EVIDENCE-BASED DESIGN RESEARCH: Connecting the Dots Between Healthcare Design and Wellness
Francesqca Jimenez, MS
Renae Rich, MS EDAC

We are research experts with a passion for design and a focus on people. All certified in the ethics of human subjects research.

Ask Questions
Seek Knowledge
Change Thinking
Innovate Design

RESEARCH TEAM

Research and EBD

Research connects the dots between healthcare design strategies and patient & staff wellness outcomes.

RESEARCH
Systematic, Scientific Endeavor to Understand, Document, and Predict Relations Between Things and Create Generalizable Knowledge

Systematic?
Repeateable
Scientific?
Unbiased
BIAS IN RESEARCH

A systematic error that results in an incorrect or invalid estimate of a measure of association

- Little can be done to fix or remove bias once it has occurred
- Minimize bias by careful design and execution of studies and analyses

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

EVIDENCE-BASED DECISION MAKING

In Medicine
The conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients…

In Health Care Design
A process for the conscientious, explicit, and judicious use of current best evidence from research and practice in making critical decisions, together with an informed client, about the design of each individual and unique project.

EVIDENCE-BASED DESIGN STEPS

1. Define EBD Goals & Objectives
2. Find Sources for Relevant Evidence
3. Critically Interpret Relevant Evidence
4. Create & Innovate EBD Concepts
5. Develop a Hypothesis
6. Collect Baseline Performance Measures
7. Monitor Implementation of Design & Construction
8. Measure Post Occupancy Performance Results

CONNECTING DESIGN AND OUTCOMES

Drawing insight from the literature about multiple causes of health… the production of health simply cannot be understood by focusing only on isolated causes and efforts to intervene on those isolated causes will inevitably fail short.

MOVING TO OUTCOMES-DRIVEN DESIGN

DESIGN INTERVENTION

OCCUPANT EXPERIENCE

(HUMAN) OUTCOMES

Need Valid and Consistent Measures in Each Category to Identify Generalizable Relationships
LEARNING FROM BIOMEDICAL AND PUBLIC HEALTH RESEARCH

5 Typical Phases of Development

1. Exploratory and Descriptive
   Establishes intervention and outcome variables.

2. Pilot Research
   Small-scale study in which the intervention is tested to determine feasibility and effect size for a larger future study.

3. Efficacy Studies
   Intervention takes place in an ideal setting, with focus on internal validity and cost-effectiveness of the intervention.

4. Clinical Trials
   Analysis of intervention effect is conducted in practice, with focus on external validity, clinical- and cost-effectiveness.

5. Population Studies
   Wide-scale implementation of the intervention to determine effects on public health.

STRATEGIES TOWARD STRONGER EVIDENCE

1. Become savvy research consumers
2. “Think like an epidemiologist” in planning and designing built environment intervention research
3. Engage needed expertise, including designers
4. Pursue phased development of research, building upon prior work
5. Be transparent about methods, and share results

RESEARCH PROJECTS

Systematic Review

- Associations of patient and staff outcomes with inpatient unit designs incorporating decentralized caregiver workstations
- Many definitions of “decentralized” in the literature

INPATIENT ENVIRONMENT

Fremont Health and Great Plains Health

STAFF
Mixed methods approach, post only
- Impacts of decentralized unit design and organizational factors in the transition
- Validated occupant experience and outcome measures

PATIENTS
Pre/post quantitative comparison, controlling for acuity, demographics, and nurse/patient ratios
- LOS

Presentations and Awards to Date
- NIHD Lady with the Lamp Research Grant 2017
- Health Facilities Symposium 2018

INPATIENT ENVIRONMENT

Parkland Hospital

STAFF
Mixed methods study
- Impacts of decentralized unit design and organizational factors in the transition
- Validated occupant experience and outcome measures

PATIENTS
Quantitative comparison of acute inpatient outcomes in the old and new facilities, controlling for acuity, demographics, and nurse/patient ratios
- LOS
- Adverse events

Presentations to Date
- EDRA 2016
- HFD Conference Invited Deep Dive 2017
- EDRA 2018 Symposium on Patient Data
**INPATIENT ENVIRONMENT**
University of Pennsylvania Health System

**Patients**
- Pre/post comparison
- Satisfaction with care and noise (inferences analysis of individual level HCAMPS)
- Modeled thermal comfort

**Staff**
- Pre/post comparison
- Teamwork and inter-professional collaboration (focus on peri-op)
- Experience of the environment
- Health-related impacts

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**MULTI-SITE CLINIC EVALUATIONS**

**Lurie Children’s**

**Measurement Areas**
- HCAMPS: Environment Denotes and rates important measures that were assessed in this facility evaluation as an annual event

**Work Space Measures**
- Thermal comfort
- Acoustics
- Air quality
- Technology

**Multi-Occupational Measures**
- Communication
- Collaboration of Patient Care

Comparative evaluation across Lurie Children’s system to identify low performing facilities

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**MULTI-SITE CLINIC EVALUATIONS**

**Sutter Health**

**Initial Input/Benchmarking**
- Facility Design
- Data Collection (pre, post)

**Presentations to Date**
- HCD 2017
- NBE 2018
- EDRA CORE Award 2018

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**MULTI-SITE CLINIC ENVIRONMENT**

**Advocate Medical Group**

**Comparative Study of Clinic Module Types:**
- On-Stage Off-Stage vs. Back-Stage Front-Stage

**Staff**
- Teamwork and inter-professional collaboration
- Perceived efficiency
- Experience of the environment

**Patients**
- Experience of the clinic environment

**Secondary Data**
- Objective measures (e.g., patient wait time, adverse event frequency)

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**REHABILITATION ENVIRONMENT**

**Virginia Center for Behavioral Rehabilitation (VCBR)**

**Formerly Incarcerated Residents**
- Quantitative approach to document impacts of architectural interventions on
  - Aggression Incidents
  - Conditional release failures

**Staff**
- Pre/post comparison of satisfaction with environment, absenteeism, turnover

**Presentations & Awards to Date**
- HCD Conference 2016
- CBH Behavioral Health Workshop 2017
- EBD Touchstone Award 2017
- EDRA CORE Award 2018

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**ACADEMIC MEDICAL CENTER**

**University of Utah Medical Center**

**Biomedical Researchers**
- Social network and spatial analysis of scientific productivity
  - Department-level biomedical research collaborations (publications, funded grants, grant proposals not yet funded)
  - Negative association between distance walking time and collaborative outcomes

**Presentations**
- UNL Supply Chain Management & Analytics Seminar 2018
**HIGHER EDUCATION**

University of Nebraska-Lincoln and Bellevue University

Comparative evaluation of higher education science teaching facilities, post only

**STUDENTS**
- Experiential and learning outcomes
  - Experience of the physical and psychosocial environment
  - Engagement
  - Inspiration

**INSTRUCTORS**
- Impacts on teaching and curricula

**SPECIAL EDUCATION**

Spero Academy

**SPECIAL NEEDS STUDENTS**
- Learning outcomes (interrupted time series analysis)

**STAFF**
- Teamwork and inter-professional collaboration
- Experience of the environment

**WORKPLACE ENVIRONMENT**

HDR HQ and Other Offices

- Employee experience and health-related outcomes related to the workplace environment in architecture and engineering offices that are moving or renovating (pre and post for those with planned moves)
- Spatial analysis underway
- Rigorous approach to generate quality foundational content
- Possible design and objectively-measured sedentary behavior and physical activity study (pending funding)

**Q/A**