

## Design and Hospital Immobility

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In a 2006 paper about functional decline, author Carla Graf references a series of papers published in 1967 in which the editors state “in 1960, the U.S. Public Health Service reported that disability from immobilization was one of 10 preventable health problems and, with then existing knowledge, such disability could be reduced 50% to 75%” (Graf, 2006, p. 58). Decades later this is still an issue and garnering public attention in the era of healthcare reform, reimbursement, and patient centered care. For example, in May 2013, The New York Times reported on presentations at the American Geriatrics Society’s annual scientific meeting in Texas (Span, 2013). At the meeting, Dr. Cynthia Brown of the University of Alabama at Birmingham School of Medicine and the Birmingham Veterans Affairs’ Fall Prevention and Mobility Clinic discussed her 2009 study at a Veteran’s Administration hospital. She and her colleagues found that while healthy older adults are on their feet more than six hours a day at home, the group of hospitalized patients in the study spent 83% of their time in bed. The study population was also able to walk in the two weeks before they were admitted to the facility (and did not suffer from dementia). In her study, a group of patients encouraged to get up and do as much as they could showed virtually no change in their life-space score (another measure of being able to perform day-to-day activities), but those who didn’t walked experienced a significant drop in score. Architects and designers can be part of the solution. Like so many adverse events in healthcare, the hospital environment contributes to this outcome.

### **The context of hospital acquired disability**

Most hospitalized older adults spend the majority of time in bed and even short periods of bedrest accelerate muscle degeneration and deconditioning. However, the downstream effect is sobering. Kenneth Covinsky and his colleagues at the Department of Medicine and Division of Geriatrics at UCSF ( University of California, San Francisco) reported in a 2011 paper that at least 30% of medically ill hospitalized patients over 70 years old are discharged with a new disability that was not present before the onset of illness (Covinsky, Pierluissi, & Johnston, 2011). In fact, the authors cite a study indicating half of disability among older adults occurs in the setting of medical hospitalization. Walter Ettinger, who was with the University of Massachusetts Medical School and the UMass Memorial Medical Center at the time of his study, stated that these hospital acquired

conditions often resulted in weeks of rehabilitation (if not permanent) with an inability to perform “activities of daily living,” like bathing or dressing (Ettinger, 2011). Even more frightening is a 2008 study by Dr. Cynthia M. Boyd (Johns Hopkins University School of Medicine and the Johns Hopkins Bloomberg School of Public Health) and colleagues, where 41% of those affected by hospital disability died within one year (Boyd et al., 2008).

These types of immobility studies have been underway for years, and results indicate that even small changes make a difference. A study conducted by Steve Fisher (Division of Rehabilitation Sciences at the University of Texas Medical Branch) and colleagues in 2010 found that patients who increased their walking by at least 600 steps were discharged approximately two days earlier than those who did not (Fisher, Kuo, Graham, Ottenbacher, & Ostir, 2010).

Two themes are evident from the literature: the negative aspect of the bed and the positive nature of activity. According to Roger Leib, a member of the FGI Health Guidelines Revision Committee (HGRC) who has been a proponent of addressing this condition, “The effects of immobility are insidious. There’s no acute trauma, like a fall. No acute onset, like a hospital-acquired Superbug. So immobility remains under-recognized as perhaps the most common, debilitating, and systemically expensive unintended outcome in healthcare today.” If the design of a patient room is considered, the focus is mostly on the bed, for many reasons. However, this focus can result in a preoccupation of making sure everything can be done from the bed, with no incentive for the patient to move, and perhaps a disincentive to leave the bed if there is no way to control things like the lights or TV.

### **Why is immobility on our radar?**

Getting out of a hospital bed can be intimidating to an older person who is sick, in pain, afraid of falling, and who has been warned by the nurse to call for assistance. But fear exists for nurses and hospital administration, as well. A fall resulting in an injury is part of the group of adverse events that are no longer reimbursed by Medicare. Additionally, the CMS Partnership for Patients has included immobility with falls as a specific targeted improvement area. (Studies have found that fall-related injury has the highest likelihood of developing new or worsening disability.) From a regulatory point of view, the design of the environment as an underlying condition to immobility will be one of the components of the new required Safety Risk Assessment in the 2014 FGI *Guidelines for Design and Construction of Hospitals and Outpatient Facilities* – one of the primary resources used in the design of healthcare facilities. With information on this topic (as it relates to facility design) still emerging, the solutions related to the built environment are often based on expert opinion drawn from investigators conducting clinical studies on other outcomes.

### What is the opportunity for those undertaking a project?

There several considerations for design. First, the hospital environment is often designed for the caregiver, rather than the patient. A balance is needed to ensure patient safety and comfort, as well as the safety and efficiency of staff (e.g. patient handling) in their workspace, so, both must be addressed. Second, design elements can either contribute to the patient not walking because of fear of falling or facilitate patient mobilization and ambulation. According to Mary Matz, National Patient Care Ergonomics Program Manager for the Department of Veterans Affairs, patient handling and mobilization assistive devices along with the appropriate sling support patients so they ambulate without that fear. She shares a story of a veteran who would not ambulate due to his fear of falling. “After being coaxed to try a lifting device and walking sling, the veteran progressed very rapidly and was nearly able to walk out of the hospital on his own, bringing tears to his face.” Lastly, the combination of acute illness and uncomfortable environments can lead to or worsen depression, compounding functional decline. The following table is adapted from Graf’s paper (2006) that contained questions to evaluate preventive efforts reacted to immobility. It is supplemented with suggestions offered by Kenneth Covinsky and colleagues (2011).

*Table 1: Questions to evaluate your preventive efforts (adapted from Carla Graf, 2006)*

<b>FUNCTIONAL DECLINE: HOW IS YOUR FACILITY DOING?</b>	<b>Built environment suggestions</b> (drawn from Graf, 2006 and Covinsky et al., 2011)
<b>(1) Is the environment elder friendly?</b>	<ul style="list-style-type: none"> <li>• Specify non-glare floors;</li> <li>• Provide handrails and distance markers in hallways;</li> <li>• Include shower chairs, raised toilet seats when clinically advised, and grab bars in bathrooms;</li> <li>• Use adjustable height beds that can be lowered (if necessary);</li> <li>• Install large clocks and calendars in the room;</li> <li>• Include a geographically defined area so older patients don’t have to navigate equipment, clutter, and high flow traffic;</li> <li>• Provide space for chairs in hallways so patients know they can safely stop and rest;</li> <li>• Consider delirium - include natural light; circadian rhythm lighting; calendars; clocks;</li> </ul>

FUNCTIONAL DECLINE: HOW IS YOUR FACILITY DOING?	<b>Built environment suggestions</b> (drawn from Graf, 2006 and Covinsky et al., 2011)
	<ul style="list-style-type: none"> <li>• Design for a quiet environment (e.g., soft phones, silent pagers, closed doors, acoustical ceilings, headphones, earplugs);</li> <li>• Specify beds that have flexibility for height and rail use.</li> </ul>
<b>(2) Are you taking appropriate steps to prevent sensory deprivation?</b>	<ul style="list-style-type: none"> <li>• Include storage and/or furnishings to accommodate hearing aids, eyeglasses, and dentures, as well as items from home such as robes, blankets, or pictures;</li> <li>• Provide family zones/amenities to encourage family involvement;</li> <li>• Provide space/furnishings for activities such as reading, listening to music, watching TV or playing puzzles/games.</li> </ul>
<b>(3) Are you promoting self-care activities?</b>	<p>Caregivers should be “prescribing” specific routines (e.g. 50 feet of hallway walking twice a day) that are posted in the room as a reminder.</p> <ul style="list-style-type: none"> <li>• Provide space for movement prompts, whether on a whiteboard or some other means;</li> <li>• Provide patients access to assistive devices such as walkers, as well as physical and occupational therapy;</li> <li>• Include convenient storage on the unit for this equipment with room storage considered for personal devices brought by the patient.</li> </ul> <p>Patients should be out of bed for meals, walking to bathroom, and in the hall as tolerated.</p> <ul style="list-style-type: none"> <li>• Provide a common eating area for both walking and socializing where the setting allows;</li> <li>• Consider room layout and furniture placement for ease of access;</li> <li>• Specify furniture that allows the patient to spend time out of the bed (For specifics around EBD furniture guidelines refer to <a href="#">Malone &amp; Dellinger, 2011</a>);</li> <li>• Ensure the room design allows for a clear unobstructed path to the bathroom;</li> <li>• Provide access to room controls beyond the range of the bed (e.g. TV, reading lights, call button).</li> </ul>
<b>(4) Are you providing sufficient patient support and education?</b>	<p>The benefits of exercise and ambulation, the hazards of functional decline, the use of assistive devices, fall prevention, the patient’s routine—it’s crucial that both the patient and family understand these topics. Provide ample information and make time to answer questions.</p> <ul style="list-style-type: none"> <li>• Design the spaces to facilitate conversation (e.g., furnishings, layout, acoustics) and promote family engagement in care.</li> </ul>



### What research might advance our knowledge?

There is a need for research that more specifically addresses this topic. For example:

1. Longer term prospective studies on the impact of hospitalization in different types of environments
2. Studies to identify whether family presence and engagement have an impact on mobility as a patient outcome
3. Research that considers the combination of falls and patient handling policies and equipment use, as the two areas are integrally linked
4. Whether the use of overhead patient lifting devices with repositioning slings decreases hospital acquired pressure ulcers, pneumonia, or length of stay
5. Whether the use of overhead patient lifting devices with ambulation slings results in more rapid rehabilitation and/or a decrease in length of stay
6. Evaluations to determine the optimum space within a patient room for safely performing patient care at the bedside, ambulating patients, and transferring patients with lifting devices.

Renovations can be an interesting testing ground, as well. Teams might consider the impact of furniture types and use, as well as minor changes to hallway design (such as distance markers, space for chairs, etc.)

In a 2012 interview, Derek Parker (the 2012 Center for Health Design Changemaker Award recipient) bemoaned the lack of innovation happening in healthcare today. Combatting some of the status quo thinking, he said, “We’re designing now a series of devices that makes it easy and safe to get patients out of bed, and a device that supports them for early mobility. We’re designing the corridors in such a way that there’s a traffic lane, where people can actually be walking, and graphics that allow them to measure their progress day by day: ‘I made it to the poppies yesterday, so I’m going to make it to the apples today,’ for example” (Zeit, 2012).

Architects and designers have the opportunity to be on the leading edge of this issue to help healthcare providers understand how the environment can part of a set of tools to improve the plethora of outcomes that result from immobility.

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## References

- Boyd, C. M., Landefeld, C. S., Counsell, S. R., Palmer, R. M., Fortinsky, R. H., Kresevic, D., ... Covinsky, K. E. (2008). Recovery of Activities of Daily Living in Older Adults After Hospitalization for Acute Medical Illness. *Journal of the American Geriatrics Society, 56*(12), 2171–2179. <https://doi.org/10.1111/j.1532-5415.2008.02023.x>
- Covinsky, K. E., Pierluissi, E., & Johnston, C. B. (2011). Hospitalization-associated disability: “She was probably able to ambulate, but I’m not sure”. *JAMA - Journal of the American Medical Association, 306*(16), 1782–1793. <https://doi.org/10.1001/jama.2011.1556>
- Ettinger, W. H. (2011). Can hospitalization-associated disability be prevented? *JAMA - Journal of the American Medical Association, 306*(16), 1800–1801. <https://doi.org/10.1001/jama.2011.1563>
- Fisher, S. R., Kuo, Y., Graham, J. E., Ottenbacher, K. J., & Ostir, G. V. (2010). Early ambulation and length of stay in older adults hospitalized for acute illness. *Archives of Internal Medicine, 170*(21), 1942–1943. <https://doi.org/10.1001/archinternmed.2010.422>
- Graf, C. (2006). Functional decline in hospitalized older adults. *The American Journal of Nursing, 106*(1), 58–67.
- Span, P. (2013, May 30). Trapped in the Hospital Bed [The New York Times: The New Old Age]. Retrieved from <https://newoldage.blogs.nytimes.com/2013/05/30/trapped-in-the-hospital-bed-2/>
- Zeit, K. (2012, October). Derek Parker on Hospital Design: “Nothing New Is Happening.” Retrieved from <http://www.healthcaredesignmagazine.com/architecture/derek-parker-hospital-design-nothing-new-happening/>