Maximizing Health Through Informed Design

An Evidence-Based Design (EBD) Approach

MAXIMIZING HEALTH THROUGH INFORMED DESIGN

THE CENTER FOR HEALTH DESIGN®

“We shape our buildings and , thereafter, they shape us.” W.C.

In fact, physical environments are one of the most obvious and enduring reflections of our collective values and priorities that continuously influence the experiences and behaviors of all who encounter and engage with them. This is especially important to consider in healthcare settings because, while the provision of healthcare might be a medical issue, ensuring access to healthcare environments is a design issue. This session will explore the use of an evidence-based design (EBD) process that provides a foundation for outcome-oriented decision-making. Designers will benefit from learning to treat the design of the built environment as a modifiable risk factor and leverage the evidence-based design process for planning and designing healthcare facilities to improve outcomes for all patients, especially for aging populations and those living with dementia who are disproportionally negatively affected by unsupportive environments.

THE CENTER FOR HEALTH DESIGN®

Learning Objectives

1. Learn about the evolution and application of evidence-based design (EBD).
2. Understand how designers can advance the evidence-based design process.
3. Discover an EDAC certification process that will increase recognition and reach within the industry.
4. Explore how evidence-based design can be used to move the “needle of consciousness” in projects by advancing person-centered care.

THE CENTER FOR HEALTH DESIGN®

Addie Abushousheh PhD, EDAC

Org. & Env. Gerontologist
Research Associate
The Center for Health Design

Tri-Chair – FGI's Residential Design Guidelines
Advisor – AIA *Design for Aging* Knowledge Community
Advisor – Abacus Institute
Adjunct Faculty – Kent State University
Board Member – IDEAS Institute

THE CENTER FOR HEALTH DESIGN®

The Center for Health Design

Events, Grants, Sponsors, Partners, & Members

501(c)(3) Organization

Mission: Maximize health through informed design

Pillars: Research, Education & Community

Uniting, inspiring, and empowering people to improve health through design.

THE CENTER FOR HEALTH DESIGN®

Evidence-Based Design (EBD)

Origin, Evolution & Application

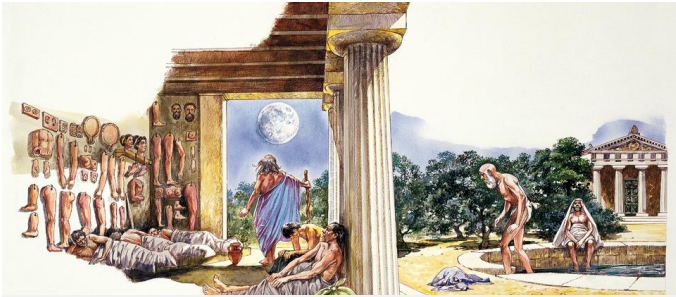
THE CENTER FOR HEALTH DESIGN®

EBD Roots & Evolution

*"The desire to create **healing environments** can be traced back to the vestiges of **European medicine.**"*

Asclepieion Hospital

- Built in ancient Epidaurus, Greece (6th century BC)
- Included patient rooms that faced eastward to promote healing
- Most celebrated healing center of the classical world



http://www.greece-is.com/snakes-dogs-and-dreams/

*"While the decision to orient the rooms toward the sun **was done intuitively**, on what basis are **current healthcare-facility design decisions** made?*

- Statement not only true for healthcare facilities

Florence Nightingale

- Evidence-based approach (1860)
- Identified fresh air as "the very first canon of nursing"
- Emphasized importance of quiet, proper lighting, warmth and clean water

EBD Roots & Evolution

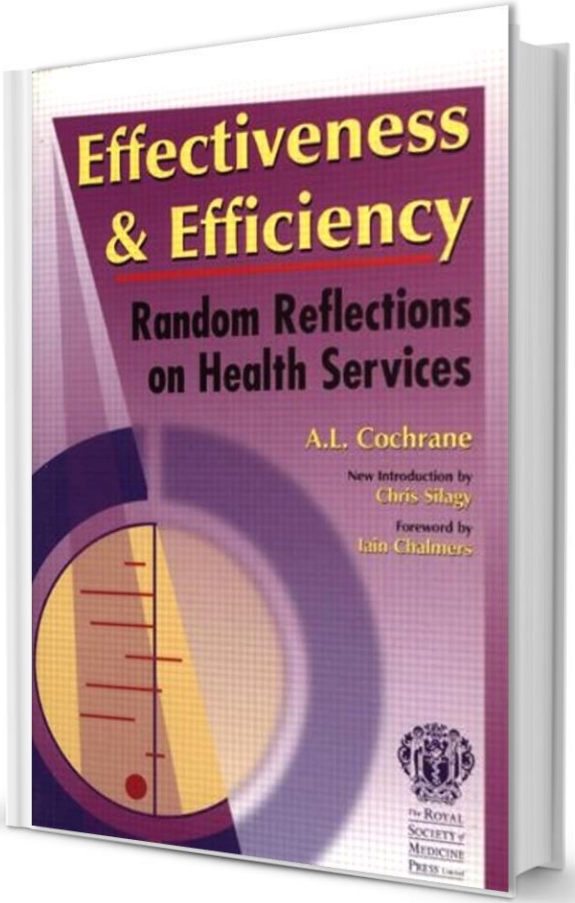
50 Year History

McMaster University Research Group (1970s)

- Sackett & Guyatt
- Established research methodologies to determine the **best medical evidence in patient care** that would ultimately be **translated into practice**, resulting in **patient-care improvements** (Cochrane, 1972)

Archie Cochrane's Book (1972)

- "Effectiveness and Efficiency: Random Reflections on Health Services"
- Highlights work to collect, codify, and disseminate the **"evidence" gathered in randomized control trials**



EBD Timeline

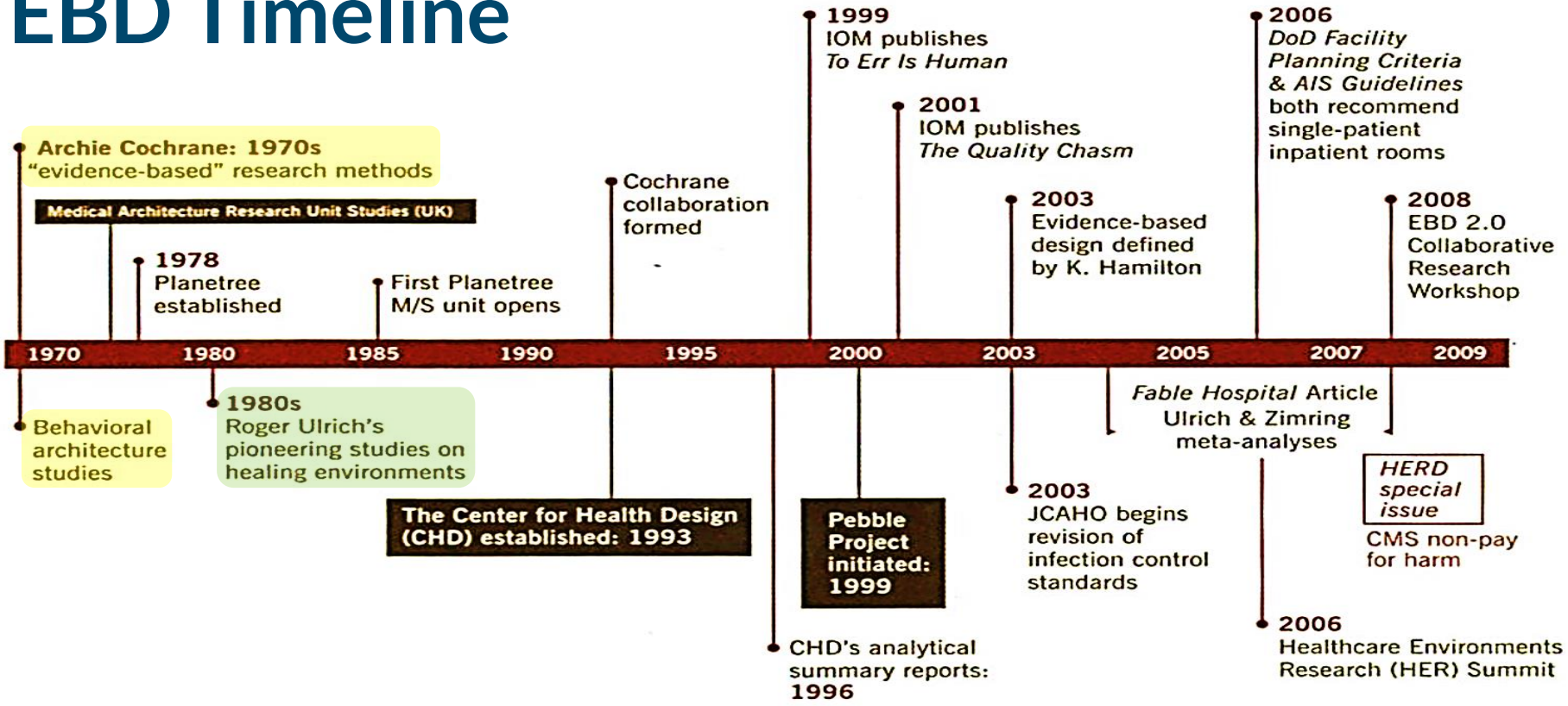


Image from Center for Health Design EDAC Study Guide 1 (2008), p. 23

EBD Roots & Evolution

Seminal Study by Ulrich in 1984

- The effect of views from window on hospital patient recovery.
- Quantitative and qualitative review:
  - Less pain medication
  - Shorter hospital stay
  - Fewer negative comments

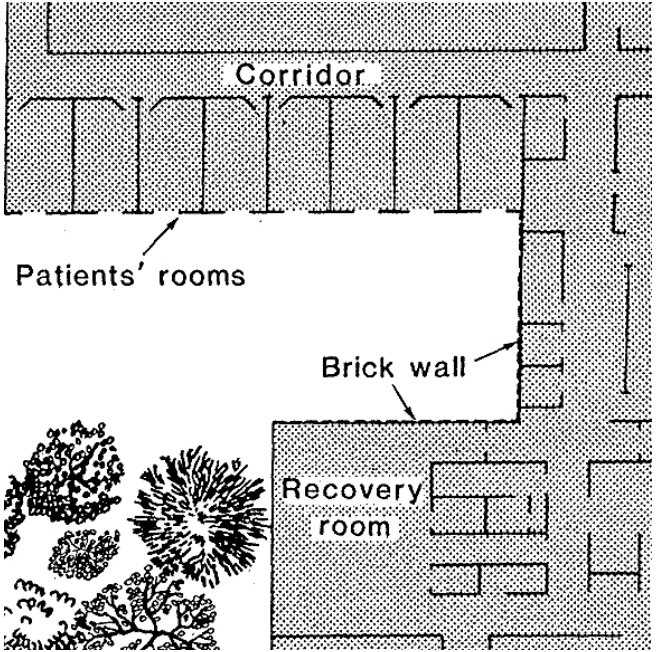


Image : Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science, 224*(4647), 420–421..

EBD Timeline

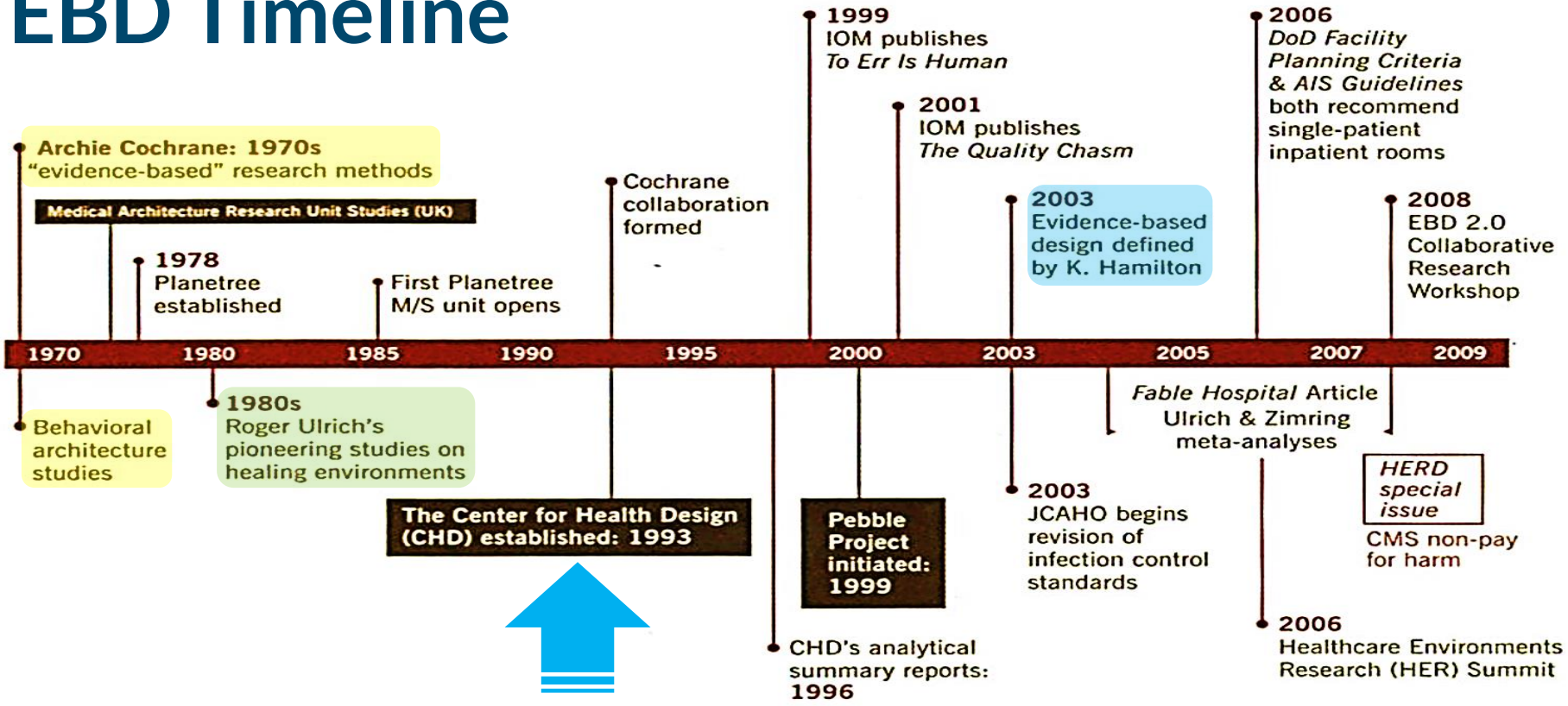


Image from Center for Health Design EDAC Study Guide 1 (2008), p. 23

CHD championed the evidence-based design process. (2009)

Evidence-Based Design

Process of **basing decisions** about the built environment on **credible research** to achieve the **best possible outcomes**.

MEASURE

The research team implements the research study as outlined in the research plan, tracks any changes, and makes necessary adjustments. Data collection is the most time-consuming and costly phase of a research project.

compliance with the proposed research plan. At the end of construction, the project team verifies that the commissioned building complies with the EBD intent and is ready for post-occupancy research.

in the creation of the functional and space program.

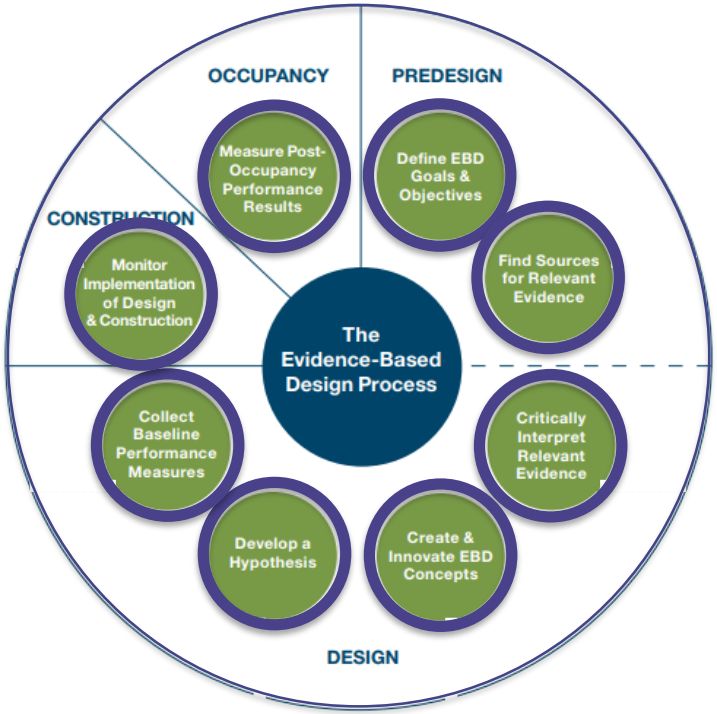
DEFINE

Establish a vision that defines the intentions, direction, and goals & objectives for the project. The team can then properly articulate the project goals in terms of their desired outcomes.

gaps in knowledge, determine what relevant research has already been performed, and inform the basis for new research.

and the hypotheses, it is important to understand the relevance, rigor, validity and generalization of the information cited.

guidelines.



EBD Touchstone Award

Collaborate

Demonstrate interdisciplinary team and stakeholder education, engagement, and development.

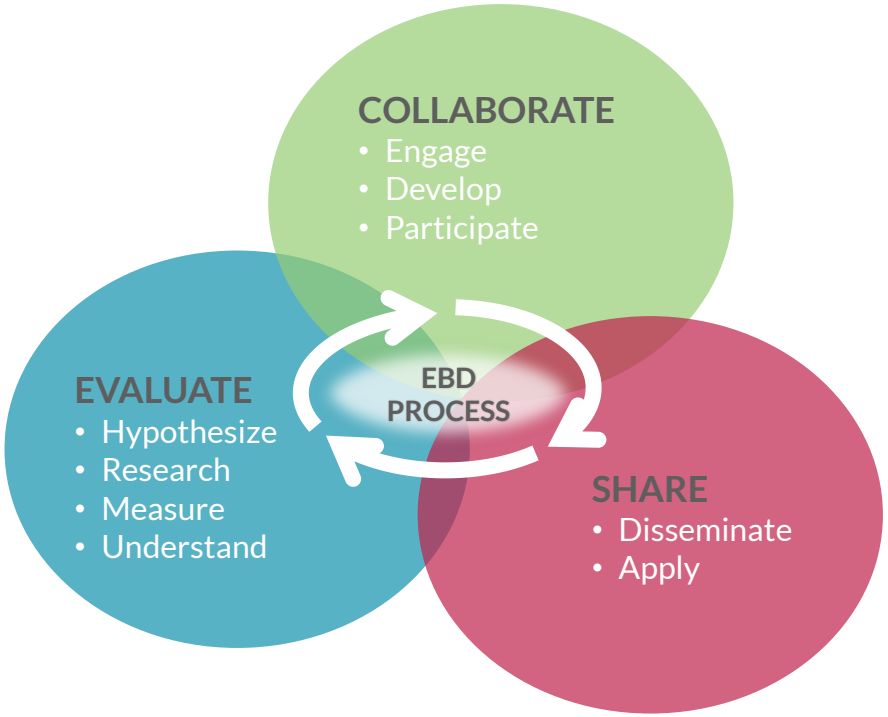
Evaluate

Demonstrate the extent to which research was found, evaluated, and applied to link design to outcomes and measurements of results.

Share

Demonstrate how the EBD process was applied and how the knowledge gained was disseminated, captured, and has the potential for application to future projects.

Award Criteria



CHD Touchstone Documentation

INTERDISCIPLINARY TEAM AND ROLES/CONTRIBUTIONS

This is the core group who remains together through the life of the project. (For example, owners, architects, users, designers, researchers, patients/residentss, families, etc).

Title/Organization Name*	How was this person engaged in the EBD process? Provide specific examples that describe how and when the person was engaged in the EBD Process.	Describe this person's contributions. Please be as specific as possible.	During which design phases did this person contribute? (Mark with an "x)				Is this person EDAC certified? Yes or No (See Note Below)
			Predesign	Design	Construction	Occupancy	

CHD Touchstone Documentation

Touchstone Documentation is applicable to every phase of the Evidence-Based Design Process:

	DEFINE	FIND	INTERPRET	CREATE	HYPOTHESIZE	COLLECT	MONITOR	MEASURE
	Define evidence-based goals and objectives. Prior to design, the project team needs to come to consensus and document a vision that defines the intentions, direction, goals and objectives for the project. The EBD team needs to properly articulate the project goals in terms of their desired outcomes.	**Find sources for relevant evidence.** A literature review will identify gaps in knowledge, determine what relevant research has already been performed, and inform the basis for new research.	**Critically interpret relevant evidence.** To determine if evidence is credible and useful to inform design and hypotheses, it is important to understand the relevance, rigor, validity and generalization of the information cited.	**Create and innovate evidence-based design concepts.** Translate relevant evidence into design guidelines–summary statements that designers use for guiding aesthetics, functional or compositional decisions. The team can begin to create preliminary design concepts derived from the design guidelines.	**Develop a hypothesis.** Develop hypotheses to predict the expected relationship between variables. Hypotheses point out the direction for data collection and provide guidance for analyzing and interpreting the data.	**Collect baseline performance measures.** Assess the current processes at a macro that will be used to measure outcomes. These will aid in the creation of the functional and space program.	**Monitor implementation of design and construction.** It is the responsibility of the project team to ensure that all design strategies are executed as specified in the design documents and in compliance with the proposed research plan. At the end of construction, the project team verifies that the commissioned building complies with the EBD intent and is ready for post-occupancy research.	**Measure post-occupancy performance results.** The research team implements the research study as outlined in the research plan, tracks any changes, and makes necessary adjustments. Data collection is the most time-consuming and costly phase of a research projects.
High Resolution **Project Images and illustrations** (e.g., diagram, annotated diagram, sketch, concept model, photograph, or other graphic) that demonstrate how the project meets the criteria for Collaborate, Evaluate, and Share. (PDF, JPG, JPEG file types limited to 16MB)	Team, stakeholders, existing conditions, etc.	Capture as image/illustration opportunities arise	Capture as image/illustration opportunities arise	Capture as image/illustration opportunities arise	Capture as image/illustration opportunities arise	Capture as image/illustration opportunities arise	Capture as image/illustration opportunities arise	Capture as image/illustration opportunities arise
Describe **WHEN activities, events, initiatives, engagement, etc.** (e.g., interdisciplinary project team formation) **occurred** throughout the lifecycle of the project (from the project's inception, design, construction, occupancy and post occupancy).	Interdisciplinary team formation	Interdisciplinary team formation	Interdisciplinary team formation	Interdisciplinary team formation	Interdisciplinary team formation	Interdisciplinary team formation	Interdisciplinary team formation	Interdisciplinary team formation
Identify **core interdisciplinary team** members (e.g., owners, architects, users, designers, researchers, patient/residents, families, etc.), how they were engaged in the EBD process, EDAC certification, and contributions during various stages throughout the life of the project.	Interdisciplinary Team & Roles and Stakeholders Chart	Interdisciplinary Team & Roles and Stakeholders Chart	Interdisciplinary Team & Roles and Stakeholders Chart	Interdisciplinary Team & Roles and Stakeholders Chart	Interdisciplinary Team & Roles and Stakeholders Chart	Interdisciplinary Team & Roles and Stakeholders Chart	Interdisciplinary Team & Roles and Stakeholders Chart	Interdisciplinary Team & Roles and Stakeholders Chart
Identify **other individual or group-based stakeholders**, roles, number involved, how they were engaged in the EBD process, EDAC certification, and contributions during various stages throughout the life of the project.	Invested stakeholders	Subject matter experts	Advisors	Researchers	Designers	Clients/consumers	Contractor	Occupants
Describe **HOW the team was educated** about the EBD process throughout the lifecycle of the project. Provide examples that illustrate what education was offered and how the team members were engaged on an ongoing basis.	Interdisciplinary team education	Interdisciplinary team education	Interdisciplinary team education	Interdisciplinary team education	Interdisciplinary team education	Interdisciplinary team education	Interdisciplinary team education	Interdisciplinary team education
Describe how the project team used the **vision and evidence-based design goals and objectives** as guideposts throughout the lifecycle of the project. (Tip: Complete the Functional Programming Process Guide to establish project vision and EBD goals/objectives.)	Vision/EBD goals & objectives project guideposts	Sources for evidence	Identify evidence	Evidence/interpretation	Hypothesis	Vision/EBD goals & objectives project guideposts	Vision/EBD goals & objectives project guideposts	Vision/EBD goals & objectives project guideposts
Describe the **business case** that was used to document the return on investment (ROI) for the design strategy/intervention. Provide a clear and concise example of a design strategy, intended outcome, the anticipated ROI (e.g., first costs, savings and time to achieve ROI).	Cost/revenue centers that inform EBD priorities and goals	Isolate cost/revenue centers	Information on cost/revenue centers	Estimate cost/revenue centers	ROI business case	ROI business case	ROI business case	ROI business case
Describe how the EBD process and results were **systematically documented** during the design and delivery of the project.	Research questions	Source types/summaries	Critically evaluate evidence	Link between design concepts and project goals/outcomes	Research plan	Metrics/preliminary results	Metrics/POE results	Evaluation/examination of project/product outcomes
Describe how the EBD process and results were **shared internally** within the project team during the design and delivery of the project. Provide the titles and dates of any presentations given within the design/vendor organization or the healthcare/long-term care organization.	Data collection/dissemination	Data collection/dissemination	Data collection/dissemination	Data collection/dissemination	Data collection/dissemination	Data collection/dissemination	Internal dissemination	Internal dissemination
Describe how the EBD project/product results were **shared externally** beyond the immediate firms/organizations? Provide the titles and dates of any blogs, white papers, webinars, magazine articles, conference presentations.	External dissemination	External dissemination	External dissemination	External dissemination	External dissemination	External dissemination	External dissemination	Industry project/EBD dissemination
Describe how the legacy of the project will be used to **inform future projects** (e.g., how lessons learned and outcomes were tracked and documented using database or other systematic capture of information through research reports, research repositories, etc.).	Informing future projects	Informing future projects	Informing future projects	Informing future projects	Informing future projects	Informing future projects	Informing future projects	Informing future projects

** While documentation may use industry, disciplinary or project-specific jargon, Touchstone Award applications should be written for key industry stakeholders: Academics; Architects; Designers; Healthcare Executives; Planners; Facility Executives; Patient/Family Advisors; Researchers.*

EBD Process | Touchstone | Define | Find | Interpret | Create | Hypothesize | Collect | Monitor | Measure

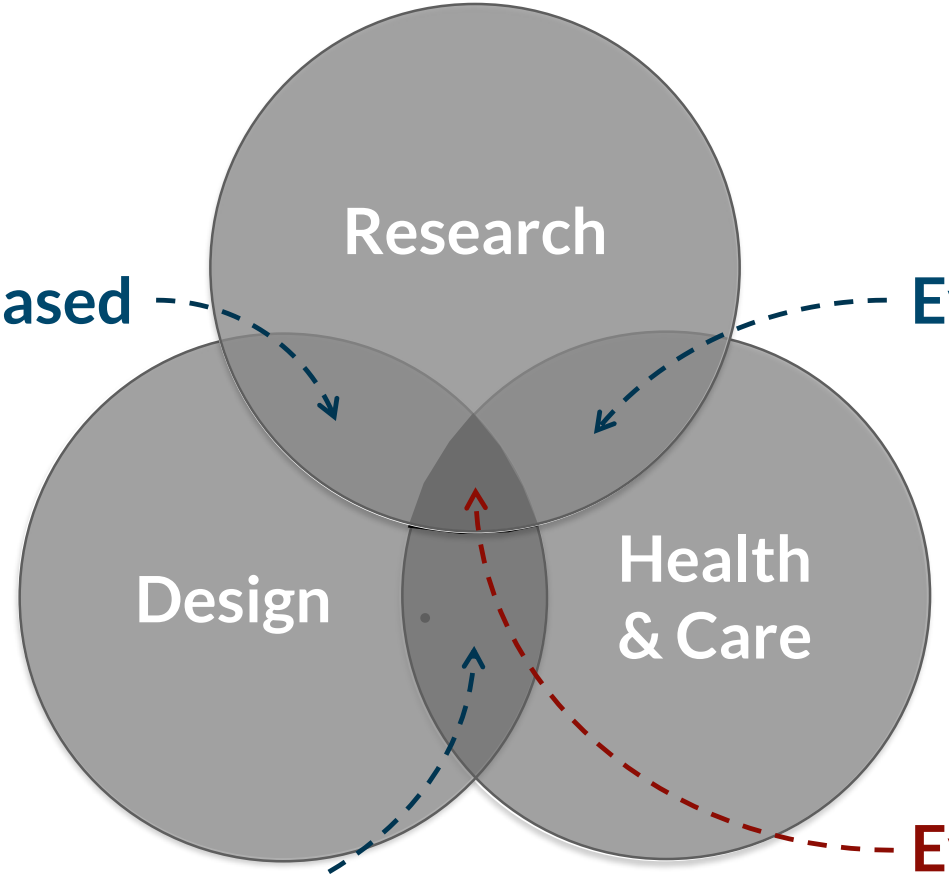
CHD Touchstone Documentation

DEFINE

Touchstone Documentation associated with
Defining evidence-based goals and objectives:

	Documentation
COLLABORATE CATEGORY	
1. Describe WHEN your interdisciplinary project team was formed and HOW the team was educated about the EBD process throughout the lifecycle of the project (from the project's inception, design, construction, occupancy and post occupancy).	
a. Provide examples that illustrate what education was offered and how the team members were engaged on an ongoing basis. Also, if applicable, describe how EBD was integrated with the traditional design process or other approaches (e.g., Lean).	
2. In addition to the core interdisciplinary team, what other stakeholders were involved in the project? Describe how these stakeholders were educated about the EBD process throughout the lifecycle of the project (from the project's inception, design, construction, occupancy and post occupancy). Provide examples that illustrate what education was offered and how the stakeholders were engaged on an ongoing basis.	
3. Please upload and complete the Interdisciplinary Team & Roles and Stakeholders Chart.	
4. What was the vision for the project/product? Describe how the vision was developed, who was involved and when and how they were involved?	
5. List the evidence-based design goals and objectives for the project.	
6. How did the project team use the vision and evidence-based design goals and objectives as guideposts throughout the lifecycle of the project?	
EVALUATE CATEGORY	
1. What were your research questions? (Developing a research question is an important step prior to searching for relevant evidence. A good research focus will make finding information easier and help the team to understand and organize the information.)	
2. Describe the business case that was used to document the return on investment for one design strategy/intervention. What was the design strategy and its intended outcome? What was the anticipated return on investment for this design strategy? Provide a clear and concise example. The example must include information that illustrates the first costs, the projected savings and the time to achieve the projected return on investment. (Optional)	
SHARE CATEGORY	
1. Describe how the EBD process and results were systematically documented and shared internally within the project team and externally outside of the project team during the design and delivery of the project. Provide the titles and dates of any presentations given within the design/vendor organization or the healthcare/long-term care organization.	
2. Were the project/product results shared externally beyond the immediate firms/organizations? Provide the titles and dates of any blogs, white papers, webinars, magazine articles, conference presentations.	
3. Describe how the project team demonstrated commitment to the legacy of the project. How were lessons learned shared and documented to inform future projects? Examples illustrate how lessons learned and outcomes were tracked and documented, e.g., database or other systematic capture of information through research reports, research repositories, etc.	

EBD Process | Touchstone | Define | Find | Interpret | Create | Hypothesize | Collect | Monitor | Measure



Evidence-Based Design

Evidence-Based Health

Health Design

Evidence-Based Health/Care Design

Why Healthcare?

*"Without a doubt, healthcare represents the most **personal and complex** service provided"*

- Intimate personal information must be shared with strangers
- Complex and often frightening and painful tests & procedures must be performed
- Life-and-death decisions are constantly made
- Staff speak an entirely different language
- Buildings are daunting and often difficult to navigate

Text taken from Center for Health Design EDAC Study Guide 1 (2015), p1

Why Healthcare?

*"Stakeholders need to understand how design can help **produce the preferred healthcare outcomes** being sought and **mitigate the untoward mistakes** now plaguing the industry"*

- Errors are not just statistics
- Every mistake has a face, a story, and consequences for the patient, his or her family, and the care delivery team
- Evidence-based design provides another important intervention in a bundle of solutions to improve desired outcomes

Text taken from Center for Health Design EDAC Study Guide 1 (2015), p1-2

Architects are Healthcare Providers

Health, Safety & Welfare

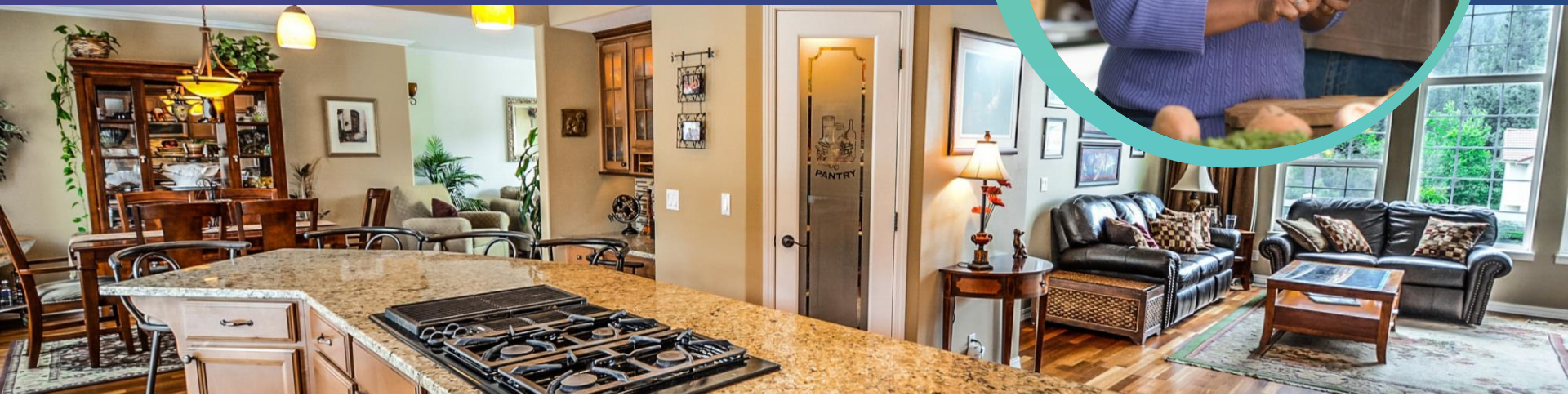
- **Health** Those aspects of professional practice that improve the physical, emotional, and social well-being of occupants, users, and any others affected by buildings and sites.
- **Safety** Those aspects of professional practice that protect occupants, users, and any others affected by buildings or sites from harm.
- **Welfare** Those aspects of professional practice that enable equitable access, elevate the human experience, encourage social interaction, and benefit the environment.

“First Do No Harm”

- Those who provide care are bound to the hypocritic oath
- An evidence-based approach is consistent with this aim

EBD for Aging and Dementia

Supporting Health, Safety & Welfare



THE CENTER FOR HEALTH DESIGN®

Disproportionate Vulnerability

- **Hospital:** Stays twice as likely for individuals with Alzheimer's Disease or other Dementias (ADRD)
  - Duration of stay nearly 5x longer than people 65 + without these conditions
  - 7% greater risk of dying during hospital stay
  - 21% readmission rate within 30 days vs. 18% for those without ADRD
- **ER:** Emergency department visits are nearly 2⅓ times more frequent for individuals with ADRD
- **SNF:** Stays almost 4 times more likely for individuals with ADRD
- **Home Health:** 25% of those 65 and older with ADRD had at least 1 visit per year vs. 10% without ADRD

Alzheimer's Association. (2018). 2018 Alzheimer's disease facts and figures. *Alzheimer's & Dementia: The Journal of the Alzheimer's Association*, *14*(3), 367–429. https://doi.org/10.1016/j.jalz.2018.02.001

Cumulative Changes

To design spaces supportive of aging and dementia:

- Understand age-related changes
- Discover dementia-related changes

Normal Age-Related Changes

- Musculoskeletal
  - Osteoporosis
  - Arthritis
  - Muscle mass

- Integumentary
  - Appearance
  - Fragility
  - Fat loss

- Sensorial
  - Vision
  - Hearing
  - Touch

- Digestive
  - Bowel & bladder
  - Metabolism
  - Dental & taste

- Movement
  - Coordination
  - Reflexes
  - Balance

- Memory
  - Slower recall
  - Alert
  - Competent

Source: NIH MedlinePlus (2007, Winter). Your Guide to the New Science of Aging Well: 8 Areas of Age-Related Change. *NIH Medline Plus, 2*(1), 10-13. Retrieved from: https://medlineplus.gov/magazine/issues/pdf/winter2007.pdf

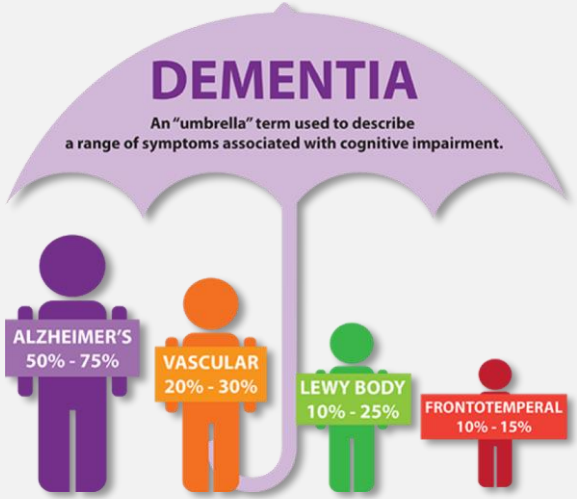
Dementia-Related Changes

- Cognition
  - Comprehension
  - Judgement
  - Recall

- Functional
  - ADL's
  - IADL's
  - Focus

- Perception
  - Misinterpretation
  - Hypersensitivity
  - Spatial awareness

- Behavioral
  - Communication
  - Withdrawal
  - Personality changes



https://www.dfwsheridan.org/sites/default/files/images/types%20of%20dementia.png

Activities of Daily Living (ADLs):

1. Personal hygiene
2. Dressing
3. Eating
4. Maintaining continence
5. Transferring/Mobility

Source: NIH MedlinePlus (2007, Winter). Your Guide to the New Science of Aging Well: 8 Areas of Age-Related Change. *NIH Medline Plus, 2*(1), 10-13. Retrieved from: https://medlineplus.gov/magazine/issues/pdf/winter2007.pdf

EBD Timeline

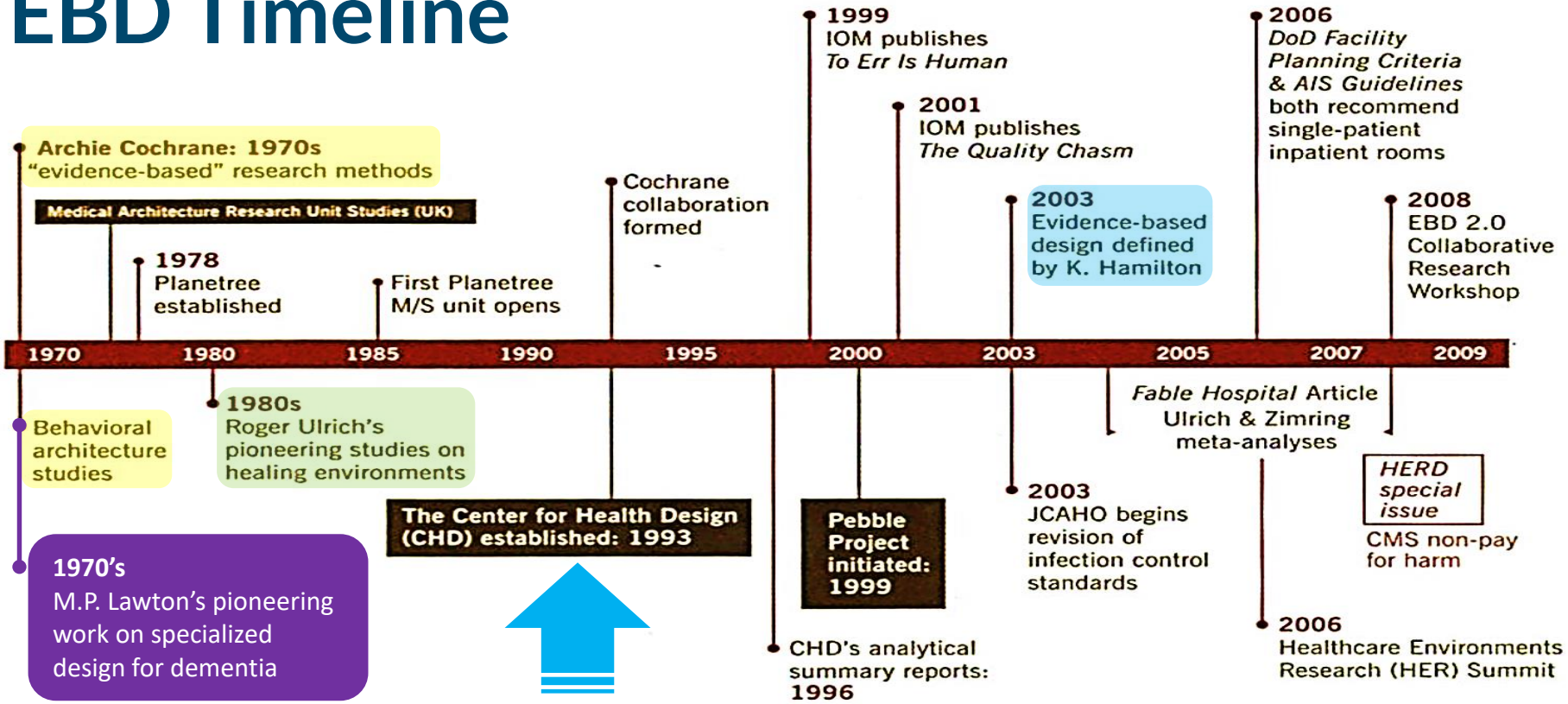


Image from Center for Health Design EDAC Study Guide 1 (2008), p. 23

Specialized Design for Dementia

Lawton opened Weiss Pavilion in 1974

- Use design features to minimize unwanted (maximize desirable) behaviors & feelings.
- Post-Occupancy Evaluation:
  - Disorientation
  - Memory loss
  - Social interaction
  - Sense of self

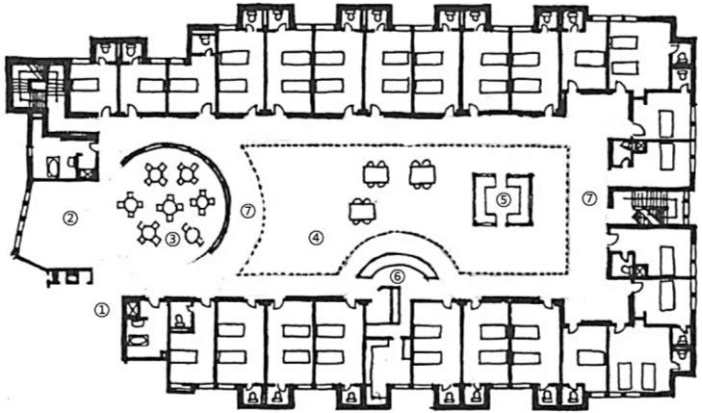


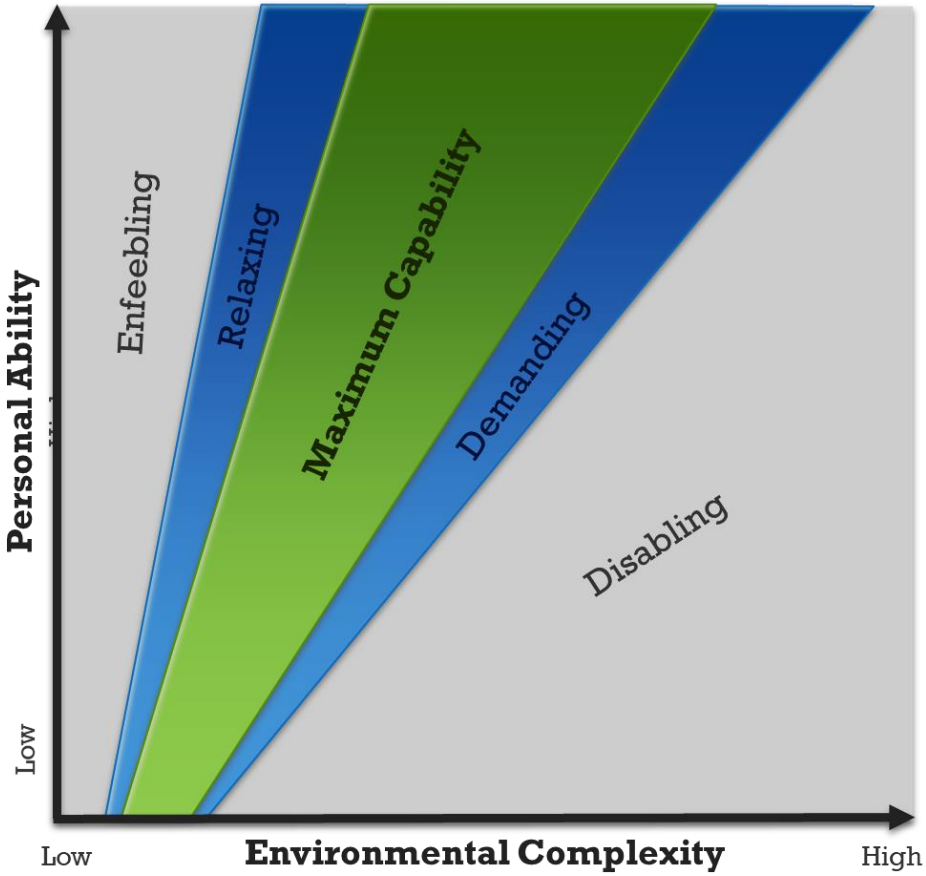
Image source: ArchD, P. U. C., & Day, M. K. (1993). *Contemporary Environments for People with Dementia* (1 edition). The Johns Hopkins University Press.

Objectives:

- ↑ cognitive functioning
- ↑ quality of living
- ↓ behavior symptoms
- Perform ADLs
- Use treatment options
- Manage conditions
- Coordinate care
- Engage in activities
- Connect with others
- Educate & plan

Fauth, E. B. and Gibbons, A. (2014)

Image adapted From: Lawton, M. P., & Nahemow, L. (1973)



Promotes:

- Welfare
- Enablement
- Privacy
- Familiarity
- Orientation
- Perception
- Self-Continuity
- Engage in activities
- Connect with others
- Educate & plan

Fauth, E. B. and Gibbons, A. (2014)

Environmental Considerations

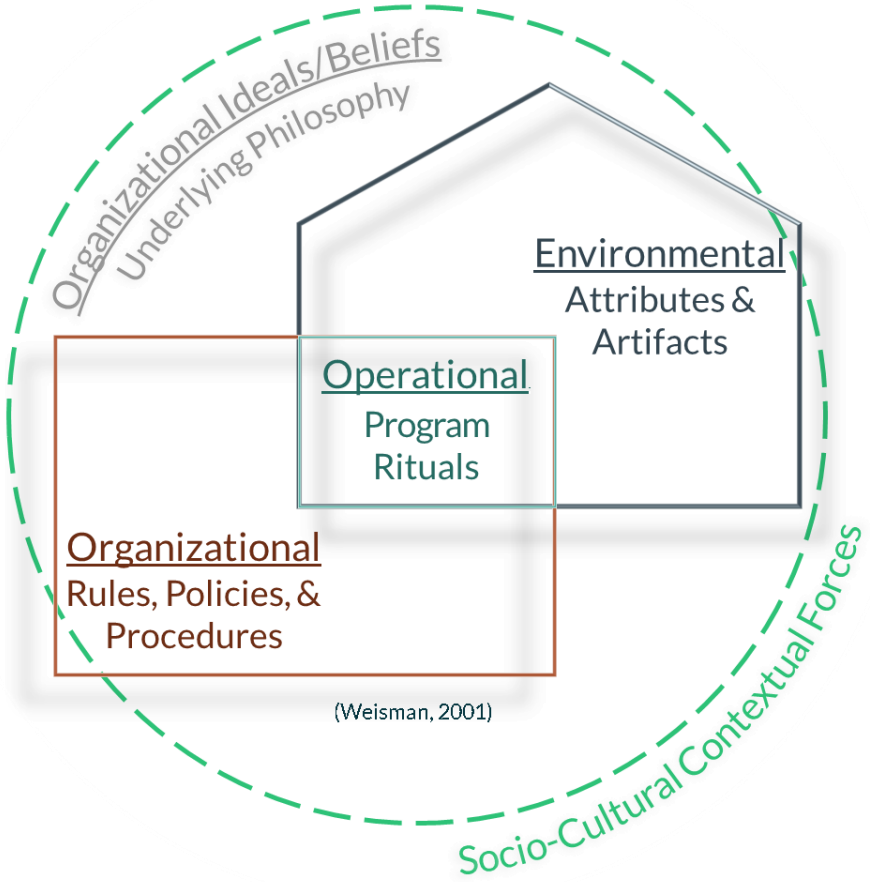
Scale

- Locality
- Site
- Building
- Support systems:
  - MEP, security, lighting…
- Room, Area & Space
- FF&E
- Décor
- Details

Location

- Setting layout
- Outdoor
- Public & communal
- Kitchen
- Living
- Dining
- Bedroom
- Bathroom
- Service
- Storage

Formal statements of organizational philosophy, values, and creeds.
(Schein, 1992, p. 231)



(Weisman, 2001)

Design of physical space, facades, and buildings
(Schein, 1992, p. 231)

Organizational design and structure
(Schein, 1992, p. 231)

Operational systems and procedures
(Schein, 1992, p. 231)

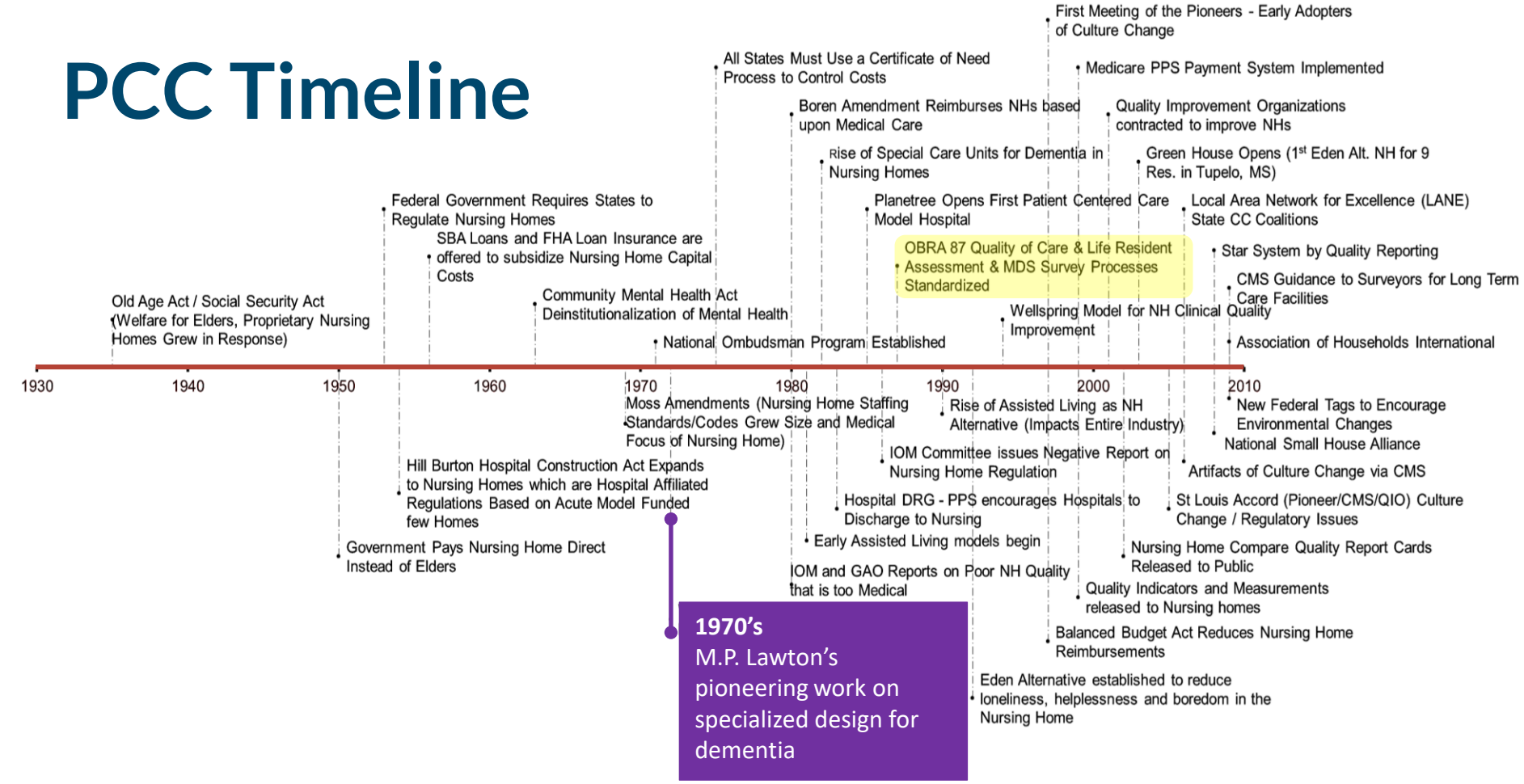
- Schein, E. H. (1992). *Organizational culture and leadership*. Jossey-Bass Publishers, San Francisco, CA.
- Weisman, G. D. (2001). *The place of people in architectural design.* Architectural design portable handbook: A guide to excellent practices. ed. A. Pressman, McGraw-Hill, New York; 158-70.

Define EBD Goals & Objectives

- Establish Vision
- Define intentions
- Articulate goals
- Delineate desired outcomes

DEFINE
Establish a vision that defines the intentions, direction, and goals & objectives for the project. The team can then properly articulate the project goals in terms of their desired outcomes.

PCC Timeline

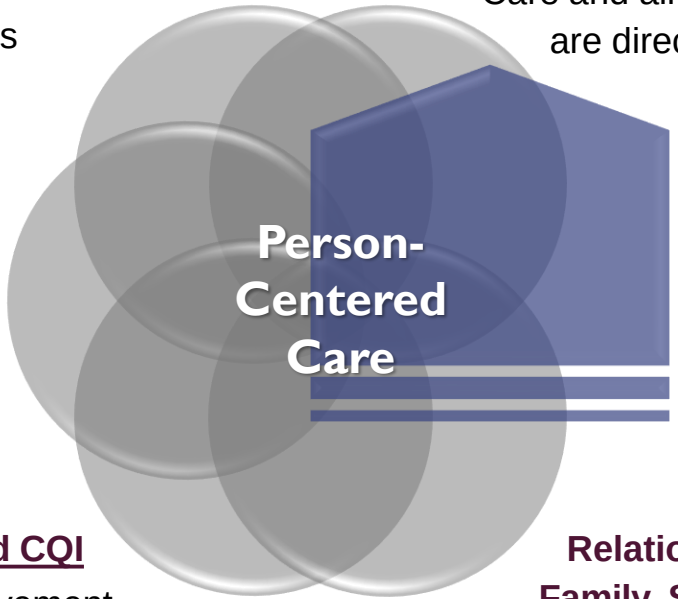


Staff Empowerment

Work is organized to support and empower all staff to respond to residents' needs and desires

Resident-Directed Care and Activities

Care and all resident-related activities are directed by each resident



Collaborative and Decentralized Management

Management enables collaborative/decentralized decision-making

Home Environment

Living environments are designed to be homes rather than institutions

Measurement-Based CQI

Continual quality improvement of systematic processes that are comprehensive and measurement-based

Relationships - Resident, Family, Staff and Community

Close relationships between residents, family members, staff, and community

Adapted from: Colorado Foundation for Medical Care. (2006). Measuring culture change: A literature review. No. PM-411-114 CO 2006. Denver, CO: CFMC.

People

Small grouping of residents (typically 10-20) and their dedicated staff comprised a self-led team that has the autonomy and accountability to respond to individual and collective needs, as well as the responsibility to foster self-directed relationship-based life based on deep knowing.

(Proffitt, Abushousheh & Kaup, 2010)

BUILDING

Intimately-sized with clear boundaries and a variety of pleasing homey spaces typical of home including a functional kitchen.

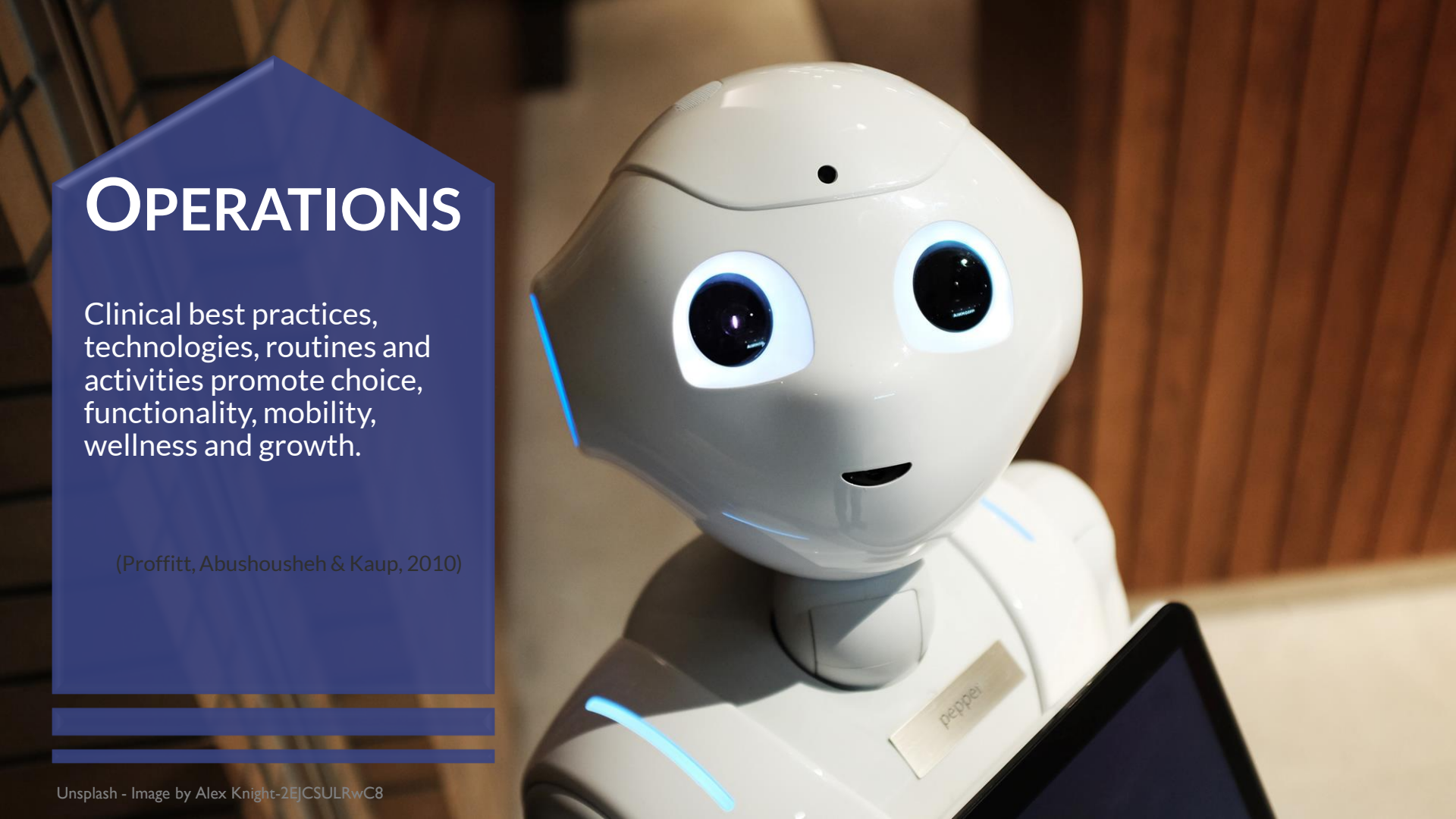
(Proffitt, Abushousheh & Kaup, 2010)

Pixabay - Image by Kirk Fisher - kitchen-2486092

OPERATIONS

Clinical best practices, technologies, routines and activities promote choice, functionality, mobility, wellness and growth.

(Proffitt, Abushousheh & Kaup, 2010)



Unsplash - Image by Alex Knight-2EJCSULRwC8

ORGANIZATION

Household teams, are supported by the leadership and resources of the organization to become the primary vehicle for all operational decisions and administration, replacing the traditional department structure.

(Proffitt, Abushousheh & Kaup, 2010)

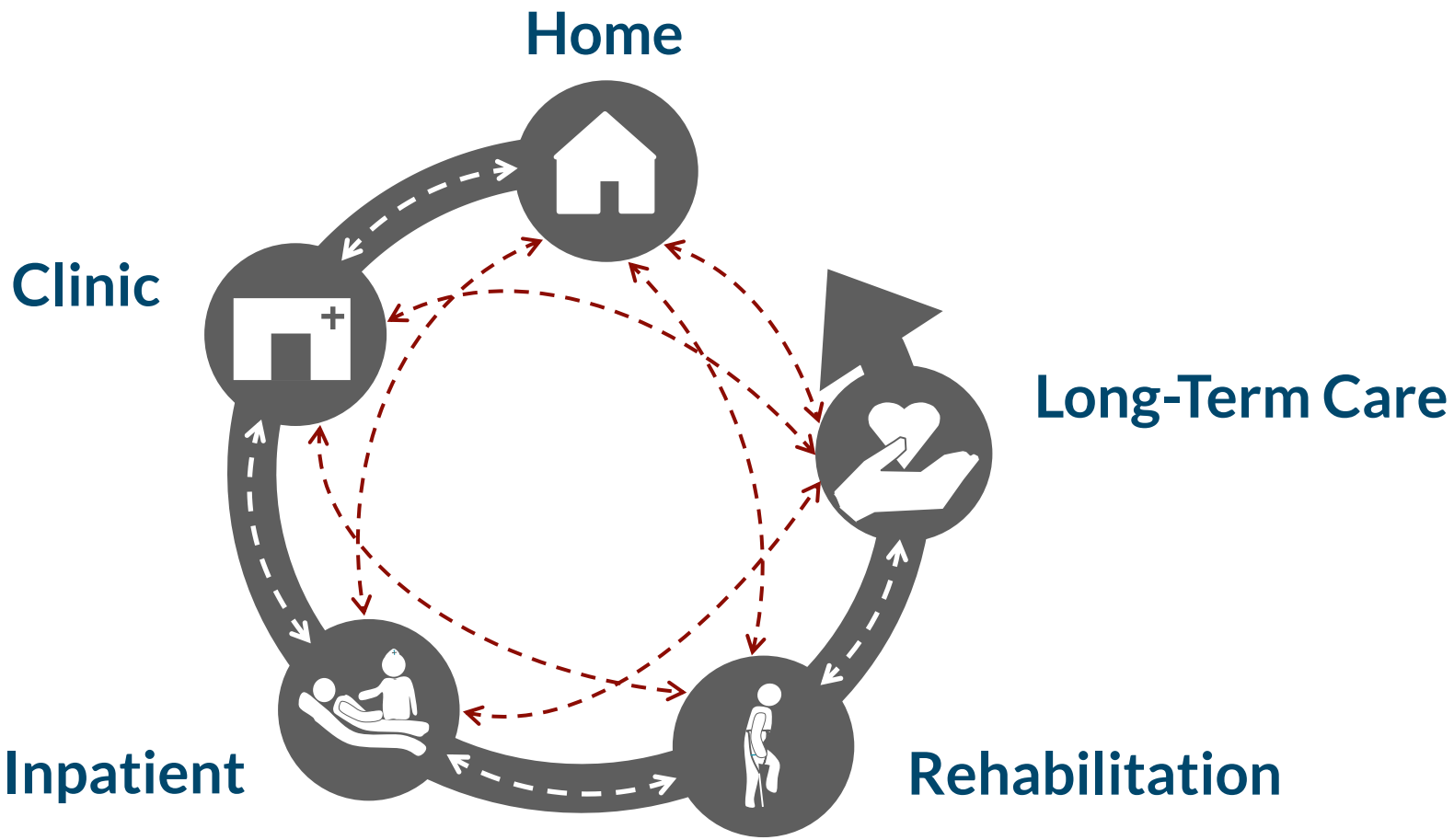
Pixabay - Image by Gerd Altmann - target-group-3460039

Find Sources for Relevant Evidence

- Execute a literature review
- Find previously performed relevant research
- Identify gaps
- Establish basis for new research

FIND

A literature review will identify gaps in knowledge, determine what relevant research has already been performed, and inform the basis for new research.



There is a **LOT** of information out there!

Where do I look?
How do I get started?

Asking the right Questions

- Identify areas of interest
- Understand challenges

Define the research topic(s)

How can design increase engagement?

How can design improve independent eating?

How can design improve resident & family satisfaction?

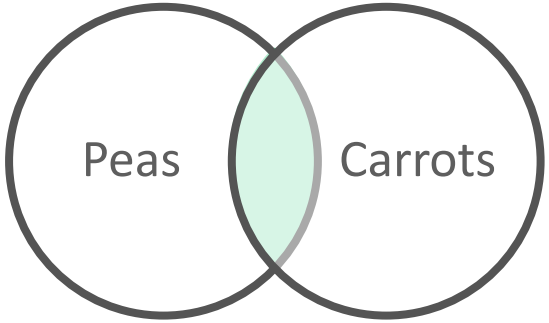
Photo credit: Nik MacMillan

Define the Research Question


Photo credit: rawpixel.com

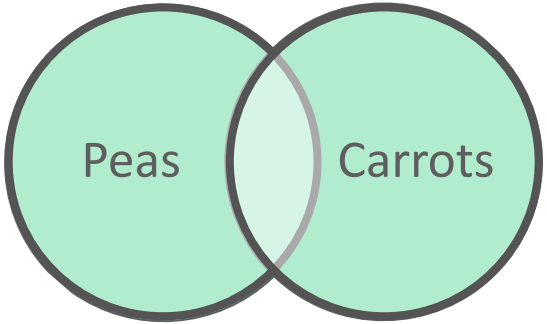
- Develop a research question before searching for relevant evidence.
- A good research focus helps to strategically address a design challenge.
- Plan to be systematic

Search Words, “Key Terms” & Strategies



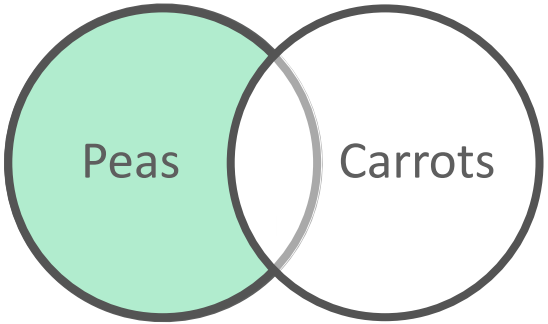
AND

Only results containing both “peas” *AND* “carrots” will be returned



OR

All results containing either “peas” *OR* “carrots” will be returned



NOT

Any results containing “peas” but *NOT* “carrots” will be returned

Execute a Literature Review

Databases

- CHD Knowledge Repository
- Central Repository
  - Curated
  - Public
  - In-house

Online Journals

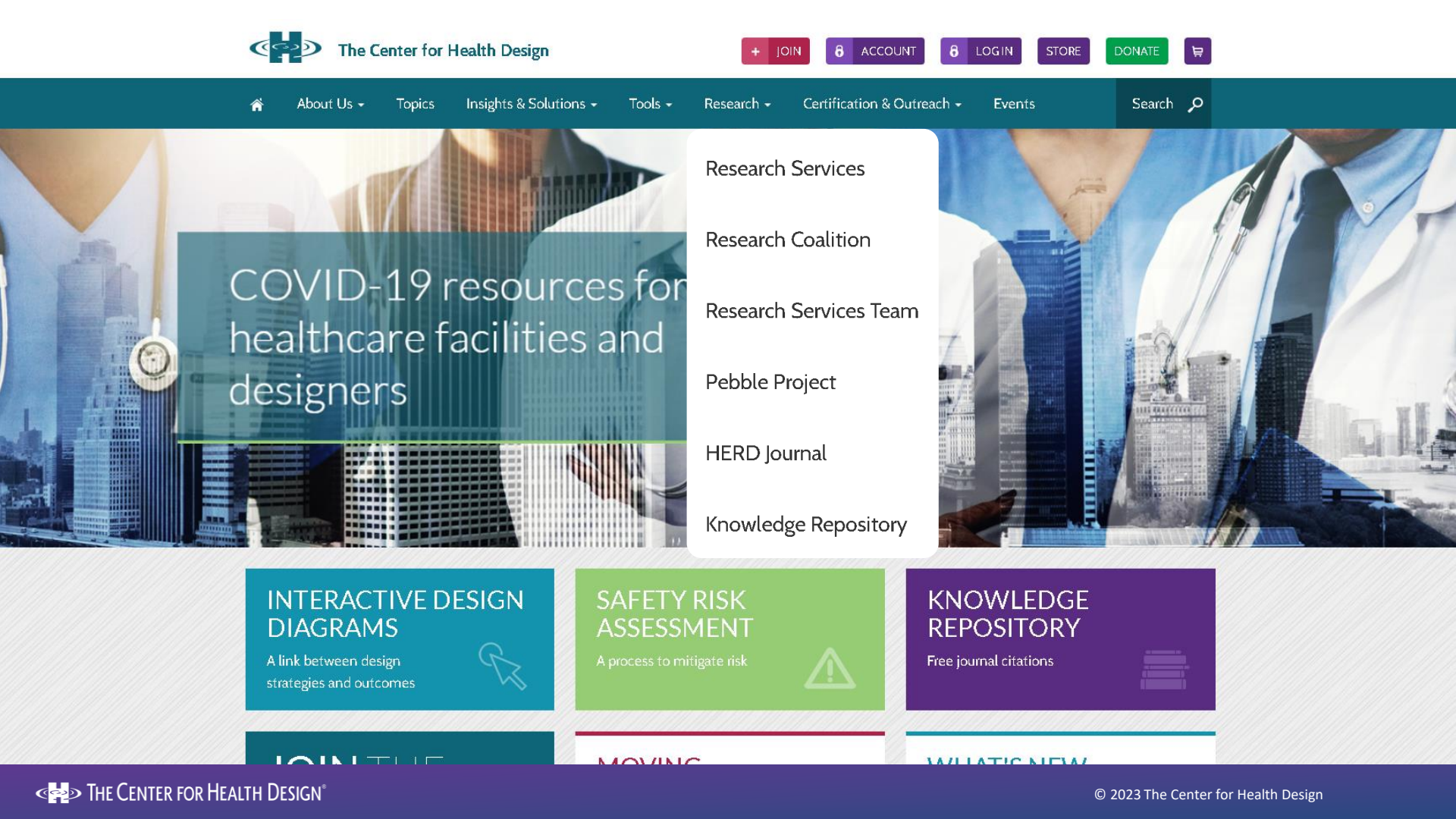
- HERD Journal
- Environment & Behavior
- Journal of Environmental Psychology
- JAMA
- Other medical journals

Abstract / Indexing Services

- Repository of Abstracts
  - For-profit agencies (fee-based), e.g., EBSCO
  - Government agencies (free): PubMED Central

Search Engines

- Google
  - Google Scholar
- Organization- or Society-based website search engines



Knowledge Repository

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

A complete, user-friendly database of healthcare design research references that continues to grow with the latest peer-reviewed publications. Start with our Knowledge Repository for all of your searches for articles and research citations on healthcare design topics. Access full texts through the source link, read key point summaries, or watch slidecasts. Expand your search and find project briefs, interviews, and other relevant resources by visiting our Insights & Solutions page.

Need help with a research project? Our team of top-notch researchers at The Center for Health Design provides you with timely healthcare industry research advice along with project management support that will help propel your healthcare facilities projects. Click here to learn more.

RESEARCH IN A SNAP | HOW-TO VIDEOS | ADDITIONAL RESOURCES | SURVEY

The Knowledge Repository is a collaborative effort with our partners:

Academy of Architecture for Health
an AIA Knowledge Community

The American

Waiting room physical environment and outpatient experience: The spatial user experience model as analytical tool

2021 o Journal of Interior Design o Journal Article

Issue 4 , Volume 46 , Pages 27-48

Author(s): Juliá Nehme, B., Torres Irribarra, D., Cumsille, P., Yoon, S.-Y.

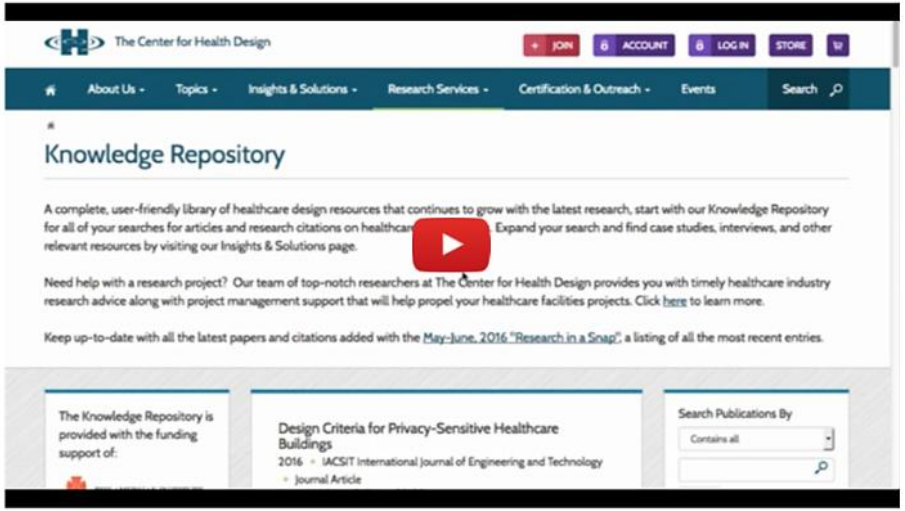
Search by

Contains all

Search | Reset

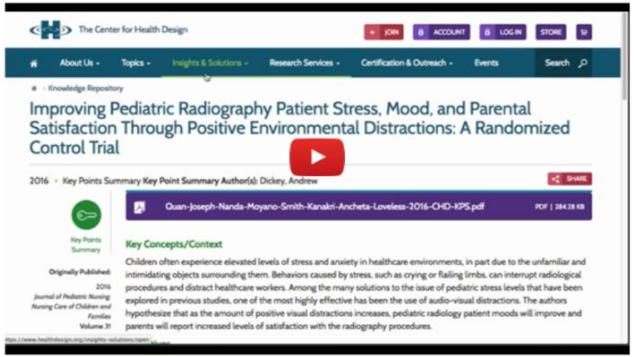
Sort by

Video Tutorials



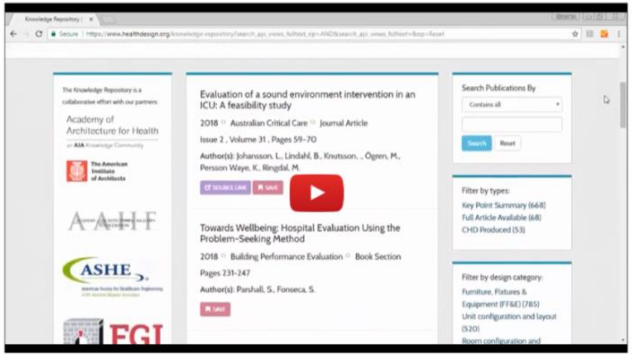
About The Knowledge Repository

About the Knowledge Repository



How to read KPS

Understanding a Key Point Summary



How To Do a Search on the Knowledge Repository

How to Do a Search

THE KNOWLEDGE REPOSITORY

A complete, user-friendly database of healthcare design citations that continues to grow with the latest research

- Research in a SNAP
- 5806 citations
- 907 key point summaries (KPS)
- 151 full articles available
- 56 CHD produced articles available

The Knowledge Repository is a collaborative effort with our partners:

Academy of Architecture for Health
an AIA Knowledge Community

The American Institute of Architects

ASHE
Optimizing health care facilities

FGI

Additional key point summaries provided by:

NIHD Nursing Institute for Healthcare Design
INSPIRING AND EDUCATING NURSES

RESEARCH·DESIGN connections

Pixabay - Image from Free-Photos - books-768426

SYNOPSIS

KEY POINT SUMMARY

A Decade of Adult Intensive Care U
Design: A Study of the Physical Des
Features of the Best-Practice Exar

OBJECTIVES

This article identifies important ICU physical design features by looking across the best-practice example ICUs in the United States.

Rashid, M., Abushousheh, A.
2006 | Critical Care Nursing Quarterly
Volume 29, Issue 4, Pages 282-311

Key Concepts/Context

This article reports a study of the physical design characteristics
intensive care units (ICUs), built between 1993 and 2003. These
recognized as the best-practice examples by the Society of Crit
the American Association of Critical Care Nurses, and the Am
Architects.

Methods

This study is based on a systematic analysis of the materia
the booklet and videos jointly published by the above Soc
Medicine, the American Association of Critical Care Nur
Institute of Architects in 2005.

Findings

The study identified the Guidelines, economy, patien
research evidence as the four primary forces shapin
ICUs. According to the study findings, the effects of
ICU design were not always in the best interests of
effects of the Guidelines were positive in some ar
that the basic needs of patients, staff, an

SYNOPSIS

The Center for Health Design: Moving Healthcare Forward

The Center for Health Design advances best practices and empowers healthcare leaders with quality research providing the value of design in improving patient and performance outcomes in healthcare facility planning, design, and construction, optimizing the healthcare experience and contributing to superior patient, staff, and performance outcomes.

Learn more at www.healthdesign.org

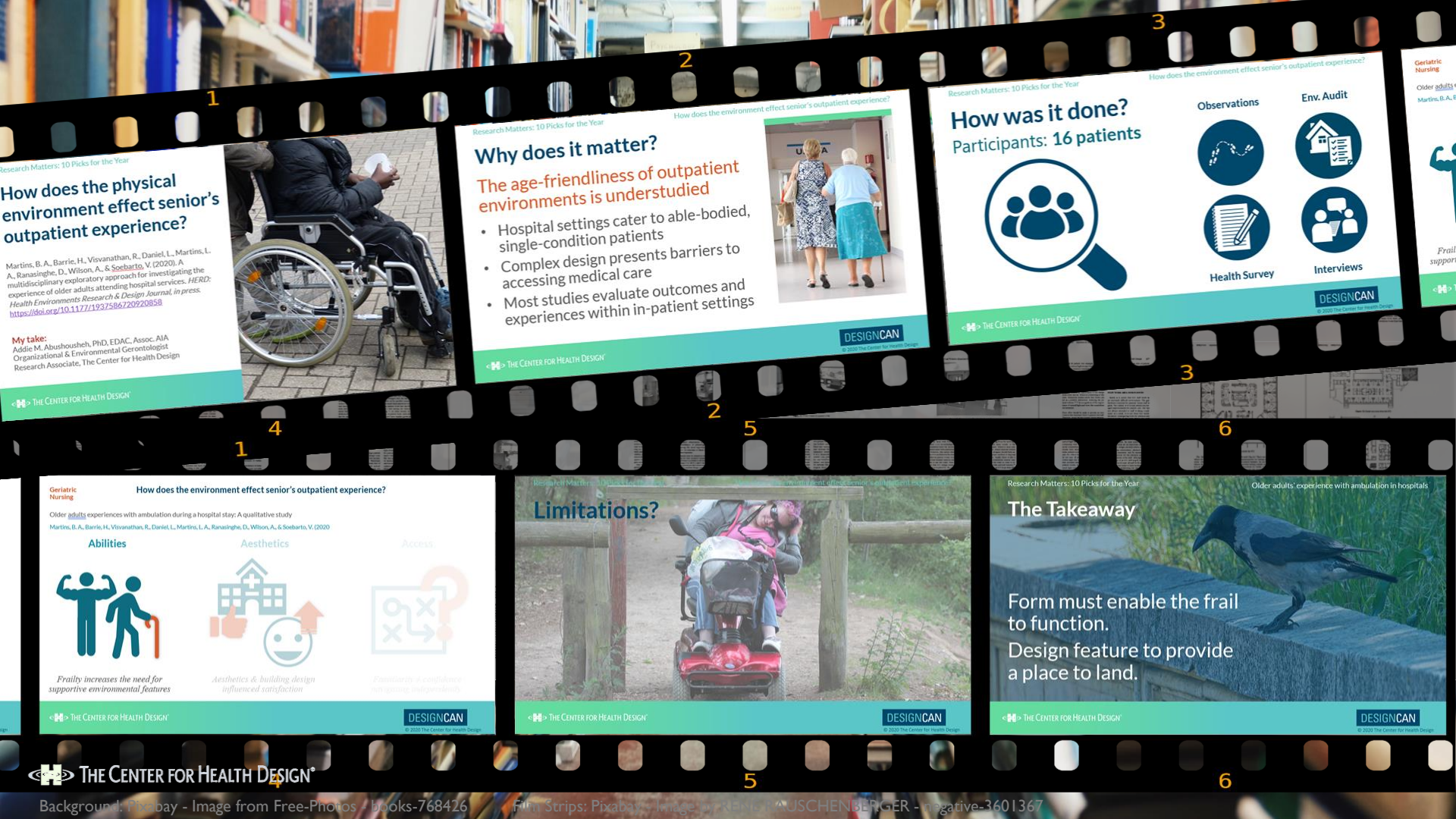
suggested in the Guidelines. Since economy and patient volume are beyond control, the ICU design community would serve its purpose well by conducting more empirical research aimed at resolving basic ICU design questions and updating the Guidelines for Intensive Care Unit Design more frequently on the basis of that research.

Limitations

Generalizability is limited by sample size. Information was limited to video and document review.

Design Implication

The study finds that most of the examples of best-practice adult ICUs have the following negative characteristics: (1) they are built as renovation projects with more health and safety hazards during construction; (2) most of them are mixed-service units with more safety and staffing problems; (3) the overall layout and the layout of staff work areas in these ICUs do not have any common design solutions for improved patient and staff outcomes; and (4) in these ICUs, family space is often located outside the unit, and family access to the patient room is restricted, even though family presence at the bedside may be important for improved patient outcomes. Some of these negative characteristics are offset by the following positive characteristics in most ICUs: (1) they have only private patient rooms for improved patient care, safety, privacy, and comfort; (2) most patient beds are freestanding for easy access to patients from all sides; (3) they have hand-washing sinks and waste disposal facilities in the patient room for improved safety; and (4) most patient rooms have natural light to help patients with circadian rhythms.



THE CENTER FOR HEALTH DESIGN®

Background: Pixabay - Image from Free-Photos - books-768426 Film Strips: Pixabay - Image by RENE AUSCHENBERGER - negative-3601367

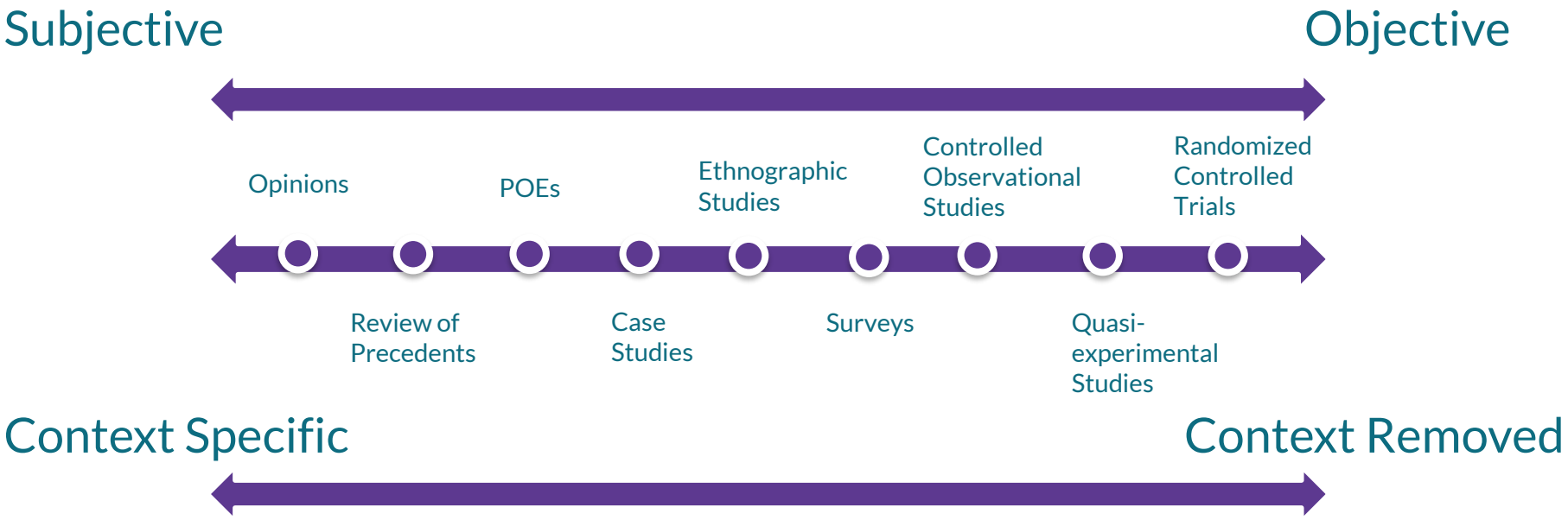
Critically Interpret Relevant Evidence

- Determine evidence credibility
- Establish alignment with hypothesis
- Ascertain:
  - Relevance
  - Rigor
  - Validity
  - Generalizability

INTERPRET

To determine if the evidence is credible and can be used to inform the design and the hypotheses, it is important to understand the relevance, rigor, validity and generalization of the information cited.

Evidence comes in a variety of forms



Critically Evaluate Resources

- Timeframe
- Key Concepts/Context
- Methods
- Findings
- Limitations
- Design Implications

Create & Innovate EBD Concepts

- Translate relevant info into guidelines
- Guide design decisions
- Create preliminary design concepts

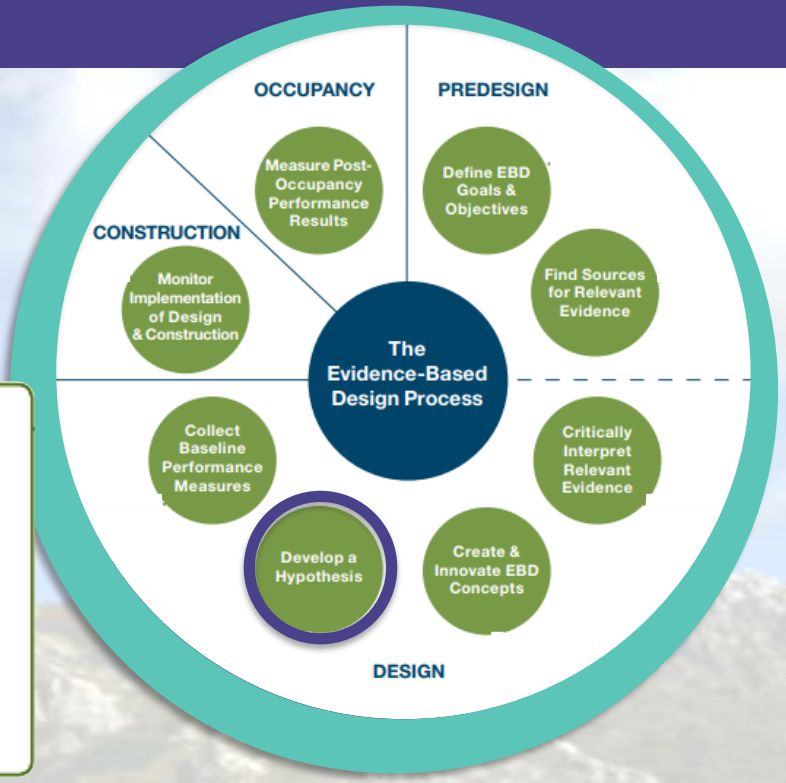
CREATE

Translate relevant evidence into design guidelines—summary statements that designers use for guiding aesthetic, functional, or compositional decisions. The team can begin to create preliminary design concepts derived from the design guidelines.

Specific Criteria for Guidance

- Performance
  - Primarily operational with environmental implications for success
- Prescriptive
  - Measurable feature of the environment

Develop a Hypothesis



HYPOTHESIZE

Develop hypotheses to predict the expected relationship between variables. Hypotheses point out the direction for data collection and provide guidance for analyzing and interpreting the data.

- Develop hypotheses
- Predict relationship between variables
- Direct data collection
- Inform data analysis and interpretation

Base Searches on Design Hypothesis

Design Intervention will intended influence outcome of interest

Link Design to Outcomes

Challenges

- High staff turnover
- Patient Safety
- Survey Citations

↑

What matters to the C-Suite?
The Consumer?
The Caregiver?
The Community?

Goals

- Increased staff satisfaction
- Increased patient satisfaction
- Reduction in slips, trips & falls

↑

What can you measure?
What data do they collect?

Design Strategies

- Staff respite areas
- Natural light
- Grab-bar placement

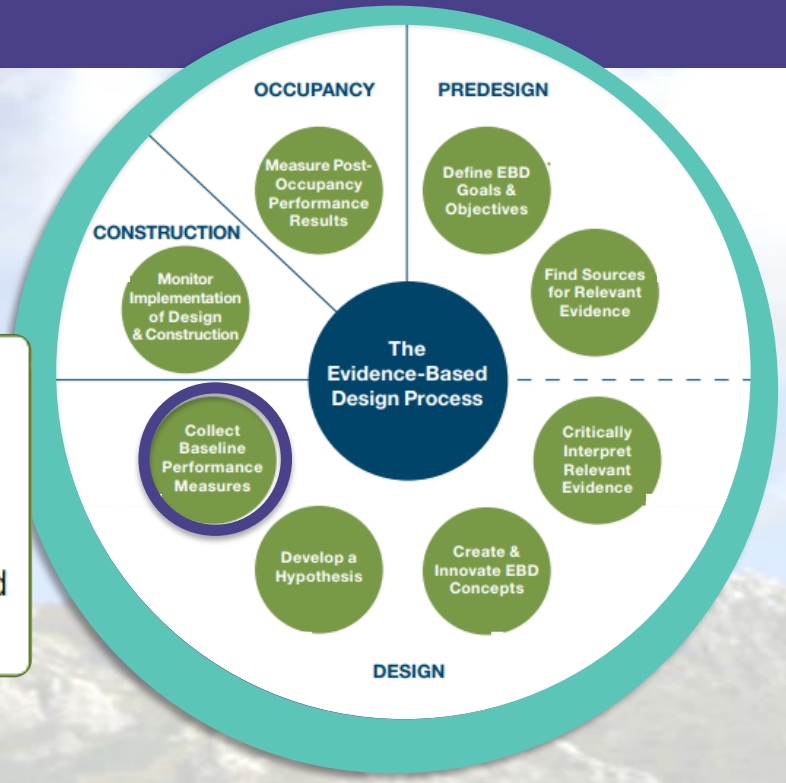
↑

What can you do?

Photo credit: JJ Ying

Collect Baseline Performance Measures

COLLECT
Assess the current processes at a macro level and define project metrics that will be used to measure outcomes. These will aid in the creation of the functional and space program.



- Assess current processes
- Define project metrics
- Create functional and space program

Develop a Hypothesis

Anatomy of the Hypothesis Statement

_____ will _____ _____.

design intervention | type and direction of change | outcome of interest

more specifics

(by_____)

predicted amount (e.g. percentage of change)

(as measured by _____).

metrics

Measurement Strategies

Observations

Interviews and Focus Groups

Transactional Tracking

Social Media Monitoring

Online Tracking

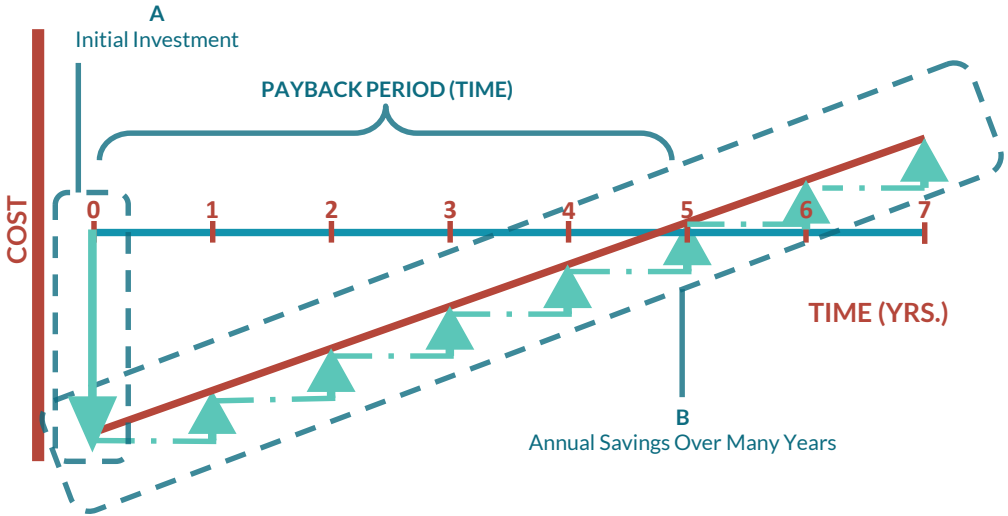
Surveys

Forms

Image adapted from: https://safetyculture.com/wp-content/media/2022/05/7-Data-Collection-Techniques.png

The EBD Business Case

Return on Investment



Source: Zofia Rybkowski. *The Financial Implication and Application of Evidence-Based Design for Healthcare Facility Planning*, 2009.

Apply To:

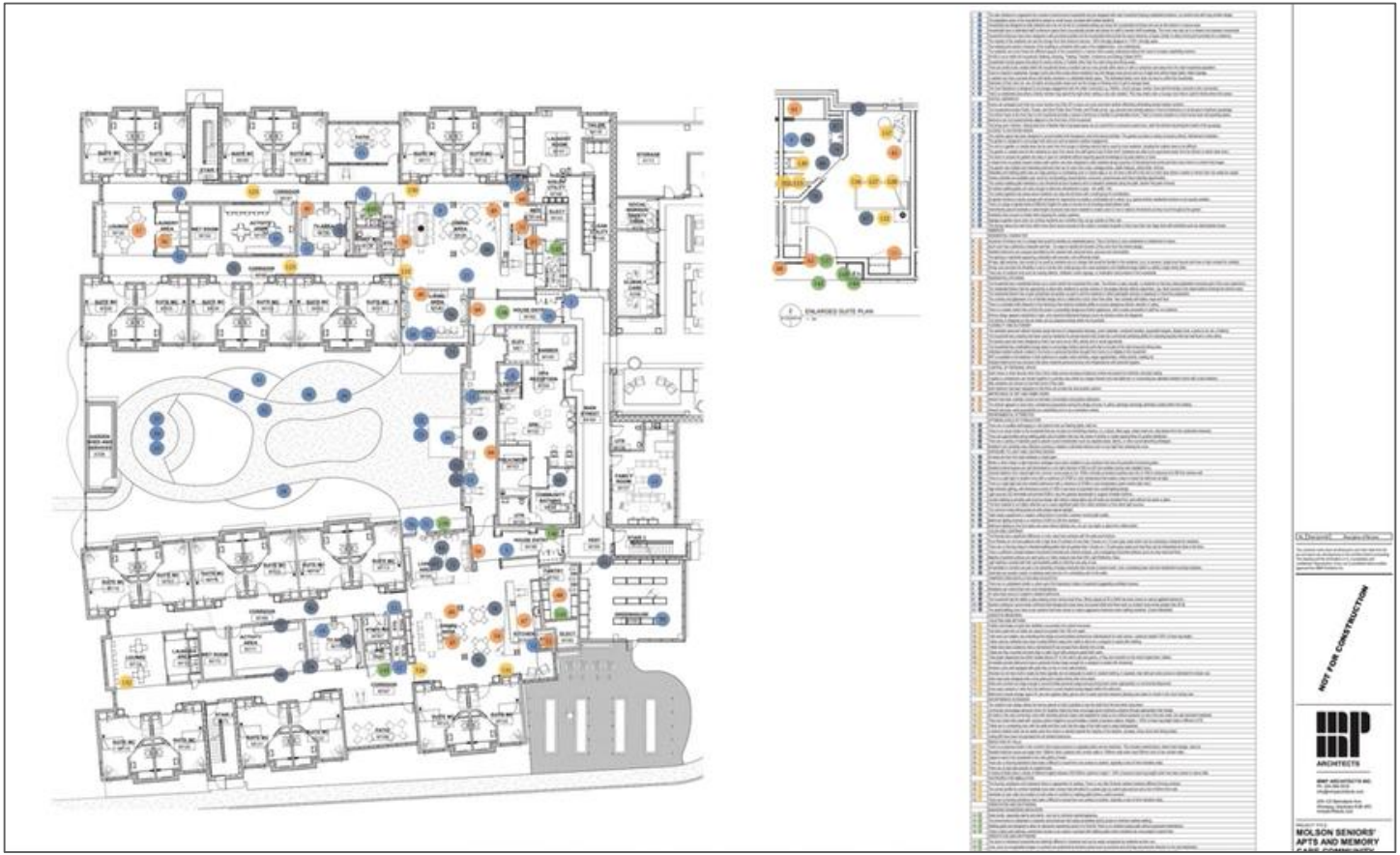
- **Building systems**: Structural, mechanical, electrical, plumbing, communications, lighting, acoustics, egress, security and fire protection
- **Construction documents**: Drawings, specifications and delivery methods
- **Design**: Urban planning, master planning, building design, site design, interiors, safety and security measures
- **Environmental**: Energy efficiency, sustainability, natural resources, natural hazards, hazardous materials, health impact analysis, occupant comfort, air quality, ventilation, weatherproofing and insulation
- **Legal**: Laws, codes, zoning, regulations, standards, life safety, accessibility, ethics and insurance to protect owners and the public

Monitor Design & Construction

MONITOR

It is the responsibility of the project team to ensure that all design strategies are executed as specified in the design documents and in compliance with the proposed research plan. At the end of construction, the project team verifies that the commissioned building complies with the EBD intent and is ready for post-occupancy research.

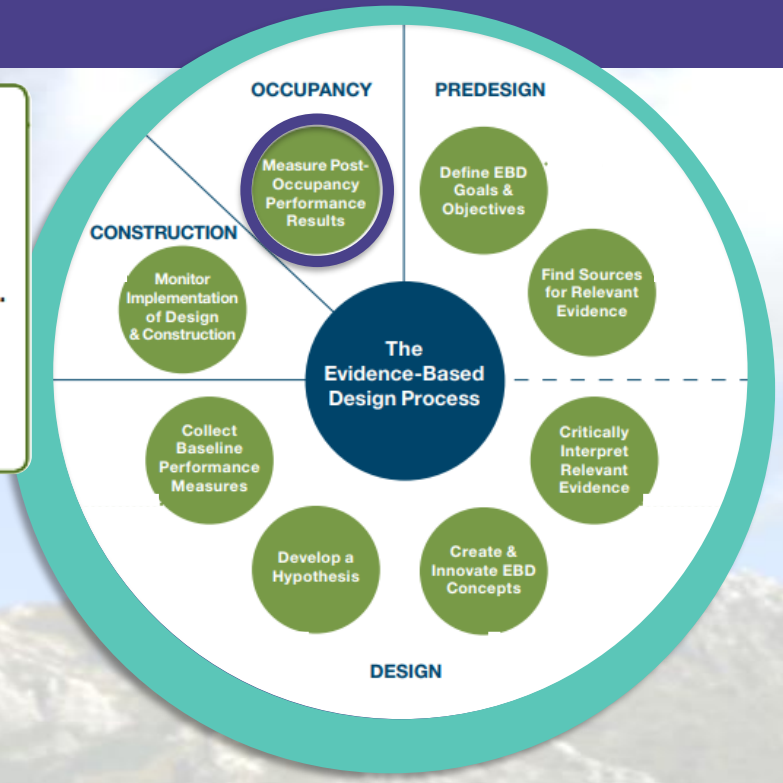
- Execute design strategies
- Stay in compliance with research plan
- Verify via building commissioning
- Prepare for POE research



Measure POE Performance Results

MEASURE

The research team implements the research study as outlined in the research plan, tracks any changes, and makes necessary adjustments. Data collection is the most time-consuming and costly phase of a research project.



- Implement per research plan
- Identify pertinent changes
- Make necessary adjustments
- Efficiently collect intended data

Develop a Hypothesis

Anatomy of the Hypothesis Statement

_____ will _____ _____.

design intervention | type and direction of change | outcome of interest

more specifics

(by_____)

predicted amount (e.g. percentage of change)

(as measured by _____).

metrics

Four Levels of EBD

Outlined by Kirk Hamilton, PhD

4 levels of EBD →

	Activity	1
Interpret the evidence	Read material to stay current on emerging trends	■
	Use critical thinking to interpret implications of research on current projects	■
	Collect success stories and historical data on completed projects	■
Hypothesize & measure	Perform applied research as a practitioner on real projects	
	Hypothesize intended results of design interventions	
Share results publicly	Report unbiased project results in the public arena, writing and speaking	
	Perform independent third-party post-occupancy evaluations	
	Improve understanding of research methods through advanced education	
Meet academic standards	Collaborate with credible academic researchers and social scientists	
	Publish research results in peer reviewed journals	
	Write academic thesis or dissertation on evidence-based design topic	

Text from Center for Health Design EDAC Study Guide 1 (2015), p. 6

Thank You

Questions?

THE CENTER FOR HEALTH DESIGN®

Addie Abushousheh PhD, EDAC

Org. & Env. Gerontologist
Research Associate

The Center for Health Design
www.HealthDesign.org

Email:
AAbushousheh@HealthDesign.org

THE CENTER FOR HEALTH DESIGN®