The Bioethics of Built Space

On the Shared Responsibilities of Bioethics and Architecture

Project: Cleveland Clinic Abu Dhabi; HDR

Presenters

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National Strategic Council, American Institute of Architects

Disclosures

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Project: Lucile Salter Packard Children's Hospital at Stanford; Perkins+Will, HGA

Learning Objectives

At the end of this session, attendees will be able to:

- Discuss the role the built environment plays in wellbeing and medical outcomes and provide several examples.
- Be familiar with some of the most pressing ethical issues arising out of design decisions in healthcare architecture and be able to describe both evidence-based considerations and theoretical concerns.
- Articulate the state of research in healthcare architecture, discuss the challenges of implementing modern research practices in ongoing and future work, and the benefits of solving the issues involved.

Project: Cedars-Sinai Advanced Health Sciences Pavilion; HOK

Agenda

- Architecture's Professional Context
- Key Questions at the Nexus of Bioethics and Architecture
- Next Steps

Project: Vitura Voorhees Hospital; HGA

In recent decades, our understanding of the role the environment plays in shaping us and our interactions has expanded immensely. Researchers have examined the profound effect social and environmental factors can have on behavior and decision-making.

Yet, design choices in the built healthcare environment raise substantive bioethical issues that demand the attention of bioethicists and ethical inquiry.

It is time for the built environment to be considered alongside other parameters of care.

Sources: Appiah, KA. Experiments in Ethics (The Mary Flexner Lectures). Boston, MA: Harvard University Press; 2008. Ogien, Ruwen. Human Kindness and the Smell of Warm Croissants: An Introduction to Ethics. Columbia University Press. Chichester, New York. 2011: 131-180.

Project: Duke Student Wellness Center; Duda|Paine Architects

Social/Environmental Factors Affecting Patient Outcomes:

- Form
- Unit layout
- Floor material
- Room features
- Medical equipment visibility
- Nature
- Lighting
- Music

Source: Jamshidi S, Parker JS, Hashemi S. The effects of environmental factors on the patient outcomes in hospital environments: A review of literature. Frontiers of Architectural Research. 2020 June; 9(2):249-263. https://doi.org/10.1016/j.foar.2019.10.001

Project: Children's Hospital of Philadelphia, Buerger Center for Advanced Pediatric Care; CannonDesign;

Emerging Ethical Issues in Healthcare Design

Just as medicine is using ethical awareness to encourage and empower clinicians, healthcare architecture can benefit from a bioethics lens.

Some of the better firms involve frontline healthcare professionals in design decisions, but doing so is not required, and there is no regulatory structure to consider the kinds of issues raised here.

Healthcare Design's Impact on Bioethics

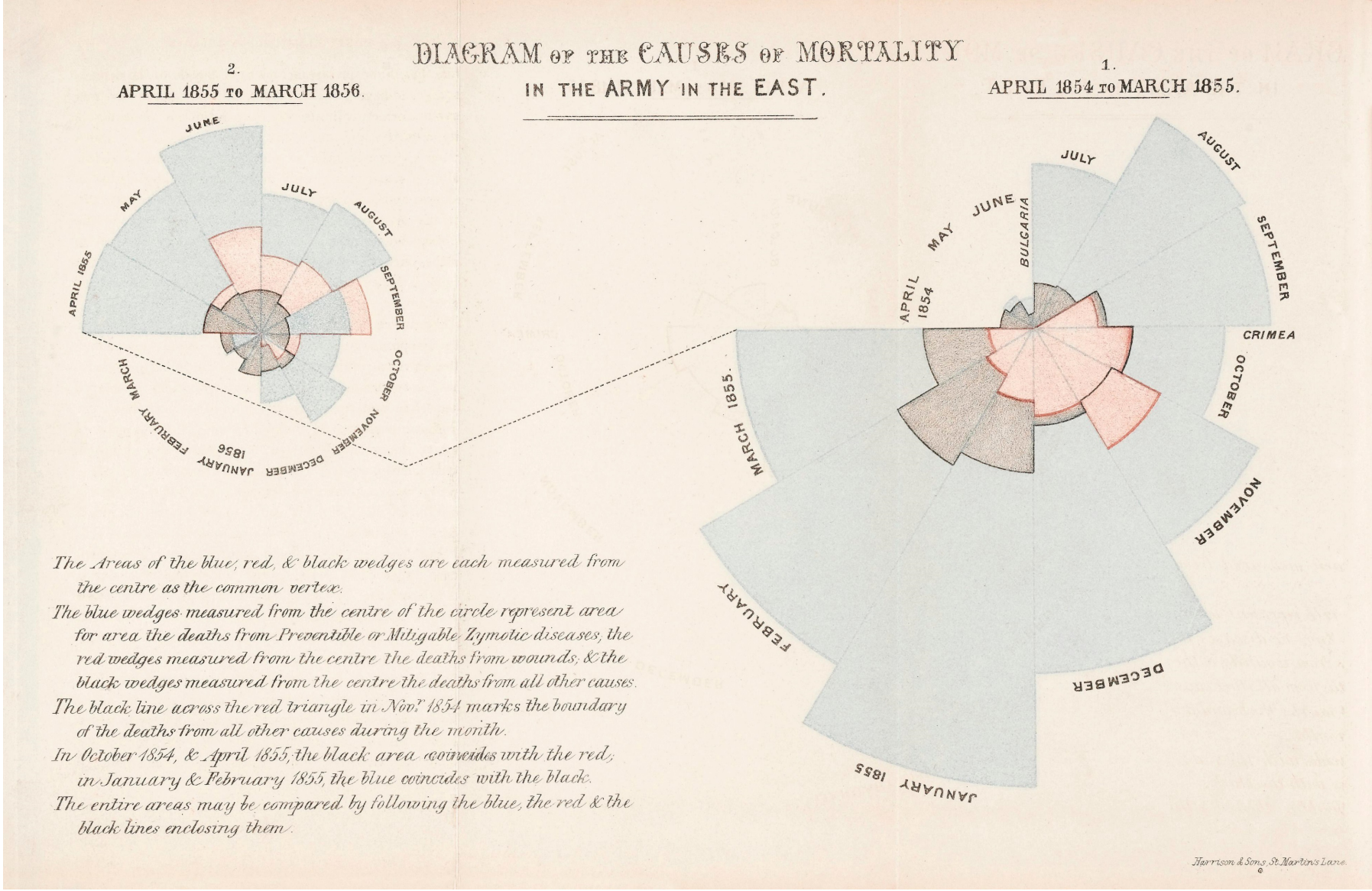
"On the night of May 10, 1941, with one of the last bombs of the last serious raid, our House of Commons was destroyed by the violence of the enemy, and we have now to consider whether we should build it up again, and how, and when.

We shape our buildings, and afterwards our buildings shape us.

Having dwelt and served for more than forty years in the late Chamber, and having derived very great pleasure and advantage therefrom, I, naturally, should like to see it restored in all essentials to its old form, convenience and dignity."

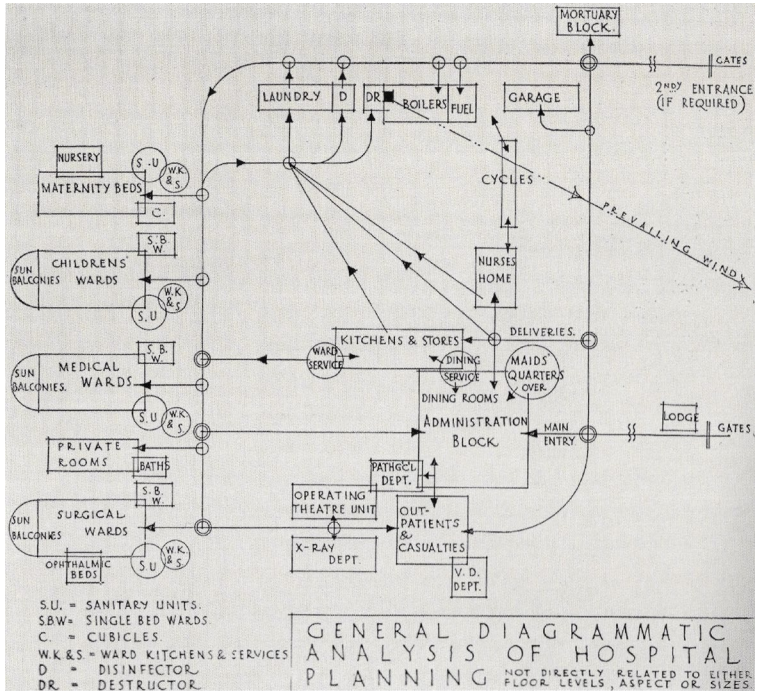
Source: "Churchill and Commons Chamber". Living Heritage, Architecture of the Palace. https://www.parliament.uk/about/living-heritage/building/palace/architecture/palacestructure/churchill/. 10/1943. Accessed 5/31/2020.

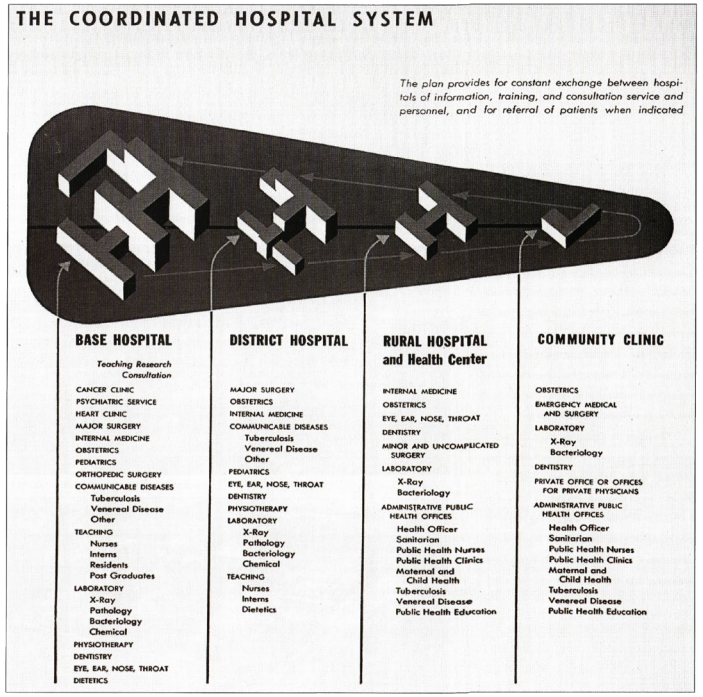
Historical Perspective



Source: Nightingale, Florence. Diagram of the Causes of Mortality in the Army in the East. Notes on Matters Affecting Health, Efficiency, and Hospital Administration of the British Army. pg. 311. Harrison & Sons, London, 1858. Weblink. Accessed 11 Oct 2020.

Historical Perspective





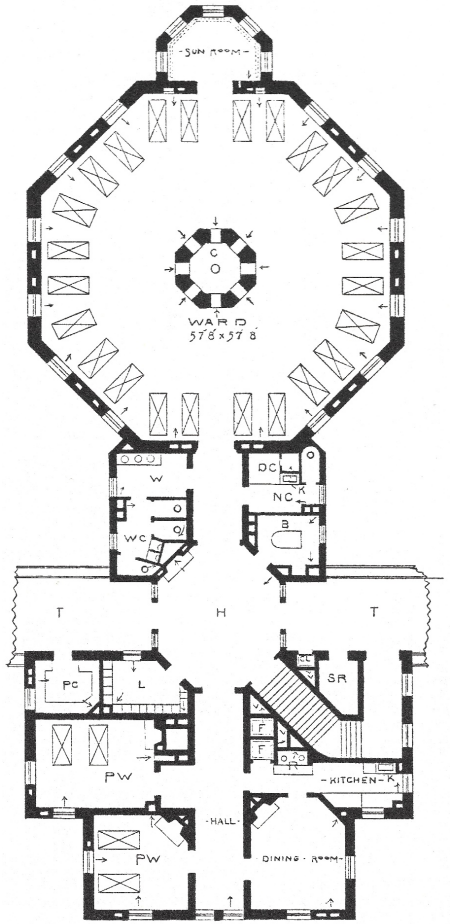


Fig. 189 (a) Floor plan of the first floor (longitudinal section north and south), octagon ward, Johns Hopkins Hospital.

C	central ventilating chimney, 8′0″ × 8′0″	VL	ventilator for linen closet and clothes room, 14″ diameter
BC	boiler iron cylinder, 6′0″ diameter	Co	corridor
AC	accelerating steam coils	PT	pipe tunnel
VWC	vent pipe from water closet, 24″ diameter	B	basement floor
V	ventilator for water closet bath room and lavatory, 32″ diameter	D	main floor
VS	ventilator for special wards, 42″ diameter	E	second floor
		G	attic floor
		DC	chimney damper
		S	smoke pipe

Source: Curry, John Michael. The Fourth Factor: A Historical Perspective on Architecture and Medicine. The American Institute of Architects' Academy of Architecture for Health. 2007. pgs. 138, 159. ISBN: 978-57165-018-4.

Thompson, John D., Goldin, Grace. The Hospital: A Social and Architectural History. Yale University Press, New Haven & London, 1975. pg. 190. ISBN: 0-300-0-1829-0

Healthcare Design as an Architectural Specialty

- The American Institute of Architects (AIA) was founded in 1857 in New York.
- The Academy of Architecture for Health (AAH) was officially chartered by the American Institute of Architects in 1945 as a response to the demand for federal funds to support hundreds of post-war hospitals, and regulatory oversight.
- The Veterans' Administration proposed that hospital architects be screened for competency.
- Federal financial support for the hospital building boom ended in the 1980s, and so did the federal regulations.
- State Departments of Health assumed regulatory authority over hospital design and construction, and each adopted various but disparate model building codes.
- The AIA's AAH then adopted the task of centralizing minimum requirements for hospital construction into a model code, which may be adopted by individual states.
- The American Hospital Association developed a special interest organization related to the management of healthcare facilities – the American Society for Healthcare Engineering.
- The American College of Healthcare Architects (ACHA) launched in 2000 as a response to demonstrate individual competence in healthcare architecture that was legally defensible and professionally sound.
- The Center for Health Design became the joint knowledge repository for several professional organizations, and subsequently launched its certification in Evidence-based Design (EBD) with its EDAC credential.

Source: "A Brief History of the AIA's Programs on Health Facilities". American Institute of Architects, and AIA correspondence with author, Oct 2020.

State of Research

https://www.healthdesign.org/knowledge-repository

"One can look at evidence-based design (EBD) in a narrow context as focusing only on research affecting the built environment or, in a more expansive context, as research coming from the neurosciences or lean design or a number of healthcare system research initiatives designed to improve patient outcomes."

- Jain Malkin

Academy of Architecture for Health
an AIA Knowledge Community

The American Institute of Architects

THE CENTER FOR HEALTH DESIGN®

ACADEMY of ARCHITECTURE for HEALTH FOUNDATION

ASHE™
Optimizing health care facilities

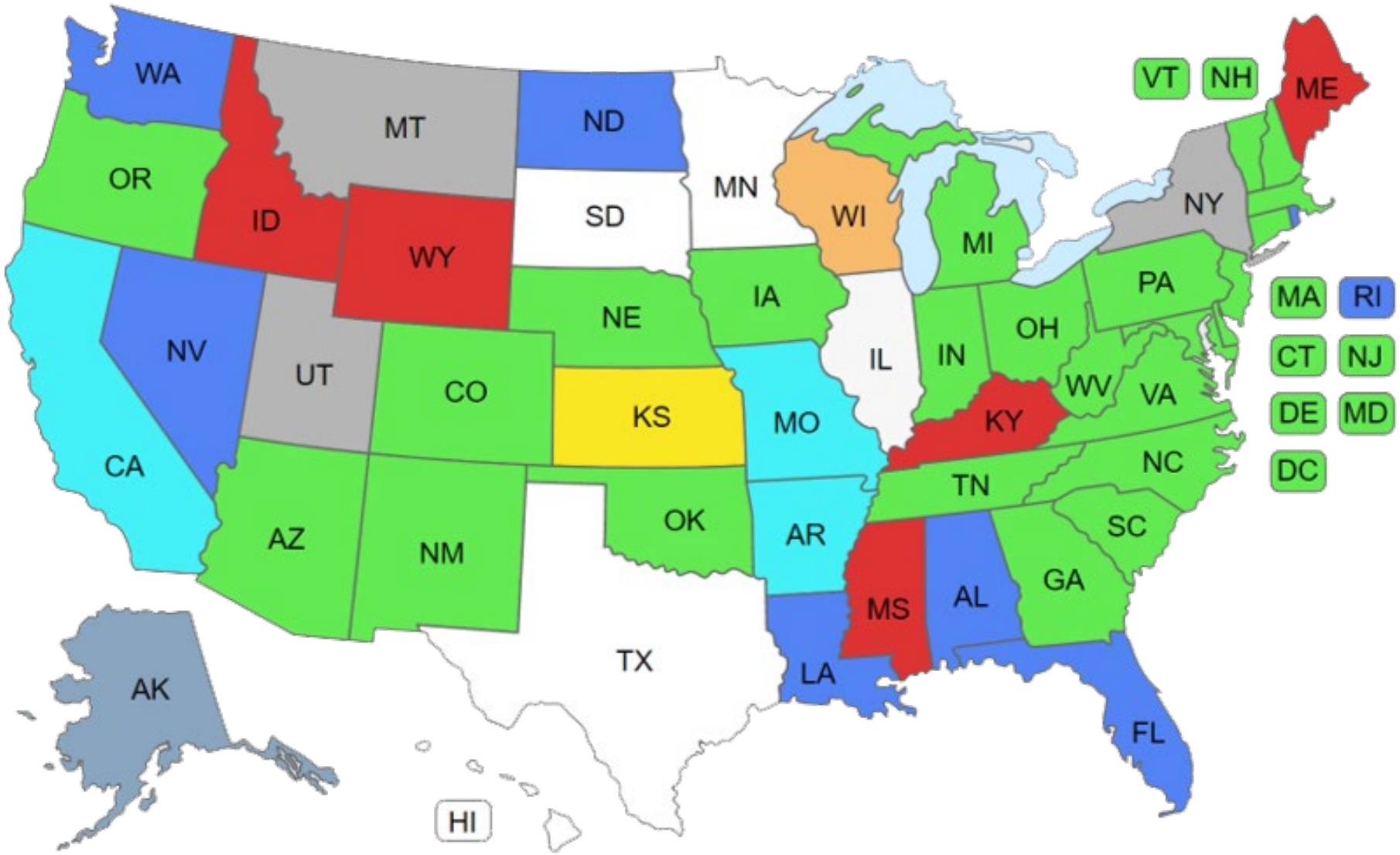
NIHD Nursing Institute for Healthcare Design
INSPIRING AND EDUCATING NURSES

FGI

RESEARCH·DESIGN connections

Sources: *Knowledge Repository. Center for Health Design, et al. Weblink. Accessed 11 Oct 2020.*
Malkin, Jain. A Visual Reference for Evidence-Based Design. Ch 1. Center for Health Design; 1st Edition 30 March 2008. ISBN-13: 978-0974376363.

State of Regulation



KEY

2018	
2014	
2010	
2006	
2001	
1996–97	
Equivalency*	
HVAC only	

**Guidelines* may be applied as an equivalency to state rules.

Source(s): Adoption of the FGI Guidelines, Facility Guidelines Institute, 26 Feb 2020. Weblink. Accessed 11 Oct 2020

Emerging Ethical Issues in Healthcare Design

While the decisions to influence through design are made prior to the time of their effect – prior to the building being occupied – such practices should fall under the same considerations as interpersonal efforts to influence behavior.

Project: Leishenshan Hospital Coronavirus Hospital, Wuhan

Emerging Ethical Issues in Healthcare Design

The intended goal is the same; only the means of achieving that end differs. It is the intentional component, the effort to influence behavior, that is ethically salient, not the differing means of implementation.

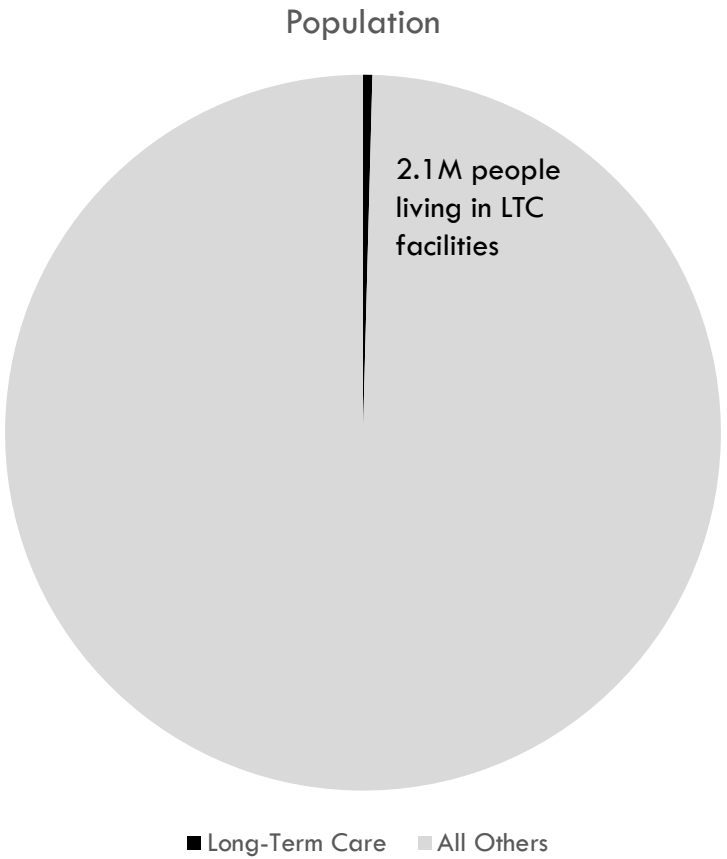
Project: Javits Center Coronavirus Field Hospital; U.S.A.C.E.

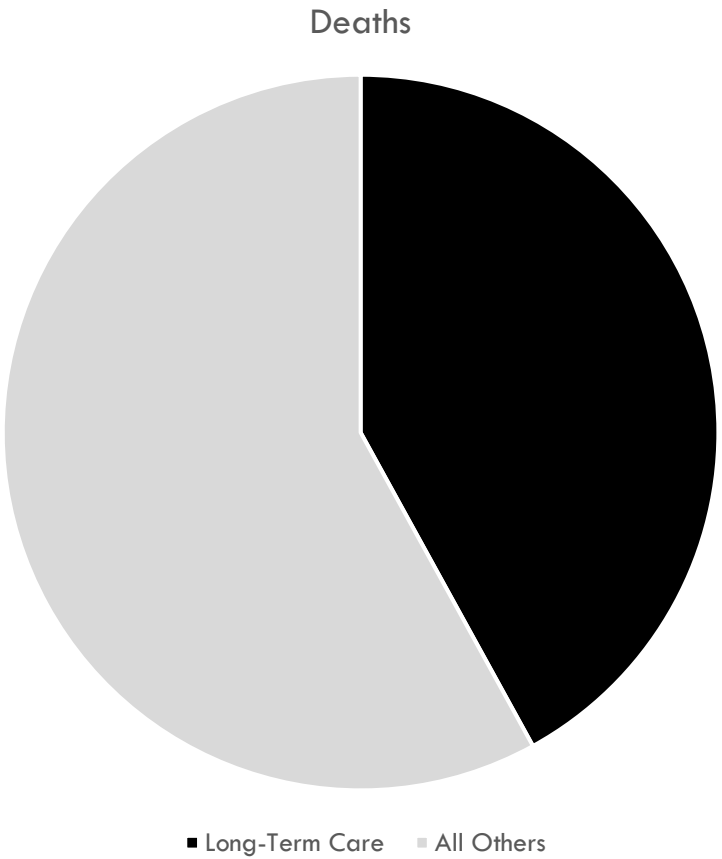
Long-Term Care Facilities and COVID

"In this country, we have erected a vast apparatus of last-stop living arrangements that, during the pandemic, have proven remarkably successful at killing the very people they were supposed to care for. The disease that has roared through nursing homes is forcing us to look hard at a system we use to store large populations and recognize that, like prisons and segregated schools, it brings us shame."

Source: Davidson, Justin. The American nursing home is a design failure. New York Magazine. June 25, 2020. Weblink. Accessed 7/6/2020

Differential Impact of COVID-19:
Long-term Care Facilities vs. All other Sources

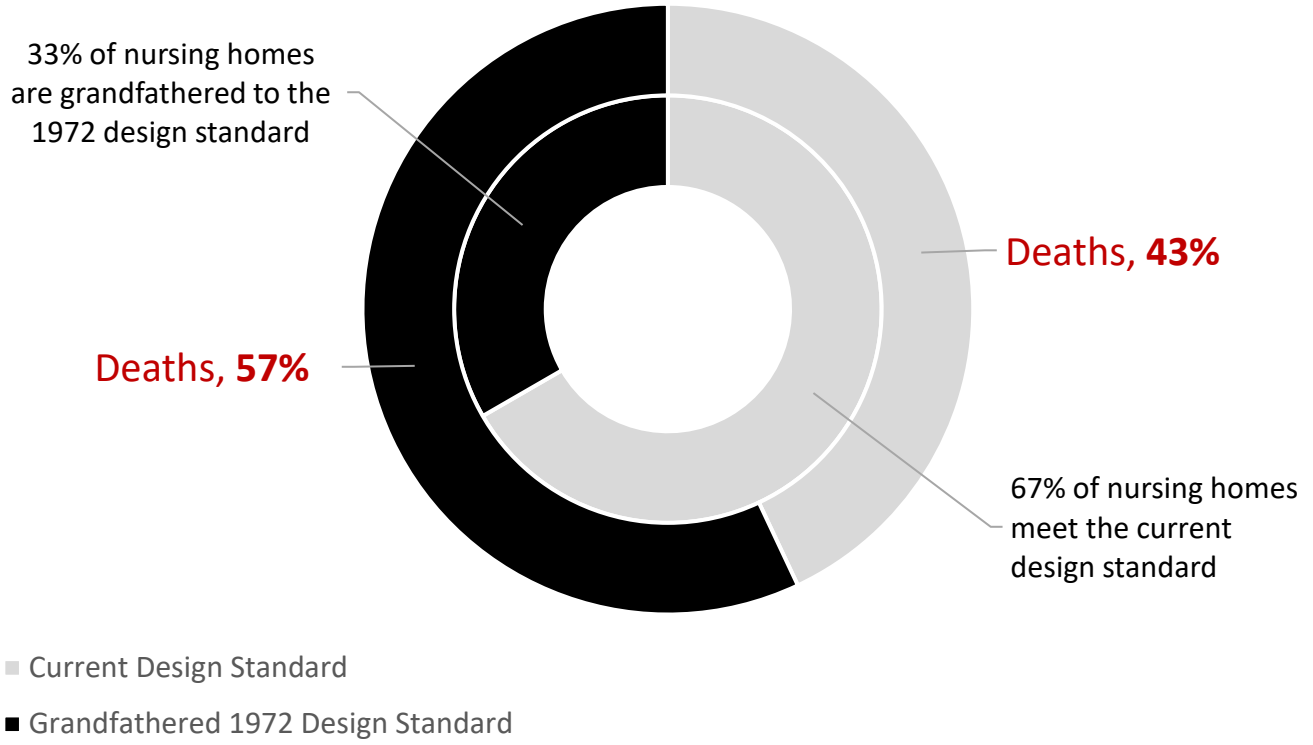




Source: Girvan G, Roy A. Nursing Homes & Assisted Living Facilities Account for 42% of COVID-19 Deaths. FreeOP. 5/7/2020. Weblink. Accessed 10/3/2020

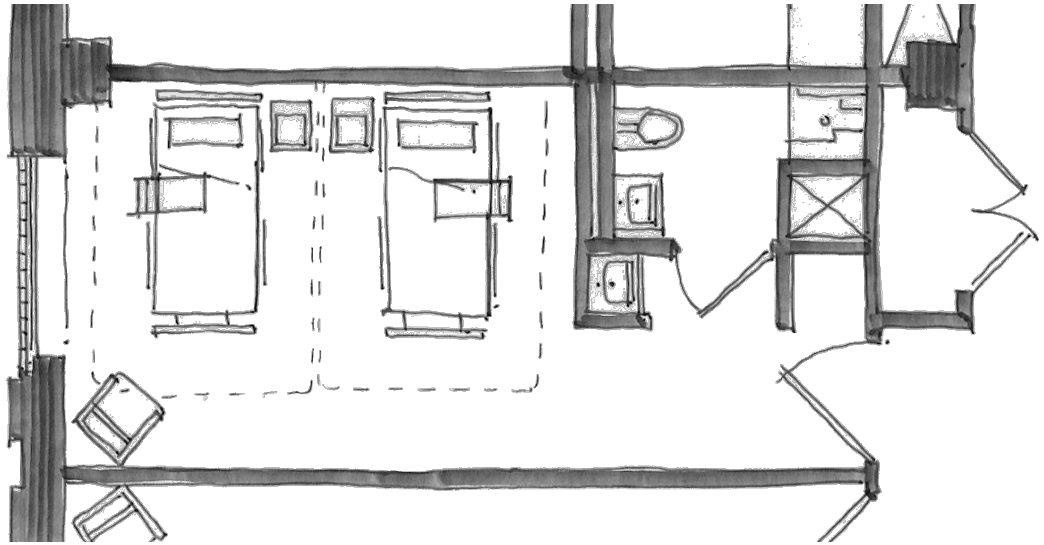
The Deadly Cost of Delay:
Canadian Nursing Home Upgrades

Living in a nursing home grandfathered into the 1972 design standard nearly doubled the risk of death due to COVID-19.



Source: Pedersen K, Mancini M, Wolfe-Wylie W. Ont. nursing homes have had 22 years to do safety upgrades. COVID-19 reveals deadly cost of delay. CBC. June 9, 2020. Weblink. Accessed 7/6/2020.

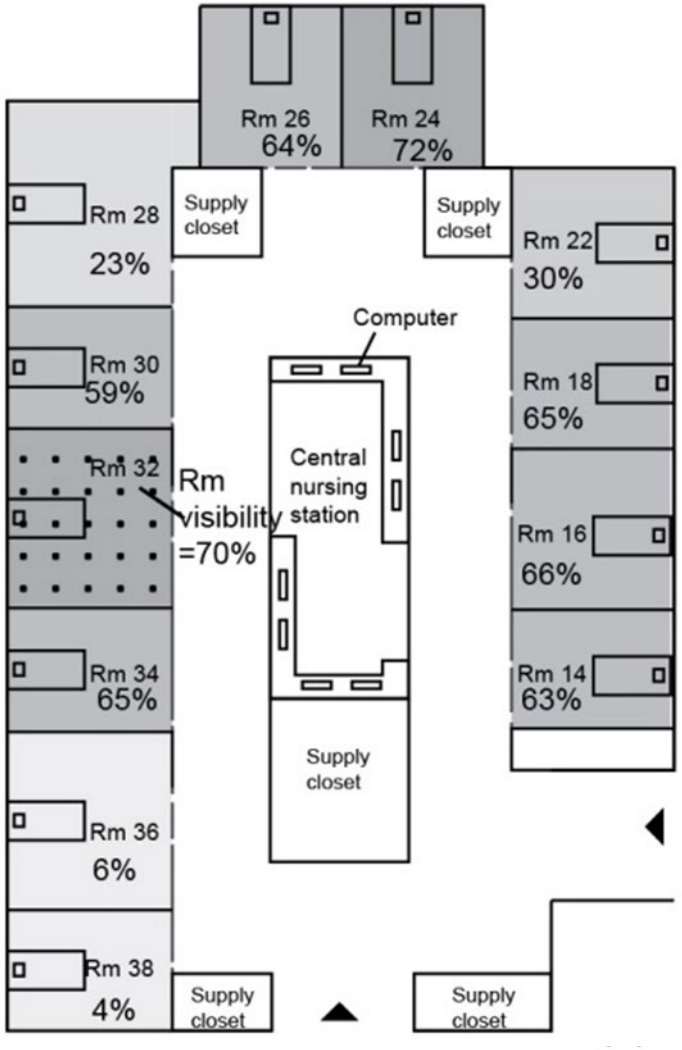
Nursing Home Design and Health Outcomes

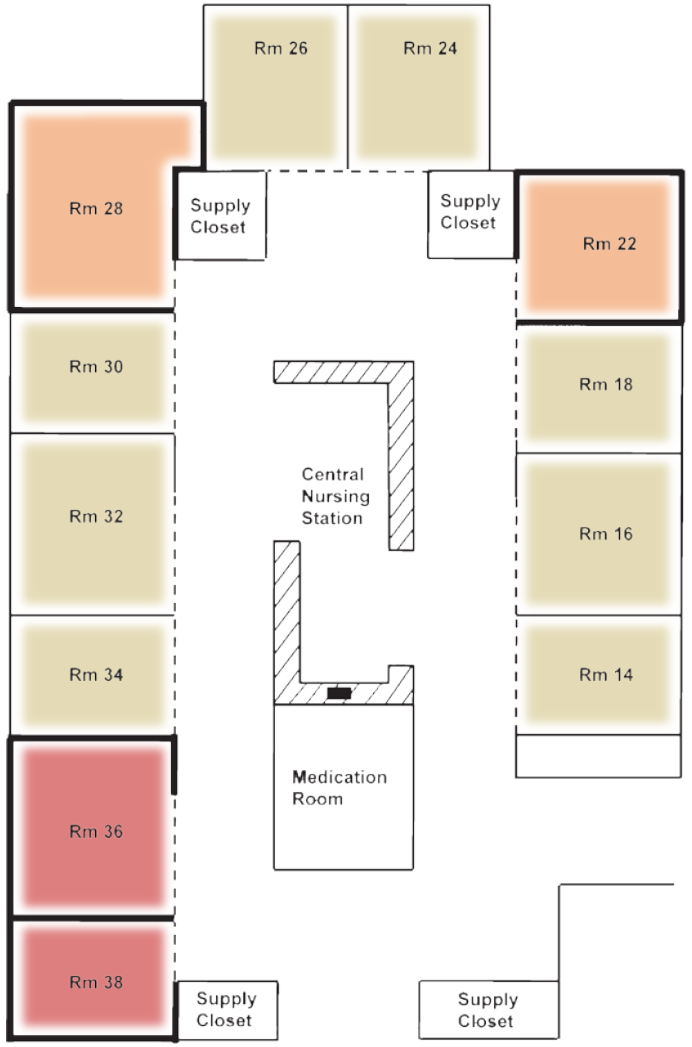


Visibility

Mortality

For sicker patients, assignment to a lower visibility room resulted in a higher mortality rate.



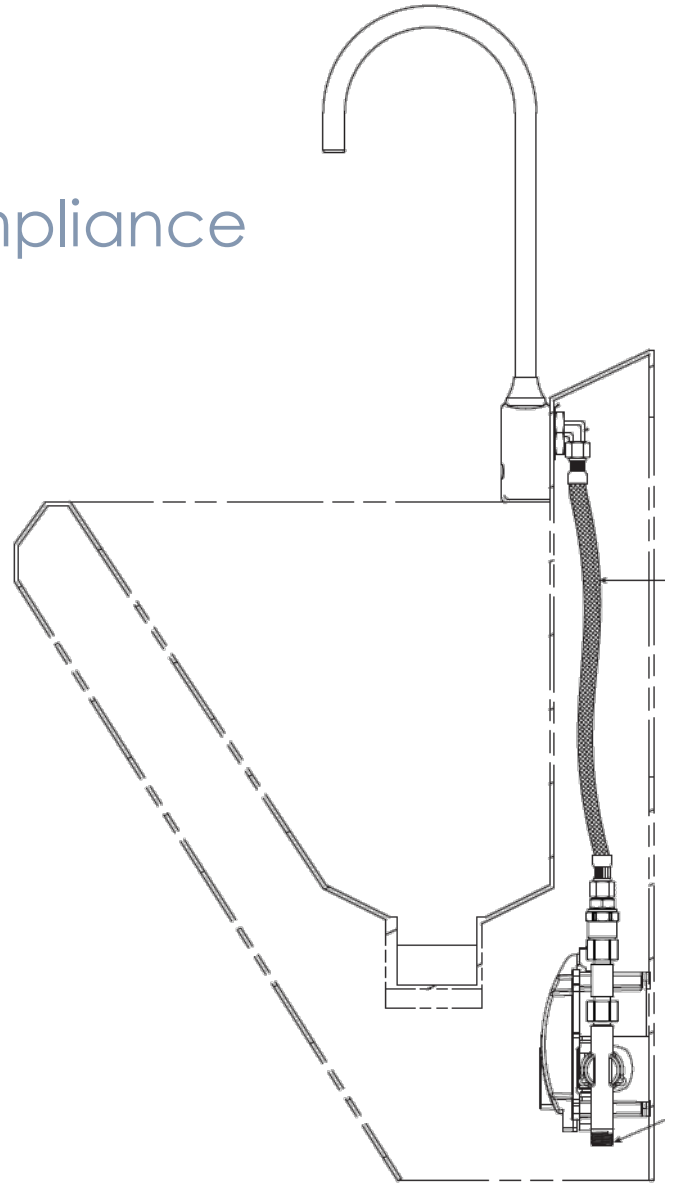


Sources: Leaf DE, Homel P, Factor PH. Relationship between ICU design and mortality. Chest. 2010 may;137(5):1022-1027. doi: 10.1378/chest.09-1458.

Lu Y, Ossman, MM, Leaf D, Factor PH. Patient Visibility and ICU Mortality: A Conceptual Replication. Health Environments Research and Design. Volume: 7 issue: 2, page(s): 92-103.

Sink Availability:
Independent Predictor of Handwashing Compliance

"Every additional meter that must be walked by the healthcare worker to reach a sink decreased the likelihood of hand washing by approximately 10%."



Source: Deyneko, A., Cordeiro, F., Berlin, L. et al. Impact of sink location on hand hygiene compliance after care of patients with Clostridium difficile infection: a cross-sectional study. BMC Infect Dis 16, 203 (2016). https://doi.org/10.1186/s12879-016-1535-x

Audience Questions

We have witnessed differing designs result in markedly differing outcomes – such as LTC's and COVID-19 deaths in general, and Canada's 1972 design standard facilities specifically.

Given the data we do have, is there an obligation, moral or otherwise, to conduct research on the built environment in healthcare?

- Hospitals
- Ambulatory Care Centers
- Long-term Care Facilities
- Other

Project: Maggie's Centre, Manchester; Foster + Partners

Is illusion acceptable in a healthcare environment?

In all cohorts of environments – Pediatrics, Adults, Geriatrics - do the benefits outweigh the harms?

Project: Quebec-trompe-l-oeil


PEDS-7
PEDS-9


Entrée principale: 2e étage
Sortie stationnement arrière: Sous-sol
Archives / Accueil
Audiologie
Bibliothèque
Centre d'expertise sur la santé des personnes âgées et des aidants (CESPA)
Centre de recherche
Clinique dentaire
Cliniques externes
Département de pharmacie
Hôpital de jour
Inhalothérapie, E.C.G.
Laboratoires / Radiologie
EN CAS D'URGENCE POUSSEZ POUR OUVRIR
2


KEEP DOORS
CLOSED
Wandering Patients

Pseudo Market

Residents are encouraged to visit a market with real food and spend fake money.

Project: De Hogeweyk, Dementia Village, Weesp, The Netherlands; Molenaar & Bol & VanDillen


BUS
STOP


EXIT

Emerging Ethical Issues in LTC Design

Long-term care facility design is being increasingly used to modify behavior and create illusions that pacify residents.

Design interventions may include:

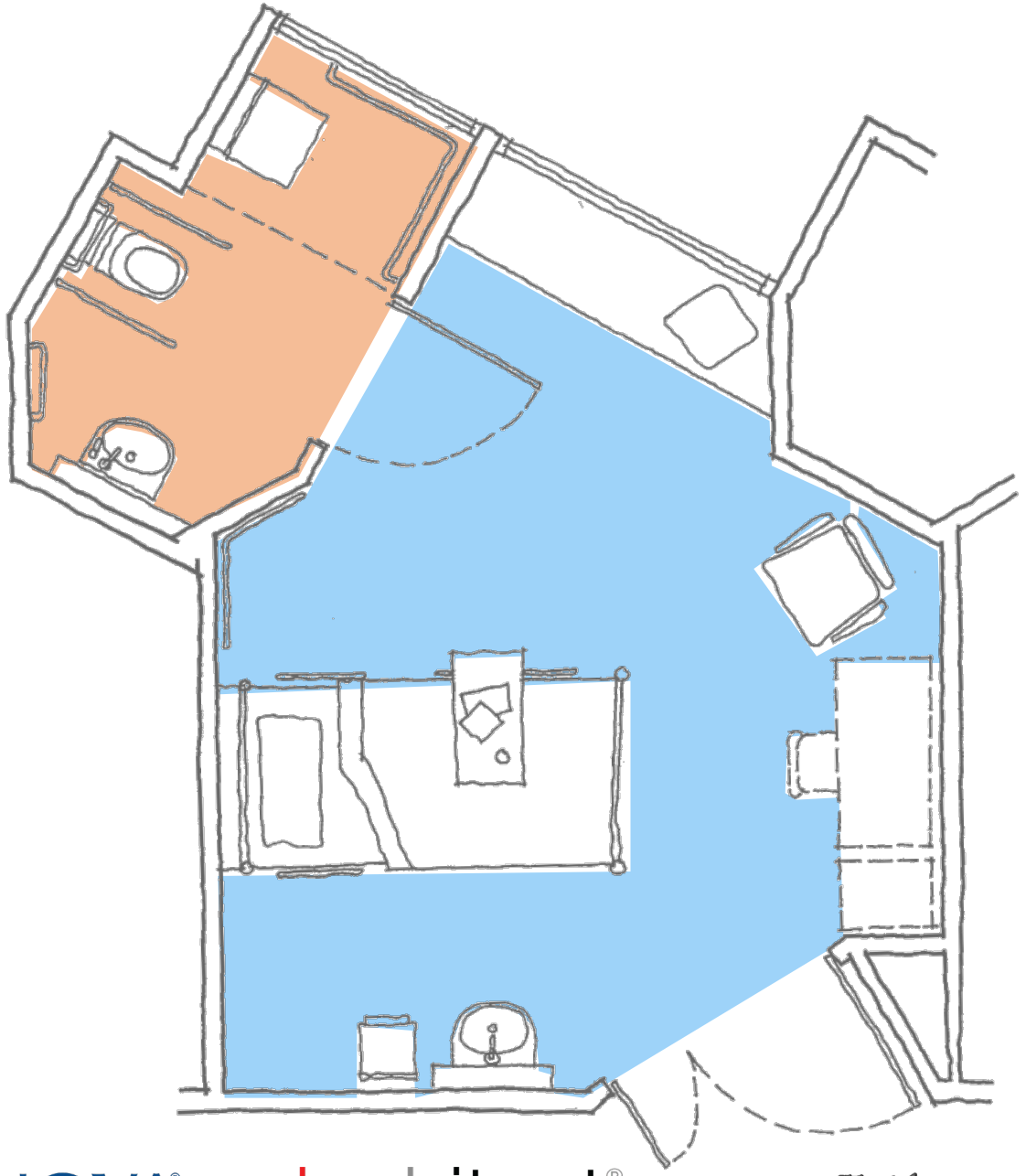
- The illusion that a patient is free to leave, when they are not.
- The illusion of carrying out plans/reaching goals when they are not.
- Immersive environments that convince the residents they are either somewhere else, or in a different time period.
- Controlling resident behavior with designs that induce immobility or evoke fear.

We argue these efforts are no different in kind than interventions undertaken in medical research or pharmaceutical development, either real or placebo.

Confinement by Design

"I know of no evidence that shows the therapeutic value of bed rest"

- Morton Creditor, MD



Rx: Window Bed

OLD LIVES TALES

Rx: Window Bed

"Interns, any other ideas?" my attending asked the team as we made our daily rounds to the bedside of Ms. T, an octogenarian who had been in our intensive care unit (ICU) for just over a week. She had dementia and had undergone a tracheotomy, limiting her ability to communicate with us. The concern of my attending that morning was her sustained tachycardia, the etiology of which we could not explain; she had not responded to medical interventions.

I was only days into my internship; how could I have any medical suggestions to address this woman's heart rate? "We could move her to another room with a window," I said to the group instead, yielding several questioning looks. "There is evidence," I added, as I knew physicians would consider an intervention seriously if it had been documented in prior studies. In fact, there is an emerging field to support my appeal on rounds for space design. Evidence-based design (EBD), an analog to evidence-based medicine, grew out of a landmark study examining the restorative effect of nature on people after surgery. Individuals with views of nature had shorter postoperative hospital stays, took fewer moderate and strong analgesic doses, and had lower scores for minor postsurgical complications than those with views of a brick wall.[1]

When considering Ms. T's case, half of our ICU is without windows, and she had been in a windowless room for days, the overhead fluorescent lights remaining on for most of that time. My sensitivity to environmental factors comes from my training and experience as a hospital architect. As a physician and a licensed architect, I consider many hospitals to be unsupportive physical settings in which to heal. Despite the specialization of healthcare architecture, many planned spaces are ill-suited for their actual use.

Through the advent of EBD and hospital architecture training programs, research supporting space design is growing, with medical planning interventions and their effect on patient care and safety now featured in medical journals.[2]

That afternoon, Ms. T was moved to the other side of the unit where windows overlooked the river. I recall looking into her room that evening and seeing the distinct light of a summer sunset streaming through her window. I noted that her cardiac monitor had stopped its incessant beeping as her heart rate normalized. The next day on rounds, my attending acknowledged that the tachycardia had resolved, "but there is likely another explanation," she said. Although we will never know the exact mechanism for this physiological change, given that she was receiving numerous interventions in addition to the room change, I believe that the sunlight and river views may very well have had an effect; the room change had been the single most obvious adjustment to her course of care in the previous 24 hours.

I called a colleague that evening to share Ms. T's story. I knew it would interest him. "Natural light has been shown to enhance the therapeutic environment," he said. "Your elderly patient was in a dull, low-stimulus environment with no natural light and subjected to incessant noise and constant artificial light that flickers at unnatural wavelengths." I agreed that those were the conditions to which she was exposed. "The move put her into a setting where the window provided an important chronobiological regulator through natural light and access to the diurnal cycle. The window may have provided a view of the naturally changing sky and perhaps even human activity and the river. Even if she was not fully aware of all these things, some of it was getting in through the retina."[3] Again, the architect in me agreed. It is possible that some or all of these things played a role in the change she exhibited.

My design perspective has enhanced my medical experience. Since that day, I include environmental interventions in my daily notes. For shared rooms on the general medicine floors, my plan will include "window bed" if I feel an elderly adult or an individual with delirium would benefit from this intervention.

As often happens with the rotational structure of clinical training, I would never know Ms. T's full course and discharge plan because I left the ICU before she was moved to another level of care. What I can say for certain is that my brief time knowing her prompted an alternative discussion of hospital care on rounds that day and for several days after her room change. Her physiological response to what they eventually attributed at least partly to the move prompted my clinical colleagues to consider architectural design and the existing evidence. Only time and more research will tell if Ms. T's story will become the norm.

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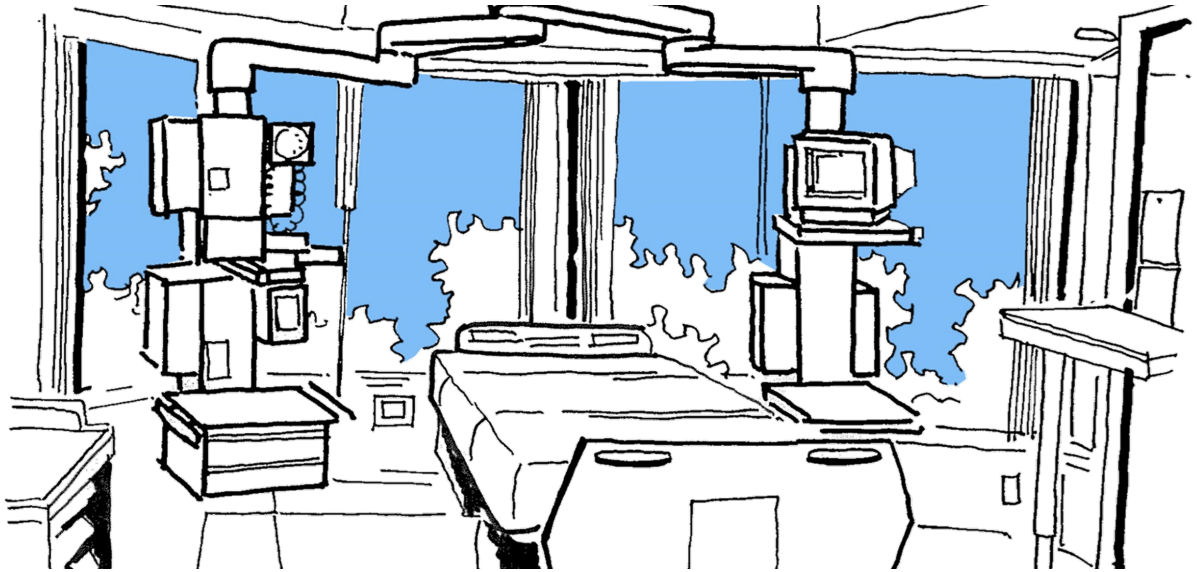
DOI: 10.1111/jgs.12650

JAGS 62:378–379, 2014

0002-8614/14/$15.00



Source: Anderson, Diana C; Hamilton, Kirk D. Rx: Window Bed. Journal of American Geriatric Society. 2014 Feb;62(2):378-9. doi: 10.1111/jgs.12650.

OPINION

How architects ruined healthcare

JOSHUA LANDY
CONTRIBUTED TO THE GLOBE AND MAIL
PUBLISHED MAY 24, 2019

THE GLOBE AND MAIL

"Is this place built to make us healthy – or to distract us from thinking about our health?"

INOVA

dochitect®

WJH HEALTH


The Healing Garden is a space for patients and family members to find peace and respite.
RESTRICTED STAFF USE

Questions for the Audience

If organizations are using the built environment to affect patients – to influence their moods, alter their perceptions, mislead their senses, or control their behavior – do patients have a right to know about it?

Is experimenting with the built environment to affect patients – to influence their moods, alter their perceptions, mislead their senses, or control their behavior – a form of research on human subjects?

Next Steps

It is time for the built environment to become a part of the same calculus as other physical and psychological factors affecting care.

- Funding and scholarly research is required to investigate the curative efficacies of specific architectural interventions.
- The ethical issues in healthcare architecture experimentation requires the development of an ethical rubric to clarify the intent, risks, and expected outcomes.
- Bioethicists need to engage with healthcare architects to develop a mechanism for considering the effects of differing design implementations on patient outcomes around issues of equal access and treatment, prevention of comorbidities, and use of space to influence people.

The opportunities to create lasting improvements in equitable, efficient care delivery and preparedness for the next public health emergency should motivate us all to take up this challenge.

Please reach out to us…

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