

Reframing stroke rehabilitation spaces: A multi-disciplinary approach to design evaluation

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The burden of stroke

- Over 50 million people have a stroke each year.¹
- Stroke patients may need to re-learn how to walk, talk, use their arm/s, or understand speech.
- Many stroke patients remain in inpatient rehab for weeks (median length of stay in Australia is 21 days).²



1/3
OF STROKE PATIENTS
REQUIRE INPATIENT
REHABILITATION

The problem

- Stroke patients in inpatient rehab are inactive, alone, and bored, which is detrimental to their recovery.^{5,6}
- The role of the built environment in rehab is under researched.
- **We need a shared understanding of what is important in the built environment of stroke rehab spaces in order to evaluate current designs, guide research, and inform new designs.**

Inpatient rehabilitation facilities are unique healthcare spaces

➤ They are both a healthcare space and a learning space

- Patients' re-learning depends on stroke severity, and their behaviour, experiences, and extent of practice post-stroke.³
- Rehabilitation guidelines recommend cognitive stimulation, physical exercise, and goal-directed practice to promote learning.⁴
- Priorities for the design of stroke rehab facilities are therefore likely to be distinct from acute settings.
- Many stakeholder perspectives must contribute to understanding these priorities, including: Patients, clinicians, architects and designers, rehabilitation scientists, and government. Since rehabilitation requires re-learning, experts in learning environments research may also provide pertinent input. See Figure 1.

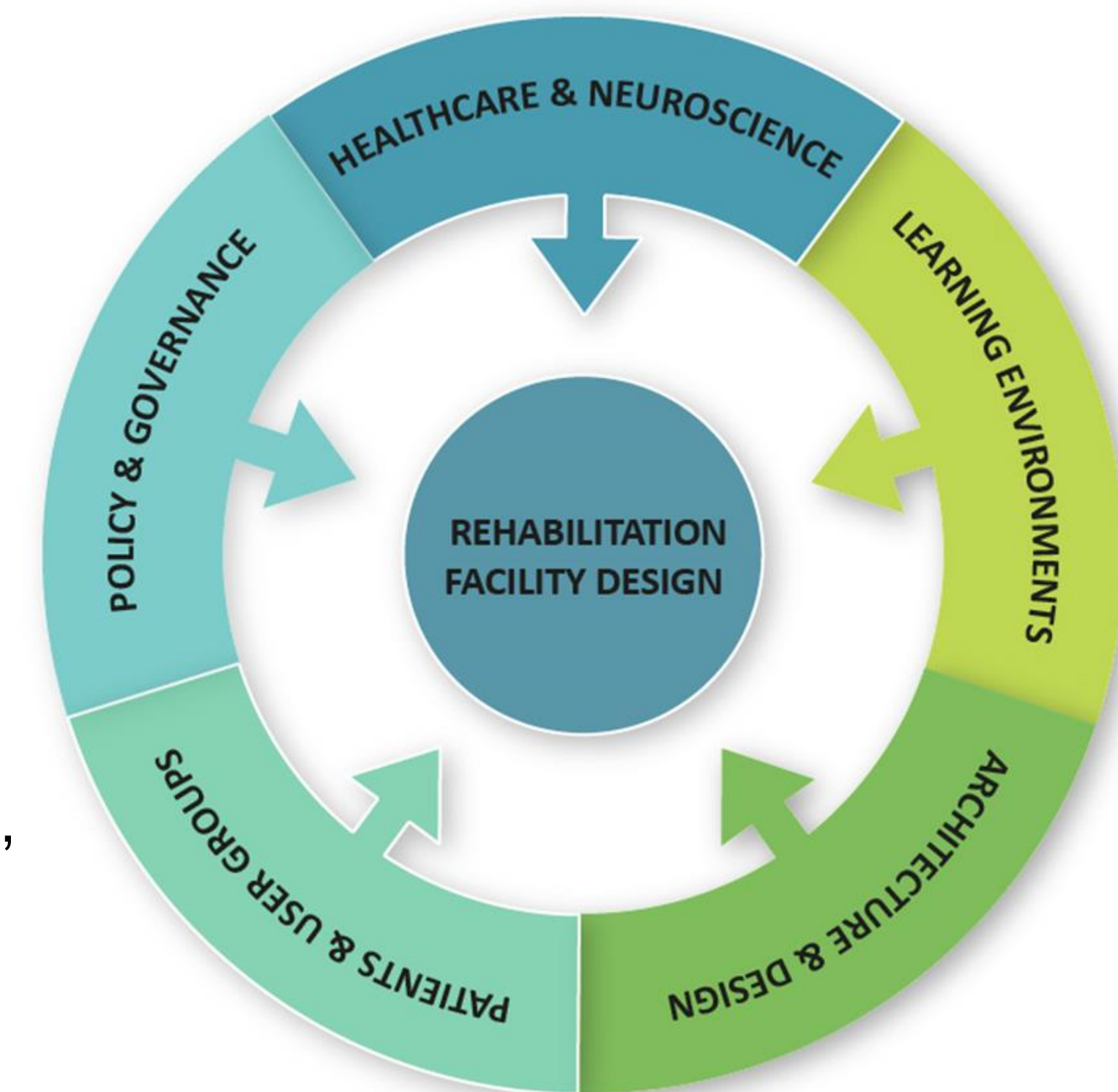


Figure 1. The stakeholder perspectives that should contribute to rehab facility design. Image created by Heather Mitchelltree.

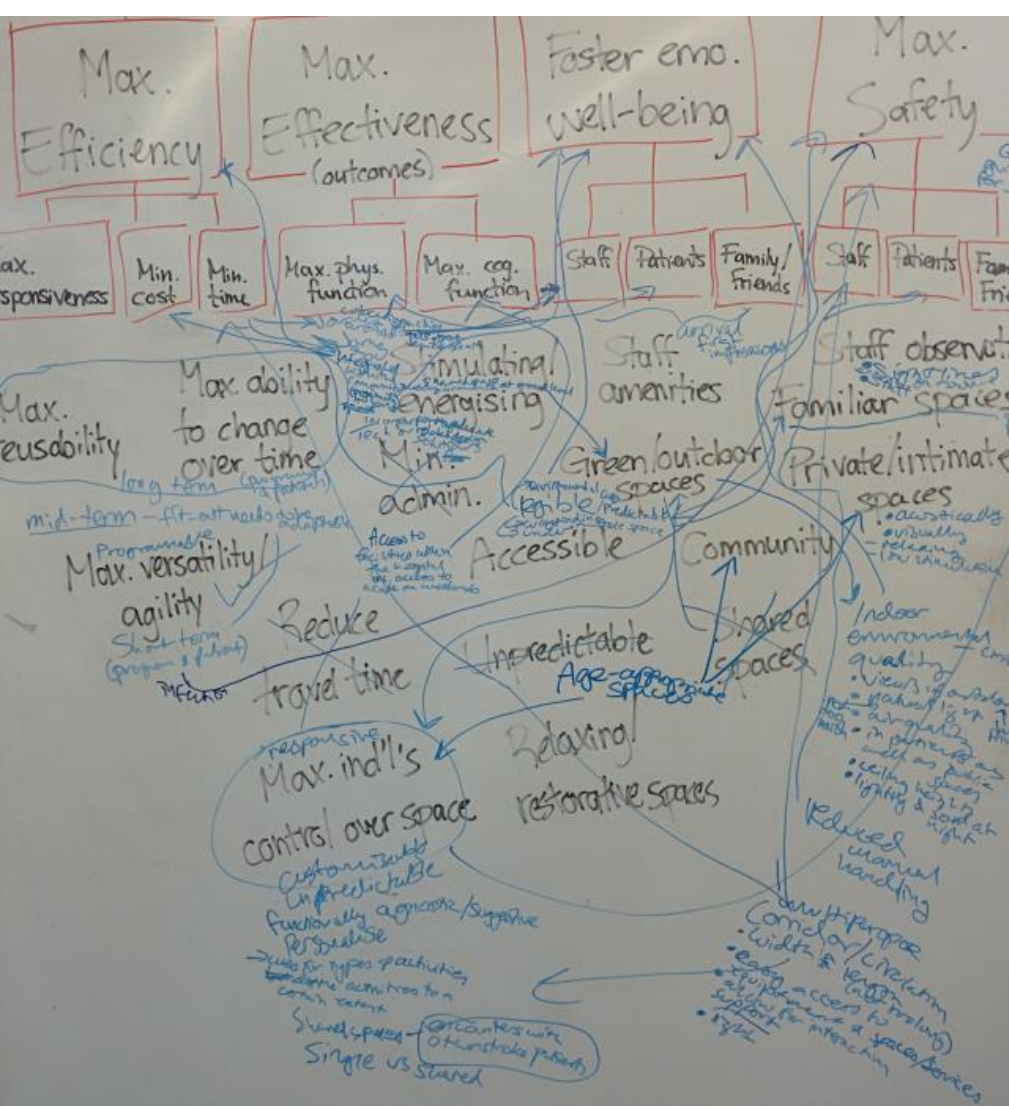


Figure 2. Value-Focused thinking in progress

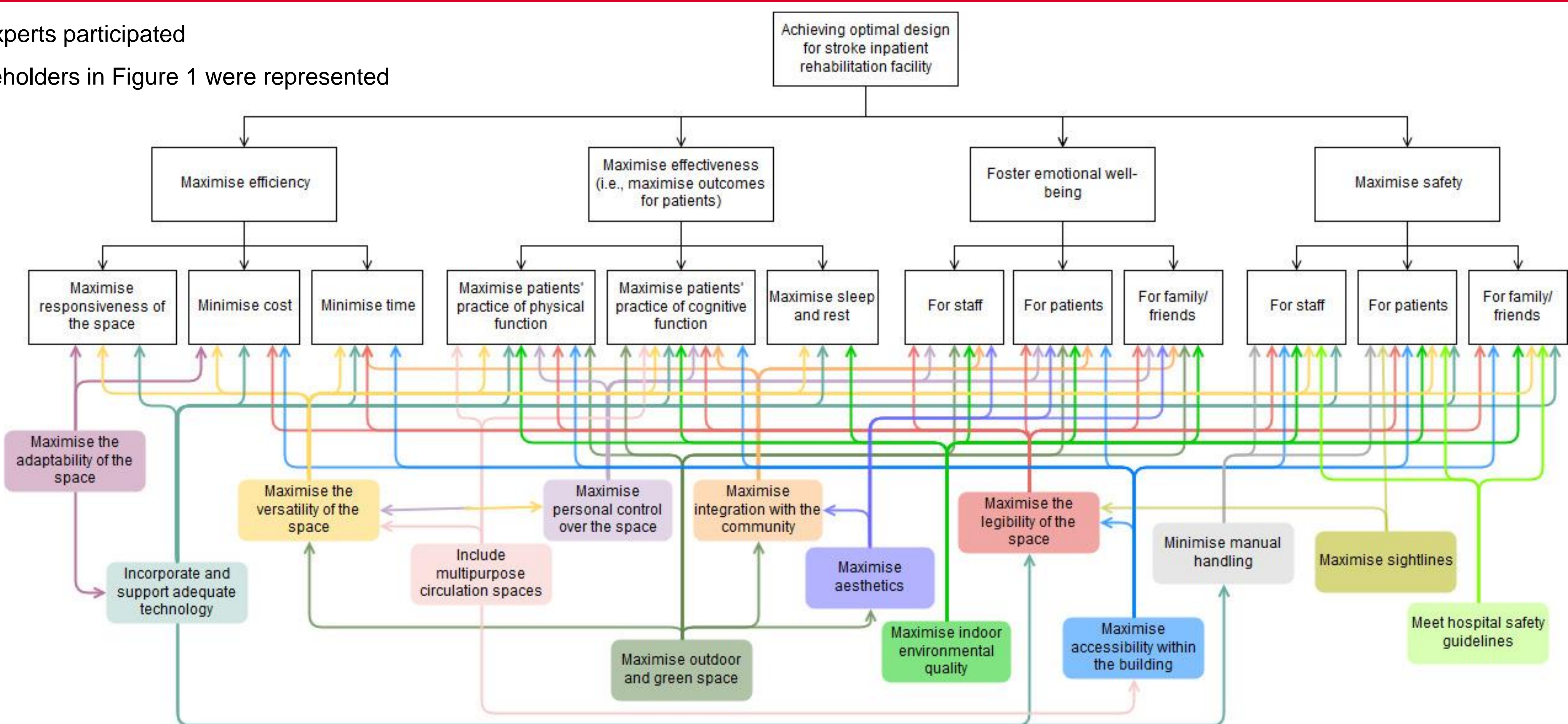
Methods

- Experts from all of the stakeholder groups in Figure 1 were invited to participate in 2 workshops.
- The workshop attendees were divided into multidisciplinary groups and asked to brainstorm what they value (i.e., what they believe to be important) in the design of stroke inpatient rehabilitation spaces (see Figure 2).
- Value-Focused Thinking was used to structure the iterative expert elicitation process. Value-Focused Thinking is a systematic process that encourages decision-makers to think about what they want (i.e., what they value) before they think about how they can get it (i.e., the possible alternatives), resulting in better decisions.⁷

Results

A framework to understand what is important in the design of inpatient rehabilitation facilities

- Thirty experts participated
- All stakeholders in Figure 1 were represented



References

1. Thrift, A. G., Thayabaranathan, T., Howard, G., Howard, V. J., Rothwell, P. M., Feigin, V. L., et al. (2017). Global stroke statistics. *International Journal of Stroke*, 12(1), 13-32.
2. Stroke Foundation. (2016). *National Stroke Audit – Rehabilitation Services Report*. Melbourne, Australia.
3. Kolb, B., & Muhammad, A. (2014). Harnessing the power of neuroplasticity for intervention. *Frontiers in Human Neuroscience*, 8.
4. Stroke Foundation. (2017). *Clinical Guidelines for Stroke Management*. Melbourne, Australia.
5. Kenah, K., Bernhardt, J., Cumming, T., Spratt, N., Luker, J., & Janssen, H. (2017). Boredom in patients with acquired brain injuries during inpatient rehabilitation: a scoping review. *Disability and Rehabilitation*, 1-10.
6. West, T., & Bernhardt, J. (2012). Physical Activity in Hospitalised Stroke Patients. *Stroke Research & Treatment*, 1-13.
7. Keeney, R. L. (1992). *Value-focused thinking: a path to creative decision-making*. Cambridge, MA: Harvard University Press, 1992.

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Acknowledgments

The authors thank the workshop attendees and especially Jessica Keating, Heather Mitchelltree, and Kirra Liu. Ruby Lipson-Smith is supported by a Research Training Program PhD scholarship from the Australian federal government.



Conclusions

- Design choices that are standard in acute healthcare settings may need to be re-thought for rehabilitation settings.
- Value-Focused Thinking elicited novel insights and organised the design priorities of rehab spaces into a framework so that they can be considered systematically.
- The framework highlighted that many interconnected variables are important in rehab facility design; each is important in its own right despite conflicts or interdependencies.

This research was funded by the Hallmark Aging Research Initiative (HARI)