Sara Campagna:** supervision, conceptualization, writing – review and editing. **Alberto Dal Molin:** supervision, conceptualization, writing – review and editing.

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Disclosure

The statistics were elaborated and checked prior to submission by Prof. Lorenza Scotti, statistician at the University of Piemonte Orientale. Email address: lorenza.scotti@uniupo.it.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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