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Article:

Strategies to support safe wandering in care homes for older adults – what works, for whom, and in which circumstances?: A realist synthesis

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ABSTRACT

Objectives: Wandering is a common behaviour among people with dementia living in care homes, driven by various factors such as enjoyment, a sense of purpose, lifelong habits, and social interaction. These elements can bring both physical and mental benefits, highlighting the need for strategies that enable safe wandering while respecting individual autonomy. This realist synthesis aimed to explore these strategies and the conditions under which they lead to successful outcomes.

Methods: This realist synthesis involved scoping the literature to develop initial theoretical explanations for how different strategies could support safe wandering. From this literature, we developed context-mechanism-outcome configurations, which we combined into initial programme theories. Systematic searches were then used to test and refine these programme theories. Studies were prioritised for inclusion based on criteria of relevance and richness. We extracted data pertinent to the initial programme theories and documented relevance, richness, and rigour. We synthesised data into five refined programme theories. At each stage of the process, we collaborated with stakeholders to develop and validate the strategies.

Results: The review included 79 evidence sources, leading to five refined programme theories. 1) **Personalised Care:** Emphasising the importance of staff practicing person-centred care by understanding residents, their reasons for wandering, and their life histories. 2) **Monitoring:** Effective monitoring requires good visual access or technological solutions that enable staff to observe residents, and detect when residents need support to walk while also enabling resident freedom and independence. 3) **Navigation:** Navigation is facilitated by dementia-friendly design features and environmental cues, which help minimise the challenges residents face due to diminished orientation and wayfinding abilities. 4) **Managing access:** Involving balancing residents' safety and autonomy. Strategies may include restricting access to unsafe areas by locking doors or using technology and camouflage, while ensuring access to safe spaces. 5) **Hydration and nutrition:** Hydration and nutrition (e.g., suitable snacks) is provided to prevent weight loss for residents who wander and may not stay seated during meals. These theories provide insight into supporting safe wandering, leading to improved wellbeing for both residents and staff, enhanced safety and autonomy for residents, and reduced staff anxiety.

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Discussion: Strategies that create a supportive environment, provide physical assistance, and support hydration and nutrition enabled residents to wander safely. Identified strategies improved wellbeing for both residents and staff. However, the same strategies also led to ethical concerns around digital monitoring, deception, and access restrictions.

Study registration: The protocol was registered with PROSPERO (CRD42024559085).

What is already known

- There are many barriers to supporting people to wander safely in care homes, in particular, staff and families' risk concerns, despite the physical and mental health benefits this may bring.
- There is little knowledge of which strategies work for whom and in what circumstances.

What this paper adds

- We identified and synthesised strategies to promote safe wandering in care homes, relating to personalised care, monitoring, navigation, managing access, and hydration and nutrition.
- Residents' independence and autonomy, along with the well-being of both residents and staff, are enhanced when residents can wander safely.
- Some strategies raise ethical concerns related to digital monitoring, deception, and access restrictions.

1. Introduction

Around 60% of people living with dementia will wander whilst residing in care homes (Jayasekara, 2009), and wandering often precedes individuals transitioning into care homes (Balesreri et al., 2000). Wandering is characterised by walking slowly in a relaxed way, often without a specific purpose or direction (Halek and Bartholomeyczik, 2012) and can be challenging for care staff and family members to manage due to risks associated with wandering (Graham, 2017; Dimitriou et al., 2022; Cloak et al., 2024), such as falls, dehydration, malnutrition, and mortality (Barrett et al., 2020). There is no consensus on the definition of wandering in dementia care (Park and Lee, 2024), but associated characteristics include a high frequency and repetition of walking (Algase et al., 2007). Significant debate surrounds the term 'wandering', and alternatives such as 'walking with purpose' or 'exploring the environment' may better reflect the intentions of individuals, values their needs, abilities, and identity (Kitwood, 1997), and help reduce stigma (Graham, 2017). However, for consistency with current literature and terminology used by those working in the social care sector, this review will use the term 'wandering'.

Care home staff may interpret frequent walking or being lost, restless, unable to sit down, hyperactive, and/or confused as being associated with wandering (Graham, 2017; Kwak et al., 2015). However, the purpose and aim may not be understood by others (Cipriani et al., 2014). People with dementia give diverse reasons for wandering, including enjoyment, purpose, lifelong habits and socialisation (Adekoya and Guse, 2019). Despite these clear reasons, care home staff may find it stressful to support people who demonstrate wandering behaviours (Agrawal et al., 2021), and as a result, many families and staff prioritise safety over the right to freedom and independence. Historically, restrictive measures, including physical and chemical restraints, have been used to prevent wandering (Dewing, 2011; Robinson et al., 2007). However, restrictive measures can lead to adverse effects such as anxiety, falls, pressure sores, and increased morbidity and mortality (Robinson et al., 2006; Engberg et al., 2008; Gill et al., 2007; Raetz, 2013). Restraints are still commonly used, such as bed rails and preventing residents from rising from their chairs; however, these are not typically perceived by staff as restraints (Hamers et al., 2004; Hakverdioğlu Yönt et al., 2023). Psychosocial interventions such as exercise, music therapy, and aromatherapy (Robinson et al., 2006; Dewing, 2011) are commonly implemented. However, these strategies also aim, to some extent, to prevent wandering rather than promote autonomy and movement.

Wandering is sometimes not fully understood by staff members and families, leading to them dismissing its benefits due to perceived risks (Dewing, 2011). However, the opportunity to walk around care homes is beneficial for older adults both physically and mentally, provided that they are supported to wander safely (Adekoya and Guse, 2019). Wandering provides physical activity, which in turn can improve circulation, reduce deconditioning, foster a sense of independence and autonomy (Dewing, 2011; Adekoya and Guse, 2019; Lai and Arthur, 2003), and reduce anxiety or conflicts between residents (Dewing, 2011). Staff need to manage a balance between promoting safe wandering and managing its associated risks (Park and Lee, 2024).

To value and promote wandering, effective strategies that enable safe wandering while maintaining individual autonomy should need to be considered. To determine what works, for whom, in what contexts and why, a realist review was conducted to explore:

1) How do strategies to support safe wandering for older adults in care homes work, and why?
2) In what circumstances can successful outcomes be expected for these strategies?

2. Methods

A realist synthesis approach (Pawson, 2002) was used, which focuses on drawing causal explanations from the data through identifying mechanisms, the contexts in which they are activated, and the resultant outcomes. The protocol was registered with PROSPERO (registration number CRD42024559085). Reporting followed the Realist And MEtanarrative Evidence Syntheses: Evolving Standards (RAMESES) publication standards (Wong et al., 2014). There were three phases: one round of searches to support theory development (Phase 1); and another for theory testing (Phase 2); followed by sense-checking (Phase 3). This process is depicted in Fig. 1.

2.1. Ethical considerations

We consulted with key stakeholders throughout the conduct of the realist review. Involvement in Phases 1 and 2 was considered stakeholder consultancy rather than research, and therefore we did not seek ethical approval, in line with the outcome of the Health Research Authority (HRA) decision tool. Within Phase 3, we conducted formal sense-checking conversations with stakeholders. Ethical approval was obtained from Camberwell St Giles National Health Service (NHS) Research Ethics Committee (reference 336231), on 11th November 2024. All stakeholders provided informed consent (Phase 1 and 2, verbal; Phase 3, written) and were involved on a voluntary basis. All procedures were performed in compliance with relevant UK laws and institutional guidelines.

2.2. Phase 1: initial programme theory development

We undertook scoping literature searches in August 2023 across PubMed, PsycInfo and Cumulated Index in Nursing and Allied Health Literature (CINAHL) databases, combining terms for 'wandering', 'care

homes' and 'dementia', supplemented with hand searches of reference lists. Relevant studies were qualitative and explored any aspect of wandering in care homes for people with dementia. We identified 17 evidence sources (see Supplement 1), including empirical papers and reviews, which were dual-extracted to identify initial context-mechanism-outcome configurations, which are causal chains describing the relationship between contexts, mechanisms and outcomes. We also consulted with a panel of family and friends of people living in care homes in the North of England, who are part of an

academic and research partnership called Nurturing Innovation in Care Home Excellence in Leeds (NICHE-Leeds) (Leeds, 2025), and generated context-mechanism-outcome configurations from additional information they reported in relation to wandering safely. This process resulted in a list of 287 initial context-mechanism-outcome configurations.

We organised and refined the 287 initial context-mechanism-outcome configurations into a shorter list of 11 initial programme theories, in a two-stage process. First, (EH) grouped conceptually similar context-mechanism-outcome configurations together, then combined
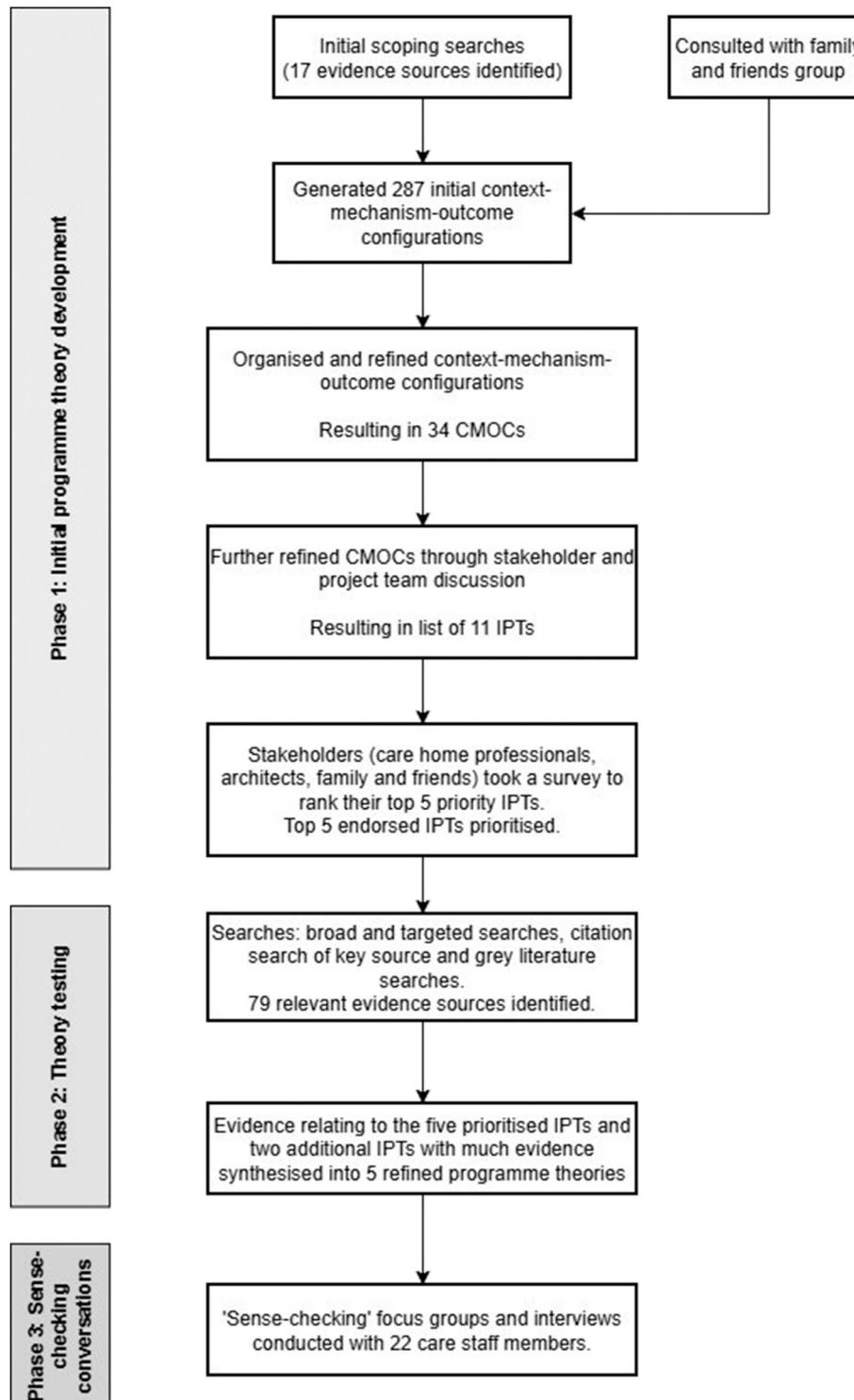

Fig. 1. Realist review process.

similar statements and removed duplicates. EH and BWH subsequently looked through the list and refined further by removing context-mechanism-outcome configurations that were tangential to safe wandering and further combining any that were conceptually similar. This resulted in a list of 34 context-mechanism-outcome configurations, which were further refined through discussion with stakeholders and within the project team, whereby an agreement was reached to further refine the context-mechanism-outcome configurations into a shorter list of 11 for prioritisation by grouping according to mechanisms related to promoting safe wandering. Stakeholders were members of the public and care home staff (care staff, managers, occupational therapists) with experience of care homes and wandering, and architects with experience in care home design, in the North of England, recruited through contacts of members of the research team.

In the second stage, we consulted with additional stakeholders (care staff, managers, other care home staff and architects) and asked them to rank their top five priority initial programme theories. We calculated frequencies of endorsement of each initial programme theory, then listed the initial programme theories in order of frequency of endorsement. We collated the rankings in a spreadsheet and prioritised the top five most frequently endorsed initial programme theories for further testing and refining, following consultation with stakeholders who highlighted the importance of those theories.

2.3. Phase 2: theory testing

2.3.1. Searches

An initial broad search for evidence to test the initial programme theories was conducted in PubMed, Cochrane Library, PsycInfo, CINAHL, ProQuest Dissertations & Theses Global, Scopus, and the National Institute for Health and Care Research (NIHR) Journals Library, using Boolean operators to combine terms relating to 'wandering' 'care homes' and 'dementia'. Initial searches were limited to items published between 2005 and 2024 (for pragmatic reasons) and published in English (Supplement 2).

This broad search was followed by targeted searches focused on the five prioritised initial programme theories (Supplement 2). Full text searches were undertaken using the search functions on Litsense and Scite, with combinations of terms and specific phrases from the initial programme theories plus 'wandering' and 'dementia'. The most rich and relevant article that included evidence relating to most initial programme theories (Griffiths et al., 2024) was entered into Scite and Google Scholar, and citations and 'related articles' were examined. Relevant websites (identified by the FREEDEM Lay Advisory Group, comprising members of the public and care home staff with experience of care homes and wandering in the North of England) were searched systematically via menu headings and by searching key terms relating to wandering and, where relevant, dementia (Supplement 2). One reviewer (EH) conducted and documented grey literature searches (Stansfield et al., 2016).

2.3.2. Study selection

Two reviewers (EH and BWH) used Rayyan to double-screen titles and abstracts from the initial broad search. Disagreements and queries were resolved by discussion with AWG, RD and MGC. EH, BWH and EF double-screened full texts of papers included at the abstract stage, focusing on relevance and richness (Box 1). The same approach was used to screen, review, and select grey literature full texts.

One reviewer, EH, who conducted the theory-focused searches, screened relevant extracts from each paper iteratively within the search results while searching, as Scite and Litsense present records in order of relevance. Potentially relevant sources were checked against the Rayyan database and, if new, full texts were screened.

Following the study selection process, it was clear that many sources reported data relevant to two additional initial programme theories from our initial list. Therefore, we synthesised these, bringing the total number of initial programme theories synthesised in the theory-testing phase to seven.

2.3.3. Data extraction

Two reviewers (EH and BWH) extracted data (study sample, methods, setting and care home context). Reviewers categorised theory-related data by each relevant initial programme theory at extraction, and logged judgements about relevance, richness and rigour (Box 1).

2.3.4. Synthesis

The initial unit for synthesis was the initial programme theory. EH synthesised data for each of the seven initial programme theories by reporting on contexts and mechanisms in relation to the outcomes of strategies used to support safe wandering (checked by AWG, RD and MGC). Two reviewers (EH and EF) summarised the synthesis for review by the lay advisory group. Because of the large amount of data relating to each theory, and diversity in contexts, mechanisms, outcomes and interventions, we organised the data relating to each theory by broadly grouping them by strategies to signpost within the paper. These groupings and categorisations were developed through discussions within the research team and with the lay advisory group.

During the synthesis, we identified several common mechanisms and contexts, and developed an overarching programme theory to demonstrate links between them. Within this overarching theory, we identified natural groupings within which distinct concepts could be arranged. These resembled the initial programme theories but were not exactly matching. We then grouped findings within these distinct concepts and synthesised them into five refined programme theories.

2.4. Phase 3: sense-checking conversations

After synthesising the data, we carried out 'sense-checking' of our

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Box 1
Definition of relevance, richness and rigour (Dada et al., 2023).

Relevance: The degree to which the source could contribute to theory building/testing, particularly in terms of descriptive data for one or more of our initial programme theories, and coding for dyads/triads (links between aspects of our initial programme theories)
Richness: The degree of 'conceptual richness' and/or 'contextual thickness' (sufficient detail on theoretical and conceptual development and contextual detail)
Rigour: The methodological quality of the source, including representativeness and quality of contribution to the context-mechanism-outcome configuration.

findings with care home staff through one-on-one conversations and focus groups, to assess the relevance of review findings to current practice. We presented the review methodology and lay summaries of each refined programme theory to staff, who provided their reflections and feedback on whether our findings aligned with their experiences.

Twenty-two care home staff from four care homes participated in sense-checking focus groups (n = 13) and one-to-one interviews (n = 9). Eighteen female and four male staff members took part. Participants were regional managers, team leaders, nurses, care staff, front-of-house managers, and housekeeping staff.

3. Results

3.1. Phase 1: programme theory development

The original list of initial programme theories is provided in Fig. 2, along with the prioritised initial programme theories, which were:

- Staff detect when residents need support (IPT3)
- Staff understanding of why each resident wanders (IPT4)
- Residents can't access dangerous spaces (IPT7)
- Residents are supported physically (IPT9)
- Residents are adequately nourished and/or hydrated (IPT10).

And two additional initial programme theories with a large volume of evidence:

- Residents can orient themselves and find their way (IPT6)
- Residents can access spaces (IPT8).

3.2. Phase 2: theory testing

3.2.1. Volume of evidence

For Phase 2, theory testing, of 2875 records retrieved through database searches, 155 full texts were screened and 57 were included. Of 5205 records retrieved through iterative initial programme theories searches, 45 full texts were screened and 19 were included. Of 251 potentially relevant grey literature sources examined, three were included. In total, 79 evidence sources were included in the realist synthesis (Fig. 3).

Characteristics of the included evidence sources are presented in Table 1 and relevance, richness and rigour are further detailed in Supplement 3. Evidence sources were published between 1987 and 2025, from a range of countries. There were 18 qualitative studies, 17 quantitative, eight mixed methods, four case studies, seven systematic reviews, one meta-review, 11 reviews of other types, nine commentaries, and four grey literature sources (one of which was identified through database searches). Evidence was generated in diverse settings including general care settings such as care homes, care communities, long-term care facilities and assisted living facilities, and those providing specialised support, such as nursing homes, dementia care units, special care units, psychiatric units, and related settings (e.g., a day centre, hospital, the community). Of the included evidence sources, 45 (57%) were considered trustworthy (judged high or moderate for rigour), and 34 (43%) were classed as untrustworthy (judged low for rigour). Twenty-seven (34%) were judged high, 43 (54%) were judged moderate, and 9 (11%) were judged as being low relevance. Ten (13%) were judged high, 49 (62%) were judged moderate and 20 (25%) were judged low richness (Table 1).
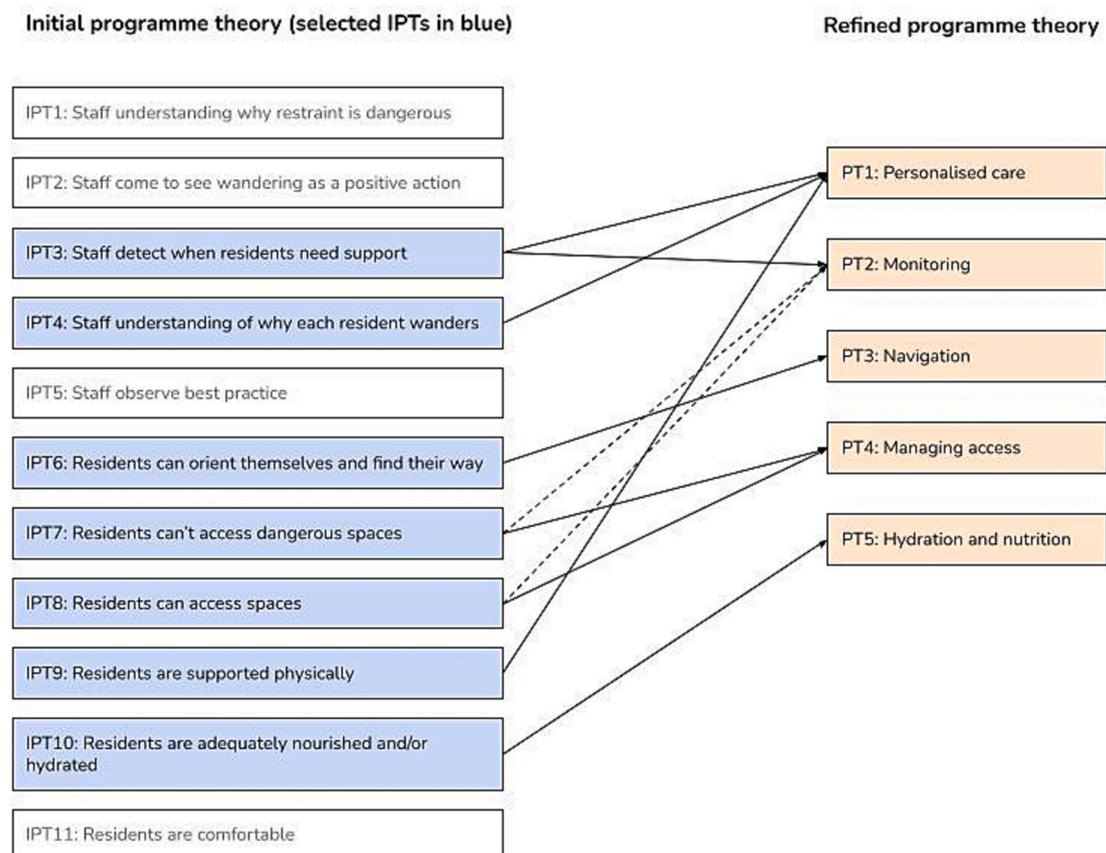

Fig. 2. Programme theory refinement (selected initial programme theories are in blue, solid arrows represent a major contribution to refined programme theories, dashed arrow represents a minor contribution to refined programme theories). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)
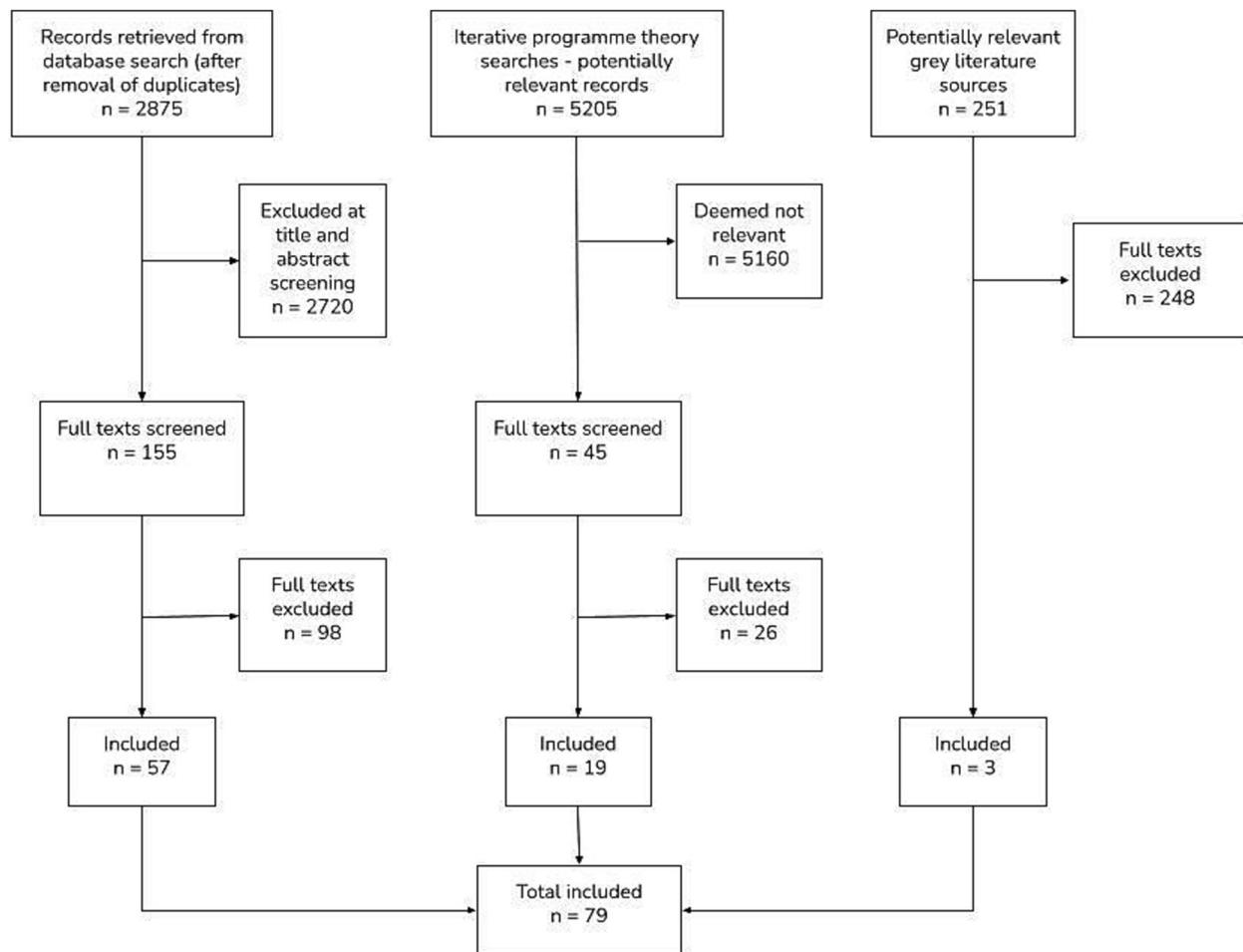
Fig. 3. PRISMA diagram of study selection.

3.2.2. Realist synthesis

The overarching programme theory developed during the synthesis is presented in Fig. 4. Within this overarching theory, we identified natural groupings within which distinct concepts could be arranged. These resembled the initial programme theories but were not exactly matching. We then grouped findings within these distinct concepts and synthesised them into the five refined programme theories resulting from natural grouping and distinct concepts identified within the overarching theory: (1) personalised care; (2) monitoring; (3) navigation; (4) managing access; (5) hydration and nutrition (Table 2). We have considered outcomes as part of each theory. Table S4.1 (Supplement 4) displays the evidence mapped to the initial programme theories and refined programme theories.

3.2.2.1. Personalised care.
Within a person-centred care approach, wandering is seen as purposeful, and a culture of positivity about wandering and the freedom to take risks, supports staff in using individualised strategies to support residents to wander. Adopting a person-centred approach requires staff training and adequate staffing levels to provide personalised support, particularly for residents who wander.

3.2.2.2. Life history.
Staff use strategies to understand each resident's life history, gaining insights into the reasons why they are wandering. Ongoing discussions with relatives and documentation in care plans or the Alzheimer's Society's 'This is me' leaflet provide insight into residents' previous careers, hobbies, and level of activity (Barrett et al., 2020; Griffiths et al., 2024; Heward et al., 2022; Mikhaylova-O'Connell et al., 2025; Wigg, 2010). Staff thus understand how walking and

movement are integrated into each resident's daily life, enabling provision of personalised and optimal support, including predicting which residents will wander (Barrett et al., 2020; Benbow, 2017; Dewing, 2011; Duffy and Hallahan, 2019; Griffiths et al., 2024; Heward et al., 2022; McQuilkin, 2016). As a result, residents are supported in wandering, with improved mood and reduced anxiety and agitation (Wigg, 2010).

3.2.2.3. Current motivations.
Knowing each resident extends beyond life history knowledge to include interpersonal skills such as patience, reassurance, empathy and trust (Heward et al., 2022). Staff gain insights into residents' experiences and motivations by speaking to them while walking, discussing what they are doing, and observing the way they interact with objects around the care home (Benbow, 2017; Dickinson and McLain-Kark, 1998; Mikhaylova-O'Connell et al., 2025). Having sufficient staffing levels enables staff to spend time with residents to understand their reasons for wandering (Barrett et al., 2020; Griffiths et al., 2024; Mikhaylova-O'Connell et al., 2025).

3.2.2.4. Formal wandering assessments.
Formal wandering tools and assessments like the Dewing screening tool can be integrated into care protocols and highlight physiological or psychological needs that may precede wandering (Dewing, 2011; Hirst and Metcalf, 1989; Neville et al., 2006). Ongoing assessments and reviews ensure the use of person-centred strategies, allowing tailored care plans to be developed for each resident that support safe wandering (Barrett et al., 2020).

3.2.2.5. Staff training.
Staff interpersonal skills development is

Table 1
Characteristics of included studies.

First author, year, country	Type of evidence	Study design	Setting	Strategy to support safe wandering	Participant type	Initial programme theories	Refined programme theories	Relevance, richness & rigour
Alam and Kim (2023), USA	Mixed methods	Survey and interview	Care home	Design elements	Care staff	3[a], 6, 7[a]	Navigation	Moderate relevance, moderate richness, low rigour
Anderson et al. (2023), various	Review	Experimental	Assisted living	Environmental modification to prevent exit	Residents	6[a], 7, 8[a]	Managing access	High relevance, moderate richness, low rigour
Anonymous. (2007), not reported	Commentary	N/A	Care home	Various	N/A	3[a], 6[a], 7[a]	Monitoring, Navigation, managing access	Moderate relevance, low richness, low rigour
Anonymous (2018), UK	Website	Blog	Care home	Wayfinding intervention (signs)	N/A	6[a]	Navigation	Low relevance, low richness, low rigour
Apple (2015), USA	Mixed-methods	Instrumental case study	Care home	Physical environment	Residents, Staff	3, 6, 7, 8, 9[a]	Monitoring, managing access	Moderate relevance, moderate richness, moderate rigour
Barrett et al. (2020), UK	Mixed-methods	Survey and interview, case studies	Extra care housing and retirement housing	Various, mainly focused on person-centred care	Managers, care staff and family members of residents	3[a], 4, 6[a], 7, 8[a], 9	Personalised care, Monitoring, managing access	High relevance, moderate richness, moderate rigour
Bautrant et al. (2019), not reported	Quantitative	Pre- and post-intervention	Care home	Environmental modification/ design elements	Residents	6	Navigation	Moderate relevance, low richness, low rigour
Benbow (2017), various	Commentary	N/A	Care home	Environmental modification/ design elements	N/A	3[a], 6[a], 7, 8	Personalised care, Monitoring, managing access	High relevance, moderate richness, moderate rigour
Bowes and Dawson (2019), various	Systematic review	Various	Various including care homes	Environmental design features, preventing exit	Various	6, 7, 8[a]	Monitoring, navigation managing access	High relevance, moderate richness, high rigour
Britton (2021), UK	Website	Blog	N/A	Various including nutrition and environmental modification	N/A	8[a], 9[a], 10[a]	Managing access, hydration and nutrition	Moderate relevance, moderate richness, low rigour
Brush and Calkins (2008), N/A	Commentary	N/A	Various	Wayfinding	N/A	6	Navigation	High relevance, moderate richness, high rigour
Brush et al. (2015), USA	Quantitative	Pre- and post-intervention	Care communities	Wayfinding intervention (signs)	Residents	6	Navigation	High relevance, moderate richness, moderate rigour
Caffò et al. (2014), Italy	Quantitative	Experimental	Care home and day centre	Assistive technology/ orientation	Residents	6	Navigation	High relevance, moderate richness, moderate rigour
Cheung et al. (2022), Hong Kong (China)	Quantitative	Observational	Care home	Remote sensing technology	Residents	3, 7[a]	Monitoring	Moderate relevance, moderate richness,

Table 1 (*continued*)

First author, year, country	Type of evidence	Study design	Setting	Strategy to support safe wandering	Participant type	Initial programme theories	Refined programme theories	Relevance, richness & rigour
Cohen-Mansfield and Werner (1998), N/A	Quantitative	Multiple single subject design	Nursing home	Design features	Residents	8	Managing access	moderate rigour Moderate relevance, moderate richness, moderate rigour
Detweiler et al. (2008), N/A	Quantitative	Observational	Care home	Garden access	Residents	7[a], 8, 9[a]	Managing access	High relevance, high richness, moderate rigour
Detweiler et al. (2009), not reported	Quantitative	Pre- and post-intervention	Care home	Garden access	Residents	8	Managing access	High relevance, high richness, moderate rigour
Dewing (2011), UK	Commentary	N/A	Care home	N/A	N/A	4[a], 7[a], 9[a]	Personalised care	Low relevance, low richness, low rigour
Dickinson et al. (1995), USA	Quantitative	Experimental	Care home	Visual barriers on exits	Residents	7	Managing access	Moderate relevance, moderate richness, low rigour
Dickinson and McLain-Kark (1998), USA	Qualitative	Experimental and observations	Care home	Visual barriers on exits	Residents	3[a], 4, 7	Monitoring, managing access	High relevance, high richness, low rigour
Dreyfus et al. (2018), Australia	Qualitative	Focus group	Care home	Perimeter fences	Staff, family members	6[a], 7, 8[a]	Managing access	High relevance, moderate richness, moderate rigour
Duffy and Hallahan (2019), UK	Commentary	N/A	Nursing home	Assessments and care planning	N/A	3, 4, 7[a], 8[a]	Personalised care, monitoring, managing access	Moderate relevance, moderate richness, low rigour
Faith (2014), Northern Ireland	Mixed methods	Ethnography, behavioural mapping	Care home	Layouts, routes, wayfinding	Residents, staff, family members	3, 4[a], 6, 7, 8, 9[a]	Personalised care, monitoring, navigation, managing access	High relevance, high richness, high rigour
Fine (2015), USA	Mixed-methods	Literature review and design brief	Care home & retirement communities	Design elements	N/A	6[a], 8[a]	Managing access	Low relevance, low richness, low rigour
Fleming and Purandare (2010), various	Literature review	Various quantitative	Long term care facilities	Various including design elements	N/A	6[a], 7[a]	Managing access	Moderate relevance, low richness, high rigour
Gibson et al. (2004), Canada	Qualitative	Observations	Care home	Orientation task	Residents	6	Managing access	Moderate relevance, moderate richness, moderate rigour
Griffiths et al. (2024), UK	Qualitative	Semi-structured interviews	Care home	Various, including environmental considerations and care home culture	Care home staff	3, 4, 6, 7, 8, 9[a]	Personalised care, navigation, managing access	High relevance, high richness, high rigour
Gulwadi (2013), USA	Mixed-methods	Exploratory study and qualitative interviews	Assisted living facility, skilled nursing facility, special care unit	Memory boxes for orientation	Residents and staff	6	Navigation	Moderate relevance, moderate richness, low rigour

Table 1 (*continued*)

First author, year, country	Type of evidence	Study design	Setting	Strategy to support safe wandering	Participant type	Initial programme theories	Refined programme theories	Relevance, richness & rigour
Heward et al. (2022), UK	Qualitative	Semi-structured interviews	Care home	Design features for orientation and wayfinding	Care home managers	4[a], 6, 8[a], 9	Personalised care, navigation, managing access	High relevance, moderate richness, moderate rigour
Hirst and Metcalf (1989), N/A	Commentary	N/A	N/A	Various including care planning	N/A	4[a], 10[a]	Personalised care, hydration and nutrition	Low relevance, low richness, low rigour
Holthe et al. (2018), various	Systematic review	Various	Community settings	Monitoring technology	People with dementia	3[a], 6[a]	Monitoring	Low relevance, low richness, moderate rigour
Hussian and Brown (1987), not reported	Quantitative	Experimental	Public mental health hospital	Visual barriers on exits	Residents	7	Managing access	High relevance, low richness, moderate rigour
Ilem and Feliciano (2018), USA	Quantitative	Experimental	Assisted living facilities	Shadow box wayfinding intervention	Residents	6	Navigation	High relevance, moderate richness, moderate rigour
Innes et al. (2011), UK	Qualitative study	Focus groups	Care home	Environmental design	Residents, family, care staff	6[a], 7[a], 8[a]	Navigation, managing access	Moderate relevance, moderate richness, high rigour
Jay (2014), USA	Quantitative	Experimental	Care home	Shadow box wayfinding intervention	Residents	6	Navigation	Moderate relevance, moderate richness, moderate rigour
Joy (2008), N/A	Commentary	N/A	Care home	Environmental design	N/A	6, 7[a]	Navigation, managing access	Low relevance, low richness, low rigour
Kearns et al. (2007), USA	Qualitative	Focus group	Hospital	Technology (elopement management systems)	Family members, Staff, People with dementia, Engineers	3, 7	Managing access	Moderate relevance, moderate richness, moderate rigour
Lancioni et al. (2013), Italy	Quantitative	Experimental	Day centre	Technology-based orientation system	Residents	6	Navigation	Moderate relevance, moderate richness, low rigour
Lancioni et al. (2011), not reported	Quantitative	Experimental	Day centre	Orientation system with sound at each destination	Residents	6	Navigation	High relevance, moderate richness, low rigour
Li et al. (2023), China	Literature review and case study	N/A	Day centre	Environmental design and layout	N/A	6[a], 8[a]	Managing access	Moderate relevance, low richness, low rigour
Lorey (2019), Israel	Literature review and commentary	N/A	Nursing home	False bus stops	N/A	7	Managing access	High relevance, high richness, low rigour
Ludden et al. (2019), Netherlands	Meta-review and case studies	Various	Care home	Multi-sensory handrails	Residents	6	Navigation	Moderate relevance, moderate richness, low rigour
MacAndrew et al. (2019), various	Systematic review	Experimental	Community and day centre	Various including technology, sensory therapies	Residents	3, 6[a], 7	Monitoring	Moderate relevance, moderate

Table 1 (*continued*)

First author, year, country	Type of evidence	Study design	Setting	Strategy to support safe wandering	Participant type	Initial programme theories	Refined programme theories	Relevance, richness & rigour
				and environmental design.				richness, low rigour
Margot-Cattin and Nygård (2006), Switzerland	Qualitative	Observations and semi-structured interviews	Hospital	Various including access-control technology	Staff and residents	3[a], 6, 7, 8	Monitoring, managing access, navigation	High relevance, high richness, moderate rigour
Marquardt and Schmieg (2009), Germany	Quantitative	Empiric-qualitative exploration	Nursing home	Architectural design for wayfinding	Residents	6	Navigation	High relevance, high richness, moderate rigour
Marquardt (2011), various	Review	N/A	Nursing home	Architectural design for wayfinding	N/A	6, 8[a]	Navigation, managing access	Moderate relevance, moderate richness, moderate rigour
Mazzei et al. (2014), Canada	Qualitative	Observations, case study	Hospital	Environmental design	Residents	7, 8[a]	Navigation, managing access	Moderate relevance, moderate richness, moderate rigour
McGilton et al. (2003), Canada	Quantitative	Randomised controlled trial	Nursing home	Backwards chaining procedure for orientation	Residents	6	Navigation	High relevance, moderate richness, moderate rigour
McQuilkin (2016), USA	Mixed-methods	Architectural assessment. Interviews, observations	Care home	Architectural features	Staff	3, 4, 6, 7[a], 8, 9	Monitoring, navigation, managing access	High relevance, moderate richness, moderate rigour
Meiner (2000), not reported	Case study	Observational	Nursing home	Care planning	Residents	3[a], 4[a], 7[a], 9[a]	Navigation	Low relevance, low richness, low rigour
Mikhaylova-O'Connell et al. (2025), UK	Qualitative	Semi-structured interviews	Care home	Person-centred care	Managers, care staff, activity coordinators, nurses	3, 4, 9[a], 10[a]	Personalised care, monitoring, hydration and nutrition	High relevance, moderate richness, moderate rigour
Miskelly (2004), UK	Quantitative	Single group design	Care home, hospital, community	Electronic tagging	Residents	3, 7	Monitoring	Moderate relevance, moderate richness, low rigour
Moore et al. (2009), not reported	Review and conceptual framework development	N/A	N/A	Various including environmental modification, staff training, technology	N/A	3, 6[a], 7, 8[a]	Monitoring, managing access	Moderate relevance, low richness, low rigour
Mueller et al. (2013), Germany	Qualitative	Semi-structured interviews and observations	Care home, hospital & assisted living	Various environmental features and technological interventions	Staff, residents, relatives	3, 6[a], 7	Monitoring, managing access	High relevance, moderate richness, high rigour
Murphy et al. (2017), UK	Qualitative	Semi-structured interviews and focus groups	Care home	Nutrition	Staff, managers, health professionals	10[a]	Hydration and nutrition	Low relevance, low richness, high rigour
Murphy et al. (2019), not reported	Grey literature/ guidelines	N/A	N/A	Nutrition	N/A	10	Hydration and nutrition	Moderate relevance, moderate richness, moderate rigour
Neubauer et al. (2018), various	Literature review	Various including	Various	Technology to manage wandering,	Caregivers	3, 6[a], 7, 8[a]	Monitoring, managing access	Moderate relevance, moderate

Table 1 (*continued*)

First author, year, country	Type of evidence	Study design	Setting	Strategy to support safe wandering	Participant type	Initial programme theories	Refined programme theories	Relevance, richness & rigour
		qualitative and quantitative		including alarms and sensors				richness, moderate rigour
Neubauer and Liu (2020), Canada	Qualitative	Semi-structured interviews	Community	Various including redirection, monitoring technology and signage	Various including people with dementia, family members, care staff, law enforcement/search and rescue personnel	3, 6[a], 7	Monitoring	Moderate relevance, moderate richness, moderate rigour
Neville et al. (2006), N/A	Commentary	N/A	N/A	Staff training, screening tools, monitoring technology	N/A	3, 4	Personalised care, monitoring	Moderate relevance, low richness, low rigour
Niemeijer et al. (2015), Netherlands	Qualitative	Ethnography	Care home	Surveillance technology	Residents, staff, relatives	3, 7[a], 8, 9[a]	Monitoring, managing access	Moderate relevance, moderate richness, moderate rigour
O'Malley et al. (2017), various	Review	N/A	Various	Wayfinding	Various including resident and care staff	6	Navigation	Moderate relevance, moderate richness, low rigour
Olson and Albensi (2021), various	Literature review and commentary	Various (review)	Care home	Various, including wayfinding and garden access	Various including resident and care staff	6, 8	Navigation, managing access	Moderate relevance, moderate richness, low rigour
Padilla (2011), various	Systematic review	Efficacy studies	Various	Various environmental design features	Person with dementia	7[a]	Navigation, managing access	Moderate relevance, low richness, high rigour
Padilla et al. (2013), Spain	Case study	Observational	Day centre	Environmental modification and behavioural intervention	Person with dementia	7	Managing access	Moderate relevance, moderate richness, low rigour
Passini et al. (2000), Canada	Qualitative	Interviews and multiple case study	Nursing home	Design features, Care home culture	Staff	6, 7[a], 8, 9[a]	Monitoring, navigation, managing access	High relevance, high richness, moderate rigour
Provencher et al. (2008), USA	Case study	Observational	Senior residence	Error-based technique for wayfinding	Resident	6	Navigation	Moderate relevance, moderate richness, low rigour
Roberts (1999), UK	Case study	Observational	Hospital	Design features including camouflage	Patients	7	Managing access	Moderate relevance, low richness, low rigour
Rule et al. (1992), various	Review	N/A	Various	Wayfinding	Residents	6	Navigation	Moderate relevance, moderate richness, low rigour
Seetharaman et al. (2022), various	Systematic review	Grey literature and guidelines	Care home	Guidelines for staffing and physical environment	N/A	3[a], 4[a], 6, 7, 8	Personalised care, navigation	Moderate relevance, moderate richness, moderate rigour
Shabha et al. (2022), various	Systematic review	Various	Various	Wayfinding	Residents	3[a], 6	Navigation	High relevance, moderate richness, moderate rigour
Sharp (2021), UK	Website	Blog	N/A	Nutrition	N/A	10[a]	Hydration and nutrition	Moderate relevance, moderate richness, low rigour

Table 1 (*continued*)

First author, year, country	Type of evidence	Study design	Setting	Strategy to support safe wandering	Participant type	Initial programme theories	Refined programme theories	Relevance, richness & rigour
Tseng and Fang (2022), Taiwan	Quantitative	Experimental	Nursing home	Wayfinding technology support	Residents, staff	3[a], 6[a]	Monitoring	Moderate relevance, low richness, low rigour
Tufford et al. (2018), various	Qualitative	Ethnographic observations and interviews	Care home	Environmental design, locking doors,	Management, staff, union representatives, residents, family members/informal carers	7, 8, 9	Managing access	High relevance, moderate richness, moderate rigour
van Buuren and Mohammadi (2022), Netherlands	Mixed methods	Comparative floorplan analysis	Care home	Environmental layout	N/A	6	Navigation	Moderate relevance, moderate richness, moderate rigour
van Hoof et al. (2010), Netherlands	Qualitative	Focus groups	Community	Environmental design	Patient and community organisation representatives	3[a], 6, 7, 8	Monitoring	Moderate relevance, low richness, moderate rigour
van Liempd et al. (2023), various	Systematic review	Qualitative, quantitative, or mixed methods	Nursing home	Freedom of movement	Staff, management	8[a]	Managing access	Moderate relevance, low richness, high rigour
Wiener and Pazzaglia (2021), N/A	Commentary	N/A	Care home	Wayfinding	N/A	6	Navigation	High relevance, moderate richness, low rigour
Wigg (2010), USA	Qualitative	Observational	Care home	Locked doors and sensors	Residents	3, 4, 7, 8, 9	Personalised care, monitoring, managing access	High relevance, high richness, moderate rigour
Wigg (2020), various	Review	N/A	Care home & community	Monitoring technology	N/A	3[a], 7[a], 8[a]	Monitoring, managing access	Moderate relevance, low richness, low rigour

N/A, not applicable.

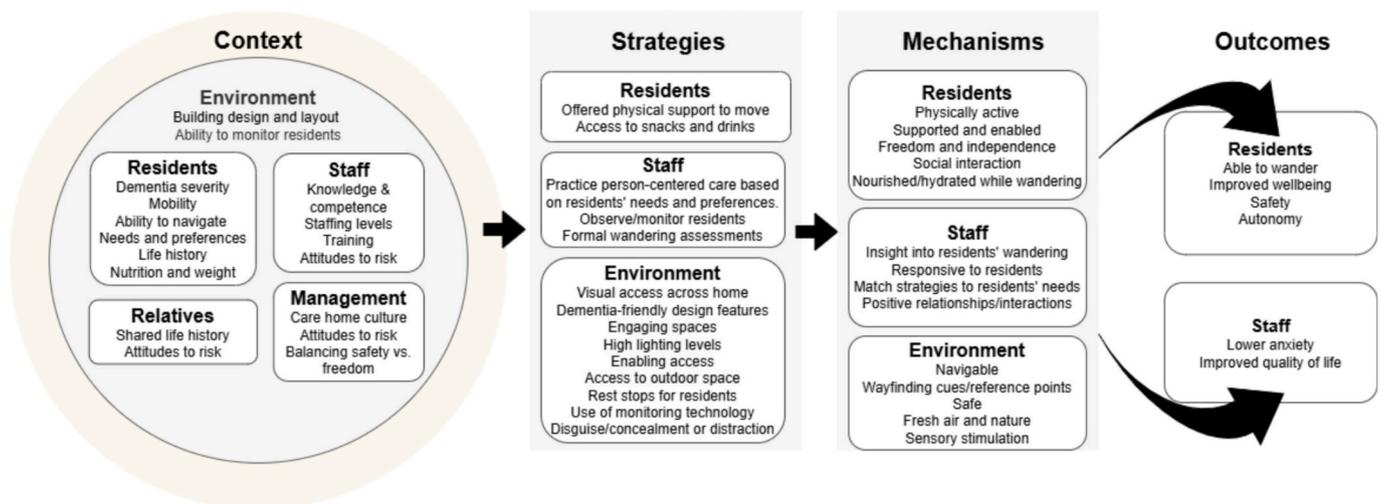[a] Denotes minor contribution to the initial programme theory.

Fig. 4. Overarching programme theory for safe wandering in care homes (direct relationships).

facilitated through training focused on supporting residents' individual needs and enhanced through on-the-job learning, mentoring or shadowing (Barrett et al., 2020; Faith, 2014; Griffiths et al., 2024; Seetharaman et al., 2022).

3.2.2.6. Monitoring

3.2.2.6.1. Visual monitoring. A layout with good visibility across the care home, including outdoor spaces, allows staff to monitor residents non-invasively (Alam and Kim, 2023; Faith, 2014; McQuilkin, 2016;

Table 2
Refined programme theories.

Programme theory	Context	Strategy	Mechanism	Outcome
Personalised care	Staffing levels are suitable, with staff trained in person-centred care.	Staff actively seek to know the residents and their histories, and practice person-centred care.	Staff understand the reasons behind wandering, generally and in the moment, and match strategies to each resident. Staff and residents have positive relationships and interactions.	Residents can wander, are kept safe, and have high well-being.
Monitoring	Care home setup enables non-invasive monitoring, through good visual access or technological solutions.	Staff monitor residents by keeping them in sight or with technological aids.	Staff can detect when residents need support to walk, while also allowing residents freedom and independence	Residents experience autonomy resulting from independence, which improves their wellbeing. Residents can wander while staying safe from harm. Staff are less anxious.
Navigation	Design features are actively utilised to minimise the impact of residents' diminished orientation and wayfinding abilities due to dementia-related cognitive impairment.	Dementia-friendly design features are incorporated into the environment to enable wayfinding.	The space becomes navigable even for residents unable mentally map their surroundings. Residents orient themselves and wayfind using environmental cues, and recognise familiar items and decor.	Residents have independence and autonomy in walking.
Managing access	Care home managers and staff must balance the need for resident safety with their need for freedom, independence and autonomy. This balance is informed by varying levels of risk aversion and risk-taking.	Residents have access to desirable/essential spaces, whilst being prevented from entering unsafe areas. This may involve locking/unlocking doors and using access control or alert technology. It may also involve strategies that leverage residents' visuospatial deficits to deter entry to particular areas.	Accessing spaces gives residents independence and a sense of autonomy, and restricting access to dangerous areas maintains safety. Access to outdoor spaces provides fresh air and a connection with nature.	Residents are kept safe from harm, and access and autonomy improve residents' wellbeing.
Hydration and nutrition	Care homes seek to prevent residents who regularly wander from losing weight, and ensure residents are adequately nourished and hydrated even when they do not stay seated at mealtimes. Residents eat and drink as they walk.	Staff provide snacks and drinks in various locations, including on common wandering routes, ensuring availability of high-energy and nutritious food in small, accessible portions.	Residents can maintain their nutrition and hydration while walking as and when they wish, giving them a sense of autonomy.	Residents experience improved health and wellbeing.

Wigg, 2010). Thus, staff can identify and assist residents who need help walking, enhancing their safety while promoting independence and autonomy (McQuilkin, 2016). To improve monitoring, a smaller space with fewer residents and shorter corridors with no corners or kinks is ideal (Apple, 2015; Faith, 2014; van Hoof et al., 2010). Locating the staff base centrally can improve visual access (Faith, 2014; Passini et al., 2000; Seetharaman et al., 2022) and larger homes can be separated into small clusters to facilitate visual monitoring (Faith, 2014).

3.2.2.6.2. Nighttime monitoring. Residents may be disorientated or confused when they get out of bed at night, and are likely to come to harm if they fall (Faith, 2014). Staff can keep residents safe through frequent monitoring (Duffy and Hallahan, 2019), although poor staff adherence to checks may make this less successful (Moore et al., 2009).

3.2.2.7. Use of technology. Technological devices including cameras, sensors, door alarms, GPS trackers and motion detectors can enable staff to monitor residents by sounding an alarm or pushing a notification to their mobile device (2007, Barrett et al., 2020, Cheung et al., 2022, Dickinson and McLain-Kark, 1998, Holthe et al., 2018, Kearns et al., 2007, MacAndrew et al., 2019, Mikhaylova-O'Connell et al., 2025, Miskelly, 2004, Moore et al., 2009, Neubauer and Liu, 2020, Neubauer et al., 2018, Neville et al., 2006, Niemeijer et al., 2015, Tseng and Fang, 2022, van Hoof et al., 2010, Wigg, 2010, Wigg, 2020). Technology allows staff to monitor residents from a distance and be notified when assistance is needed (Cheung et al., 2022; Neubauer et al., 2018; Wigg, 2010), which affords residents independence and autonomy while maintaining safety (Neubauer et al., 2018). Residents have the freedom to access indoor and outdoor areas of the care home (Neubauer et al., 2018), while staff are reassured of residents' safety, leading to reduced staff anxiety (Tseng and Fang, 2022). This enables staff to engage positively with residents, leading to better interactions (Wigg, 2010). Granting this freedom also reduces residents' confusion, frustration and agitation when confronted with a physical barrier, such as a locked door

(Faith, 2014; van Liempd et al., 2023).

Technological failure, however, can lead to problems (Margot-Cattin and Nygård, 2006). Issues (e.g., an empty battery) may mean resident movement is not detected compromising residents' safety (Benbow, 2017; Mueller et al., 2013; Neubauer et al., 2018; Niemeijer et al., 2015). Residents may remove a wearable monitoring tag if they feel stigmatised, uncomfortable with being monitored, or do not recognise it (Bowes and Dawson, 2019; Holthe et al., 2018; Margot-Cattin and Nygård, 2006; Neubauer and Liu, 2020; Neubauer et al., 2018; Niemeijer et al., 2015). Conversely, staff may not respond to alerts, due to not noticing them, assuming someone else will respond, or irritation over frequent alerts (Benbow, 2017; Niemeijer et al., 2015). Where technology is used to manage access, residents may experience distress upon witnessing another resident entering areas restricted to them (Niemeijer et al., 2015). Staff may feel a (false) sense of security, leading to reduced attention to residents' needs, and potentially management reducing staffing levels (Margot-Cattin and Nygård, 2006). Ethical concerns surround privacy and autonomy, with potential for monitoring to limit residents' control, autonomy and freedom to wander (Cheung et al., 2022; Faith, 2014; Miskelly, 2004; Niemeijer et al., 2015).

3.2.2.8. Navigation

3.2.2.8.1. Orientation and wayfinding difficulties. As dementia progresses, problems with orientation and wayfinding can worsen (Marquardt and Schmieg, 2009). Orientation is a resident's sense of their place in the environment, while wayfinding is their ability to locate and move through spaces in the care home. As these abilities decline, a resident may find themselves in an unexpected place because of orientation difficulties, and familiar areas might seem out of place because of wayfinding difficulties. Residents may have sensory processing problems, visual/auditory impairments, and reduced ability to form and use a cognitive map, leading to deteriorating orientation (Marquardt, 2011; Marquardt and Schmieg, 2009; Shabha et al., 2022). Cognitive maps are

spatial representations of the environment that created in the mind's eye, containing information on places beyond the range of vision (Marquardt, 2011). When disoriented, residents can experience helplessness, raised blood pressure, headaches, increased physical exertion and fatigue (Brush and Calkins, 2008). Thus, orientation and wayfinding strategies are needed to help residents wander.

3.2.2.8.2. Wayfinding strategies. Strategies can be categorised into compensatory and restorative. Compensatory strategies provide residents with new ways to perform cognitive and behavioural tasks based on their existing competencies, while restorative strategies focus on restoring functioning (Caffò et al., 2014). Common compensatory strategies include care home layout, colours and designs, signage, points of interest, personalised items, visual cues, and sensory stimulation. Restorative strategies include wayfinding training (Bowes and Dawson, 2019; Caffò et al., 2014; Faith, 2014; Lancioni et al., 2013, 2011). Strategies are more effective when care quality is high, and when staff implement person-centred care, tailoring strategies to each resident (Bowes and Dawson, 2019) (see 'Personalised care').

3.2.2.8.3. Care home layout. Simple, compact care home layouts with good visual access aid navigation when residents can see their destination (Marquardt, 2011; Marquardt and Schmieg, 2009; O'Malley et al., 2017; van Buuren and Mohammadi, 2022). Walking around corners, decision-making at junctions and navigating dead-end corridors make wayfinding difficult, as the destination is not visible (Marquardt and Schmieg, 2009, O'Malley et al., 2017, van Buuren and Mohammadi, 2022) and decision points can cause confusion (Faith, 2014). A home-like layout can aid navigation (van Buuren and Mohammadi, 2022). Placing a kitchen or dining room at points where the direction changes can aid navigation as a meaningful anchor point (Marquardt, 2011).

Circular layouts support wandering by allowing residents to walk continuously without reaching dead ends (Faith, 2014; Mazzei et al., 2014), while square-shaped layouts can be challenging due to frequent direction changes (Faith, 2014; Marquardt, 2011; Marquardt and Schmieg, 2009). Whether square or circular, continuous layouts facilitate wayfinding by allowing residents to walk without the need to orient themselves (Faith, 2014; Passini et al., 2000). However, this can also lead to fatigue and exhaustion, especially in residents who tend to walk continuously (Faith, 2014).

A symmetrical layout can aid navigation when the two sides are sufficiently distinct, aiding development of a mental map (Wiener and Pazzaglia, 2021). When both sides look identical, residents experience confusion and struggle with orientation and wayfinding, as spaces are not in expected locations (Alam and Kim, 2023; Faith, 2014). Open-plan layouts can aid navigation by providing visual access to destinations (McQuilkin, 2016; Shabha et al., 2022), however residents may struggle to distinguish between spaces unless they are well-defined, presenting a navigational challenge (Faith, 2014). In non-open-plan layouts, visual access can be improved by adding glazing and large doorways, giving residents sight of their destinations (Faith, 2014; Innes et al., 2011; Margot-Cattin and Nygård, 2006; McQuilkin, 2016). Placing spaces closer together and ensuring a clear path through the care home can enable wayfinding (Faith, 2014; Griffiths et al., 2024; Seetharaman et al., 2022). Wide corridors allow residents ample space to wander, enhancing residents' sense of freedom (Griffiths et al., 2024; van Buuren and Mohammadi, 2022).

3.2.2.8.4. Points of interest. Care home layouts can facilitate navigation and orientation by making certain spaces prominent, and therefore more meaningful and memorable to residents. A well-stocked, live-in kitchen can act as a focal point, particularly if there is only one available, or if multiple kitchens are positioned side-by-side (Marquardt, 2011, Marquardt and Schmieg, 2009). Regardless of layout, navigation can be aided by visual cues and points of interest. Distinct spaces, in both function and design, that are architecturally legible, improve navigation (Faith, 2014; Marquardt, 2011; Marquardt and Schmieg, 2009; O'Malley et al., 2017). Residents can recognise spaces more easily based on their function, aiding orientation (Faith, 2014; Heward et al., 2022;

Marquardt, 2011; Marquardt and Schmieg, 2009; Seetharaman et al., 2022). Rooms with multiple functions (e.g., dining room also used for activities), can cause confusion (Faith, 2014; Seetharaman et al., 2022).

Points of interest located throughout the care home (e.g., murals, paintings, clocks, furniture, memory boxes, architectural elements, the lift) can function as landmarks, aiding wayfinding (Alam and Kim, 2023; Gulwadi, 2013; Ilem and Feliciano, 2018; Jay, 2014; Joy, 2008; Marquardt and Schmieg, 2009; McQuilkin, 2016; O'Malley et al., 2017; Wiener and Pazzaglia, 2021), especially when hallways are similar (2007). Landmarks help residents recognise their position and orientate towards their destination (2007, Rule et al., 1992, Wiener and Pazzaglia, 2021), particularly if they are unique, salient, distinctive and persistent (Brush et al., 2015; Marquardt and Schmieg, 2009; O'Malley et al., 2017; Wiener and Pazzaglia, 2021), and easy to recognise (Wiener and Pazzaglia, 2021). 'Beacons' (landmarks viewable from decision points) are particularly effective for navigation (O'Malley et al., 2017, Wiener and Pazzaglia, 2021), especially when they are nameable (e.g., 'clock') (Wiener and Pazzaglia, 2021). Points of interest encourage purposeful movement, attract residents' attention to certain areas and start conversations (e.g., shop front displays) (Faith, 2014; Griffiths et al., 2024). Adding furniture along long corridors for rest stops can alleviate tiredness and encourage walking (Griffiths et al., 2024). Some points of interest, however, can be confusing, for instance, residents trying to interact with a mural (Griffiths et al., 2024). Similarly, residents can become disorientated and confused when furniture arrangements change unexpectedly, leading to falls (Alam and Kim, 2023).

3.2.2.8.5. Colour and design. Colour and design can aid orientation and wayfinding. Consistent use of colours throughout the care home helps residents interpret their environment (Brush et al., 2015) and varying colours by location enables residents to orient themselves (Alam and Kim, 2023; Heward et al., 2022; Innes et al., 2011; Rule et al., 1992). Painting areas and features differing colours (e.g., residents' room doors) can distinguish the spaces, aiding navigation (Alam and Kim, 2023; Heward et al., 2022). Creating colour contrast between different elements (e.g., handrails and walls), can assist residents with visual impairments to perceive and identify key features, improving wayfinding and reducing falls (Brush et al., 2015; Faith, 2014; Olson and Albensi, 2021). Since residents often look downwards when walking, floor coverings varying in colour can facilitate wayfinding (Alam and Kim, 2023, Faith, 2014). Plain floor coverings without patterns or swirls can be easier for walking, as residents may perceive patterns as holes or water due to dementia-related visuospatial distortions (Alam and Kim, 2023; Faith, 2014; Marquardt, 2011; Olson and Albensi, 2021). Handrails provide a guide for residents to follow with stopping points when they end and support walking for longer distances (Faith, 2014). Bright lighting (natural and artificial) ensures residents can see well, even with visual impairments, and enables detection of wayfinding cues (Bautrant et al., 2019; Brush and Calkins, 2008; Faith, 2014; van Buuren and Mohammadi, 2022).

3.2.2.8.6. Signage. Signs that are easy to see, understand and follow guide residents, aiding navigation (Griffiths et al., 2024). Low positioning (including on the floor), aligns with residents' downward gaze, making signs easier to see (2007, Alam and Kim, 2023, Brush et al., 2015, Brush and Calkins, 2008, Faith, 2014, Marquardt, 2011, Seetharaman et al., 2022, Wiener and Pazzaglia, 2021). Placing signs in uncluttered areas reduces the chance of information overload (Marquardt, 2011), and simple, uncluttered signs with large text, sans serif fonts, bold colours, and high colour contrast enhances visibility and clarity (Brush et al., 2015; Jay, 2014). Signs combining words with pictograms are easier to follow and do not rely on word recognition (Brush et al., 2015; Faith, 2014; Heward et al., 2022; Marquardt, 2011), particularly when using representational images (Wiener and Pazzaglia, 2021). Naming and labelling areas of the care home (e.g., door numbers, 'street' addresses or name labels for residents' rooms) can further aid navigation (Alam and Kim, 2023; Faith, 2014; Gulwadi, 2013; Padilla, 2011), especially when residents can recall their door number or

'address', perhaps if written on their key (Anonymous, 2018; Faith, 2014). However, a room number that differs from a resident's previous house number can inhibit recall, as past addresses may interfere with learning the new one (Faith, 2014).

3.2.2.8.7. Multi-sensory stimulation. Multi-sensory stimulation can aid wayfinding by providing multiple types of information (Alam and Kim, 2023; Brush and Calkins, 2008; Marquardt, 2011). If one sense is impaired, residents can use another (Marquardt, 2011), and integrating stimuli from various senses and sources creates a coherent environment (Brush et al., 2015; Ludden et al., 2019). Sensory cues aid orientation when coherent with the space (e.g., TV sounds in the living room, coffee and food smells from the kitchen/dining area) (Alam and Kim, 2023; Faith, 2014). However, overbearing sensory stimulation (e.g., loud sounds) can cause distress.

3.2.2.8.8. Support from staff. Staff can support wayfinding through physical assistance, helping residents move in the right direction while also providing social support and interaction, benefiting residents' well-being (Dewing, 2011; Faith, 2014; Heward et al., 2022; Meiner, 2000; Niemeijer et al., 2015; Rule et al., 1992). However, frequent accompaniment can reduce wayfinding abilities, potentially reducing autonomy, by giving residents fewer opportunities to practice their skills (Passini et al., 2000).

3.2.2.8.9. Route learning. Restorative strategies aiming to improve route learning can be successful when the surroundings are facilitative, for instance, a simple floor plan and key spaces located in close proximity (Caffò et al., 2014). Multiple trials in relatively quick succession are required for successful route learning, but some residents may forget the route once training ends (McGilton et al., 2003; Provencher et al., 2008). Access control systems (e.g., keycard access to bedrooms) support wayfinding by providing reinforcement, assisting recognition of residents' own rooms and reducing the likelihood of unsuccessful door-testing (Margot-Cattin and Nygård, 2006).

3.2.2.9. Managing access

3.2.2.9.1. Balancing safety and freedom. Concerns about residents' safety from management, care staff and relatives provide an overarching context for preventing residents from entering unsafe spaces. Different levels of risk aversion influence the strategies implemented, creating tension between safety and freedom for residents (Griffiths et al., 2024). Additionally, care home managers may worry about potential legal consequences of if residents come to harm (Wigg, 2010).

3.2.2.9.2. Access to spaces within the care home. Access can be facilitated by a simple, compact, open-plan layout (see 'Navigation') situated on a single floor, with a wandering path throughout the home, and clearly visible common spaces located within close proximity (Anderson et al., 2023; Benbow, 2017; Faith, 2014; Li et al., 2023; Passini et al., 2000; Seetharaman et al., 2022). Unlocked doors throughout the care home can reduce anxiety and improve sleep in residents (Faith, 2014; Niemeijer et al., 2015; Tufford et al., 2018; van Liempd et al., 2023; Wigg, 2010).

Access to spaces throughout the care home is enhanced and enabled by ensuring that fixtures and fittings are obvious and easy to use. Door handles increase accessibility over door knobs (Faith, 2014), and bold colours and colour contrasts can make handrails, door features and spaces easy to see and navigate (Faith, 2014; Gibson et al., 2004; Heward et al., 2022; Seetharaman et al., 2022) (see 'Navigation'). Visual enhancements can enable access by making spaces appealing, for instance, by depicting natural scenery (Cohen-Mansfield and Werner, 1998). Maintaining visual access throughout the care home and to outdoor areas increases light levels and promotes freedom of movement (Faith, 2014; Fine, 2015; McQuilkin, 2016). Good lighting enables access to spaces, by compensating for age-related visual impairments (Benbow, 2017; Faith, 2014). Access is further enabled by floor coverings that are plain and simple, without any patterns that could be interpreted as holes, steps, water or obstructions (Apple, 2015; Faith,

2014; Passini et al., 2000; Seetharaman et al., 2022; Shabha et al., 2022). Hard floors are easier for residents to walk on than carpet, whereas uneven flooring and steps can increase falls (Britton, 2021; Faith, 2014).

3.2.2.9.3. Access to outdoor space. Granting residents access to indoor and outdoor spaces in the care home can improve wellbeing and give a sense of freedom and autonomy (Faith, 2014; Griffiths et al., 2024; Innes et al., 2011; McQuilkin, 2016; Wigg, 2010). Access can reduce agitation, frustration and distress, improve mood, quality of life, sleep quality, memory, language abilities, spatial abilities and energy levels and allow residents to escape excessive stimulation, noise and crowding inside the care home (Detweiler et al., 2009; Faith, 2014; Griffiths et al., 2024; McQuilkin, 2016; Neubauer et al., 2018; Olson and Albensi, 2021; Tufford et al., 2018; van Liempd et al., 2023; Wigg, 2010), in addition to improving the quality of life of staff members correspondingly, as residents are less agitated (Detweiler et al., 2008). Outdoor spaces can benefit residents through physical activity, exposure to fresh air, sunlight and greenery, contact with plants and animals, and exposure to seasonal change (Faith, 2014; Marquardt, 2011; McQuilkin, 2016; van Liempd et al., 2023; Wigg, 2010), in addition to increased and varied opportunities for social interaction with relatives and care staff (Detweiler et al., 2008; Innes et al., 2011). Outdoor access is facilitated by ensuring such spaces contain shelter, adequate lighting, year-round access, ramps, handrails, sufficient interest (including places with unique character and intense activity), rest stops/seating, and wide walking paths with safe, level surfaces (Anderson et al., 2023; Apple, 2015; Faith, 2014; Fine, 2015; Innes et al., 2011; Marquardt, 2011; McQuilkin, 2016; Moore et al., 2009; Wigg, 2020). Staff can facilitate and support access to outdoor spaces by monitoring residents (see 'Monitoring') and ensuring they have appropriate clothing for the weather (McQuilkin, 2016). Doors leading outside from the live-in kitchen and/or residents' bedrooms facilitate access to outdoor spaces (Fine, 2015; Marquardt, 2011; Seetharaman et al., 2022; Tufford et al., 2018).

3.2.2.9.4. Preventing access to unsafe spaces. Several strategies have been employed by care home staff and management to prevent residents from accessing places that may present a safety hazard, to allow them to wander safely in other areas.

3.2.2.10. Camouflage or illusion.

Camouflage or illusion can be used to facilitate wandering in certain areas of the care home. This included camouflaging doors to unsafe spaces (Alam and Kim, 2023; Anderson et al., 2023; Benbow, 2017; Bowes and Dawson, 2019), such as disguising them as a continuation of the wall or with a mural, or disguising distinguishing features on a door such as the panic bar, door handle, using frosted glass, placing a mirror on the door, or placing markings in front of the door (e.g., tape placed across the floor as a two-dimensional grid) (Alam and Kim, 2023; Anderson et al., 2023; Barrett et al., 2020; Benbow, 2017; Dickinson and McLain-Kark, 1998; Dickinson et al., 1995; Fleming and Purandare, 2010; Hussian and Brown, 1987; Joy, 2008; Mueller et al., 2013; Padilla et al., 2013; Padilla, 2011; Roberts, 1999). Camouflage is most effective when lighting is good and the level of contrast is not too high or low (Anderson et al., 2023). Residents often avoid camouflaged exit doors because visual and spatial perception issues prevent them from recognising the door (Alam and Kim, 2023; Benbow, 2017; Joy, 2008). When residents move away from a disguised door on their own, staff spend less time redirecting them and, therefore, have time for positive interactions (Anderson et al., 2023).

Residents with less significant cognitive impairments may still recognise a camouflaged door, leading to an increase in door-testing (Anderson et al., 2023; Dickinson and McLain-Kark, 1998; Mazzei et al., 2014). Placing a mirror in front of a door can cause symptoms associated with agitation in some residents (Padilla, 2011).

Disguising spaces poses potential ethical challenges due to inherent deception, although it could be argued that if the act of deception

improves the well-being of residents it may be warranted (Lorey, 2019). Residents who cannot perceive the exit door may find exiting the care home challenging in a fire (Anonymous., 2007), although staff support and additional signage can mitigate this risk (Benbow, 2017). Positioning doors to limit visual access from communal and circulation spaces can reduce residents' exiting due to the lack of a visual exit cue (Anderson et al., 2023; Benbow, 2017; Faith, 2014). Door positioning can also reduce residents' distress and behaviour that challenges by preventing them from feeling excluded from spaces (Benbow, 2017, Faith, 2014). This approach may circumvent some of the difficulties of camouflage and concealment approaches where the layout permits.

3.2.2.11. Locking doors. Keeping doors to exits and other unsafe spaces locked provides a physical barrier, preventing residents from coming to harm and therefore allowing them to wander safely in other areas (Barrett et al., 2020; Benbow, 2017; Mazzei et al., 2014; Wigg, 2010). Locked doors are typically found in care homes with a culture of perceiving wandering as risky and risk as unacceptable, meaning individuals are prevented from independently accessing exits (Wigg, 2010). When residents move through or towards a locked door (e.g., by following another resident and/or their family outside), staff redirect the resident (Wigg, 2010). Residents can feel confined when outdoor spaces are fully enclosed with fences, and, in some cases, attempt to climb the fence (Dreyfus et al., 2018). However, when residents experience freedom of movement in outdoor spaces, fences can benefit residents' wellbeing as well as providing safety (Barrett et al., 2020; Dreyfus et al., 2018; Wigg, 2010), and can create a sense of ownership over the space by defining boundaries, like front and back gardens at home (Dreyfus et al., 2018). Residents living in settings with secure perimeter fences and unlocked doors are outdoors more often and are more physically active, leading to a better quality of life (Dreyfus et al., 2018; van Liempd et al., 2023; Wigg, 2010).

3.2.2.11.1. Use of technology. Wearable technology can control access by granting residents entry to safe spaces while restricting access to unsafe/private spaces (2007, Duffy and Hallahan, 2019, Kearns et al., 2007, Margot-Cattin and Nygård, 2006, Mueller et al., 2013). These devices can improve residents' wellbeing by enabling them to walk freely without feeling confined (Margot-Cattin and Nygård, 2006). Residents experience increased security and improved self-esteem due to increased autonomy (Margot-Cattin and Nygård, 2006), although there are some potential issues with device use (see 'Monitoring').

3.2.2.11.2. Use of distraction. Distraction or stimulation, such as visual or tactile interest, art-based design or physical guidance from staff, can keep residents away from unsafe spaces by engaging their interest in the environment (Anderson et al., 2023; Benbow, 2017; Dickinson and McLain-Kark, 1998; McQuilkin, 2016; Padilla et al., 2013). Creating a circular 'endless' hallway can draw residents away from unsafe spaces by enabling them to walk continuously without reaching an exit (Mueller et al., 2013). Creating an association between an unsafe space and a noxious stimulus can prevent residents from approaching that space (Anderson et al., 2023).

3.2.2.12. Hydration and nutrition. Staff support the nourishment and hydration of residents as they wander by making food and drink more convenient and regularly available (Hirst and Metcalf, 1989; Murphy et al., 2017). Food and drink can be placed along wandering routes or at endpoints, such as the living room (Mikhaylova-O'Connell et al., 2025; Murphy et al., 2019). Staff can also provide food and drink that residents can eat while on the move, including lunchboxes with separate sections, finger foods and grazing menus, and meal shakes to drink on the move (Mikhaylova-O'Connell et al., 2025; Murphy et al., 2019, 2017; Sharp, 2021). Residents can thus eat and drink frequently, at their own pace while also wandering, enabling them to maintain nutrition and hydration (Mikhaylova-O'Connell et al., 2025, Murphy et al., 2019, 2017, Sharp, 2021). This is particularly important for residents who do not

stay seated at mealtimes (Murphy et al., 2019; Sharp, 2021). Staff can increase residents' nourishment by offering food high in energy and protein, providing energy to wander while preventing weight loss (Murphy et al., 2019).

3.2.2.12.1. Responding to residents' needs. Knowing residents' wandering patterns enable staff to provide food and drink according to residents' preferences and patterns, supporting residents' nutrition and hydration (Mikhaylova-O'Connell et al., 2025, Murphy et al., 2019, 2017, Sharp, 2021). Monitoring residents' weight can enable staff intervention to prevent (further) weight loss as part of delivering personalised care (Mikhaylova-O'Connell et al., 2025).

3.2.2.12.2. Safety considerations. Ensuring safe eating practices can facilitate safe wandering. Staff can support residents to eat and drink safely on the move by using appropriate lids on drinks bottles and ensuring finger foods are cut up small enough to be chewed and swallowed safely (Britton, 2021).

3.3. Phase 3: sense-checking conversations

Across the homes, staff expressed positive views about wandering, wishing to encourage this when possible, as it promotes physical activity and allows residents to achieve tasks or find purpose through household activities. Staff felt that preventing or dismissing wandering could increase falls, agitation, and behavioural issues among residents.

Low staffing levels limit visual monitoring and hinder staff's ability to meet residents' broader needs. Understaffed teams are more likely to discourage wandering and encourage residents to stay seated or remain in one room. One care home wanted to provide one-to-one support to residents who wander, but local authorities assessed this level of care unnecessary.

Care homes emphasised that monitoring should be a shared responsibility among all staff, not just care staff. Non-care staff may have the time to spend with residents engaging in non-care tasks and are generally freer to move around with residents. However, they cannot access residents' care plans, limiting their provision of person-centred care. Additionally, staff reported challenges when supporting residents physically, particularly shorter care staff who face increased risk of injury to themselves.

Staff members reported facing emotional challenges, as they feel mentally taxed when residents become agitated and distressed when they fall. Staff feel overwhelmed when multiple residents are walking simultaneously, underscoring the need for person-centred strategies and adequate staffing levels.

3.3.1. Personalised care

All participants emphasised the importance of understanding residents' life histories. However, staff at one home reflected that knowing a resident's background helps to contextualise their actions, but does not necessarily assist in supporting their wandering behaviour. New staff members may struggle to get to know residents, often relying on more experienced colleagues and relatives for additional information. One individual highlighted that when residents moved from hospitals, planning was compromised due to poor information on mobility from the hospital.

3.3.2. Monitoring

For visual monitoring, staff suggested asking residents to sit down when they appear unsteady, while watching them from a safe distance. The main devices used were room alarms and pressure mats or cushions. Many staff were unfamiliar with other devices discussed in the literature. One home used a nighttime audio listening device. In one home, management tracked staff response times to call alerts, which encouraged timely attendance, a common issue in homes without such oversight. They also mentioned using monitoring devices to track and review residents' activity, and food and drink intake. However, care homes highlighted issues such as equipment damage by residents and safety

concerns related to spills. Some residents learned to bypass the devices, such as stepping over mats, which can increase risks.

3.3.3. Navigation

Navigation strategies resonated with staff, including signage, pictures on bedroom doors, coloured doors, and murals. However, some questioned the effectiveness of these for residents with advanced dementia, reflecting that they physically guide residents when they appear lost, which again highlights staffing concerns. One care home noted that communication difficulties with staff from other countries complicates navigation.

3.3.4. Managing access

Staff felt it would be unfair for some residents to have access to certain areas while others do not. Some staff endorsed using distractions, and optical illusions to prevent residents from entering certain places. While some staff did not advocate for restricting access to certain areas, they acknowledged that some spaces should be locked for safety reasons (e.g. kitchens, cleaning cupboards, sloshies). While many care homes did not offer free garden access, staff said residents could ask to go outside. However, it was unclear whether residents had the capacity to understand this or make such requests.

Participants highlighted the importance of preventing residents from entering each other's rooms, and how staff need to consider how the behaviour of one resident may affect others.

3.3.5. Hydration and nutrition

Whilst in one care home, concerns about leaving snacks out existed for medical reasons, in another, snack trolleys and drinks were available at every seating location. Staff reported initial concerns about residents spilling liquids, taking too much or mishandling items, though these often had not materialised. Residents also frequently ask staff for assistance with selecting items. Staff noted that offering finger food helped residents who struggle with cutlery to eat more. They also highlighted the importance of portion control, as large portions could discourage residents from eating.

4. Discussion

This review has shown how safe wandering in care homes can be facilitated. We developed a comprehensive theory encompassing context, strategies, mechanisms, and outcomes across five main programme theories: personalised care, monitoring, navigation, managing access, and hydration and nutrition. These elements illustrate the strategies that care homes can implement to help older adults to wander safely.

The literature emphasises the balance between safety and independence for individuals with dementia, a key aspect of our programme theory. Risk perception of wandering differs among institutions and individuals and is often influenced by adverse outcomes such as elopement and falls (Barrett et al., 2020). While some studies focus on the dangers of wandering, it is equally important to highlight the positive aspects (Adekoya and Guse, 2019; Dewing, 2006). Neubauer and Liu (Neubauer and Liu, 2021) introduced the 'Goldilocks Principle on Dementia and Wayfinding' to explain the need for the perception of risk to be 'just right' with the need for independence, including the perception of relatives, people with dementia and health care professions. The different levels of risk are proposed with consideration of the limitation of the two extreme levels. Neubauer and Liu hoped the theory would promote the development and adoption of proactive strategies that addressed an optimal risk perception where individuals were given a level of independence while remaining safe. It was developed to address concerns about elopement and getting lost in community settings, but can be applied to falls and injuries, which are a more significant concern for care home staff (Griffiths et al., 2024).

Many strategies employed across the programme theories raise

potential ethical issues. Several strategies identified to enable wandering could also be employed to prevent wandering, including locking doors, using monitoring technology, and employing camouflage. These strategies are typically implemented to mitigate risks associated with residents leaving care homes or accessing unsafe areas. This review contextualises these strategies within the framework of preventing access to unsafe spaces while allowing residents the freedom to wander in secure and appropriate environments, highlighting the need to clearly define wandering support strategies and communicate them effectively across staff teams.

The use of wearable technology raises concerns about privacy and loss of autonomy and could result in discomfort and stigma for residents. The process of using such technologies should include a discussion between the resident, their family and the care home team, and informed consent should be received before implementation (Landau and Werner, 2012; Robinson et al., 2007).

Ongoing debate surrounds the ethics of exploiting perceptual deficits in people with dementia to keep them away from specific spaces, especially when visual hallucinations cause confusion or distress. While 'compassionate deception' may support safe wandering (Skov et al., 2024), less intrusive options like limiting door visibility should be considered first. Strategies that deceive or restrict autonomy and freedom should be considered on a case-by-case basis, balancing risk with independence and prioritising alternatives like staff training; in line with the principles of least restrictive practice outlined in the Mental Capacity Act (2005) (Government, 2005).

4.1. Strengths and limitations

Strengths of the review include a broad and iterative search strategy, coverage of diverse and international evidence, detailed programme theories, and input from two lay advisory groups. Findings were sense checked with key stakeholders. Studies were mainly conducted in Western countries, with one study from Asia. The inclusion of a paper written by some authors as a key text to inform searches represents a limitation. Additionally, we did not identify evidence statistically quantifying the relationship between the strategies, mechanisms and outcomes. There was limited representation of the voices of people with dementia, with most evidence coming from care home staff. While capturing the views of those with dementia presents ethical and practical challenges, it is essential for gaining genuine insight (Digby et al., 2016; Novek and Wilkinson, 2019). Most literature focused on individual-level strategies, with little attention to how these work collectively in care homes.

4.2. Implications for practice and research

Multiple approaches are available to enable residents to wander safely. Many small-scale strategies are easily implementable in care homes, whilst others require a shift in care culture or should be considered at the design stage. A proactive approach involving routine implementation of individualised non-pharmacological interventions could help reduce risks (Backhouse et al., 2016).

Residents describe how wandering provides a sense of purpose and enjoyment (Adekoya and Guse, 2019). A person-centred care approach can be applied to find the strategies that best suit each resident and their needs. Staff should get to know each resident well and anticipate their wandering behaviours and needs, including supporting their hydration and nutrition. A care home that encourages positive risk-taking in relation to wandering will provide residents with the chance to wander safely, with staff support when necessary (Griffiths et al., 2024). Assessment and regular review are required to ensure that strategies are appropriate for each individual (Barrett et al., 2020), recognising that preferences may change as dementia progresses (Mikhaylova-O'Connell et al., 2025). Staff can walk with residents to offer reassurance and build relationships, however this is dependent on having sufficient staffing

levels for one-to-one care.

Those building or redesigning care homes can take steps to help residents navigate independently. Design features include creating clear, distinct areas, using consistent design with varied colour schemes for orientation, and applying colour contrast to key features like handrails. Visual cues, landmarks, sensory stimuli, and accessible signage (with large print and pictograms) enhance navigation. Simple layouts with good visibility and monitoring technology foster autonomy while ensuring safety. Disguising areas to prevent unsafe entry may be effective, but this raises ethical concerns (Lorey, 2019).

Managers and staff must balance residents' freedom to access spaces around the care home, while also ensuring their safety. Staff must possess the knowledge, skills, and support needed to balance resident preferences and safety in care homes (Backhouse et al., 2016). Training could focus on identifying why someone may be wandering and supporting residents in wandering safely. Managers and senior staff should support care staff to implement training in practice through shadowing and mentoring.

Future research should address identified evidence gaps, including examining the role of relatives in supporting safe wandering, and considering how strategies work when there are multiple residents who wander with different needs. Longitudinal research, incorporating the views of residents, relatives and staff should be conducted to understand how preferences and safety are balanced across care homes. Future research could explore how staffing and shift patterns affect strategies, and what the impact of supporting wandering is on staff. Evidence on how staff physically support residents, and provide food and drink while they wander, is lacking and should be considered for future research. There is limited evidence for the effectiveness of these strategies, therefore work should be undertaken to further evaluate their use in a care home context for enabling safe wandering.

5. Conclusion

Allowing residents with dementia the freedom and autonomy to wander can prevent residents from feeling trapped and increase well-being. Physical and psychosocial strategies that create a facilitative environment, provide physical support, and creatively meet residents' hydration and nutrition needs have been shown to support wandering in care homes. These strategies allow staff and managers to offer residents freedom while ensuring their safety. Strategies to facilitate safe wandering should address the five programme theories.

CRediT authorship contribution statement

Emma S. Hock: Writing – review & editing, Writing – original draft, Visualization, Methodology, Formal analysis, Data curation. **Bryony Waters-Harvey:** Writing – review & editing, Writing – original draft, Resources, Project administration, Formal analysis, Data curation. **Alys Wyn Griffiths:** Writing – review & editing, Writing – original draft, Supervision, Resources, Project administration, Investigation, Funding acquisition, Conceptualization. **Emily Fisher:** Writing – review & editing, Writing – original draft, Visualization, Data curation. **Tamara Backhouse:** Writing – review & editing, Methodology, Investigation, Funding acquisition. **Iria Cunha:** Writing – review & editing, Visualization, Resources, Funding acquisition. **Sion Scott:** Writing – review & editing, Funding acquisition. **Clarissa Giebel:** Writing – review & editing, Funding acquisition. **Liz Jones:** Writing – review & editing, Resources, Funding acquisition. **Jignasa Mehta:** Writing – review & editing, Funding acquisition. **Karen Spilsbury:** Writing – review & editing, Supervision, Funding acquisition. **Andrew Booth:** Writing – review & editing, Supervision, Methodology. **Reena Devi:** Writing – review & editing, Validation, Supervision, Methodology, Funding acquisition. **Mary Gemma Cherry:** Writing – review & editing, Validation, Supervision, Methodology, Funding acquisition, Conceptualization.

Declaration of competing interest

Alys Griffiths is an NIHR RfPB North West (England) panel member. Clarissa Giebel is an NIHR Health Services and Delivery Research (HS&DR) panel member. Karen Spilsbury is an NIHR Policy Research Programme (PRP) Core Committee member and a panel member for the NIHR Doctoral Local Authority Fellowships. She is a NIHR Senior Investigator.

Appendix A. Supplementary data

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References

Adekoya, A.A., Guse, L., 2019. Wandering behavior from the perspectives of older adults with mild to moderate dementia in long-term care. Res. Gerontol. Nurs. 12, 239–247.

Agrawal, A.K., Gowda, M., Gowda, G.S., Harbishettar, V., 2021. Approach to management of wandering in dementia: ethical and legal issue. Indian J. Psychol. Med. 43, S53–S59.

Alam, S., Kim, D., 2023. Navigating the maze: caregivers perception on design elements to improve wayfinding for older adults with dementia in long-term care facilities. Health Environ. Res. Des. J. (HERD) (Sage Publications, Ltd.) 16, 132–145.

Algase, D.L., Moore, D.H., Vandeweerd, C., Gavin-Dreschnack, D.J., 2007. Mapping the maze of terms and definitions in dementia-related wandering. Aging Ment. Health 11, 686–698.

Anderson, D.C., Kota, S.S., Yeh, L., Budson, A.E., 2023. Built environment design interventions at the exits of secured dementia care units: a review of the empirical literature. Herd 16, 251–269.

Anonymous, 2018. Street signs help dementia residents navigate their care home. Available from:, Care Choices Blog. https://www.carechoices.co.uk/blog/street-signs-help-dementia-residents-navigate-their-care-home/. (Accessed 9 July 2024) (Internet).

Anonymous., 2007. Whither do they wander—and how can you intervene? Nursing 37, 14–15.

Apple, C.E., 2015. Patterns of Behavior in Alzheimer Units: Examining the Role of the Physical Environment Interface. Colorado State University (M.S.).

Backhouse, T., Killett, A., Penhale, B., Gray, R., 2016. The use of non-pharmacological interventions for dementia behaviours in care homes: findings from four in-depth, ethnographic case studies. Age Ageing 45, 856–863.

Balesreri, L., Grossberg, A., Grossberg, G.T., 2000. Behavioral and psychological symptoms of dementia as a risk factor for nursing home placement. Int. Psychogeriatr. 12, 59–62.

Barrett, J., Evans, S., Pritchard-Wilkes, V., 2020. Understanding and supporting safe walking with purpose among people living with dementia in extra care, retirement and domestic housing. Hous. Care Support 23, 37–48.

Bautrant, T., Grino, M., Peloso, C., Schiettecatte, F., Planelles, M., Oliver, C., Franqui, C., 2019. Impact of environmental modifications to enhance day-night orientation on behavior of nursing home residents with dementia. J. Am. Med. Dir. Assoc. 20, 377–381.

Benbow, W., 2017. Reliable roaming in dementia care: designs for safe walking. Can. Nurs. Home 28, 16–21.

Bowes, A., Dawson, A., 2019. Designing Environments for People With Dementia: A Systematic Literature Review. Emerald publishing.

Britton, B., 2021. Supporting a person with dementia to walk. Available from:, Care Choices Blog. https://www.carechoices.co.uk/blog/supporting-a-person-with-dementia-to-walk/ (Online, Accessed 2 June 2021 2024).

Brush, J.A., Calkins, M.P., 2008. Cognitive impairment, wayfinding, and the long-term care environment. Perspect. Gerontol. 13, 65–73.

Brush, J., Camp, C., Bohach, S., Gertsberg, N., 2015. Developing signage that supports wayfinding for persons with dementia. Can. Nurs. Home 26, 4–11.

Caffò, A.O., Hoogeveen, F., Groenendaal, M., Perilli, V.A., Damen, M., Stasolla, F., Lancioni, G.E., Bosco, A., 2014. Comparing two different orientation strategies for promoting indoor traveling in people with Alzheimer's disease. Res. Dev. Disabil. 35, 572–580.

Cheung, J.C., Tam, E.W., Mak, A.H., Chan, T.T., Zheng, Y.P., 2022. A night-time monitoring system (eNightLog) to prevent elderly wandering in hostels: a three-month field study. Int. J. Environ. Res. Public Health 19.

Cipriani, G., Lucetti, C., Nuti, A., Danti, S., 2014. Wandering and dementia. Psychogeriatrics 14, 135–142.

Cloak, N., Schoo, C., Al Khalili, Y., 2024. Behavioral and Psychological Symptoms in Dementia. StatPearls Publishing, Treasure Island, FL.

Cohen-Mansfield, J., Werner, P., 1998. The effects of an enhanced environment on nursing home residents who pace. Gerontologist 38, 199–208.

Dada, S., Dalkin, S., Gilmore, B., Hunter, R., Mukumbang, F.C., 2023. Applying and reporting relevance, richness and rigour in realist evidence appraisals: advancing key concepts in realist reviews. Res. Synth. Methods 14, 504–514.

Detweiler, M.B., Murphy, P.F., Myers, L.C., Kim, K.Y., 2008. Does a wander garden influence inappropriate behaviors in dementia residents? Am. J. Alzheimers Dis. Other Dement. 23, 31–45.

Detweiler, M.B., Murphy, P.F., Kim, K.Y., Myers, L.C., Ashai, A., 2009. Scheduled medications and falls in dementia patients utilizing a wander garden. Am. J. Alzheimers Dis. Other Dement. 24, 322–332.

Dewing, J., 2006. Wandering into the future: reconceptualizing wandering 'A natural and good thing'. Int. J. Older People Nursing 1, 239–249.

Dewing, J., 2011. Dementia care: assess wander walking and apply strategies. Nurs. Resid. Care 13, 494–496.

Dickinson, J.I., McLain-Kark, J., 1998. Wandering behavior and attempted exits among residents diagnosed with dementia-related illnesses: a qualitative approach. J. Women Aging 10, 23–34.

Dickinson, J.I., Mclain-Kark, J., Marshall-Baker, A., 1995. The effects of visual barriers on exiting behavior in a dementia care unit. Gerontologist 35, 127–130.

Digby, R., Lee, S., Williams, A., 2016. Interviewing people with dementia in hospital: recommendations for researchers. J. Clin. Nurs. 25, 1156–1165.

Dimitriou, T., Papatriantafyllou, J., Konsta, A., Kazis, D., Athanasiadis, L., Ioannidis, P., Koutsouraki, E., Tegos, T., Tsolaki, M., 2022. Non-pharmacological interventions for wandering/aberrant motor behaviour in patients with dementia. Brain Sci. 12, 130.

Dreyfus, S., Phillipson, L., Fleming, R., 2018. Staff and family attitudes to fences as a means of detaining people with dementia in residential aged care settings: the tension between physical and emotional safety. Aust. J. Soc. Issues 53, 107–122.

Duffy, A., Hallahan, P., 2019. Wandering behaviour and elopement in the nursing home. Br. J. Healthc. Assistants 13, 26–30.

Engberg, J., Castle, N.G., Mccaffrey, D., 2008. Physical restraint initiation in nursing homes and subsequent resident health. Gerontologist 48, 442–452.

Faith, V., 2014. Designing for Dementia: An Assessment of the Impact of the Physical Environment on Wayfinding Success for Residents in Long Term Care Settings. Queen's University Belfast (United Kingdom) (Ph.D.).

Fine, S.W., 2015. Knottingham Gardens: A Therapeutic Home for Moderate Alzheimer's Sufferers. The George Washington University (M.F.A.).

Fleming, R., Purandare, N., 2010. Long-term care for people with dementia: environmental design guidelines. Int. Psychogeriatr. 22, 1084–1096.

Gibson, M.C., Maclean, J., Borrie, M., Geiger, J., 2004. Orientation behaviors in residents relocated to a redesigned dementia care unit. Am. J. Alzheimers Dis. Other Dement. 19, 45–49.

Gill, S.S., Bronskill, S.E., Normand, S.L.T., Anderson, G.M., Sykora, K., Lam, K., Bell, C. M., Lee, P.E., Fischer, H.D., Hermann, N., Gurwitz, J.H., Rochon, P.A., 2007. Antipsychotic drug use and mortality in older adults with dementia. Ann. Intern. Med. 146, 775–786.

Graham, M.E., 2017. From wandering to wayfaring: reconsidering movement in people with dementia in long-term care. Dementia 14713012 (16), 732–749.

Griffiths, A.W., Cunha, I., Mikhaylova-O`connell, Y., Devi, R., Spilsbury, K., Cherry, M.G., 2024. Exploring the impact of care home environments and culture on supporting residents to 'wander' safely. Aging Ment. Health 1–9.

Gulwadi, G.B., 2013. Establishing continuity of self-memory boxes in dementia facilities for older adults: their use and usefulness. J. Hous. Elder. 27, 105–119.

Hakverdioğlu Yönt, G., Kisa, S., Princeton, D.M., 2023. Physical restraint use in nursing homes—regional variances and ethical considerations: a scoping review of empirical studies. Healthcare 11, 2204.

Halek, M., Bartholomeyczik, S., 2012. Description of the behaviour of wandering in people with dementia living in nursing homes–a review of the literature. Scand. J. Caring Sci. 26, 404–413.

Hamers, J.P., Gulpers, M.J., Strik, W., 2004. Use of physical restraints with cognitively impaired nursing home residents. J. Adv. Nurs. 45, 246–251.

Heward, M., Adams, A., Hicks, B., Wiener, J., 2022. 'We go for a homely feel … not the clinical dementia side': care home managers' experiences of supporting residents with dementia to orientate and navigate care environments. Ageing Soc. 42, 1659–1685.

Hirst, S.T., Metcalf, B.J., 1989. Whys and whats of wandering. Geriatr. Nurs. 10, 237–238.

Holthe, T., Halvorsrud, L., Karterud, D., Hoel, K.A., Lund, A., 2018. Usability and acceptability of technology for community-dwelling older adults with mild cognitive impairment and dementia: a systematic literature review. Clin. Interv. Aging 13, 863–886.

Hussian, R.A., Brown, D.C., 1987. Use of two-dimensional grid patterns to limit hazardous ambulation in demented patients. J. Gerontol. 42, 558–560.

Ilem, A.A., Feliciano, L., 2018. Finding your way home: a systematic investigation of shadowboxes on room recognition in memory care. Spec. Issue Behav. Anal. Aging 18, 41–61.

Innes, A., Kelly, F., Dincarslan, O., 2011. Care home design for people with dementia: what do people with dementia and their family carers value? Aging Ment. Health 15, 548–556.

Jay, A.A., 2014. Finding your way home: a shadow box intervention to improve wayfinding in dementia care. In: Dissertation Abstracts International: Section B: The Sciences and Engineering, p. 74.

Jayasekara, R., 2009. Dementia: Wandering. Evidence Based Summaries. Joanna Briggs Institute.

Joy, H., 2008. Designing homes for people with dementia. Nurs. Resid. Care 10, 460–462.

Kearns, W.D., Rosenberg, D., West, L., Applegarth, S., 2007. Attitudes and expectations of technologies to manage wandering behavior in persons with dementia. Gerontechnology 6, 89–101.

Kitwood, T., 1997. The experience of dementia. Aging Ment. Health 1, 13–22.

Kwak, Y.T., Yang, Y., Koo, M.S., 2015. Wandering in dementia. Dement. Neurocognitive Disord. 14, 99–105.

Lai, C.K., Arthur, D.G., 2003. Wandering behaviour in people with dementia. J. Adv. Nurs. 44, 173–182.

Lancioni, G.E., Perilli, V., Singh, N.N., O'reilly, M.F., Sigafoos, J., Bosco, A., De Caro, M. F., Cassano, G., Pinto, K., Minervini, M., 2011. Persons with mild or moderate Alzheimer's disease use a basic orientation technology to travel to different rooms within a day center. Res. Dev. Disabil. 32, 1895–1901.

Lancioni, G.E., Perilli, V., O'reilly, M.F., Singh, N.N., Sigafoos, J., Bosco, A., Caffò, A.O., Picucci, L., Cassano, G., Groeneweg, J., 2013. Technology-based orientation programs to support indoor travel by persons with moderate Alzheimer's disease: impact assessment and social validation. Res. Dev. Disabil. 34, 286–293.

Landau, R., Werner, S., 2012. Ethical aspects of using GPS for tracking people with dementia: recommendations for practice. Int. Psychogeriatr. 24, 358–366.

Leeds, U. O, 2025. NICHE Leeds. Available:, University of Leeds. https://niche.leeds.ac. uk/. (Accessed 21 October 2025) (Internet).

Li, W., Mahdzar, S.S.S., Liu, Y., Jia, Q., Shi, W., 2023. A new perspective on cognitive rehabilitation: layout design methods for wandering behavior in dementia patients. IOP Conf. Ser. Earth Environ. Sci., 012040

Lorey, P., 2019. Fake bus stops for persons with dementia? On truth and benevolent lies in public health. Isr. J. Health Policy Res. 8, 28.

Ludden, G.D.S., Van Rompay, T.J.L., Niedderer, K., Tournier, I., 2019. Environmental design for dementia care - towards more meaningful experiences through design. Maturitas 128, 10–16.

MacAndrew, M., Brooks, D., Beattie, E., 2019. NonPharmacological interventions for managing wandering in the community: a narrative review of the evidence base. Health Soc. Care Commun. 27, 306–319.

Margot-Cattin, I., Nygård, L., 2006. Access technology and dementia care: influences on residents' everyday lives in a secure unit. Scand. J. Occup. Ther. 13, 113–124.

Marquardt, G., 2011. Wayfinding for people with dementia: a review of the role of architectural design. Herd 4, 75–90.

Marquardt, G., Schmieg, P., 2009. Dementia-friendly architecture: environments that facilitate wayfinding in nursing homes. Am. J. Alzheimers Dis. Other Dement. 24, 333–340.

Mazzei, F., Gillan, R., Cloutier, D., 2014. Exploring the influence of environment on the spatial behavior of older adults in a purpose-built acute care dementia unit. Am. J. Alzheimers Dis. Other Dement. 29, 311–319.

McGilton, K.S., Rivera, T.M., Dawson, P., 2003. Can we help persons with dementia find their way in a new environment? Aging Ment. Health 7, 363–371.

McQuilkin, J.C., 2016. Meaningful Wandering for Residents With Alzheimer's Disease in Memory Care Facilities. State University of New York at Buffalo (M.S.).

Meiner, S.E., 2000. Wandering problems need ongoing nursing planning. A case study. Geriatr. Nurs. 21, 101–106.

Mikhaylova-O`Connell, Y., Griffiths, A.W., Cunha, I., Devi, R., Spilsbury, K., Cherry, M. G., 2025. "There is always a reason why someone is doing something": the importance of life history and personhood when supporting people with dementia to "wander" in care homes. Dementia 1513–1536, 14713012251316679.

Miskelly, F., 2004. A novel system of electronic tagging in patients with dementia and wandering. Age Ageing 33, 304–306.

Moore, D.H., Algase, D.L., Powell-Cope, G., Applegarth, S., Beattie, E.R., 2009. A framework for managing wandering and preventing elopement. Am. J. Alzheimers Dis. Other Dement. 24, 208–219.

Mueller, C., Wan, L., Wulf, V., 2013. Dealing with wandering in institutional care: exploring the field. In: 2013 7th International Conference on Pervasive Computing Technologies for Healthcare and Workshops, pp. 101–104.

Murphy, J.L., Holmes, J., Brooks, C., 2017. Nutrition and dementia care: developing an evidence-based model for nutritional care in nursing homes. BMC Geriatr. 17, 1–14.

Murphy, J., Hooper, G., Holmes, J., 2019. Eating and drinking well with dementia: a guide for family Carers and friends. In: PRACTICE, T. A. A. D. R. C. A. T. N. C. F. P.-Q. S. W. A. P. (Ed.), Nutrition and Dementia Care: A Toolkit for Health and Care Staff. The Ageing and Dementia Research Centre, Bournemouth University, Bournemouth.

Neubauer, N., Liu, L., 2020. A framework to describe the levels of risk associated with dementia-related wandering…International Society for Gerontechnology's (ISG) 12th World Conference of Gerontechnology, October 6-9, 2020 (Virtual). Gerontechnology 19, 15.

Neubauer, N.A., Liu, L., 2021. Influence of perspectives on user adoption of wander-management strategies. Dementia 20, 734–758.

Neubauer, N.A., Lapierre, N., Ríos-Rincón, A., Miguel-Cruz, A., Rousseau, J., Liu, L., 2018. What do we know about technologies for dementia-related wandering? A scoping review. Can. J. Occup. Ther. 85, 196–208.

Neville, C.C., Mcminn, B., Cave, P., 2006. Implementing the wandering evidence for older people with dementia: key issues for nurses and carers. Int. J. Older People Nursing 1, 235–238.

Niemeijer, A.R., Depla, M.F., Frederiks, B.J., Hertogh, C.M., 2015. The experiences of people with dementia and intellectual disabilities with surveillance technologies in residential care. Nurs. Ethics 22, 307–320.

Novek, S., Wilkinson, H., 2019. Safe and inclusive research practices for qualitative research involving people with dementia: a review of key issues and strategies. Dementia 18, 1042–1059.

Olson, N.L., Albensi, B.C., 2021. Dementia-friendly "design": impact on COVID-19 death rates in long-term care facilities around the world. J. Alzheimers Dis. 81, 427–450.

O'Malley, M., Innes, A., Wiener, J.M., 2017. Decreasing spatial disorientation in care-home settings: how psychology can guide the development of dementia friendly design guidelines. Dementia 14713012 (16), 315–328.

Padilla, R., 2011. Effectiveness of environment-based interventions for people with Alzheimer's disease and related dementias. Am. J. Occup. Ther. 65, 514–522.

Padilla, D.V., Gonzalez, M.T.D., Agis, I.F., Strizzi, J., Rodriguez, R.A., 2013. The effectiveness of control strategies for dementia-driven wandering, preventing escape attempts: a case report. Int. Psychogeriatr. 25, 500–504.

Park, S., Lee, Y., 2024. Non-pharmacological management of wandering in persons with dementia: an integrative review. Psychogeriatrics 24, 1160–1167.

Passini, R., Pigot, H., Rainville, C., Tetreault, M.H., 2000. Wayfinding in a nursing home for advanced dementia of the Alzheimer's type. Environ. Behav. 32, 684–710.

Pawson, R., 2002. Evidence-based policy: the promise of realist synthesis'. Evaluation 8, 340–358.

Provencher, V., Bier, N., Audet, T., Gagnon, L., 2008. Errorless-based techniques can improve route finding in early Alzheimer's disease: a case study. Am. J. Alzheimers Dis. Other Dement. 23, 47–56.

Raetz, J., 2013. A nondrug approach to dementia. J. Fam. Pract. 62, 548–557.

Roberts, M., 1999. The management of wandering in older people with dementia. J. Clin. Nurs. 8, 322–324.

Robinson, L., Hutchings, D., Corner, L., Beyer, F., Dickinson, H., Vanoli, A., Finch, T., Hughes, J., Ballard, C., May, C., Bond, J., 2006. A systematic literature review of the effectiveness of non-pharmacological interventions to prevent wandering in dementia and evaluation of the ethical implications and acceptability of their use. Health Technol. Assess. 10 (Internet).

Robinson, L., Hutchings, D., Corner, L., Finch, T., Hughes, J., Brittain, K., Bond, J., 2007. Balancing rights and risks: conflicting perspectives in the management of wandering in dementia. Health Risk Soc. 9, 389–406.

Rule, B.G., Milke, D.L., Dobbs, A.R., 1992. Design of institutions: cognitive functioning and social interactions of the aged resident. J. Appl. Gerontol. 11, 475–488.

Seetharaman, K., Chaudhury, H., Kary, M., Stewart, J., Lindsay, B., Hudson, M., 2022. Best practices in dementia care: a review of the grey literature on guidelines for staffing and physical environment in long-term care. Can. J. Aging 41, 55–70.

Shabha, G., Edwards, D.J., Gaines, K., Laycok, P., 2022. Toward an integrated context-based design approach for dementia residential care homes: A review of key operational design problems. Health Environ. Res. Des. J. (HERD) (Sage Publications, Ltd.) 15, 323–342.

Sharp, B., 2021. Dementia and nutrition. Available from:, Care Choices Blog. https://www.carechoices.co.uk/blog/dementia-and-nutrition/. (Accessed 7 October 2024) (Internet).

Skov, S.S., Jensen, A.M., Rasmussen, G., Folker, A.P., Laurindsen, S., 2024. Compassionate deception: an ethnographic study of how and why health professionals and family members lie when caring for people with dementia in Danish nursing homes. SSM Qual. Res. Health 6. https://doi.org/10.1016/j.ssmqr.2024.100457 (Internet).

Stansfield, C., Dickson, K., Bangpan, M., 2016. Exploring issues in the conduct of website searching and other online sources for systematic reviews: how can we be systematic? Syst. Rev. 5, 1–9.

Tseng, W.S., Fang, J., 2022. A device designed to improve care and wayfinding assistance for elders with dementia. Sustainability 14, 11076.

Tufford, F., Lowndes, R., Struthers, J., Chivers, S., 2018. 'Call security': locks, risk, privacy and autonomy in long-term residential care. Ageing Int. 43, 34–52.

UK Government, 2005. Mental Capacity Act. UK Government, London.

van Buuren, L.P.G., Mohammadi, M., 2022. Dementia-friendly design: a set of design criteria and design typologies supporting wayfinding. Health Environ. Res. Des. J. (HERD) (Sage Publications, Ltd.) 15, 150–172.

van Hoof, J., Kort, H.S.M., van Waarde, H., Blom, M.M., 2010. Environmental interventions and the design of homes for older adults with dementia: an overview. Am. J. Alzheimers Dis. Other Dement. 25, 202–232.

van Liempd, S., Verbiest, M., Stoop, A., Luijkx, K., 2023. Influence of freedom of movement on the health of people with dementia: a systematic review. Gerontologist 63, 1351–1364.

Wiener, J.M., Pazzaglia, F., 2021. Ageing- and dementia-friendly design: theory and evidence from cognitive psychology, neuropsychology and environmental psychology can contribute to design guidelines that minimise spatial disorientation. Cogn. Process. 22, 715–730.

Wigg, J.M., 2010. Liberating the wanderers: using technology to unlock doors for those living with dementia. Sociol. Health Illn. 32, 288–303.

Wigg, J.M., 2020. Recent developments in technological support for wanderers. Curr. Geriatr. Rep. 9, 101–106.

Wong, G., Greenhalgh, T., Westhorp, G., Pawson, R., 2014. Development of methodological guidance, publication standards and training materials for realist and meta-narrative reviews: the RAMESES (Realist And Meta-narrative Evidence Syntheses: Evolving Standards) project. Health Soc. Care Deliv. Res. 2, 1–252.