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The Silent Epidemic of Hospitalization: A Multi-Disciplinary Narrative Review of Interventions Against Healthcare-Associated Disability in Older Adults

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Abstract

Background: Healthcare-Associated Disability (HAD) represents a profound, often preventable, decline in a patient's ability to perform essential life activities following a hospitalization. Addressing HAD demands a coherent response that transcends traditional medical specialties.

Aim: This narrative review aims to synthesize evidence on hospital-wide, interprofessional interventions designed to prevent HAD, with a specific focus on evaluating the distinct and integrated contributions of ten core health fields: Nursing, Health Assistance, Physiotherapy, General Practice/Emergency, Social Service, Infection Control, Epidemiology, Radiology, Health Information, and Health Security.

Methods: An integrative narrative review methodology was employed. A systematic search was conducted across PubMed, CINAHL, Scopus, and Web of Science for literature published between 2010-2024.

Results: Effective HAD prevention is contingent on synergistic, multi-domain interventions. Key findings include: the critical role of nurses and health assistants in fundamental mobility and delirium prevention; the necessity of early and intensive physiotherapy; the centrality of comprehensive discharge planning led by general practitioners and social workers; and the enabling roles of epidemiology for risk-stratification, radiology for diagnosis, health information for tracking, and health security for ensuring safety.

Conclusion: HAD is a systemic failure that can only be countered by a systematized, multidisciplinary attack. This review maps the essential contributions of a ten-profession coalition, arguing that functional preservation must be elevated as a primary, measurable outcome of hospital care, equal to disease cure. Future implementation requires dedicated resources, interprofessional education, and robust health informatics to coordinate this complex, vital effort.

Keywords: Healthcare-Associated Disability; Functional Decline; Interprofessional Teams; Aged; Hospitalization; Geriatric Syndromes

Introduction

Hospitalization for acute illness in older adults is a pivotal event, one that too often precipitates a catastrophic and disproportionate loss of independence. This phenomenon, termed Healthcare-Associated Disability (HAD) or hospital-associated functional decline, refers to a new or worsening impairment in a patient's ability to perform basic (Activities of Daily Living - ADLs) or instrumental (IADLs) activities of daily living following an acute care stay, not directly attributable to the primary admitting diagnosis (Gill et al., 2010). It represents a profound iatrogenic crisis where the cure can inadvertently inflict a chronic, debilitating condition. The epidemiology is alarming: up to one-third of patients over 70 experience significant functional decline during hospitalization, with less than half recovering to pre-admission function within a year (Covinsky et al., 2011). The consequences cascade beyond the individual, driving increased caregiver

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burden, premature nursing home admission, higher readmission rates, and staggering healthcare costs (Zisberg, Shadmi, Gur-Yaish, Tonkikh, & Sinoff, 2015).

Traditionally, the hospital's success metric has been disease resolution or procedure success, while functional outcomes—the very metrics that define quality of life for older adults—have been secondary considerations, managed in silos or relegated to post-acute care (Zogg et al., 2023). This compartmentalized approach is a fundamental contributor to the HAD epidemic. Combating HAD necessitates a paradigm shift from a disease-oriented model to a function-preserving model, requiring a synchronized, hospital-wide offensive that marshals the unique and complementary skills of the entire healthcare team (Reed et al., 2023). Figure 1 illustrates the core drivers of HAD—including immobility, delirium, infection, malnutrition, and discharge failure—and maps them to key preventive interventions and the coordinated roles of healthcare professionals across nursing, physiotherapy, general practice, social work, infection control, epidemiology, radiology, health information, and health security.

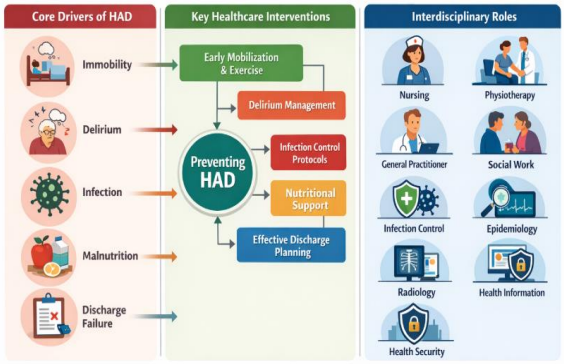

Figure 1: A Multi-Disciplinary Framework for Preventing Healthcare-Associated Disability in Older Adults

This narrative review synthesizes current evidence to articulate a cohesive, multi-disciplinary framework for HAD prevention, explicitly mapping the indispensable roles of ten core fields: Nursing, Health Assistant, Physiotherapy, General Practitioner/Emergency Medicine, Social Service, Infection Control, Epidemiology, Radiology, Health Information, and Health Security.

The Pathophysiology of HAD

Understanding HAD requires moving beyond a simple deconditioning model to appreciate a complex interplay of physiological, iatrogenic, and environmental insults. The baseline vulnerability of the older adult—often characterized by sarcopenia, diminished physiologic reserve (homeostasis), and multimorbidity—creates a precarious state (Clegg et al., 2013). The acute illness itself triggers a catabolic state and inflammatory response that directly accelerates muscle proteolysis. Upon this vulnerable baseline, the hospital environment superimposes a series of "hits." Immobility, often enforced by bed rest, misplaced caution, or tethers like IV lines and urinary catheters, leads to rapid loss of muscle mass and strength at a rate far exceeding normal aging (Pišot et al., 2016). Inadequate nutritional intake, common in hospitalized elders, exacerbates this catabolic state (Machado et al., 2020).

Polypharmacy and the use of high-risk medications (sedatives, antipsychotics) contribute directly to delirium, dizziness, and falls. The hospital environment itself is disorienting and sleep-disruptive, fostering delirium—an acute brain failure strongly and independently associated with long-term functional and cognitive decline (Witlox et al., 2010). Furthermore, healthcare-associated infections (HAIs), such as pneumonia or *Clostridioides difficile*, prolong hospitalization and intensify the catabolic burden (Mody et al., 2021). Thus, HAD emerges not from a single cause but from the convergence of insults across multiple domains: neuromuscular, cognitive, metabolic, and infectious. This multifactorial etiology is the primary rationale for a multifactorial, multidisciplinary defense. No single profession can address all these vectors; success hinges on coordinated, proactive interventions from a unified team with a shared functional outcome goal (Teesing et al., 2021).

Nursing and Health Assistant Roles in Foundational Care

Nursing is the bedrock of 24/7 HAD prevention, operationalizing the principle of "mobility as a vital sign." The nurse's role transcends traditional tasks to become the orchestrator of the patient's daily functional trajectory (Lindell et al., 2010). Evidence-based protocols like the "MOVE" (Mobilization of Vulnerable Elders) or "Walk-Well" programs, integrated into nursing workflows, have demonstrated that structured, nurse-driven ambulation schedules significantly reduce functional decline and length of stay (Boltz et al., 2014). Beyond ambulation, nurses are the primary defenders against two other key drivers of HAD: delirium and pressure injuries. Implementing non-pharmacologic delirium prevention bundles—reorientation, sleep hygiene, hydration, and sensory stimulation—is a core nursing function shown to reduce incidence by up to 40% (Zhong et al., 2023). Similarly, rigorous skin assessments and repositioning protocols prevent painful, mobility-limiting pressure ulcers.

Health Assistants (or Nursing Assistants/Aides) are the essential force multipliers in this endeavor. With proper training and supervision, they are ideally positioned to conduct frequent, scheduled ambulation, assist with feeding to prevent malnutrition, and provide consistent, orienting communication (Zisberg et al., 2015). Their close, prolonged contact with patients allows for early detection of subtle changes in mentation or mobility that may signal impending delirium or functional

slippage. However, their effectiveness is contingent on being valued members of the interprofessional team, with clear role definitions and their observations integrated into formal care planning. The synergy between nursing and health assistants creates the continuous, bedside vigilance necessary to combat the insidious, minute-by-minute risks of immobility and disorientation that fuel HAD.

The Central Role of Physiotherapy and Rehabilitation

If nursing establishes the foundational culture of mobility, physiotherapy provides the prescription, intensity, and expertise required to combat high-speed deconditioning. The outdated model of deferring physiotherapy consultation until after medical stabilization is a direct contributor to HAD. Current evidence strongly advocates for "mobilization within 24 hours," where medically appropriate, with physiotherapists as essential early partners in critical care, cardiology, and general medical units (Drolet et al., 2013).

Physiotherapists conduct crucial initial assessments of strength, balance, and mobility (using the De Morton Mobility Index or Short Physical Performance Battery) to establish a functional baseline and identify high-risk patients (Martínez-Velilla et al., 2019; Sánchez-Sánchez et al., 2022). They then design and supervise tailored, progressive exercise regimens that challenge the patient safely, focusing on strength, balance, and functional tasks (JA, 2020). This early, targeted intervention not only preserves muscle mass but also improves cardiac and pulmonary function, reduces delirium risk, and fosters psychological well-being (Blancafort Alias et al., 2021). Furthermore, physiotherapists are key in fall prevention within the hospital, conducting post-fall assessments, prescribing appropriate assistive devices, and educating other staff and patients on safe mobility strategies (Cameron et al., 2018). Their expertise extends to educating nursing staff and health assistants on safe transfer techniques and reinforcing out-of-bed activities, thereby extending the reach of their prescriptions. By framing mobility as a therapeutic imperative rather than an optional activity, physiotherapy shifts the unit's culture and provides the technical backbone for effective functional preservation.

Discharge Planning by General Practitioners and Social Services

The prevention of HAD does not conclude at the hospital door; a poorly managed transition to home or another care setting can swiftly undo inpatient gains. This is where the integration of General Practitioner (GP) and Social Service expertise becomes paramount. The GP or hospitalist, as the clinical leader, must synthesize the inputs from all team members to create a discharge plan that is medically sound and functionally coherent. This involves meticulous medication reconciliation to eliminate inappropriate prescriptions (e.g., benzodiazepines) that increase fall risk, and clear communication of functional status and goals to the next provider (Kripalani, Jackson, Schnipper, & Coleman, 2007). Social workers perform an equally critical role in conducting holistic assessments of the patient's psychosocial landscape. They evaluate the safety and suitability of the home environment (stairs, bathroom hazards), assess available caregiver support, identify financial or transportation barriers to follow-up care, and connect patients with community resources like meal services or home health aides (Allen et al., 2018).

A failure in this domain can result in a patient returning to an environment where they cannot safely perform basic ADLs, leading to fear-induced immobility, falls, and rapid rehospitalization. Effective discharge planning is a proactive, collaborative process that begins at admission, with GPs and social workers co-leading family meetings, setting realistic functional recovery expectations, and ensuring that all necessary supports—from medical equipment to home health nursing—are in place before discharge. This seamless bridge is essential for consolidating hospital-based functional gains and preventing post-discharge disability.

Infection Control as a Functional Preservation Strategy

Infection Control (IC) is often perceived as a separate discipline focused on microbiological threats. In the context of HAD, it must be reframed as a direct, non-negotiable component of functional preservation (Rodríguez-Villodres et al., 2021). Healthcare-associated infections (HAIs) are potent, independent drivers of disability. A case of ventilator-associated pneumonia extends intensive care and immobility; a catheter-associated urinary tract infection can cause delirium and weakness; *Clostridioides difficile* colitis leads to prolonged debilitation and fluid loss (Mody et al., 2015). Each HAI adds days to the hospital stay, each day magnifying the risks of deconditioning, delirium, and iatrogenic complications (Heinze et al., 2019).

Therefore, the rigorous application of IC protocols—hand hygiene, appropriate catheter use, ventilator bundles, and environmental cleaning—is a direct investment in functional outcomes. IC professionals contribute by educating all frontline staff on these protocols, auditing compliance, and investigating outbreaks that threaten entire units (Wang et al., 2020). Their work ensures that the patient's physiological resources are directed toward recovery from the primary illness, rather than being diverted to fight a new, preventable infection. By preventing the compounding physiological insult of an HAI, the IC team safeguards the patient's capacity to engage in rehabilitation and protects the functional gains achieved by nursing, physiotherapy, and others. In this light, every instance of hand hygiene is not just an infection prevention act, but a step in preserving a patient's future independence (Arnold et al., 2021).

Table 1: Core Drivers of Healthcare-Associated Disability and Corresponding Multi-Disciplinary Interventions

Driver of HAD	Contributing Factors	Key Intervening Professions	Specific Evidence-Based Actions
Immobility & Deconditioning	Bed rest, tethers (IVs, catheters), fear of falls, lack of assistance.	**Nursing/Health Assistant:** Schedule frequent walks, sit patients out of bed for meals. **Physiotherapy:** Early assessment (<24h), prescribe progressive strength/balance exercises. **GP:** Write explicit "mobilize as tolerated" orders.	MOVE protocol; "Walk-Well" programs; supervised hallway ambulation.
Delirium	Sensory deprivation/overload, sleep disruption, dehydration, medications.	**Nursing:** Implement non-pharmacologic bundle (reorientation, sleep hygiene, vision/hearing aids). **Health Assistant:** Provide consistent, orienting communication. **GP/Pharmacy:** Minimize high-risk medications (anticholinergics, benzodiazepines).	Hospital Elder Life Program (HELP) core components; CAM screening.
Iatrogenic Complications	Healthcare-associated infections (HAIs), medication side effects, falls.	**Infection Control:** Enforce hand hygiene, catheter/ventilator bundles. **Pharmacy/GP:** Medication reconciliation & deprescribing. **All Staff:** Universal fall precautions.	Central line bundle; "Choosing Wisely" medication reviews.
Nutritional Deficit	Poor intake, NPO status, dysphagia, lack of assistance.	**Nursing/Health Assistant:** Assist with feeding, monitor intake, provide oral care. **Dietitian:** Assess nutritional risk, recommend supplements. **Speech Therapy:** Assess swallow function.	Mealtime assistance programs; use of oral nutritional supplements.
Poor Discharge Transition	Inadequate planning, unsafe home environment, lack of follow-up.	**Social Service:** Assess home safety, caregiver capacity, arrange services. **GP:** Clear discharge summary with functional status & goals. **Nursing/PT:** Patient/caregiver education on home exercises/meds.	Project RED (Re-Engineered Discharge) model; teach-back method.

Data, Measurement, and Safety from Epidemiology, Health Information, and Health Security

The battle against HAD cannot be fought blindly; it requires strategic intelligence, robust logistics, and secure environments. This is the domain of Epidemiology, Health Information, and Health Security. Epidemiological research has been instrumental in quantifying the HAD problem, identifying key risk factors (pre-admission frailty, cognitive impairment), and validating predictive models like the Hospital Admission Risk Profile (HARP) (Sánchez et al., 2021). This knowledge allows teams to risk-stratify patients on admission, targeting the most intensive multi-component interventions to those who need them most. Health Information (HI) professionals and health informaticists operationalize this knowledge. They build and maintain electronic health record (EHR) systems that embed functional assessment scores (ADLs, gait speed) as structured data, flag high-risk patients via clinical decision support tools, and enable the tracking of functional outcomes across the care continuum (Kim et al., 2021).

HI creates the shared situational awareness that allows the disparate team members to coordinate their efforts. Health Security, often overlooked in clinical discussions, underpins safe mobility. This field ensures the physical safety of the environment (well-maintained floors and grab bars, secure beds) and the safe use of mobility aids to prevent falls and injuries. It also encompasses protection against elder abuse—a risk that can escalate during vulnerable care transitions—through staff training and reporting protocols (Rosen et al., 2017). Furthermore, cybersecurity, a core component of health security, protects the sensitive patient data that HI systems manage. Together, these fields provide the data-driven

insight, technological infrastructure, and safe operational context without which even the best clinical interventions can falter (Lee et al., 2020).

The Role of Radiology in Uncovering Hidden Threats

Radiology's contribution to HAD prevention is one of essential diagnostic precision, turning subjective concerns into objective findings that guide targeted intervention. Two scenarios are particularly salient. First, in the event of a fall—a major setback for functional recovery—prompt radiologic imaging is crucial to rule out occult fractures, particularly of the hip, pelvis, or spine, which might not be clinically obvious in a frail, cognitively impaired patient (Weinstein, Yelin, & King, 2016). Missing such a fracture condemns the patient to pain-induced immobility and almost certain severe disability. Second, radiology plays a growing role in assessing sarcopenia, the age-related loss of muscle mass and strength that is a prime physiologic substrate for HAD.

Opportunistic screening for sarcopenia using routine computed tomography (CT) scans (e.g., measuring psoas muscle area at the L3 vertebra) can provide an objective measure of frailty and catabolic state, informing nutritional and rehabilitation strategies (Johri et al., 2023). Additionally, neuroimaging can help delineate the structural underpinnings of delirium or cognitive decline, differentiating reversible causes from progressive dementia. By providing these critical diagnostic insights, radiology helps the team avoid misguided therapies, confirms the need for intensified rehabilitation, and offers prognostic information that shapes realistic goal-setting with patients and families. It moves the management of HAD from presumption to precision.

Evidence for Multi-Component, Interprofessional Programs

The most compelling evidence for HAD prevention comes not from isolated interventions, but from integrated, multi-component programs that explicitly coordinate the roles discussed. The archetype is the Hospital Elder Life Program (HELP), a standardized, evidence-based model that has been replicated worldwide. HELP deploys a trained, often volunteer, interdisciplinary team to implement core interventions targeting delirium risk factors: orientation, therapeutic activities, early mobilization, nutrition/hydration, and sleep enhancement (Zachary et al., 2020). Its success hinges on role clarity: volunteers and nursing staff conduct frequent visits and mobilization; geriatricians or GPs manage medications; allied health professionals address specific deficits (Assis et al., 2022).

Systematic reviews confirm that HELP and similar multi-factorial interventions significantly reduce delirium incidence (by 30-40%) and demonstrate positive trends in preventing functional decline (Hshieh et al., 2018). Other effective models include Acute Care for Elders (ACE) units, which feature a prepared environment (e.g., uncluttered spaces, clear pathways), patient-centered care, and daily interprofessional rounds focused on function (Palmer, 2018). The common thread is the structured collaboration. Daily "huddles" or interdisciplinary rounds where nurses report mobility achievements, physiotherapists update progress, social workers discuss discharge barriers, and GPs reconcile medications create a dynamic, adaptive plan centered on the patient's functional trajectory. Technology, guided by Health Information principles, can facilitate this through shared digital boards or EHR dashboards that visualize the patient's functional status and goals for all team members.

Table 2: Mapping Professional Contributions to the HELP Framework for HAD Prevention

HELP Core Component	Primary Implementing Professions	Specific Actions & Expertise	Supporting/Enabling Professions
Early Mobilization	**Physiotherapy** (prescription, progression); **Nursing/Health Assistant** (execution, encouragement).	PT: Assess, prescribe safe exercises. Nursing/HA: Assist with ambulation 3x daily, sit out of bed.	**GP:** Sanction mobility plan. **Health Security:** Ensure safe equipment/environment.
Cognitive Stimulation & Reorientation	**Nursing/Health Assistant** (consistent interaction); **Volunteers/Activity Therapists**.	Provide orienting communication, engage in puzzles/conversation, ensure sensory aids (glasses, hearing aids).	**Social Service:** Engage family in reorientation. **Health Information:** Display orienting info in EHR/room.
Sleep Enhancement	**Nursing** (environmental management).	Implement non-pharmacologic protocol: reduce noise/lights at night, cluster care, offer warm drinks.	**GP/Pharmacy:** Avoid sedative-hypnotics. **Infection Control:** Ensure quiet, clean environment.
Nutrition & Hydration	**Nursing/Health Assistant** (feeding assistance); **Dietitian**.	Provide feeding assistance, monitor oral intake, offer preferred	**GP:** Manage dysphagia risk. **Social Service:** Address

		foods/fluids, provide oral care.	financial/access barriers to food.
Medication Review & Vision/Hearing	**GP/Geriatrician, Pharmacist** (medication); **Nursing** (aids).	Deprescribe high-risk drugs (anticholinergics, sedatives). Ensure working glasses/hearing aids are used.	**Radiology:** Image if fall related to medication. **Epidemiology:** Data on high-risk drug prevalence.
Overall Coordination & Data Tracking	**HELP Nurse Manager/Team Lead.**	Coordinate volunteers/staff, ensure protocol fidelity, collect outcome data (delirium, function).	**Health Information:** Build data collection tools into EHR. **Epidemiology:** Analyze program outcomes.

Barriers to Implementation and Future Directions

Despite robust evidence, widespread implementation of multidisciplinary HAD prevention models faces significant barriers. Financial disincentives are paramount; fee-for-service models rarely reimburse for "mobility nursing" or interprofessional care coordination, while the cost savings from prevented disability (e.g., fewer nursing home admissions) are realized by payers, not hospitals (Brach et al., 2020). Cultural inertia within hospitals, where throughput and procedural volume are prioritized over functional outcomes, remains a powerful obstacle. Professional silos and hierarchical structures can impede the flat, collaborative communication essential for these models. Furthermore, a lack of interprofessional education means clinicians are often not trained to work in this integrated manner (World Health Organization, 2010).

Future directions must address these barriers. Payment reform through bundled payments or value-based purchasing that includes functional outcomes is critical. Widespread interprofessional education, from undergraduate training to continuing professional development, must simulate and reinforce collaborative, function-focused care (Reeves, Perrier, Goldman, Freeth, & Zwarenstein, 2013). Technological innovation, such as wearable sensors to monitor patient activity and AI to predict HAD risk from EHR data, holds promise for scaling personalized interventions (Mahoney, 2021). Finally, more research is needed to refine the economic case for these programs, tailor them for diverse cultural and resource settings, and identify the most effective strategies for sustaining them over time.

Conclusion

Healthcare-Associated Disability is not an inevitable byproduct of hospitalization; it is a preventable syndrome that stems from a systemic failure to prioritize functional integrity. This narrative review has charted a course for a coordinated counterattack, demonstrating that each of the ten profiled health professions holds a unique and indispensable piece of the solution. From the foundational, 24/7 vigilance of nursing and health assistants, to the expert prescription of physiotherapy, the strategic planning of GPs and social workers, the preventative rigor of infection control, the diagnostic precision of radiology, and the enabling support of epidemiology, health information, and health security—all are essential. The evidence is clear: successful models like HELP work because they explicitly define and integrate these roles into a coherent, patient-centered system. Elevating functional preservation to a core hospital performance metric, equal to mortality and infection rates, is the necessary paradigm shift. The challenge ahead is not one of clinical knowledge, but of system redesign, payment reform, and a fundamental re commitment to collaborative practice. The multi-disciplinary attack on HAD is both an ethical imperative and a practical pathway to sustainable healthcare for aging populations.

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