

Embedding Human Factors & Ergonomics in Healthcare with Building Design at the Centre of the System

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1 Background

Risk factors for patient slips, trips and falls (STF) have been identified and reported since the 1950s and are mostly unchanged in the 2010s.

The prevailing clinical view has been that STF events indicate underlying frailty or illness and so many of the interventions over the last 60 years have focussed on assessing and treating physiological factors rather than designing environmental interventions to reduce risk factors.

5 Conclusion

Design proactively for STF with an HFE integration approach to facility design by using similar approach to other industrial sectors with input from the person who experiences the STF - the patient.

Design STF interventions to support mobility, safety and autonomy for patients.

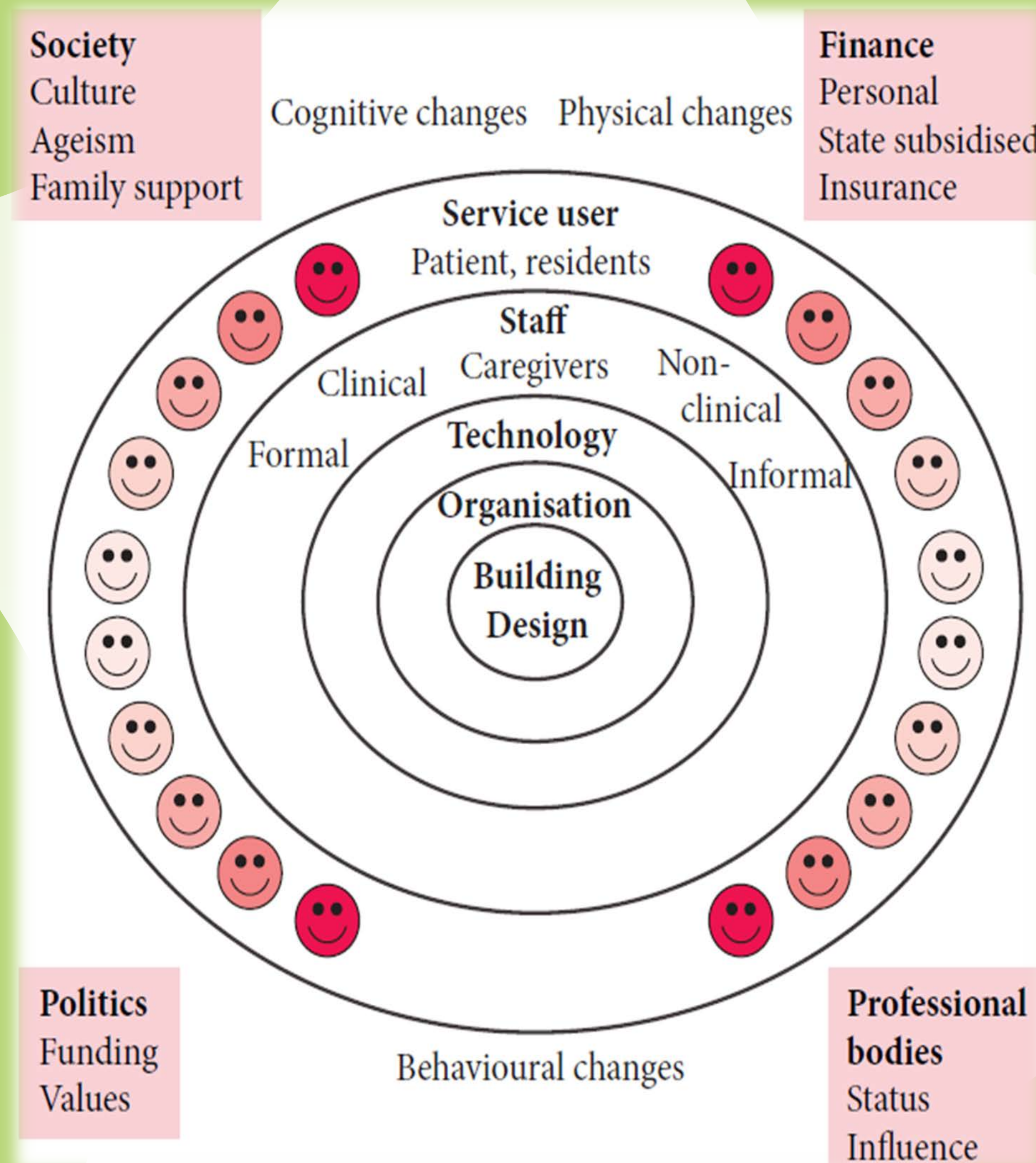
Benefits from retaining mobility are associated with continence, cognitive function, pressure care, and muscular conditioning.

2 Methods

Purpose: To use a theoretical model for HFE (DIAL-F¹) to discuss patient STF interventions

Methods: Three case studies are used to discuss how HFE has been applied to STF risk management²:

- (1) **Design-based** (building) approach to embed safety into the built environment
- (2) **Staff (and organisation)-based** approach using Lean and Six Sigma to improve processes
- (3) **Patient behaviour-based** approach to explore and understand patient perspectives of STF events



4 Results

Case study 1: many elements of STF interventions require risk management decisions (i.e. likelihood and consequence) to be made during the design and construction of healthcare facilities.

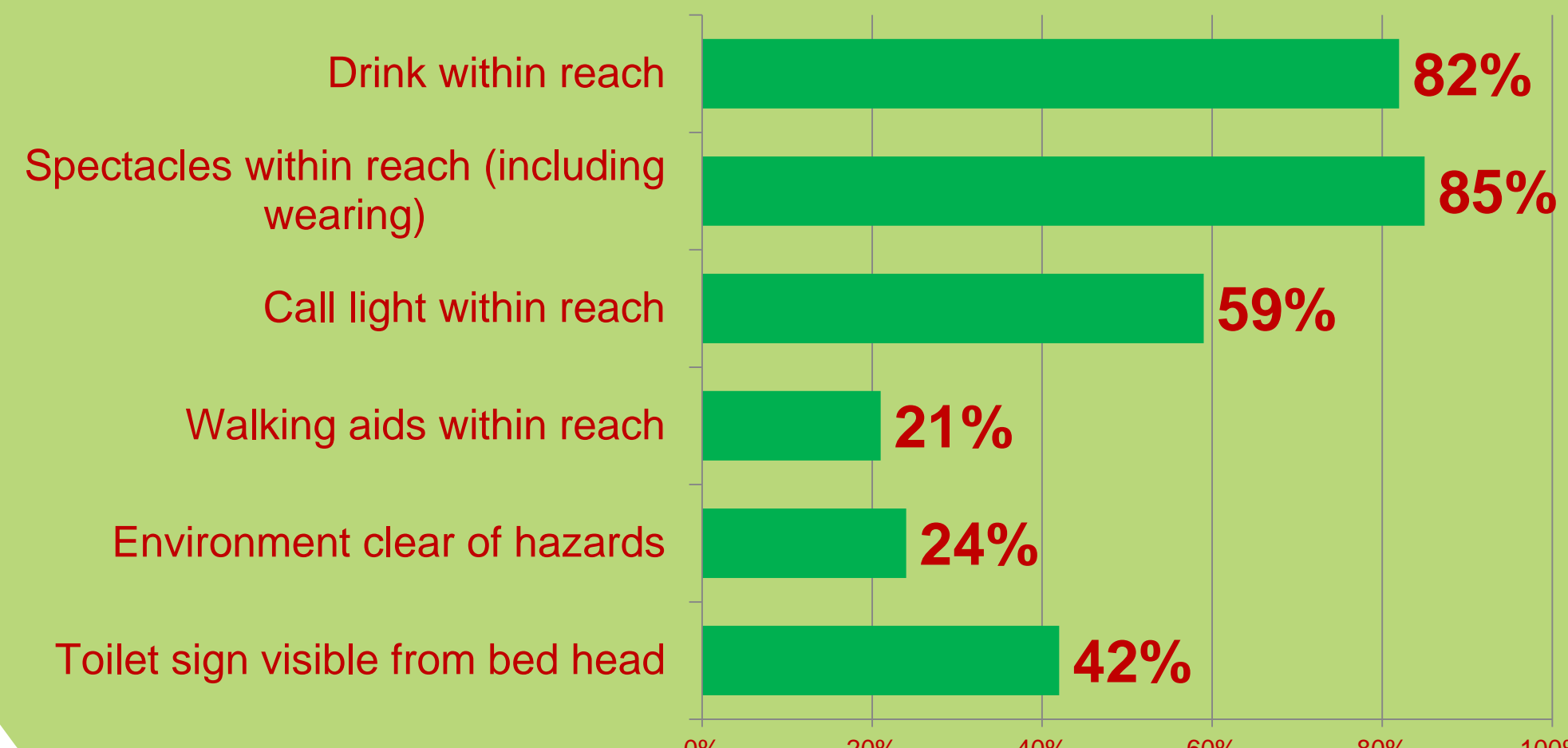
Case study 2: the reduction in the total STF rate reported from the Lean and Six Sigma projects was time-limited and had dropped to only 6% improvement over baseline within 12 months of the end of the project.

Case study 3: most of the items usually found on the bedside table (e.g. drink, spectacles) were within reach (>80%). Only 21% of walking aids (frames, crutches and sticks) were within reach, and the bedside table was often an obstruction to mobility.

Almost all patients **strongly disagreed** that they were at risk of a STF during in their hospital stay. Themes about **lack of control and frustration** with respect to getting about due to obstacles and trip hazards and **getting help when, and in the way, they 'want' it.**

3 Data

| Category | Rationale | Design Consideration Question/Statement |
|-----------------|---|--|
| Navigation | One study found that bathroom locations visible from the bed, with the door open and out of the way, resulted in fewer falls: a review referenced angled door and room layouts to provide better sight lines. | Provide room layout so that the bathroom door is clearly identifiable from the bed. |
| Flooring | Changes in floor surfaces (e.g. soft surface to hard surface and/or slip resistance) and unevenness (e.g. minor changes in height requiring transition strips, holes/cracks needing repair) can be a contributing factor for falls. | Allow for smooth transitions in walking surfaces or between flooring types to avoid surface irregularities leading to trips. |
| Noise reduction | Noisy environments can lead to confusion in older hospitalized patients, sometimes leading to restlessness and the risk of falls. When both overhead paging and alarms were rated as occurring "frequently," falls were statistically higher. | Select call and communication systems to minimize public noise. |



References

- Hignett, S. (2013) Why Design Starts with People. The Health Foundation: Patient Safety Resource Centre.
http://patientsafety.health.org.uk/sites/default/files/resources/why_design_starts_with_people.pdf
- Hignett, S., Wolf, L., Taylor, E., Griffiths, P. (2015) Firefighting to Innovation: Using Human Factors & Ergonomics to tackle Slip, Trip and Fall Risks in Hospitals. *Human Factors* (in press)