



# RESEARCH IN A SNAP

## OVERVIEW

We're keeping you updated on citations added to The Center's Knowledge Repository.

## Knowledge Repository News

This was a busy summer for adding citations, and as of the end of August, the Knowledge Repository is just one citation away from hitting the 6,000 entries mark! Among the 90 new entries in the Knowledge Repository, several papers focus on evaluation related to specific healthcare features. See the citations listed in the "Design and Evaluation" category below.

(Papers published ahead of print "in press" will be updated in the online version as volume and page information becomes available.)

### July - August 2023

#### Experience

Perceived Quality of Care (Noise, Communication, Waiting, etc.)

1. Bazaid, R., & Pati, D. (2023). Exploring Hospital Physical Environment Influencing Users First Impressions of the Healthcare Organizations: A Conceptual Framework Based on Literature Review. *HERD: Health Environments Research & Design Journal*, in press. <https://doi.org/10.1177/19375867231184573>
  2. Miller, E. M., Porter, J. E., & Barbagallo, M. S. (2023). The effects of the ward environment and language in palliative care: A qualitative exploratory study of Victorian nurses' perspectives. *HERD: Health Environments Research & Design Journal*, in press. <https://doi.org/10.1177/19375867231177299>
  3. Soni, R., Fairhurst, N., El Anbari, M., Leslie, A., & Tscherning Wel-Wel, C. (2022). Staff Perceptions and Challenges of the Single-Family Room Design—Experience of a Greenfield Level 4 Neonatal Intensive Care Unit in the Middle East. *Acta Paediatrica*, 111(12), 2291–2298. <https://doi.org/10.1111/apa.16527>
  4. van der Heijden, M., van Mol, M. M. C., Witkamp, E. F. E., Osse, R. J., Ista, E., & van Dijk, M. (2020). Perspectives of Patients, Relatives and Nurses on Rooming-in for Adult Patients: A Scoping Review of the Literature. *Applied Nursing Research*, 55, 151320. <https://doi.org/10.1016/j.apnr.2020.151320>
- Supportive Design (Social Support, Distractions, Nature, etc.)
5. Ching-Yuan, W., Chen, C.-I., & Meng-Cong, Z. (2023). Exploring Sign System Design for a Medical Facility: A Virtual Environment Study on Wayfinding Behaviors. *Buildings*, 13(6), 1366. <https://doi.org/10.3390/buildings13061366>

The Knowledge Repository is a collaborative effort between The Center for Health Design and our partners

**Academy of Architecture for Health**

AIA Knowledge Community

**ASHE**  
Optimizing health care facilities

**FGI**

Additional key point summaries provided by

**NIHD** Nursing Institute for Healthcare Design  
INSPIRING AND EDUCATING NURSES



6. Cusack, L., Munt, R., Verdonk, N., Schultz, T., & Maben, J. (2023). Comparison of Experiences of Nursing Staff and Patients Before and After Move to 100% Single-Bed Room Hospital in Australia: Mixed Methods. *BMC Health Services Research*, 23, 1–10. <https://doi.org/10.1186/s12913-023-09073-8>
7. Fay, L., Real, K., Haynes, S., Daneshvar, Z., Dowling, D., Newberry, D. M., & Parker, L. (2023). Examining Efficiency in Open-Bay and Single-Family Room NICU Designs. *Advances in Neonatal Care*, 23(4), 355–364. <https://doi.org/10.1097/ANC.0000000000001058>
8. Gallagher, J., & Carr, L. J. (2023). Internal but Not External Building Design Associated with More Occupational Physical Activity. *HERD: Health Environments Research & Design Journal*, in press. <https://doi.org/10.1177/19375867231192117>
9. Harries, B., Chalmin-Pui, L. S., Gatersleben, B., Griffiths, A., & Ratcliffe, E. (2023). 'Designing a wellbeing garden' a systematic review of design recommendations. *Design for Health*, 1–22. <https://doi.org/10.1080/24735132.2023.2215915>
10. He, Y., Holroyd, E., & Koziol-McLain, J. (2023). Understanding Workplace Violence Against Medical Staff in China: A Retrospective Review of Publicly Available Reports. *BMC Health Services Research*, 23(1), 660. <https://doi.org/10.1186/s12913-023-09577-3>
11. Hussein, A. (2022). Taking advantage of single patient rooms as a major support for the healing environment system in Egyptian hospitals. *Journal of Engineering Research*, 6(4), 1–5. <https://doi.org/10.21608/erjeng.2022.265202>
12. Jones, I. G. R., Friedman, S., Vu, M., Awladthani, S., Watts, C., Simpson, A., Al-Farsi, A. A., Gupta, R., Cupido, C., & Choong, K. (2023). Improving Daily Patient Goal-Setting and Team Communication: The Liber8 Glass Door Project\*. *Pediatric Critical Care Medicine*, 24(5), 382. <https://doi.org/10.1097/PCC.0000000000003192>
13. Mathiesen, S. L., Aadal, L., Uldbæk, M. L., Astrup, P., Byrne, D. V., & Wang, Q. J. (2021). Music Is Served: How Acoustic Interventions in Hospital Dining Environments Can Improve Patient Mealtime Wellbeing. *Foods*, 10(11), 2590. <https://doi.org/10.3390/foods10112590>
14. Moore, H., Boisvert, K., Bryan, M., Hoare, L., Gates, M., Garnett, B., Kennedy, A. G., & Latreille, M. (2023). Inspired to Garden: A Qualitative Study of Participants' Experiences in an Academic Medical Center Garden. *Cureus*, 15(7), e41695. <https://doi.org/10.7759/cureus.41695>
15. Rashid, M., Khan, N., Jones, B., & JMD Architects. (2016). Physical and Visual Accessibilities in Intensive Care Units: A Comparative Study of Open-Plan and Racetrack Units. *Critical Care Nursing Quarterly*, 39(4), 313–334.
16. Rooke, C. N., Rooke, J. A., Tzortzopoulos, P., & Koskela, L. (2023). Wayfinding in complex medical facilities: The indexicality of directional arrows. *HERD: Health Environments Research & Design Journal*, in press. <https://doi.org/10.1177/19375867231180908>
17. Schledermann, K. M., Bjørner, T., West, A. S., & Hansen, T. S. (2023). Evaluation of staff's perception of a circadian lighting system implemented in a hospital. *Building and Environment*, 242, 110488. <https://doi.org/10.1016/j.buildenv.2023.110488>



18. Shepley, M. M., Ames, R. L., & Lin, C. Y. (2023). Color and NICU design. *HERD: Health Environments Research & Design Journal*, in press. <https://doi.org/10.1177/19375867231178311>
19. Søndergaard, S. F., Frederiksen, K., & Andersen, A. B. (2023). Learning by Chance. Student Nurses' Conditions for Learning in Single-Room Hospital Design. A Realistic Evaluation. *Nurse Education in Practice*, 70, 103651. <https://doi.org/10.1016/j.nepr.2023.103651>

### Safety

20. Bertuzzi, A., Martin, A., Clarke, N., Springate, C., Ashton, R., Smith, W., Orłowski, A., & McPherson, D. (2023). Clinical, Humanistic and Economic Outcomes, Including Experiencing of Patient Safety Events, Associated with Admitting Patients to Single Rooms Compared with Shared Accommodation for Acute Hospital Admissions: A Systematic Review and Narrative Synthesis. *BMJ Open*, 13(5), e068932. <https://doi.org/10.1136/bmjopen-2022-068932>

### Infection Prevention/Control

21. Gideskog, M., Falkeborn, T., Welander, J., & Melhus, Å. (2023). Source Control of Gram-Negative Bacteria Using Self-Disinfecting Sinks in a Swedish Burn Centre. *Microorganisms*, 11(4), 965. <https://doi.org/10.3390/microorganisms11040965>
22. Guo, W., Fu, Y., Jia, R., Guo, Z., Su, C., Li, J., Zhao, X., Jin, Y., Li, P., Fan, J., Zhang, C., Qu, P., Cui, H., Gao, S., Cheng, H., Li, J., Li, X., Lu, B., Xu, X., & Wang, Z. (2022). Visualization of the infection risk assessment of SARS-CoV-2 through aerosol and surface transmission in a negative-pressure ward. *Environment International*, 162, 107153. <https://doi.org/10.1016/j.envint.2022.107153>
23. Hamdani, H., Sabri, F. S., Harapan, H., Syukri, M., Razali, R., Kurniawan, R., Irwansyah, I., Sofyan, S. E., Mahlia, T. M. I., & Rizal, S. (2022). HVAC Control Systems for a Negative Air Pressure Isolation Room and Its Performance. *Sustainability*, 14(18), Article 18. <https://doi.org/10.3390/su141811537>
24. Kek, H. Y., Mohd Saupi, S. B., Tan, H., Dzarfan Othman, M. H., Nyakuma, B. B., Goh, P. S., Hamood Altowayti, W. A., Qaid, A., Abdul Wahab, N. H., Lee, C. H., Lubis, A., Wong, S. L., & Wong, K. Y. (2023). Ventilation Strategies for Mitigating Airborne Infection in Healthcare Facilities: A Review and Bibliometric Analysis (1993–2022). *Energy and Buildings*, 295, 113323. <https://doi.org/10.1016/j.enbuild.2023.113323>
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26. Khankari, K. (2016). Patient Room HVAC. *ASHRAE Journal*, 58(6), 16-18,20-22,24,26.
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28. Li, H., Lan, Y., Liu, M., Kong, X., & Fan, M. (2023). Experimental research on the cross-infection control performance of different ventilation strategies. *Building and Environment*, 243, 110683. <https://doi.org/10.1016/j.buildenv.2023.110683>
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35. Savanti, F., & Wicaksono, D. (2023). Particulate Matter Concentration in Healthcare Facilities: The Influence of Natural Ventilation. *IOP Conference Series: Earth and Environmental Science*, 1203(1), 012015. <https://doi.org/10.1088/1755-1315/1203/1/012015>
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### COVID-19 Response

38. Bi, Y., Aganovic, A., Mathisen, H. M., & Cao, G. (2022). Experimental Study on the Exposure Level of Surgical Staff to SARS-CoV-2 in Operating Rooms with Mixing Ventilation Under Negative Pressure. *Building and Environment*, 217, 109091. <https://doi.org/10.1016/j.buildenv.2022.109091>



39. Chen, Y., Lei, J., Li, J., Zhang, Z., Yu, Z., & Du, C. (2022). Design Characteristics on the Indoor and Outdoor Air Environments of the COVID-19 Emergency Hospital. *Journal of Building Engineering*, 45, 103246. <https://doi.org/10.1016/j.jobe.2021.103246>
40. Gebczynska-Janowicz, A., Janowicz, R., Targowski, W., Cudnik, R., Paszko, K., & Zielinska-Dabkowska, K. M. (2023). Evaluation of Medical Staff Satisfaction for Workplace Architecture in Temporary COVID-19 Hospital: A Case Study in Gdańsk, Poland. *International Journal of Environmental Research and Public Health*, 20(1), 639. <https://doi.org/10.3390/ijerph20010639>
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#### Patient Handling/Mobility

45. Kevdzija, M., Laviano, A., Worf, I., Schuh, C., Tarantino, S., & Hiesmayr, M. (2023). Indirect Nutrition and Mobility Risks During Hospitalization: An Architectural Perspective on the Nutritionday Study Findings. *Nutrients*, 15(6), 1527. <https://doi.org/10.3390/nu15061527>

#### Medication Safety

46. MohammadiGorji, S., Joseph, A., Mihandoust, S., Ahmadshahi, S., Allison, D., Catchpole, K., Neyens, D., & Abernathy, J. H. (2023). Anesthesia workspaces for safe medication practices: Design guidelines. *HERD: Health Environments Research & Design Journal*. <https://doi.org/10.1177/19375867231190646>

#### Security

47. Gharaveis, A., Hamilton, D. K., Pati, D., Shepley, M. M., Rodiek, S., & McCall, D. (2023). How visibility may reduce security issues in community hospitals' emergency departments. *HERD: Health Environments Research & Design Journal*, in press. <https://doi.org/10.1177/19375867231188985>



## Care across the Lifespan

### Therapeutic Environments: Behavioral/Mental Health

48. Cho, M. (2023). Evaluating Therapeutic Healthcare Environmental Criteria: Architectural Designers' Perspectives. *International Journal of Environmental Research and Public Health*, 20(2), 1540. <https://doi.org/10.3390/ijerph20021540>
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50. Nieberler-Walker, K., Desha, C., Bosman, C., Roiko, A., & Caldera, S. (2023). Therapeutic Hospital Gardens: Literature Review and Working Definition. *HERD: Health Environments Research & Design Journal*, in press. <https://doi.org/10.1177/19375867231187154>

### Psychiatric Facilities

51. Norouzi, N., Martinez, A., & Rico, Z. (2023). Architectural Design Qualities of an Adolescent Psychiatric Hospital to Benefit Patients and Staff. *HERD: Health Environments Research & Design Journal*, in press. <https://doi.org/10.1177/19375867231180907>

### Pediatric

52. Castañeda Sandoval, M., González Gonzalez, D., Peña Suarez, K. J., Rosero Medina, D. F., Arias Torres, D., & Calderón Farfán, J. C. (2023). Neonatal Abstinence Syndrome and non-pharmacological nursing care. A scoping review. *Journal of Neonatal Nursing*. <https://doi.org/10.1016/j.jnn.2023.07.015>
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### Labor & Delivery

55. Secchi, S., Setola, N., Marzi, L., & Amodeo, V. (2022). Analysis of the Acoustic Comfort in Hospital: The Case of Maternity Rooms. *Buildings*, 12(8), 1117. <https://doi.org/10.3390/buildings12081117>





## Elders/Aging

56. Davis, R., Calkins, M., & Cai, H. (2023). The assessment of long-term care environments for wayfinding design. *HERD: Health Environments Research & Design Journal*, in press. <https://doi.org/10.1177/19375867231180905>
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*Cognitive Impairment & Dementia*
58. 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. *HERD: Health Environments Research & Design Journal*, in press. <https://doi.org/10.1177/19375867231185851>
59. Lipson-Smith, R., Zeeman, H., Muns, L., Jeddi, F., Simondson, J., & Bernhardt, J. (2023). The role of the physical environment in stroke recovery: Evidence-based design principles from a mixed-methods multiple case study. *PLOS ONE*, 18(6), e0280690. <https://doi.org/10.1371/journal.pone.0280690>
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## Aging in Place/Healthcare at Home

61. Elf, M., Slaug, B., Ytterberg, C., Heylighen, A., & Kylén, M. (2023). Housing accessibility at home and rehabilitation outcomes after a stroke: An explorative study. *HERD: Health Environments Research & Design Journal*, in press. <https://doi.org/10.1177/19375867231178313>
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63. Sum, N., Francis, J., & Naccarella, L. (2023). Residential aged care and homelike environments: A scoping literature review of views of the aged care workforce. *Asia Pacific Journal of Health Management*, 18(1), 42–57. <https://doi.org/10.3316/informit.007982190915951>

## Building Systems & Technology

64. Chantzis, G., Nižetić, S., Arıcı, M., & Papadopoulos, A. M. (2023). Energy efficiency, resilience and sustainability: A trilemma for hospital buildings? *2023 8th International Conference on Smart and Sustainable Technologies (SpliTech)*, 1–5. <https://doi.org/10.23919/SpliTech58164.2023.10192959>
65. Scialpi, G., & Declercq, J. (2023). Adaptability in healthcare buildings: A perspective through Joseph Bracops Hospital. *Frontiers in Medical Technology*, 5, 1–7.



## Design & Evaluation (e.g., Process, Methods, Simulation Modeling)

66. Aboueid, S., Beyene, M., & Nur, T. (2023). Barriers and Enablers to Implementing Environmentally Sustainable Practices in Healthcare: A Scoping Review and Proposed Roadmap. *Healthcare Management Forum*, in press. <https://doi.org/10.1177/08404704231183601>
67. Ahmad, S., Kamal, M. A., Sudhakaran, P., Verma, T., & Roy, S. (2022). Evidence Based Patient Room Design and Improving Outcomes: Case of Healthcare Facility in Saudi Arabia. *Journal of Positive Psychology and Wellbeing*, 6(2), Article 2.
68. Castor, C. J., Atreus Datuin, A. D., Anjelo, A., Realon, J. M., & Esmeria, G. J. (2023). Approaches in Evaluating Hospital Wayfinding Signage System: A Literature Review. *Proceedings of the International Conference on Industrial Engineering and Operations Management*. 13th Annual International Conference on Industrial Engineering and Operations Management, Manila, Philippines. <https://doi.org/10.46254/AN13.20230651>
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71. Englezou, M., & Aimilios, M. (2022). Evaluation of visual and non-visual effects of daylighting in healthcare patient rooms using climate-based daylight metrics and melanopic metrics. *E3S Web of Conferences*, 362. <https://doi.org/10.1051/e3sconf/202236201003>
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73. Hu, B. (2023). Wayfinding for Modern Healthcare: A Participatory Approach to Designing a Wayfinding System in a Chinese Hospital Setting. *The Design Journal*, 26(4), 662–672. <https://doi.org/10.1080/14606925.2023.2216877>
74. Jamshidi, S., & Pati, D. (2023). Hierarchy of Evidence: An Appraisal Tool for Weighting the Evidence in Healthcare Design Research Based on Internal Validity. *HERD: Health Environments Research & Design Journal*, 16(3), 19–38. <https://doi.org/10.1177/19375867231175916>
75. Lee, C., Zhong, S., Lee, S., & Ndubisi, F. (2023). Designing for Health in Healthcare Deserts: A Medical City Master Planning Project in Nigeria. *HERD: Health Environments Research & Design Journal*, in press. <https://doi.org/10.1177/19375867231181344>





76. Li, Y., Liao, P., Song, Y., & Chi, H. (2023). A Systematic Decision-Support Approach for Healthcare Facility Layout Design Integrating Resource Flow and Space Adjacency Optimization with Simulation-Based Performance Evaluation. *Journal of Building Engineering*, 77, 107465. <https://doi.org/10.1016/j.jobe.2023.107465>
77. Lindahl, B., & Bergbom, I. (2015). Bringing Research Into a Closed and Protected Place: Development and Implementation of a Complex Clinical Intervention Project in an ICU. *Critical Care Nursing Quarterly*, 38(4), 393. <https://doi.org/10.1097/CNQ.0000000000000087>
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79. Marczyk, C. E. S., Saurin, T. A., Bulhões, I. R., Patriarca, R., & Bilotta, F. (2023). Slack in the infrastructure of intensive care units: Resilience management in the post-pandemic era. *BMC Health Services Research*, 23(1), 579. <https://doi.org/10.1186/s12913-023-09495-4>
80. Papautsky, E. L., & Abdulbaseer, U. (2023). Capturing the Work of Patients' Family Members in the Medical Intensive Care Unit Using Naturalistic Observations. *HERD: Health Environments Research & Design Journal*, in press. <https://doi.org/10.1177/19375867231190620>
81. Qureshi, S. M., Purdy, N., Greig, M. A., Kelly, H., vanDeursen, A., & Neumann, W. P. (2023). Developing a simulation tool to quantify biomechanical load and quality of care in nursing. *Ergonomics*, 66(7), 886–903. <https://doi.org/10.1080/00140139.2022.2113921>
82. Salleh, N., Nuzaihan Aras, A. S., Norazman, N., & Kamaruzzaman, S. N. (2023). Fire risk assessment of Malaysia public hospital buildings. *Journal of Facilities Management*, in press. <https://doi.org/10.1108/JFM-11-2021-0138>
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