Lean Construction Institute

Provider Number H561

Lean and Evidenced-Based Design: Where to Begin

LCIV.EBD

Andrea Sponsel, Donna Deckard, Terri Zborowsky

Monday, October 19, 2020

2 LU Credit(s) earned on completion of this course will be reported to AIA CES for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

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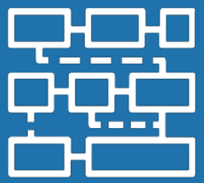
Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

Course Description

A partnership between Lean and Evidenced-Based Design can transform your project outcomes. This integrated approach ensures you're beginning with research and data collection to uncover the true why for the project, the root cause of issues in the current design and/or process and generating informed solutions to evaluate. Involving all stakeholders (subject matter experts, designers and implementers) from the beginning promotes a more inclusive decision-making process and better outcomes than with a traditional, siloed approach. Maximizing value to the customer, eliminating waste, and continuous improvement are at the core of Lean, while improving safety and quality are at the core of evidenced-based design.

Learning Objectives



01.

Participants will gain an understanding of how to build a business case with the entire team (owner, design firm, and contractor).

02.

Participants will explore the added value of integrating an Evidence Based Design (EBD) process and Lean methods to transform environments by researching the pain points a facility is experiencing, proposing improvements, and reducing the waste and rework in the design and construction process.

03.

Participants will be able to identify and outline opportunities to incorporate both Lean and EBD during the various stages of design, construction and occupancy to improve safety, quality and project delivery.

04.

Participants will be able to facilitate a goal setting session that identifies the primary areas for research and improvement.

This concludes The American Institute of Architects Continuing Education Systems Course

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OCTOBER 19-23

Lean and Evidence Based Design: Where to Begin

Donna Deckard, Center for Health Design - Andrea Sponsel, BSA - Terri Zborowsky, HGA

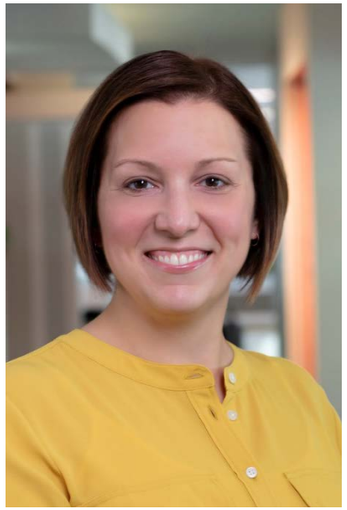
THE ABC'S OF LEAN: TRANSFORMATION THROUGH ACTIONS, BEST PRACTICES AND COACHING

OCTOBER 19, 2020

THE CENTER FOR HEALTH DESIGN®

Who We Are

Donna Deckard
The Center for Health Design
Director of Strategic Projects



Andrea Sponsel
BSA LifeStructures
Director of Lean Strategy

Terri Zborowsky
HGA
Design Researcher

Agenda

- What is Lean + EBD?
- How do I know Lean + EBD is right for the project?
- Create Alignment
- Know Your Audience
- Why do they work together?
- Case Study
- Lean + EBD Toolkit

What's Your Role?

- Architect
- Interior Designer
- Engineer
- Researcher
- Contractor
- Trade Partner
- Consultant
- Other

What is Lean?

“Lean is not a program, it is a total strategy.”
– Taiichi Ohno

Evidence Based Design

EVIDENCE-BASED DESIGN

IS THE PROCESS OF BASING

DECISIONS ABOUT THE BUILT

ENVIRONMENT ON CREDIBLE

RESEARCH TO ACHIEVE THE

BEST POSSIBLE OUTCOMES

What is Lean + EBD?

Enhanced Design with **Maximum** Value and →minimized← Waste

The Approach

Traditional vs. Integrated

Traditional Design and Construction

- *Jumping in without Defining the Problem*
- *Surprises*
- *Design Schedule Defined by Arbitrary Milestones*
- *Waiting for Bids before you know the Cost of the Project*
- *Siloed Communication*
- *Value Engineering*

Integrated (EBD + Lean) Design and Construction

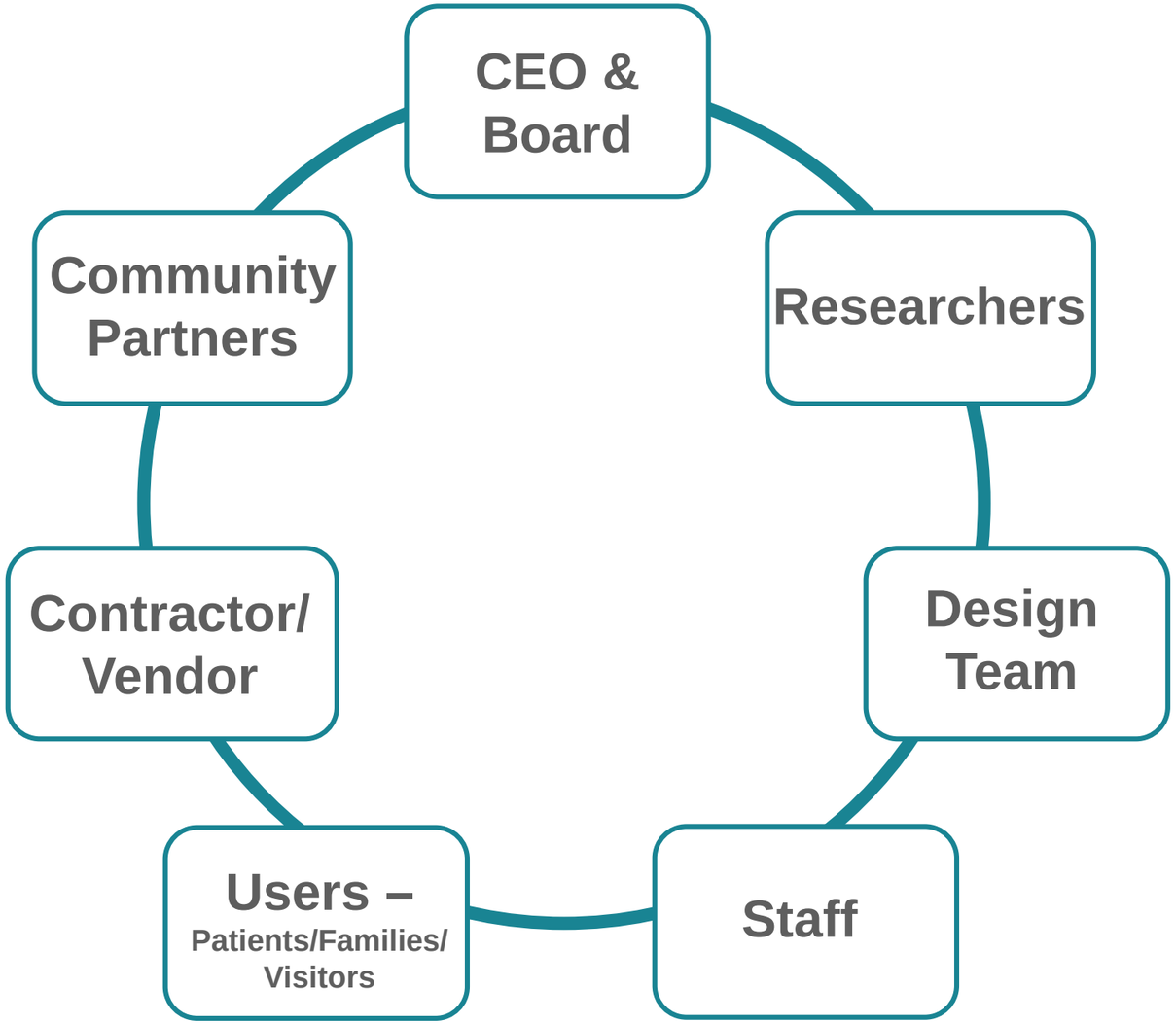
- Alignment with Client Goals
- Relevant Research Utilized to Improve Challenges
- Stability/Predictability of Projects
- Identifies and Removes Waste
- Safer Projects
- More Collaboration and Innovation
- Continuous Improvement – New Insights Gained
- Makes the project **FUN** again!

How do I know Lean + EBD is right?

- Your client is ready to look at their **processes** and how they **inform design**.
- Your client is willing to spend **time up front** with data gathering **to produce a better design**.
- You're ready to invest time into **linking design to measurable outcomes**.
- You're ready to **prove** your designs are good.

Who does Lean + EBD?

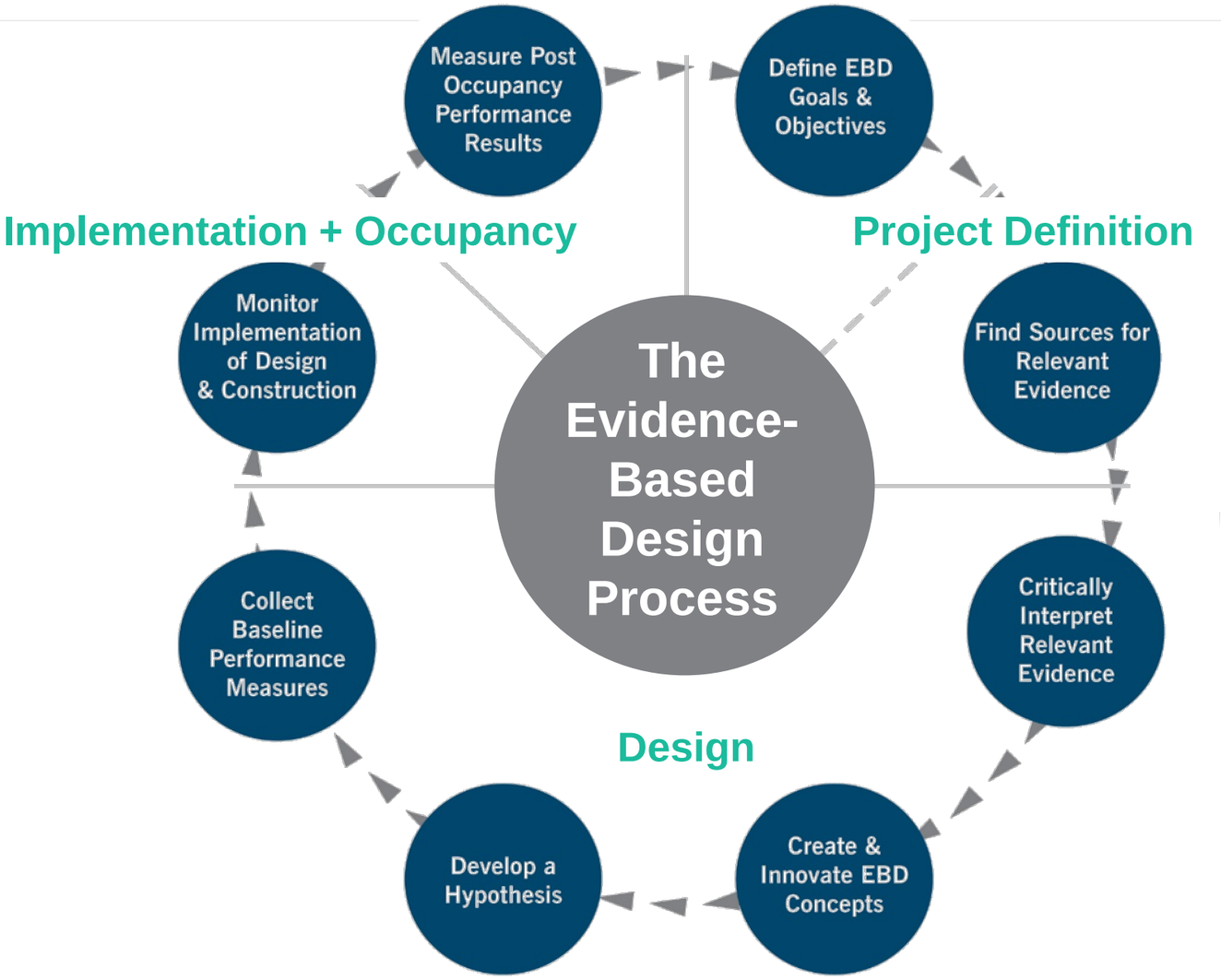
- Key Decision Makers
- Key Stakeholders with critical insights on vision, values, goals and objectives



Evidence-Based Design Process

8 Steps integrated into Design/ Construction/Occupancy

- **Process** helps designers understand issues our clients face and can show needs they didn't know they had
- **EBD** practices can prioritize and create measures of success for outcomes based on those needs



Merging Methods

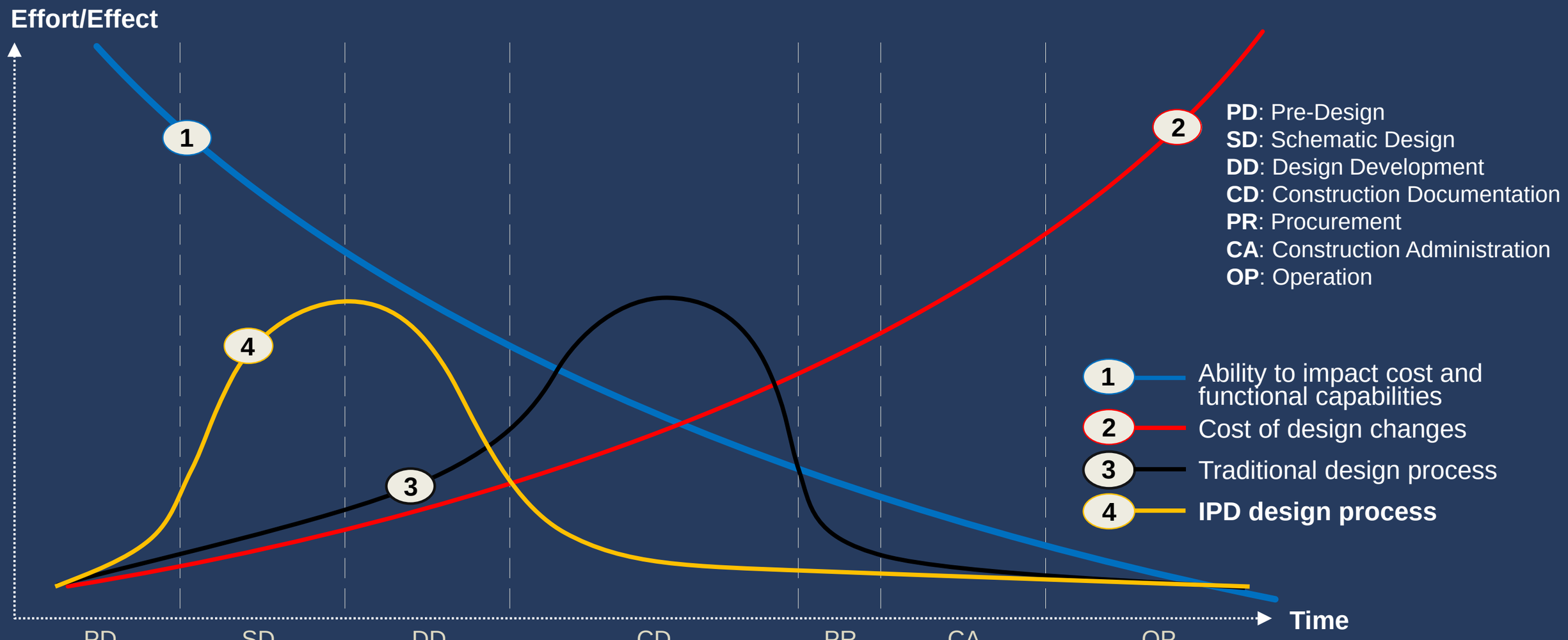
	Pre-Design	Schematic	Development	Documentation	Post-Occupancy
Lean	• Go to Gemba • Develop Data-Driven Metrics	• Develop Future-State Operational Models • Rapid Prototyping • Strategic Space Program	• Evaluate and Assess Prototypes and Mock-ups with Metrics	Set Optional Standards & Goals Special Project Support (Missing Link)	• Metrics Evaluation • Performance Report of Improvements and Continuous Improvement
EBD	• Gather Baseline/ Current-State Data with Valid Methods (shadowing, surveying, focus groups, & clinical data)	• Use Baseline Data to Develop Future-State Value Streams, Prototypes & Program • Apply EBD Concepts from Existing Literature	• Test & Predict Improvements of Future-State Models with Baseline Data	Hypothesize Outcomes Verify Application of Evidence & Metrics	• Collect Data with Same Pre-Design Methods • Compare Post-Occupancy Data with Baseline Data • Identify if Hypotheses are Supported
Change Management	**Step 1: Create a Sense of Urgency** • Share findings with staff to highlight potential improvement	**Step 2: Build a Coalition** • Engage and empower staff to influence design **Step 3: Form Operational and Design Goals** • Created an evidence-based design matrix **Step 4: Enlist & Empower Frontline Staff in Decisions**	**Step 5: Enable Staff Voice through Mock-up and Simulations** • Staff assesses the room/plan's performance **Step 6: Generate Consensus through Data** • Data is shared with staff to show workflow predictions	**Step 7: Sustain Success by having Staff Set Future-State Workflows** • Staff participates in day-in-the-life events to work through operational changes	**Step 8: Institute time to lament, then change** • Staff were able to provide continued feedback, which turned their frustration into flexibility and acceptance

EBD Step 1: Define EBD Goals and Objectives

Get Buy In

- Appeal to what keeps them up at night
- Gear your message towards your audience – Hospital Administration, Providers, Clinicians, Facilities, Design+Construction
- Build a Business Case they can’t ignore

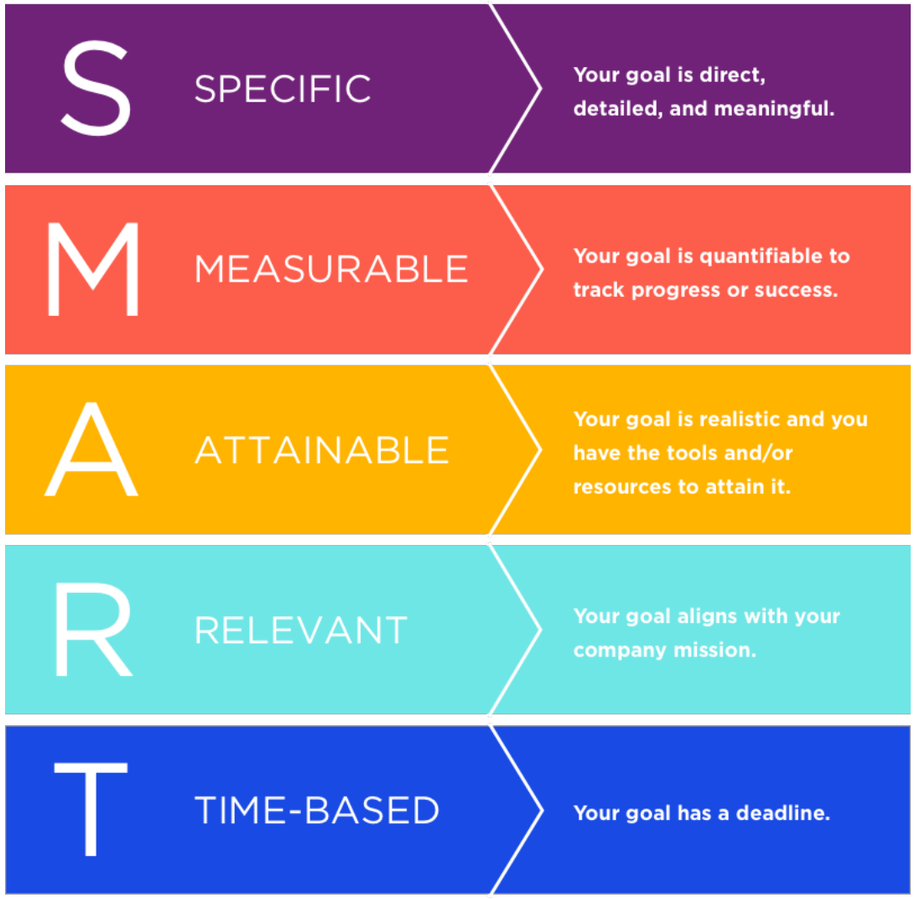
Early Engagement



Create Alignment

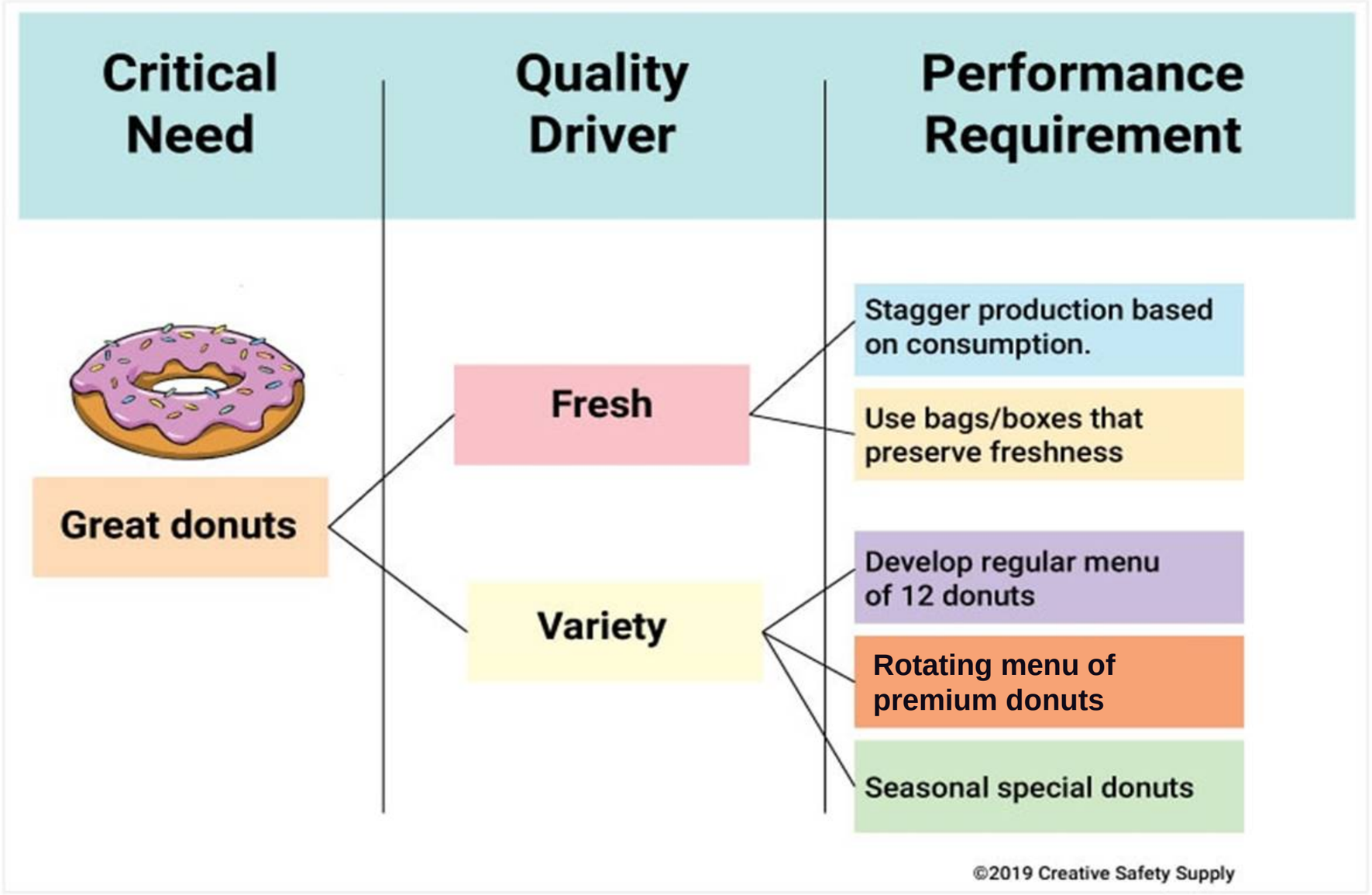
- **Make the effort inclusive of all team members and observation + research based**

- Take time for project and team alignment
  - Establish **Values**
  - **Define Success for every Stakeholder** (Owner, User, Researcher, Designer + Builder, Community)
  - Talk about the **Driving Forces** (opportunities) and the **Restraining Forces** (risks)
  - Create **SMART** goals

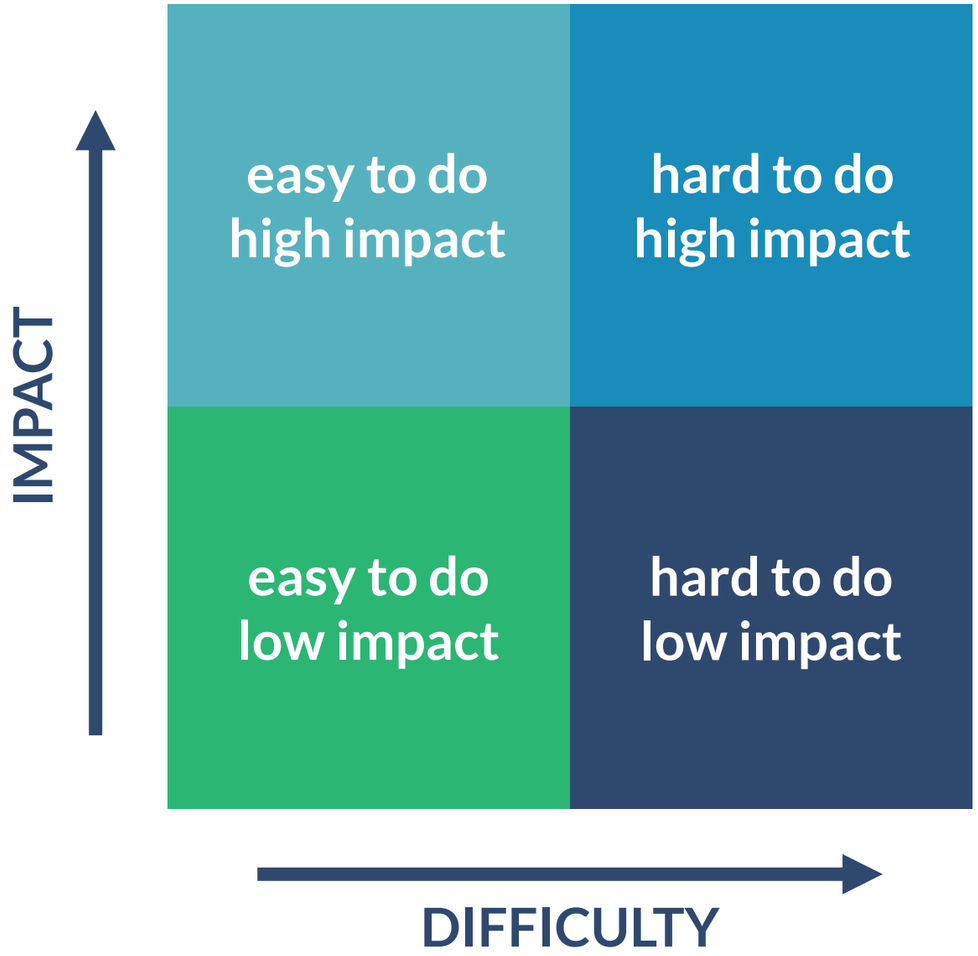


Critical Needs

Quality Outcomes


Critical Need
Quality Driver
Performance Requirement
Great donuts
Fresh
Variety
Stagger production based on consumption.
Use bags/boxes that preserve freshness
Develop regular menu of 12 donuts
Rotating menu of premium donuts
Seasonal special donuts
©2019 Creative Safety Supply

Prioritize

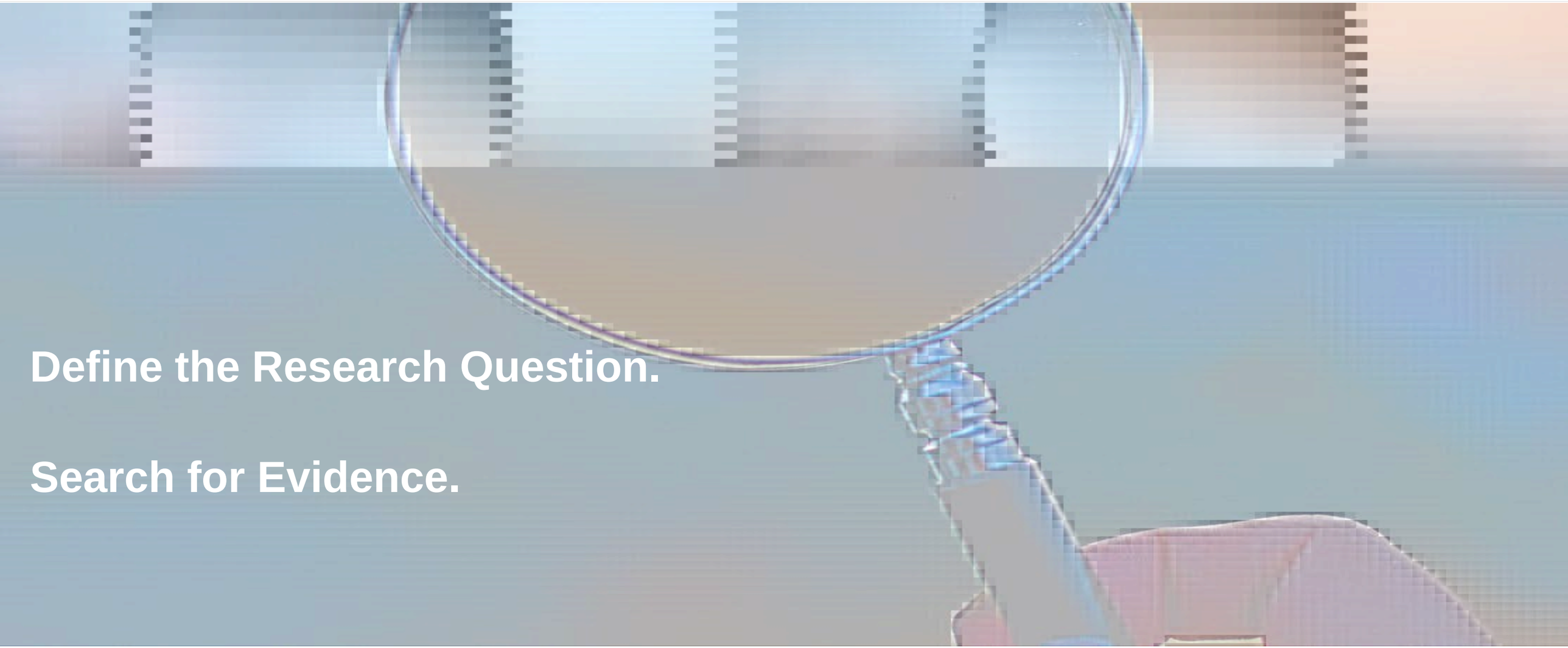


Research Context

- **Linking research and design is at the core of EBD.**
- Research can support design decision making.
- Research can evaluate the success of design innovations.
- Research aims to add to the body of knowledge.

The goal is to use facility design to help improve outcomes.

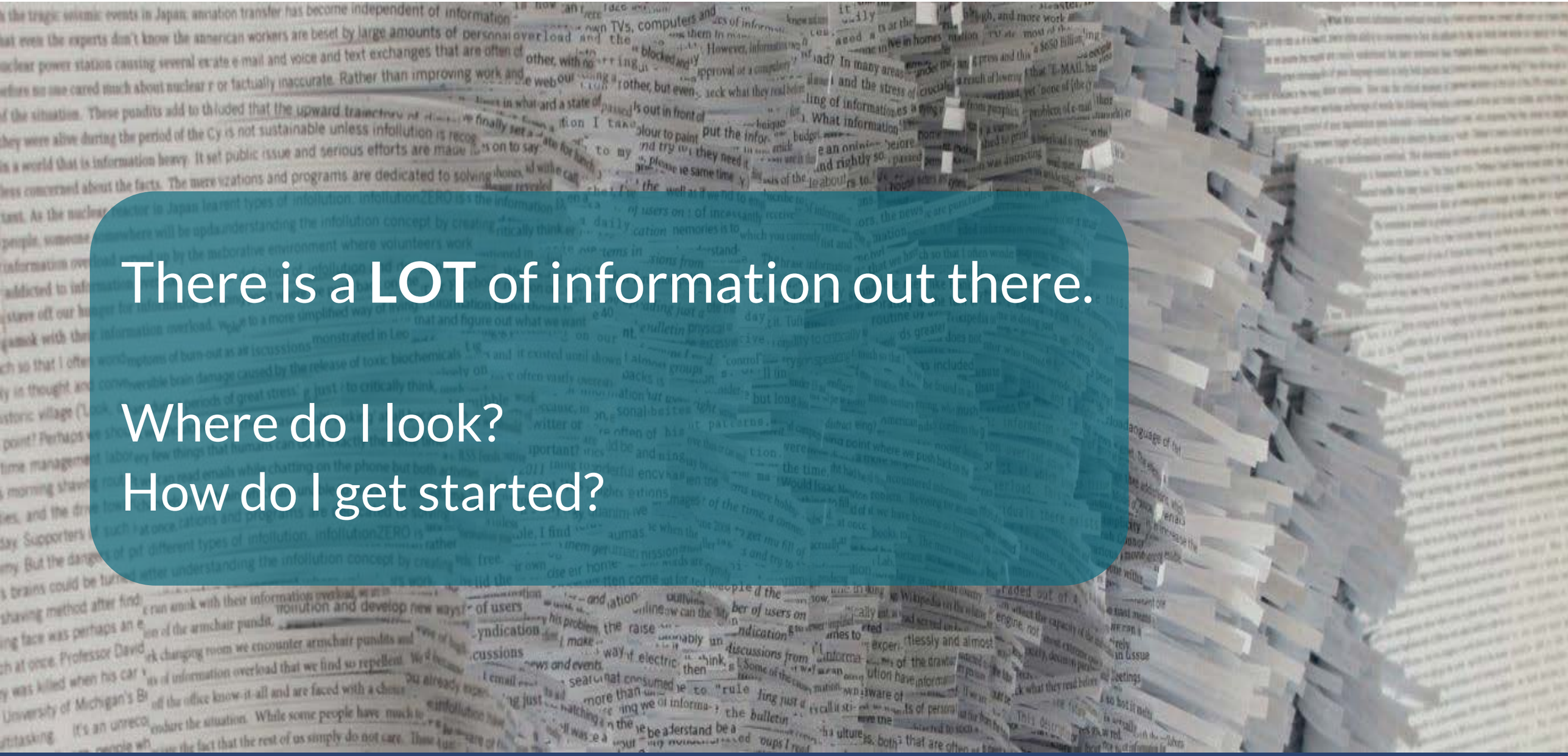
EBD Step 2: Find Sources for Relevant Evidence



Define the Research Question.

Search for Evidence.

Where to Look



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

Where do I look?
How do I get started?

Online Journals

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

Databases

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

Abstract / Indexing Services

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

Search Engines

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

The Knowledge Repository

A complete, user-friendly library of healthcare design resources that continues to grow with the latest research.

- Online decision-making tool
- 4900+ citations
- 839 key point summaries (KPS)
- Acute, Residential & Ambulatory Care citations
- 127 full articles available
- 55 CHD produced articles available

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

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Manage Your Information

- Endnote/ Mendeley/ Zotero
- Share point
- Excel/Access
- Database/ Repository

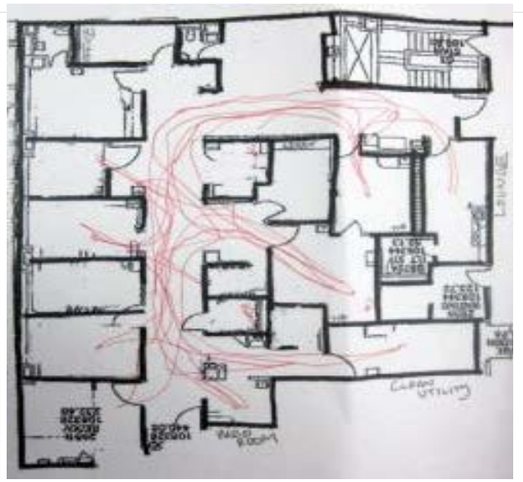
Consider a Knowledge Manager!

Other Research

- Benchmarking
- Case Studies
- Site Visits

Go to the Work

- Problem solving is more effective at the place and with the people having the problem
- Track the people, product and information flow



A3 #	Title	Revision	Champion	Date Started:	Collaborators/Participants	Approved by:	Approved Date:	Status
CA201	Cancer Center Gemba – Inpatient Areas	0	Rachel Knox	12-17-15	Chris Finch, Erin Laurenzi, Lisa Barton, Lauren Reeves, Shiela Hall, Tony Bernardini, Lauren Hegger, Jennie Evans, Brent Willson, Kristy Venrick, Rachel Knox			✓ Development ❑ Collaborative review ❑ Implementation

BACKGROUND:

Methodist University Hospital is building a new patient care tower, that will expand or replace several services including, surgery, imaging, sterile processing, pharmacy, patient beds, cancer center, and transplant center.

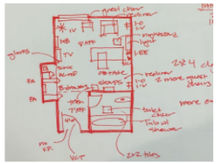
CURRENT CONDITION:

The inpatient cancer beds for ages 18 to 90 years of age are located in several areas of the hospital:

Surgical Oncology - 2nd Crews – 23 bed unit, recently renovated
- Patients are direct admit to Oncology
- Pod B – 10 – preparing for telemetry beds -

Medical Oncology & Malignant Heme
- 4 Crews, A pod, 1:5 ratio
- Includes telemetry and central monitoring
- Room 452 is a suite for room 453 – VIP, end of life, etc

BMT unit – 41 allogenics / autologous / have some 2 mismatche
- 12 beds, 1:4 ratio, but trying to get to 1:3
- ALOS is 14.5 to 30 days. Trying to decrease to 10 days.
- All positive pressure; 1 room is negative with ante room

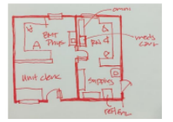


- Staff includes mid-level for regular oncology, each MD has a mid-level assigned, a case manager and social worker are assigned to Pod A and B. Unit coordinator for both pods.

GOAL (TARGET CONDITION): GOAL STATEMENT (3-6 months, measurable goal , align with Problem Statement)

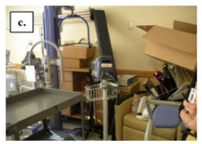
The goal of the gembas is to use current state observations to provide a frame of reference for the design team, and identify opportunities for improvement in the departments' future state spaces and operations.

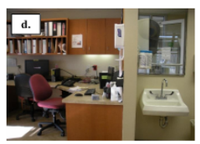
ROOT CAUSE ANALYSIS: *(Problem Cause)*
- Patients are direct admit to Oncology, from ED or clinic
- Clean Supply – no charge system; supplies charged to unit; patients charged flat rate; special requests are made through Cerner
- Nourishment – Coffee, Micro, countertop Ice, sink, ref/frz, some snack storage. Room has locked door with small vision panel.
- Equipment – not enough storage; using corridors and repurposed patient rooms
- Meds – exchange cart (daily), plus hourly delivery, single omnicell, UC ref, and disposable storage



BMT unit
- All visitors asked to wash up in a handwashing sink at entrance to unit
- Physicians conference room – 2 computers and 1 table; used by physicians
- 12 beds, 1:4 ratio, but trying to get to 1:3
- 1 small supply room
- Family room

a) **Patient Bed**
b) **Clean Supply Room**
c) **Equipment Storage**
d) **BMT Nurse Work**





Homework/Follow-Up

	What	Who	Promise Date
1.	*Return HKS information request*	*MUH*	*1/5/16*
2.			
3.			
4.			
5.			
6.			

HKS, Inc.

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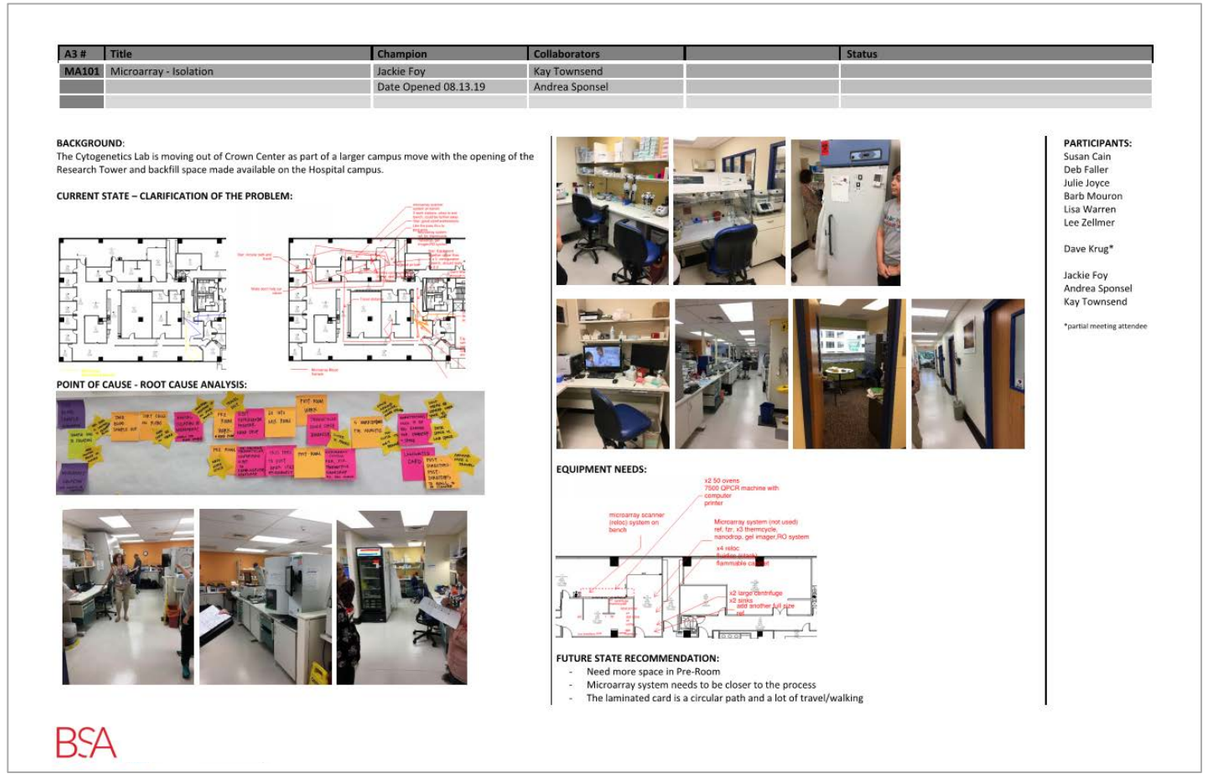
Map the Experience or Process

- Understand the experience or process and where improvements can be made
- Identify waste and improve it with operations and/or space
- Document the Current State with an A3 to start the problem solving process



A3 #	Title	Champion	Collaborators		Status
MA101	Microarray - Isolation	Jackie Foy	Kay Townsend		
		Date Opened 08.13.19	Andrea Sponsel		

BACKGROUND:
The Cytogenetics Lab is moving out of Crown Center as part of a larger campus move with the opening of the Research Tower and backfill space made available on the Hospital campus.

CURRENT STATE – CLARIFICATION OF THE PROBLEM:

POINT OF CAUSE - ROOT CAUSE ANALYSIS:

EQUIPMENT NEEDS:

FUTURE STATE RECOMMENDATION:
- Need more space in Pre-Room
- Microarray system needs to be closer to the process
- The laminated card is a circular path and a lot of travel/walking

PARTICIPANTS:
Susan Cain
Deb Faller
Julie Joyce
Barb Mouron
Lisa Warren
Lee Zellmer

Dave Krug*

Jackie Foy
Andrea Sponsel
Kay Townsend

*partial meeting attendee

BSA

EBD Step 3: Critically Interpret Evidence

Relevant

Low Credibility

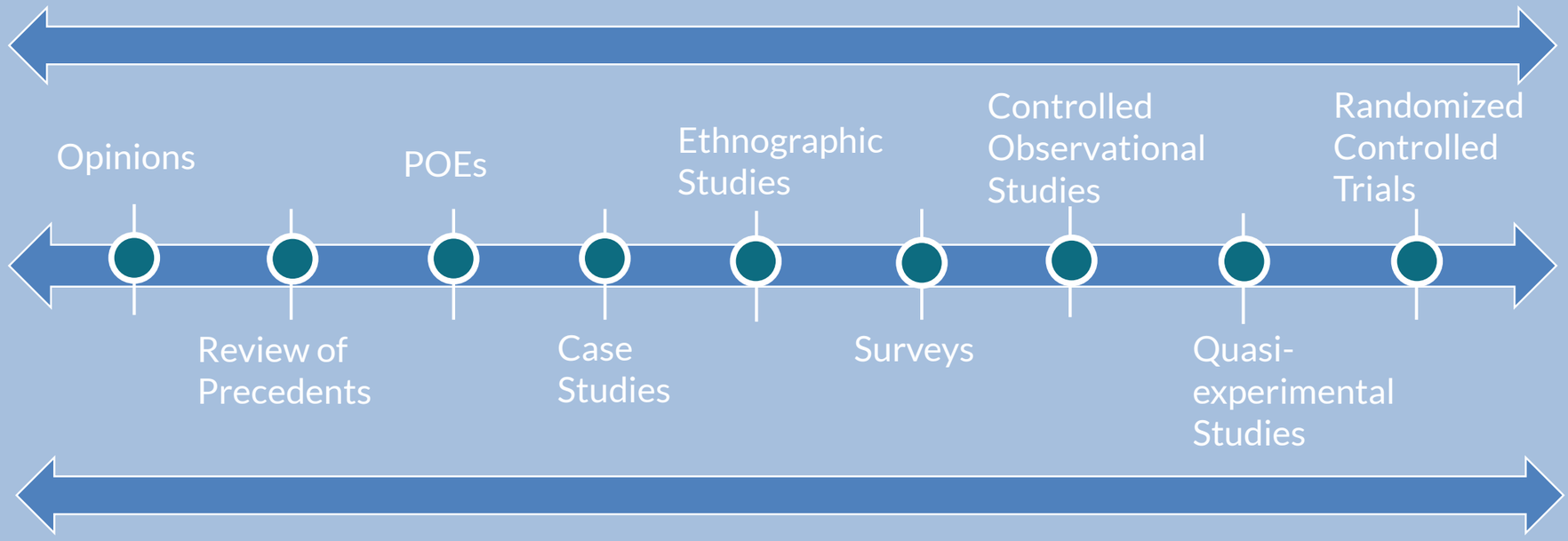
High Credibility

Irrelevant

EBD Step 3: Critically Interpret Evidence

Subjective

Objective



Context Specific

Context Removed

The Practitioner's Guide to Evidence-Based Design (2008). The Center for Health Design.

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Critically Interpret Evidence

NEW

Reference (Author, Year, Title of article. *Title of journal*, *Volume*(issue), page numbers.	**Discipline or field of study (Use our category (tab) headers)**	**Study Design** Meta-analysis, meta-synthesis, experimental, quasi-experimental/ comparative, correlational, descriptive, case study	**Setting**	**Sample or Data collected**	**Evidence Level** 1=Strong 2=Moderate 3=Weak	**Quality Level** A=High B=Good C=Low/Flawed	**Outcomes**	**Recommendations/ Implications for practice**
Example, A. (2015). Using evidence in design. *HERD, 8*(2), 221-223.	Design	Descriptive	Hospital	Survey of 10 healthcare leaders & 10 design team members	3	B	Nearly 50% of those surveys were able to describe the evidence based approach to HC facility design.	Need to educate both the design team and the HC client about the EBD approach, the benefits, and possible design features to be evaluated.

Levels of Evidence for Healthcare Design

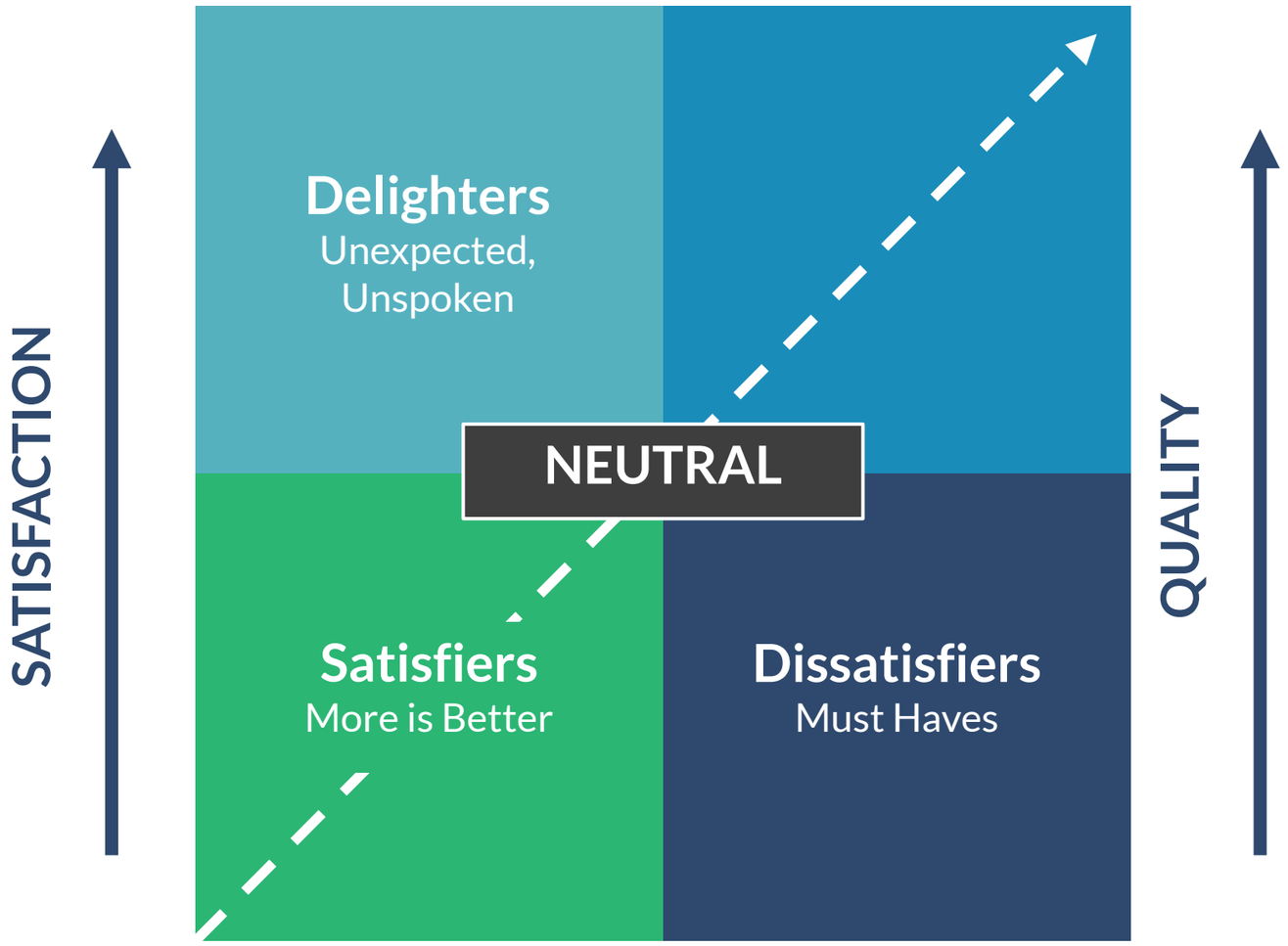
Strong	Level 1	Systematic reviews, meta-analysis of multiple experimental or quasi-experimental studies; meta-analysis of multiple qualitative studies leading to an integrative interpretation; professional standards & guidelines with supporting evidence.
	Level 2	RCTs; Well-designed experimental (randomized) studies
Moderate	Level 3	Quasi-experimental (nonrandomized) studies with consistent results as compared to other similar studies.
	Level 4	Descriptive correlational studies, qualitative studies, integrative or systematic reviews of correlational or qualitative studies, or RCT or quasi-experimental studies with inconsistent results as compared to other similar studies.
	Level 5	Peer-reviewed professional standards or guidelines with studies to support the recommendations.
	Level 6	Opinions of recognized experts, multiple case studies
Weak	Level 7	Recommendations from manufacturers or consultants who may have a financial interest or bias.

Stichler, J. F. & Zborowsky, T. (2015). Using Evidence to Guide Design Decisions. In Stichler, J. F. & Okland, K., Nurses as Leaders in Healthcare Design: A Resource for Nurses and Interprofessional Partners. Zeeland, MI: Herman Miller, Inc.

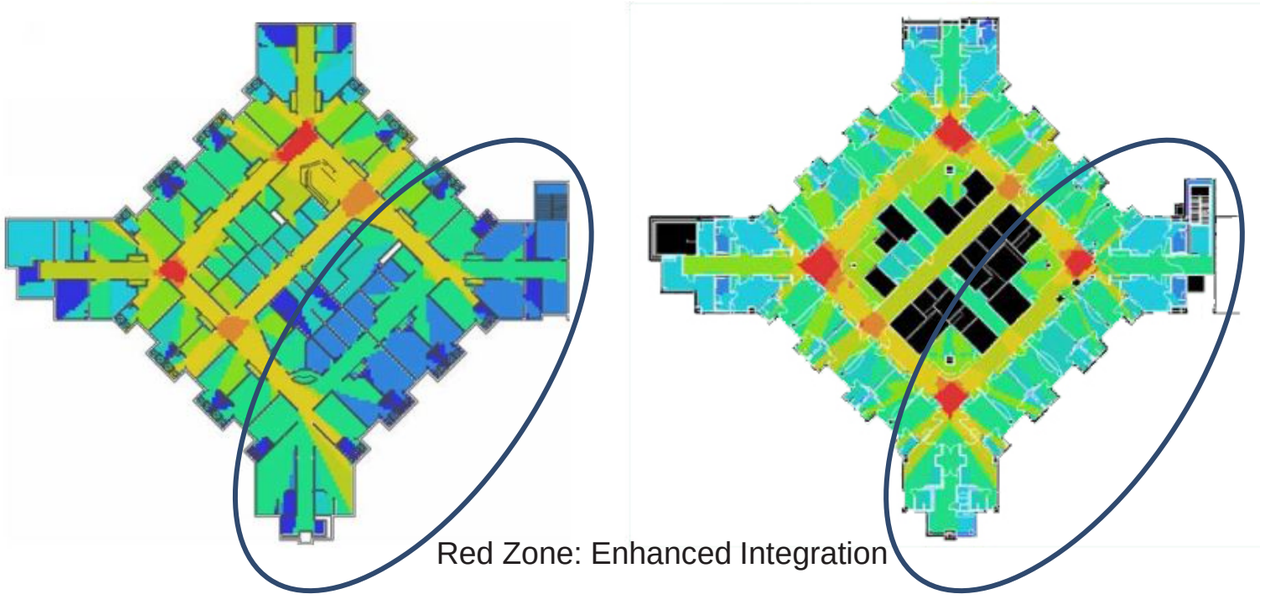
EBD Step 4: Create and Innovate Design Concepts

Evaluate the Strategies against Project Goals, Vision and Research Questions.

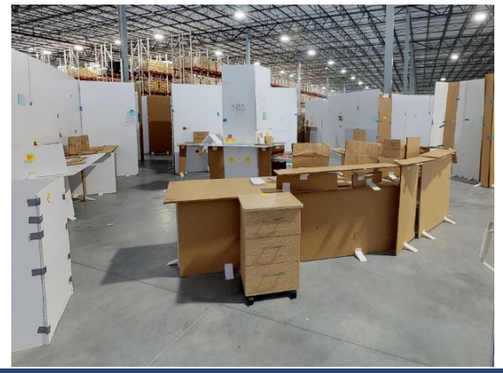
Some will be better than others.



Design - Test It - Prototyping



Red Zone: Enhanced Integration



- Enables design team to bridge the gap of understanding with end users
- Allows end users to test operations to improve functionality, decrease square footage of rooms and optimize layout within rooms
- Allows the entire team to work out details in the room before construction commences or continues

EBD Step 5: Develop a Hypothesis

- Hypotheses indicate or predict the **relationship between the design strategy** (independent variable) **and the outcome** (dependent variable).

- **Define your metrics.**

EBD Step 5: Develop a Hypothesis

Research Questions

Does
ABC
affect
XYZ?

Hypothesis Statements

ABC will
increase/
improve/
reduce/
minimize
XYZ.

EBD Step 5: Develop a Hypothesis

Anatomy of the Hypothesis Statement

_____ will _____ _____.

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

more specifics

(by _____)

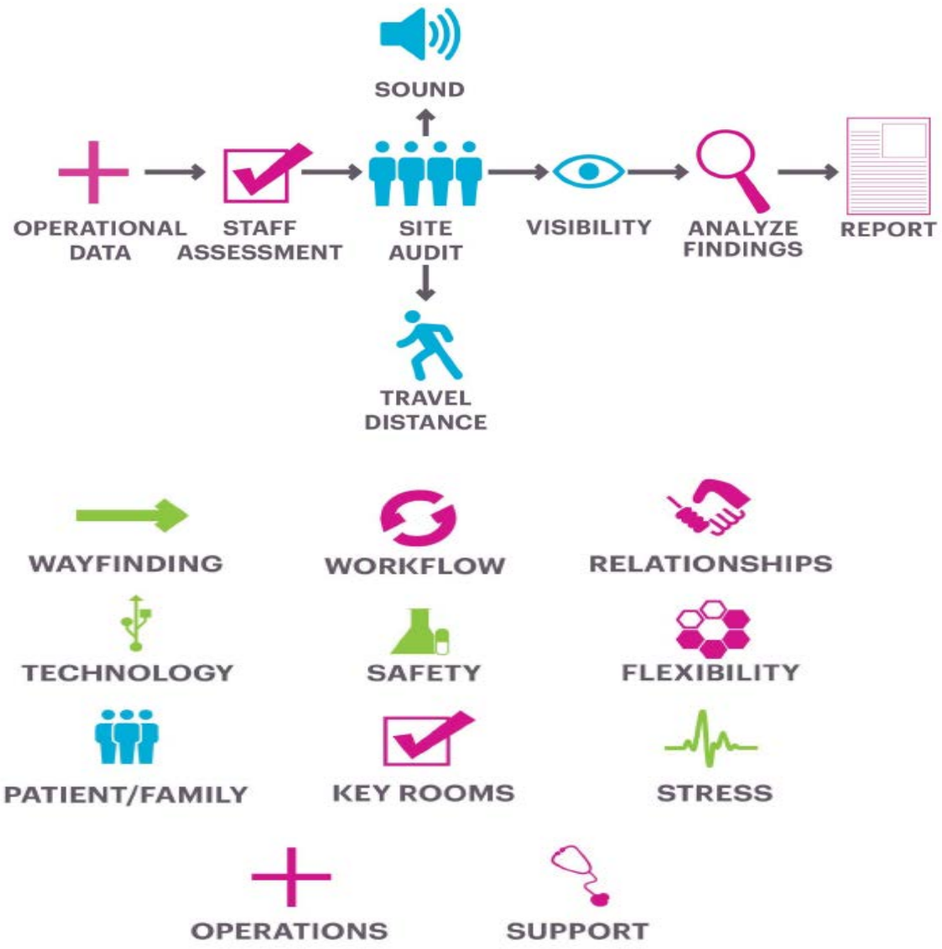
predicted amount (e.g. percentage of change)

(as measured by _____).

metrics

Critical To Quality	Design Interventions	Outcome Metrics
Efficient: Proximity	• Proximity to the hospital/ testing laboratory • Accessibility of the population via all means of commute • Visibility and maintaining social distancing	• Increase Response Times • Reduce Travel times • Increase Patient Satisfaction
Safety: Infection Control	• Doffing and donning dedicated areas • Multiple changing areas • Sinks - Hot water availability • Materiality of finishes (Vinyl) • Decontamination showers • Dedicated soiled rooms for disposable of waste & soiled linen • *Screening protocol for staff between shifts	• Reduce Cross-Contamination to Staff and Other Patient (secondary/underlying diseases); HAIs
Staff Efficiency: Storage & Access to Equipment, Supplies, and Medication and collaboration	• Storage of testing kits in an anteroom • Housekeeping equipment/supplies • Transportation of tests in batches • Multiple swap collection stations • Collaborative team space • *Area for collaboration – sorting, labeling of samples • *Area for triage phone calls • *Area for Powered air purifying respirators hoods	• Increase Staff Efficiency • Reduce Medical Errors • Increase Response Times • Increase Team-based Care & Collaboration
Flexibility: Constructability, Portability	• Modularity – ability to construct overnight • Ease of addition based on needs • Portable furniture, computer on wheels • Technology usage for Intake screening etc.	• Increase Response Times
Human Experience: Staff Wellbeing/Patient Satisfaction	• Views to the outdoors • Dedicated staff toilet • Break/locker area coupled with wellbeing unit (consider lactation room) • *Shower/decontamination areas • *Access to child care services	• Increase Staff Satisfaction • Increase Staff Respite and Sense of Wellbeing • Increase Patient Satisfaction • Increase “Likely to Recommend” HCAPHS scores

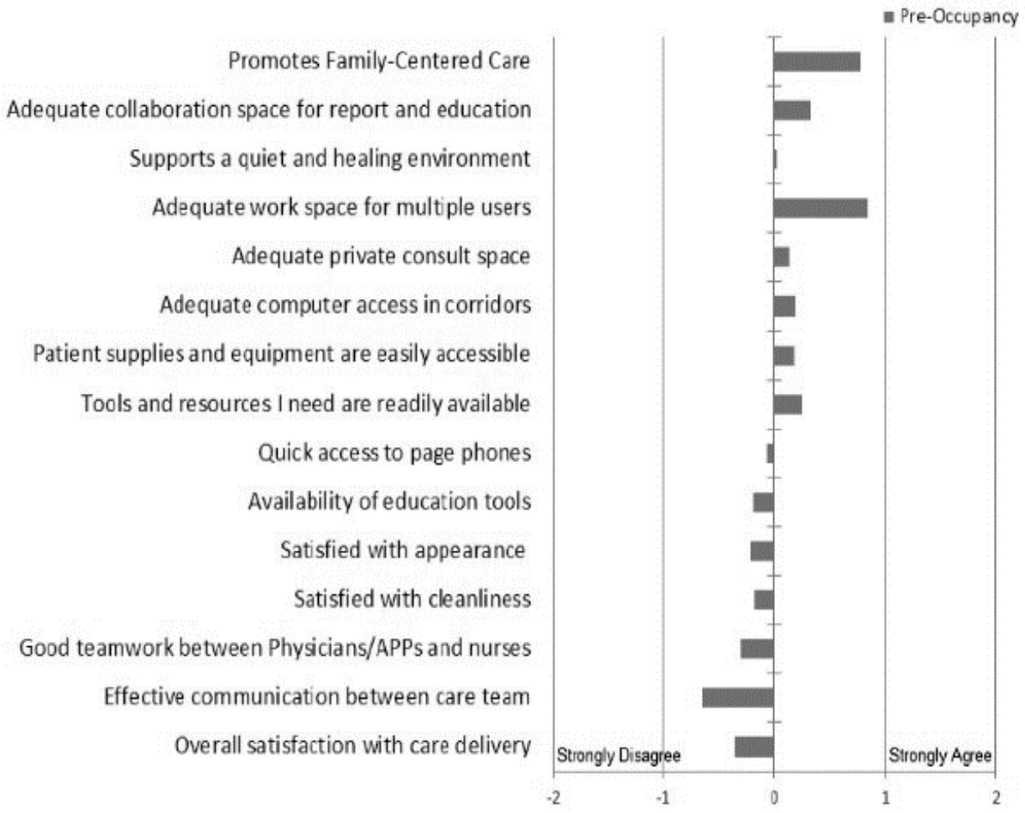
EBD Step 6: Collect Baseline Metrics



Source: Functional Performance Evaluation, HKS, 2014

EBD Step 6: Collect Baseline Metrics

User Satisfaction



Source: HGA – Froedtert Touchstone Award Submission

Image credit: pixabay

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Use Existing Metrics and Tools

- Metrics routinely collected by a facility
- Existing tools (tested for reliability and validity)

Don’t reinvent the wheel!

EBD Step 7: Monitor Implementation of Design and Construction

- Aligned team - the vision keepers
- Engagement/Communication
- Documentation
- Activation, Move, Training

Mock-up Room Simulations & Activation

EBD Step 8: Measure Post Occupancy Results

Evaluating the impact of design is a key part of the EBD process.

Photo credit: Stefan Stefancik

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EBD Step 8: Measure Post Occupancy Results

The objectives are to:

- Provide feedback to design teams
  - Clarify programming issues and fine tune a facility
- Research effects of buildings on their occupants
- Provide information to support future designs and repetitive facilities
- Verify effectiveness of prototypes and innovations
- Justify design decisions and expenditures
- Add to the body of knowledge in the industry

Photo credit: Tim Gouw

Share your findings.

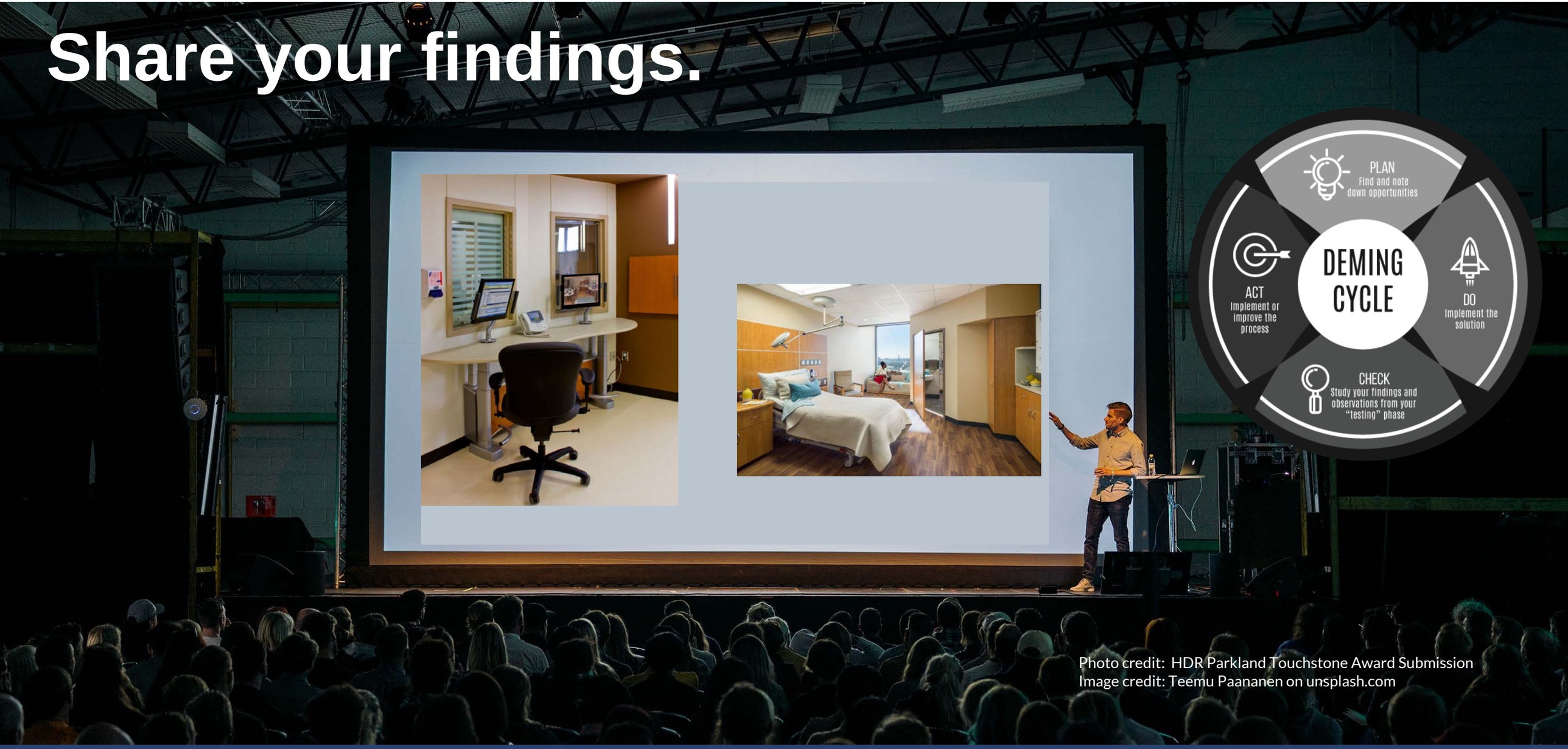
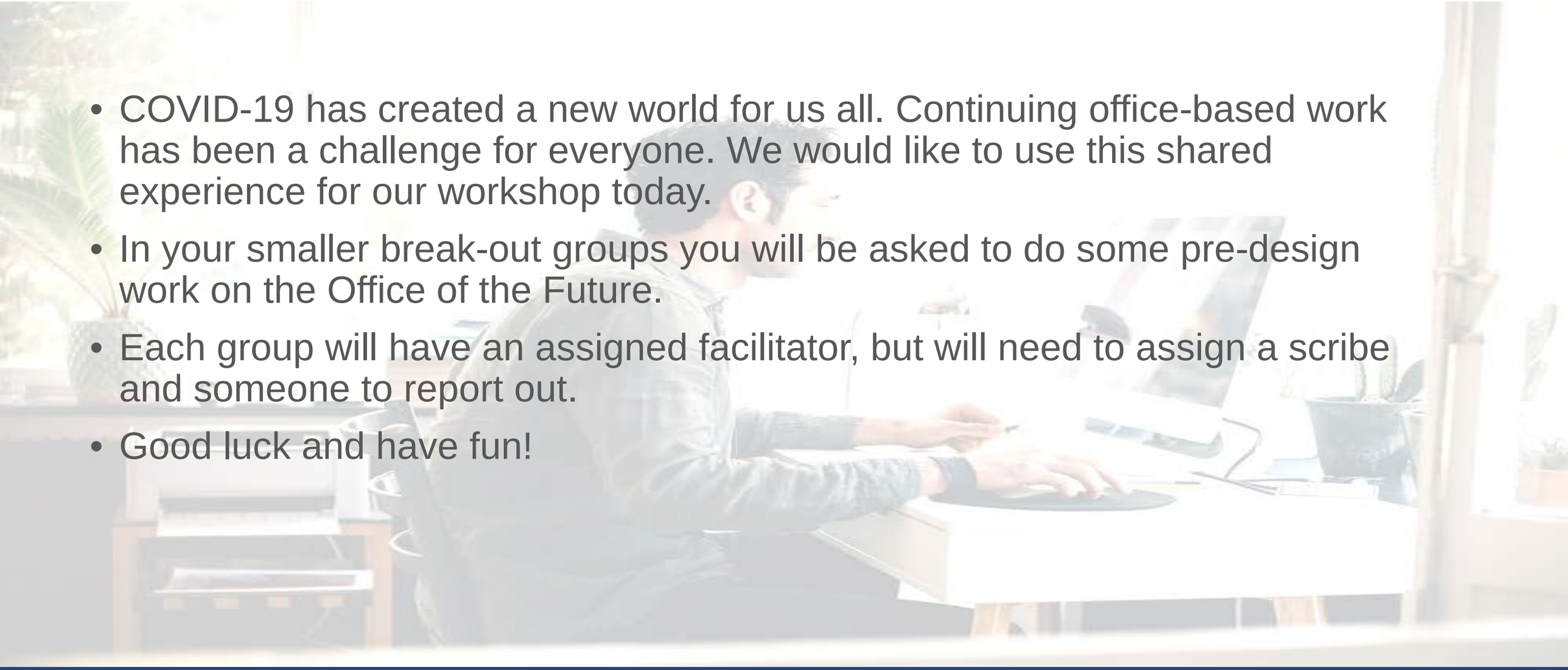


Photo credit: HDR Parkland Touchstone Award Submission
Image credit: Teemu Paananen on unsplash.com

Simulation

Andrea: https://tinyurl.com/LEANEBD1
Donna: https://tinyurl.com/LEANEBD2
Terri: https://tinyurl.com/LEANEBD3

Work from Home Office of the Future



- COVID-19 has created a new world for us all. Continuing office-based work has been a challenge for everyone. We would like to use this shared experience for our workshop today.
- In your smaller break-out groups you will be asked to do some pre-design work on the Office of the Future.
- Each group will have an assigned facilitator, but will need to assign a scribe and someone to report out.
- Good luck and have fun!

Work from Home Office of the Future

1. List 3 Goals for improving our WFH Office.

Goals	Priority Rating

Work from Home Office of the Future

2. How would you search for relevant evidence? What Lean tools would you use?

Goal	Study /Search	Tools

Work from Home Office of the Future

3. For the top Goal, what are the Drivers?

Goal	Drivers

Work from Home Office of the Future

4. For the top Goal, what are possible Design Strategies?

Goal	Top Driver	Design Strategies

Work from Home Office of the Future

5. What outcome would be expected? What is your hypothesis?

(If we do [Design Strategy] this [Predicted Outcome] will happen)

Goal	Top Driver	Design Strategy	Predicted Outcome(s)

Work from Home Office of the Future

6. How might you might measure these outcomes?

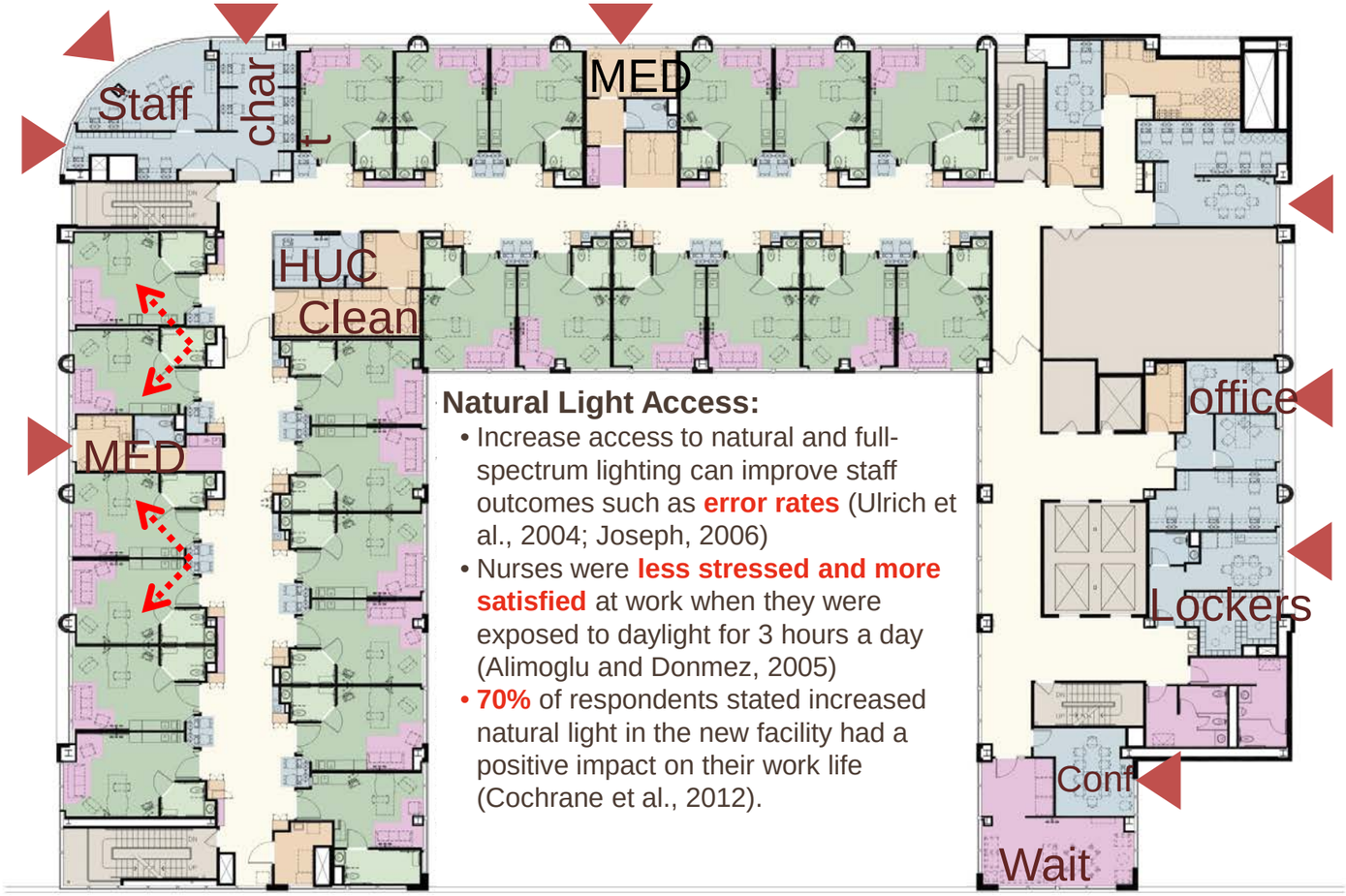
Goal	Top Driver	Design Strategy	Predicted Outcome(s)	Discuss/Define/Determine how you will measure it?

Froedert Hospital, Milwaukee, WI

Final Floor Plan: 24 Bed Unit

Surveillance:

- Significantly reduced patient falls when direct visibility from commonly occupied workstations versus no visibility ($p<0.000$); (Calkins, 2012).



Decentralization

HGA Research (Freihoefer, 2012):

- An 8-hour day shift nurse spends roughly 2.4 hours at charting stations (in this floor plan, that is a 6.66% usability among the 6 charting stations with 3 RNs).
- Nurses only spend roughly **45 minutes of their day hunting and gathering** for supplies and medications.
- Roughly **50%** of nurses' visits to decentralized charting stations involved face-to-face interaction.

Final Floor Plan: 405 SQ FT

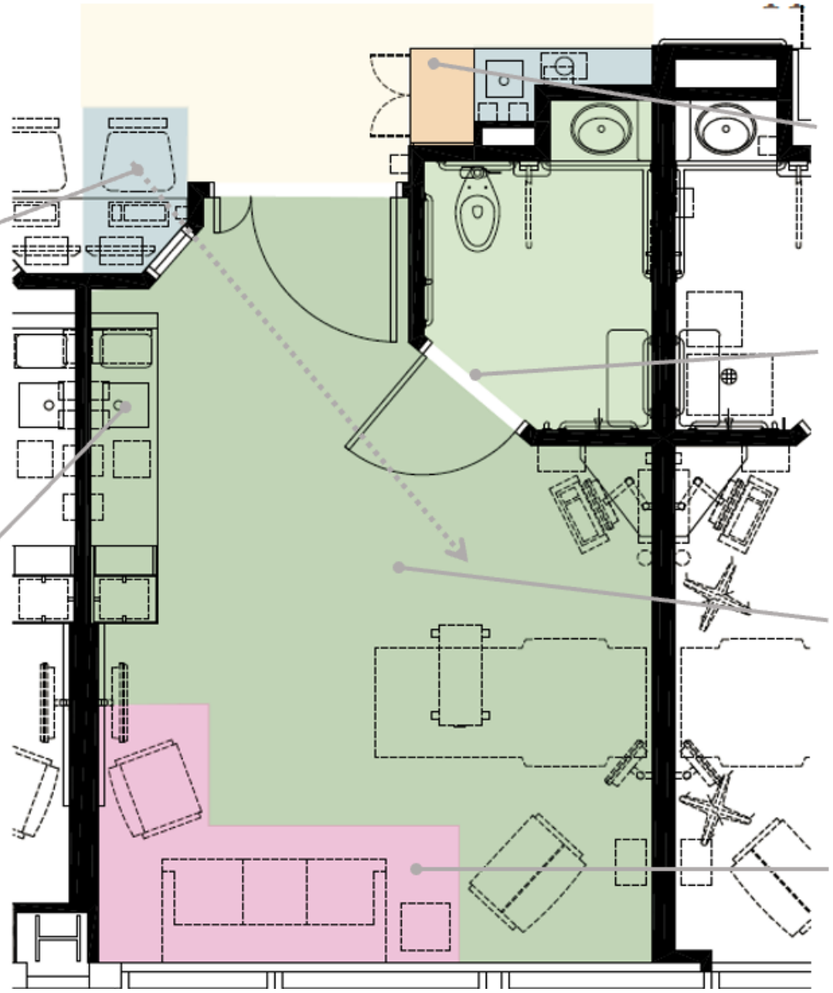
Surveillance:

Rooms with low visibility had a **30% higher mortality rate** for high acuity patients (Lu, Ossman, & Leaf, 2014)

Rooms not visible from work areas had **31% higher fall rate** (Choi, 2012)

Hand Hygiene:

Placing the sink upon entry encourages immediate hand washing, also positioning it with a line-of-sight to the patient so caregivers can greet patients and patients can observe good hygiene practices (Freihoefer, 2013).



Deployed Supplies:

Deploying supplies has shown to significantly **reduce staff travel by 1 to 1.5 miles a day** and significantly increased time spent in patient room by 6 to 10% (Freihoefer, 2013).

Fall Reduction:

Doors that can remain open and have direct access from the bed, shows nearly **50% reduction in fall** (Calkins, 2012).

Acuity-adaptable Rooms:

Acuity-adaptable rooms and universal room with ample space can reduce the risk of patient and staff injuries and patient dissatisfaction with a **90% reduction in patient transfers**. (Hendrich, Fay, & Sorrells, 2004).

Family Space:

Patient rooms with a designated family space had **nearly half the patient falls** than compared to those without (Calkins, Biddle, & Biesan, 2012).

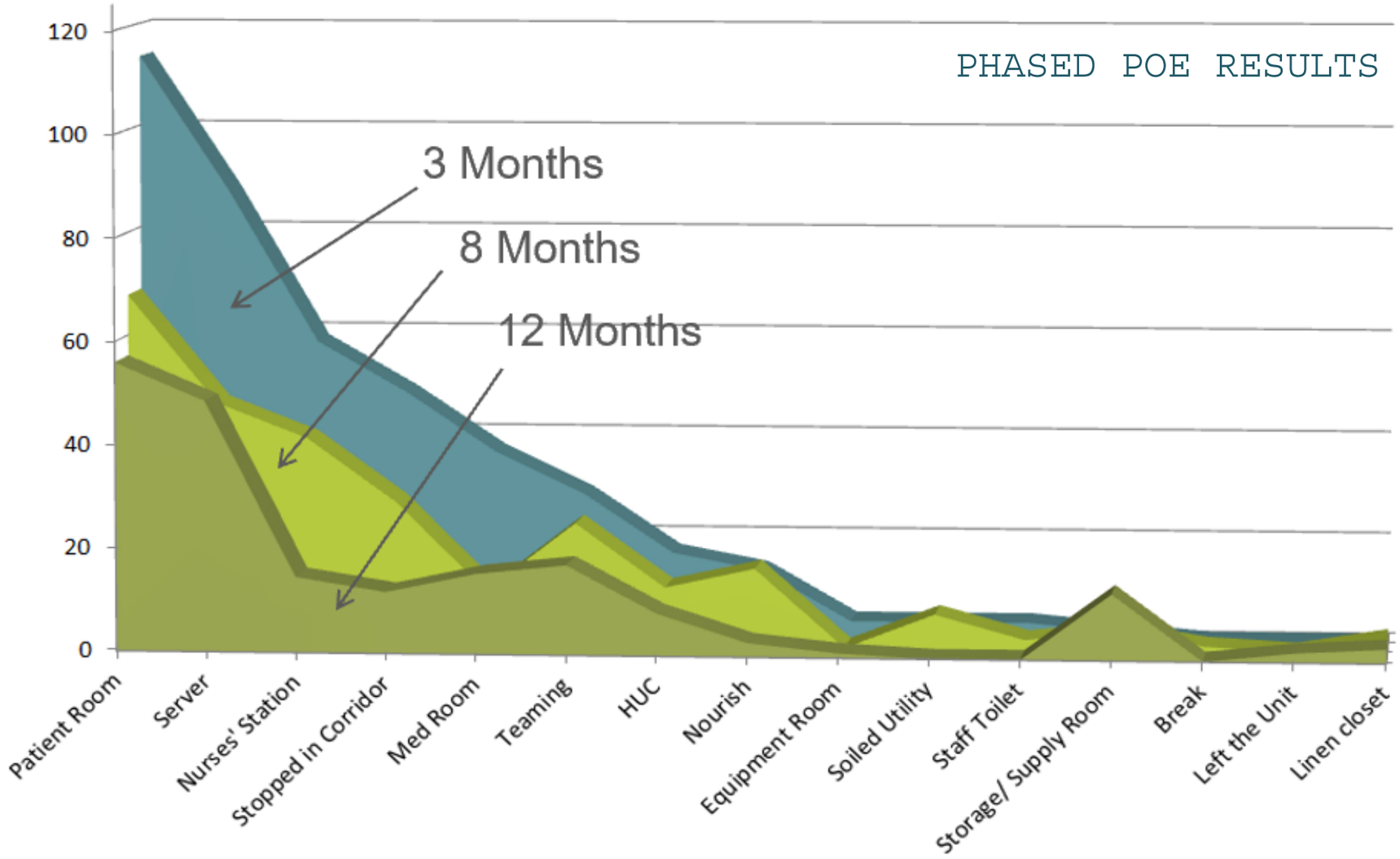
POE Results

Nurses' Time Spent

	Existing Unit Current State	Benchmark Decentralized Studies	Decentralized Prototype Prediction	Post-Occupancy Results
Patient Rooms	39%	45-54%	+5-15%	**45%*** **
Charting Stations	43%	32-39%	-4-8%	39%
Medication & Supply Rooms	5%	1-5%	-0-3%	6%
Support Rooms	1%	2-5%	-0-2%	3%
Traveling	13%	5-8%	-4-8%	**7%*** **

- 36 minutes more time spent in patient room per nurse
- 6-7 dayshift nurses = Roughly 3.5 to 4 hours more time spent in patient rooms

Post Occupancy Evaluation



PATIENT EXPERIENCE

Highest performing out of 24 units

Overall rating of care 81.3% to 89.3%

Willingness to recommend 92.5%

All 10 HCAHPs above the 83rd percentile
(8/10 in 90th percentile)

THE CENTER FOR HEALTH DESIGN®

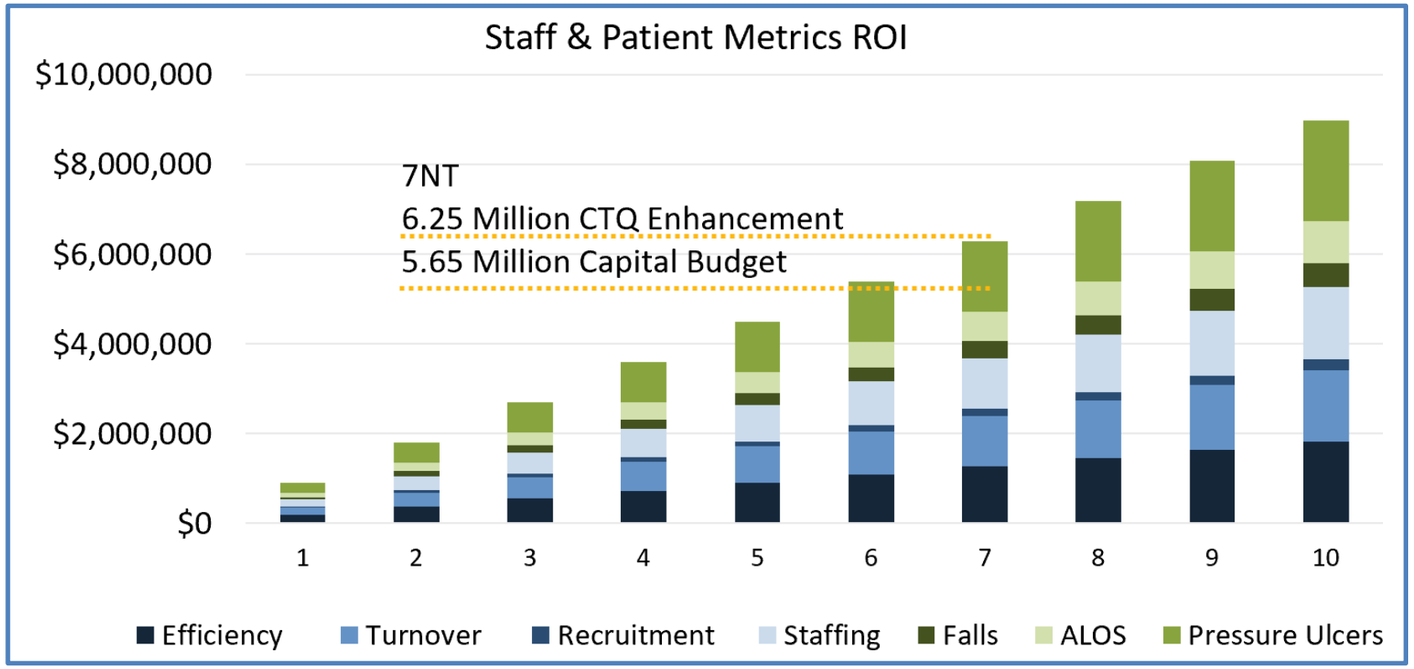
STAFF ENGAGEMENT

Power item score
4.06 to 4.17

Engagement indicator
4.44
(+.22 over all hospital)

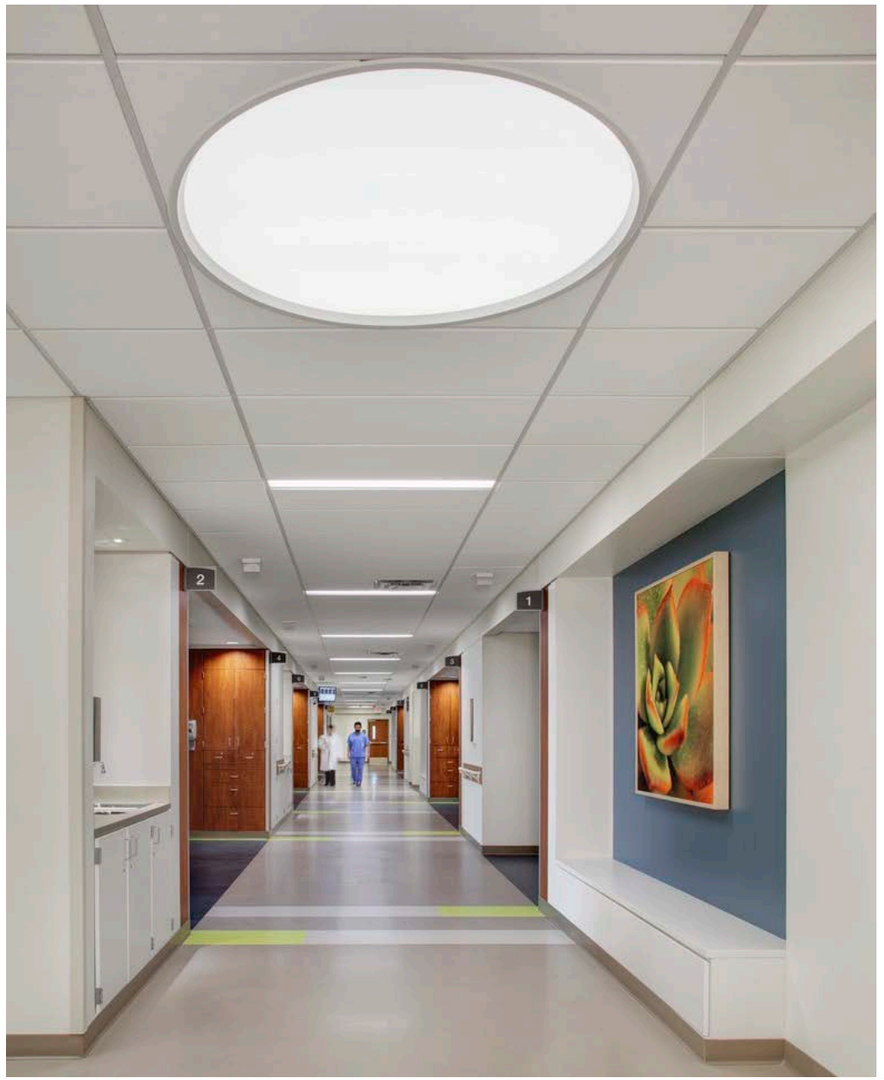
Correlating reduction in turnover and recruitment costs

Business Case: 7 Year ROI



ROI PATIENT METRICS	
Falls	53,667
ALOS	93,765
Pressure Ulcers	224,536
Annual ROI	**$371,968**

ROI STAFF METRICS	
Efficiency	182,097
Turnover	160,025
Recruitment	23,949
Staffing	160,200
Annual ROI	**$526,272**



THE CENTER FOR HEALTH DESIGN®

ROI

PATIENT METRICS

In 2017, there were 5.2 FEWER STAGE 2 AND ABOVE PRESSURE ULCER INCIDENCES with a ROI of

$224,536 yearly

Significantly less ALOS, approximately 30 less patient days yearly with a ROI of $93,765 yearly

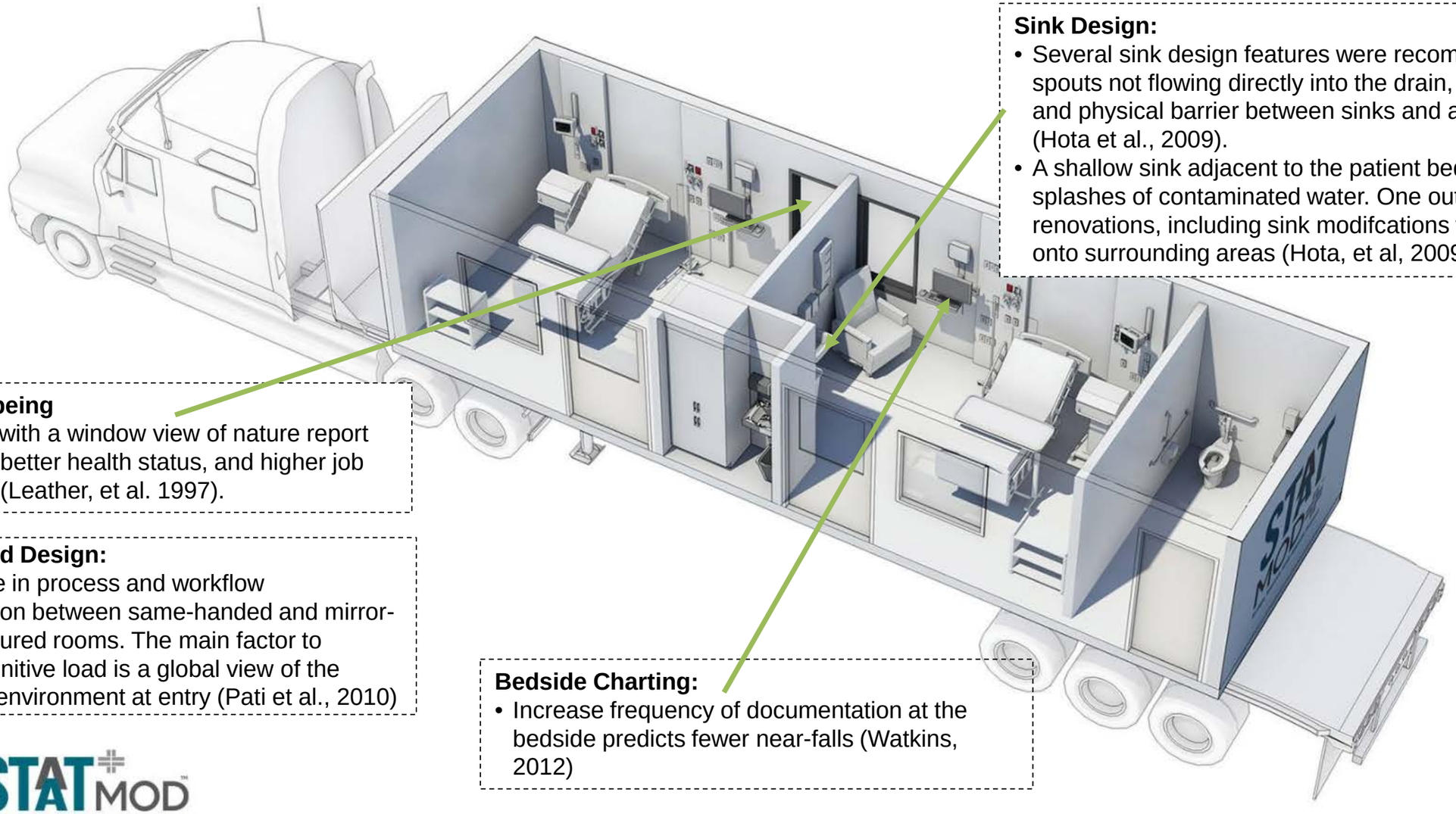
35% reduction

in falls (per 1,000pt/days); 5.75 fewer falls with injuries yearly with a ROI of $53,667 yearly

Significant increase in key HCAHPS items:

- **15%** in Quietness (p<0.000***)
- **7%** in Cleanliness (p<0.000***)
- **7%** in Overall Care (p<0.000***)
- **4.5%** in Likelihood to Recommend (p=0.003**)
- **3.5%** in Communication with Nurses (p=0.024*)

STAAT MOD



Sink Design:
- Several sink design features were recommended by research: faucet spouts not flowing directly into the drain, decreased water pressure, and physical barrier between sinks and adjacent preparatory spaces (Hota et al., 2009).
- A shallow sink adjacent to the patient bed resulted in exposure from splashes of contaminated water. One outbreak was eliminated by renovations, including sink modifcations that prevented splashing onto surrounding areas (Hota, et al, 2009).

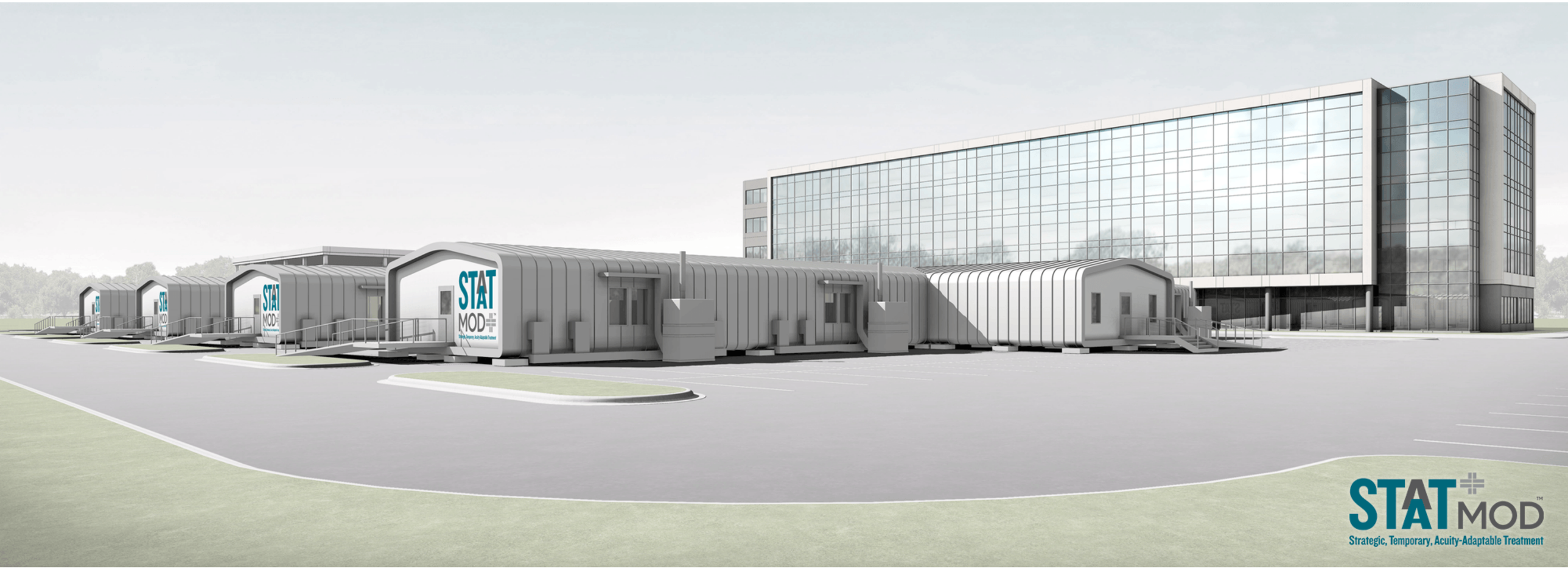
Staff Well-being
Employees with a window view of nature report less stress, better health status, and higher job satisfaction (Leather, et al. 1997).

Standardized Design:
No difference in process and workflow standardization between same-handed and mirror-image configured rooms. The main factor to reducing cognitive load is a global view of the patient care environment at entry (Pati et al., 2010)

Bedside Charting:
- Increase frequency of documentation at the bedside predicts fewer near-falls (Watkins, 2012)

STAT MOD
Strategic, Temporary, Acuity-Adaptable Treatment

STAAT MOD



Lean + EBD Toolkit

Practice Based Research (PBR)	Evidence Based Design (EBD) Steps/Toolkit	Lean Integration Toolkit
Pre-Design Activities	**EBD Step 1:** Define EBD Goals and Objectives	**Plan**
Define CTQs (Customers and Requirements)	Challenges and Trends	Project Alignment - Conditions of Satisfaction
		Community Engagement
Define Outcome Metrics	Use Facility Design to Help Improve Outcomes	
Collect/Identify Baseline Data		Gemba* - Waste Walk
Current State Investigation		Mapping - Value, Process, Experience, Journey
Determine Root Causes		5 Whys
		Fishbone Diagram
Develop Problem Statements and Goals - for Design and Operations		A3s*
Develop Project Plan and Milestones		Last Planner System™ * (LPS)
	EBD Step 2: Find Sources for Relevant Evidence	
Design Insights/Trends Discussion	Focus on Addressing a Design Challenge	
Research Collection	Develop the Question before you Search for Relevant Evidence	
Future State Development		3P Event
Visioning/Imaging - Project Vision		
Design Activities	**EBD Step 3:** Critically Interpret Relevant Evidence	
Secondary Research Collection/Review		
	EBD Step 4: Create and Innovate EBD Concepts	**Do**
Develop Potential Solutions		Target Value Delivery*
		Set Based Design
Mock-Up Development/Testing	Evaluate the Strategies	Paper Dolls
Material Research		Evaluation - Sound Decision Making*
		Choosing by Advantages (CBA)
Discuss Prefabrication Opportunities		Big Room
		Trades engaged early

	EBD Step 5: Develop a Hypothesis	
	Indicate or Predict the Relationship between the Design Strategy and the Outcome	PDCA - A3 with follow-up
	EBD Step 6: Collect Baseline Performance Measures	**Check**
Evaluate-Correct-Re-evaluate Potential Solutions	Reference Existing Metrics	Plus/Delta* - Retrospectives*
Scenario Testing		Rapid Prototyping - VR*
Preparing Staff for Process Changes		
Change Management		Stakeholder Engagement
Construction Activities	**EBD Step 7:** Monitor Implementation of Design and Construction	**Act/Adjust**
Transition Planning		Standardized Work - LPS
Activation Planning		5S - LPS
Education		
Modular Construction		
Occupancy	**EBD Step 8:** Measure Post Occupancy Performance Results	
(Phased) Post Occupancy Evaluation	Compare outcome metrics to pre-design phase	
Continuous Improvement	Provide feedback to Design+Construction Teams	Retrospectives
Sustain the Changes	Clarify Programming Issues and Fine Tune Facility	5S

***This thinking or tool will be used through the life of the Project**

https://tinyurl.com/LEANEBDforum2020

Lean + EBD Integration

Basic Services

- Organizational Goals
- Clinical Outcomes
- Scholarly Evidence
- Project Success Measures

Additional Services

- Customized to the Project
- In Depth Evaluation and Recommendation

Focused Research

- Select topic you want to study

Start small, but start.

22ND LCI CONGRESS
OCTOBER 19-23

In the spirit of continuous improvement, we would like to remind you to complete this session's survey in the Congress app! We look forward to receiving your feedback. Highest rated presenters will be recognized.

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22ND LCI CONGRESS
OCTOBER 19-23

Thank you for attending this presentation.

Enjoy the rest of the 22nd Annual LCI Congress!

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Sustain the Changes	Provide feedback to Owner, Design+Construction Teams	5S
	Clarify Programming Issues and Fine Tune Facility	
	Finalize Research Plan	
	Complete Research Study	
	Share Your Results	

***This thinking or tool will be used through the life of the Project**

Lean and Evidenced-Based Design: Where to Begin

8 Steps of the EBD Process