



The Hospital OF THE FUTURE & Healing Environments

A stack of smooth, dark stones balanced on a reflective surface, with a small yellow flower on top. The stones are stacked in a pyramid shape, and the flower is perched on the top stone. The entire scene is reflected in the surface below.

Ernesto Morales, Arch., Ph.D.
Research Centre for Innovation in Health Care
University of Applied Sciences, Utrecht, The Netherlands

Introduction:

- In the early 90's Roger Ulrich demonstrated the health outcomes in a hospital room from having a window with a view of forest compared to a view to a brick wall.



- Evidence-Based Design (EBD) and Healing environments have received a significant academic attention since then.



- EBD is the deliberate attempt to base health care building design decision on best available evidence.



Healing Environment

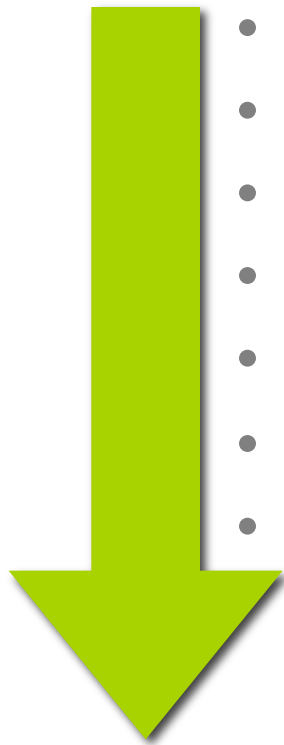
- A healing environment is a place where the interaction between the person (patient and the staff) within the physical environment produces positive health outcomes.
- Most of the research developed in healing environments encompasses three main themes: Patient –centered care, ambient environment and special populations (Devlin & Arneill, 2003).



Introduction:

- According to several authors Healing environments in healthcare facilities:

Reduces:



- Errors
- Infections
- Stress
- Falls
- Pain
- Drugs
- Fatigue

Improves:



- Sleep
- Effectiveness
- Safety
- Savings & Revenues
- Healthcare quality



Healing Environment

- A significant part of the literature regarding patients outcomes are more empirical-based than evidence-based or scientifically proven.



- Lack of the hard-science-oriented research in the Architectural domain
- Medicine has overlooked the role of the physical environment in patient well being
- The difficulty of the research process in health care settings.



Healing Environment

- Despite the fact that EBD seem to narrow possibilities and provide a more or less clear direction of where the design of a healthcare facility should follow, there is still plenty of room for interpretation.
- It is in the prioritization of the facts where there seem to be a lack of clarity in the translation into EBD solutions most of all because this process is influenced by several factors.
- Lack of a theoretical model that would take into consideration other key-actors besides the patient.



Theoretical Model

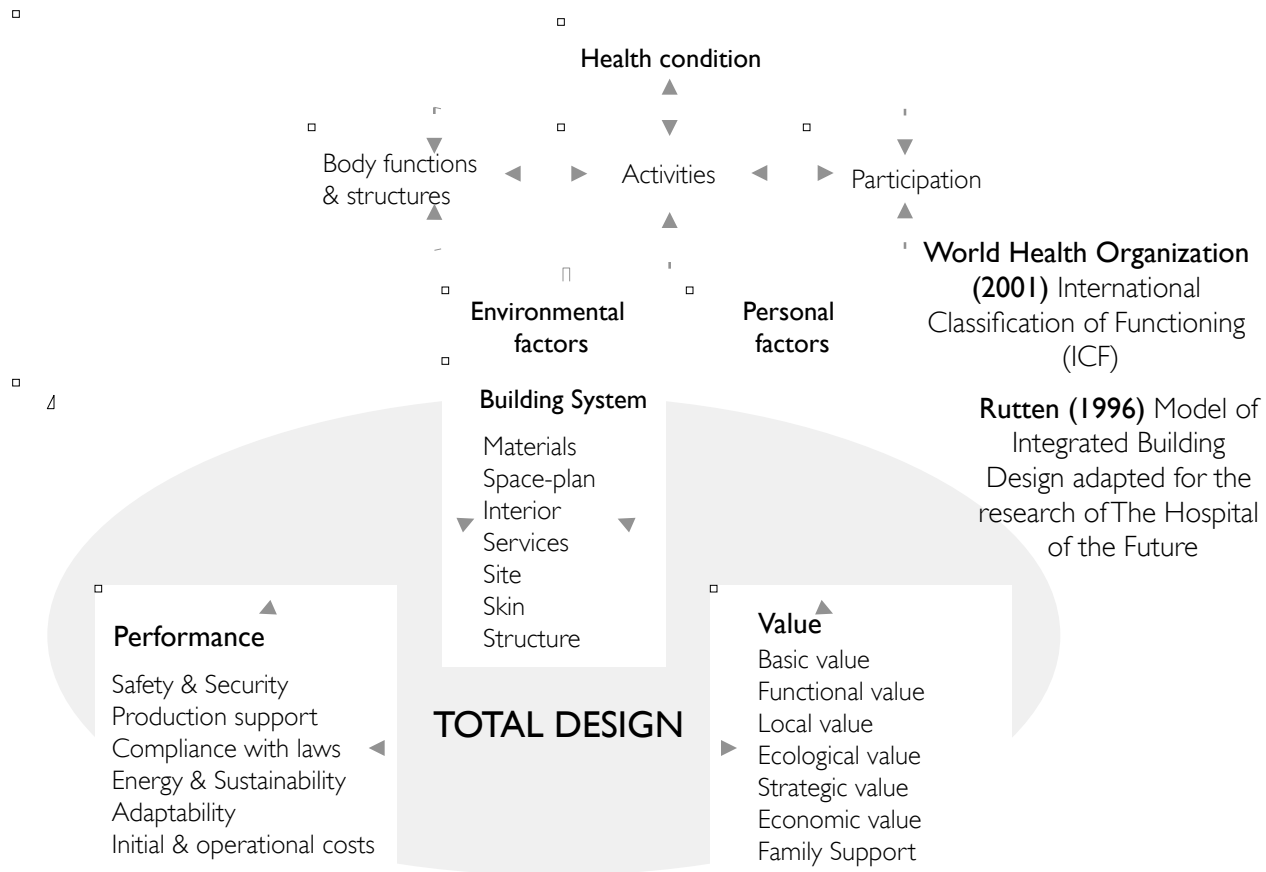


Figure I. IFC/MIBD Model adapted to the research on healing environments



Theoretical Model

Value

Is the importance and usefulness given to the hospital by the different actors (stakeholders) to respond to their needs.

Performance

Is the capability of the building system to accomplish the values given to the hospital.

Building System

Is the group of components that forms and shapes the hospital itself.



Main objectives of HEZO:

To build the hospital of the future. This implies the definition and construction of a set-up, construction systems, the institution, the services, maintenance and the care processes.

- What is the “Healing Environment-concept” and which meaning has for the hospital of the future?
- Which are the main points for the construction set-up of the hospital of the future?
- Which institution, services and care processes belong to the hospital of the future?



Waiting room

Bathroom

Control

Flexibility

Orientation

Nature

Way-finding

Color

Single - bedrooms

Healing Environment

Privacy

Safety & Security

Furniture

Fall prevention/falls in hospitals

Lighting

Noise reduction

Cleanliness

Comfort

Reduces stressors

Reduce Costs

Healing Environment

Methodology

• An extensive literature review of the “Healing Environment-concept” in order to define the implications on a healthcare facility



• Following the “Cochrane Methodology”, we used several databases such as PubMed, JSTOR, Medline, Lucas, among others

Healing Environment

Safety and Security

Single-bedrooms

reduce stressors

Lighting

Noise reduction

Cleanliness

Environmental Factors

Building System

Performance

Value

Search by Authors:

Joost van Hoof

John Zeisel

Stephen Verderber

Roger Ulrich

AnnSloan Devlin

Allison B. Arneill

Ricardo Codinhoto



Methodology

From the literature review we were able to define:

- Healing environment concept
- Its implication on a healthcare facility
- Some of the needs of patients
- Some of the needs of family members
- Some of the needs of nurses

Semi-direct interviews with:

- Chief of nurses (Meander Medisch Centrum Hospital)
- Nurses



What do we know

Value

- Basic value
- Functional value
- Economic value
- Ecological value
- Strategic value
- Local value

Performance

- Safety & Security
- Production support
- Compliance with laws
- Energy & Sustainability
- Adaptability
- Initial & operational costs

Building System

- Materials
- Space-plan
- Interior
- Services
- Site
- Skin
- Structure

What we know

Value

- Basic value
- Functional value
- Economic value
- Ecological value
- Strategic value
- Local value

- No errors
- Safety & security
- Control
- Privacy
- Comfort
- Warmth
- Family support

Performance

- Safety & Security
- Production support
- Compliance with laws
- Energy & Sustainability

Building System

- Materials
- Space-plan
- Interior
- Services
- Site
- Skin

Mirror vs. identical rooms

Ulrich (1991), Barnhart, Perkins & Fitzsimonds (1998)

Lighting, distractions and interruptions

Booker & Roseman (1995), Buchanan, Baker, Gibson, Jiang & Pearson (1991); Flynn et al. (1999)

What we know

Value

- Basic value
- Functional value
- Economic value
- Ecological value
- Strategic value
- Local value

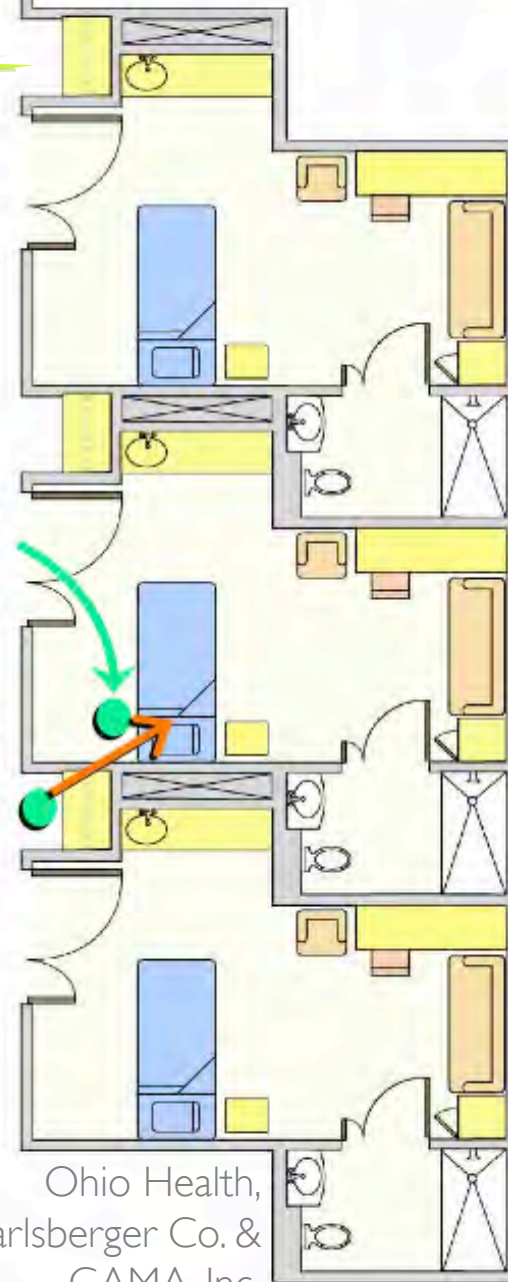
- No errors
- Safety & security
- Control
- Privacy
- Comfort
- Warmth
- Family support

Pe

- Safe
- Pro
- Co
- laws
- Ene
- Susta
- Ad
- Initi
- costs

Mirror vs. identical rooms
Ulrich (1991), Barnhart, Perkins & Fitzsimonds (1998)

Ulrich (2005), HeFMA Conference



Ohio Health, Karlsberger Co. & CAMA, Inc.

What we know

Value

- Basic value
- Functional value
- Economic value
- Ecological value
- Strategic value
- Local value

- No errors
- Safety & security
- Control
- Privacy
- Comfort
- Warmth
- Family support

Performance

- Safety & Security
- Production support
- Compliance with laws
- Energy & Sustainability

Falls in the hospital room

Wong, Glennie, Muise, Lambie & Meagher (1981); Morgan, Mathison, Rice & Clemmer (1985); Alcee (2000)

Building System

- Materials
- Space-plan
- Interior
- Services
- Site
- Skin



What we know

Value

- Basic value
- Functional value
- Economic value
- Ecological value
- Strategic value
- Local value

- No errors
- Safety & security
- Control
- Privacy
- Comfort
- Warmth
- Family support

Performance

- Safety & Security
- Production support
- Compliance with

Building System

- Materials
- Space-plan
- Interior



What we know

Value

- Basic value
- Functional value
- Economic value
- Ecological value
- Strategic value
- Local value

- No errors
- Safety & security
- Control
- Privacy
- Comfort
- Warmth
- Family support

Performance

- Safety & Security
- Production support
- Compliance with laws
- Energy & Sustainability

Lack of control

Birdsong & Leibrock (1990); Ulrich (1991 & 1992)

Building System

- Materials
- Space-plan
- Interior
- Services
- Site
- Skin



What we know

Value

- Basic value
- Functional value
- Economic value
- Ecological value
- Strategic value
- Local value

- No errors
- Safety & security
- Control
- Privacy
- Comfort
- Warmth
- Family support



Lack of privacy

Firestone, Lichtman & Evans (1980)

Hutton (2002)

“When you arrive to a hospital you leave your modesty hanging on the main entrance”



What we know

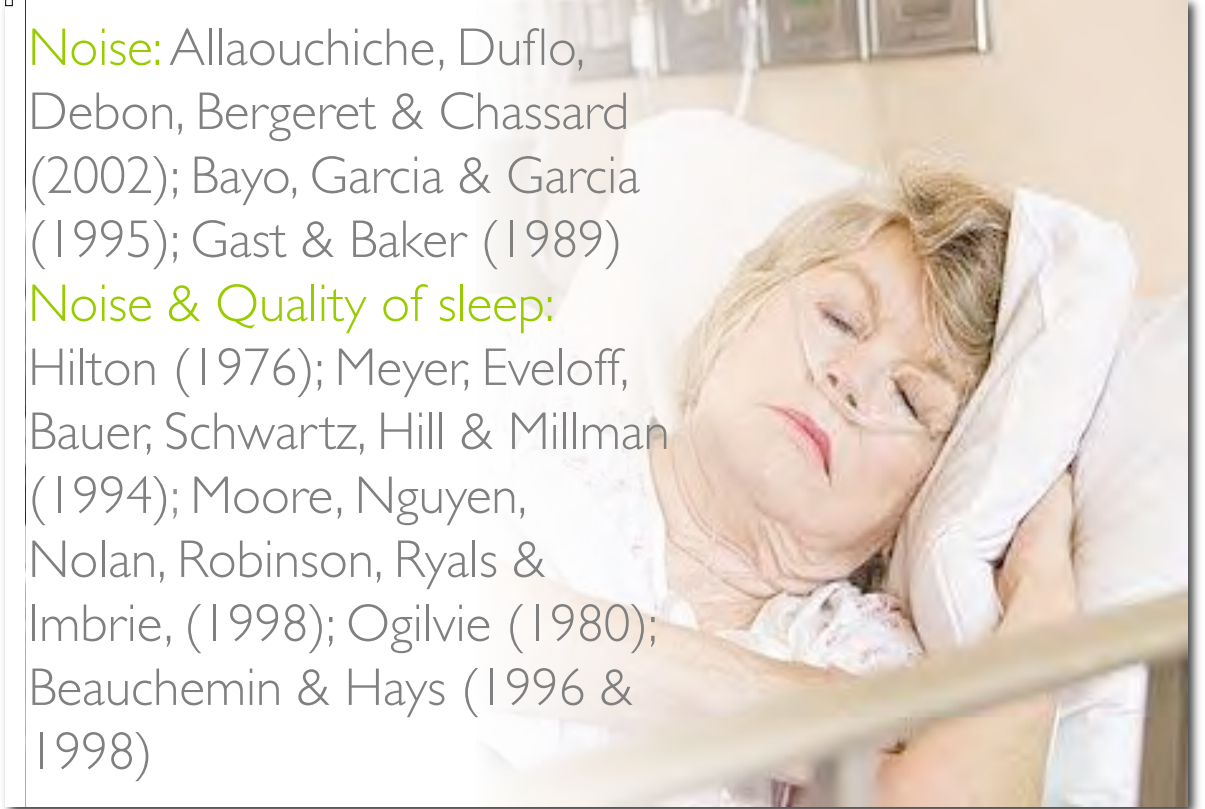
- Basic value
- Functional value
- Economic value
- Ecological value
- Strategic value
- Local value

- No errors
- Safety & security
- Control
- Privacy
- Comfort
- Warmth
- Family support

- Safety & Security
- Production support
- Compliance with

Noise: Allaouchiche, Duflo, Debon, Bergeret & Chassard (2002); Bayo, Garcia & Garcia (1995); Gast & Baker (1989)

Noise & Quality of sleep: Hilton (1976); Meyer, Eveloff, Bauer, Schwartz, Hill & Millman (1994); Moore, Nguyen, Nolan, Robinson, Ryals & Imbrie, (1998); Ogilvie (1980); Beauchemin & Hays (1996 & 1998)



What we know

Value

- Basic value
- Functional value
- Economic value
- Ecological value
- Strategic value
- Local value

- No errors
- Safety & security
- Control
- Privacy
- Comfort
- Warmth
- Family support

Performance

- Safety & Security
- Production
- Compliance

Warmth Nesmith (1995)

Cheek, Maxwell, &
Weisman, R. (1971)

Orientation & View

Beauchemin & Hays
(1996 & 1998)

Furniture Noskin,
Bednarz, Suriano, Reiner
& Peterson (2000);

Curtains: Palmer (1999);

Beds: Petzall & Petzall

(2003) + **Light & temp.**



What we know

Value

- Basic value
- Functional value
- Economic value
- Ecological value
- Strategic value
- Local value

- No errors
- Safety & security
- Control
- Privacy
- Comfort
- Warmth
- Family support

Performance

- Safety & Security
- Production support
- Compliance with laws
- Energy &

Visiting hours Hamrick & Reilly (1992) Pettinger & Nettleman (1991)

Role of visitors Astedt-Kurki, Paunonen & Lehti (1997)

Effect of visitors Bay, Kupferschmidt, Opperwall & Speer; 1988

Building System

- Materials
- Space-plan
- Interior
- Services
- Site



What we know

Value

- Basic value
- Functional value
- Economic value
- Ecological value
- Strategic value
- Local value

- Organization
- Functionality
- Technical aids
- Good lighting
- Comfort

Performance

- Safety & Security
- Production support
- Compliance with laws
- Energy & Sustainability

Way-finding

Brown, Wright & Brown (1997);
Moesser (1988);
Carpman, Grant & Simmons (1983-84);
Levine, Marchon & Hanley (1984)



What we know

Value

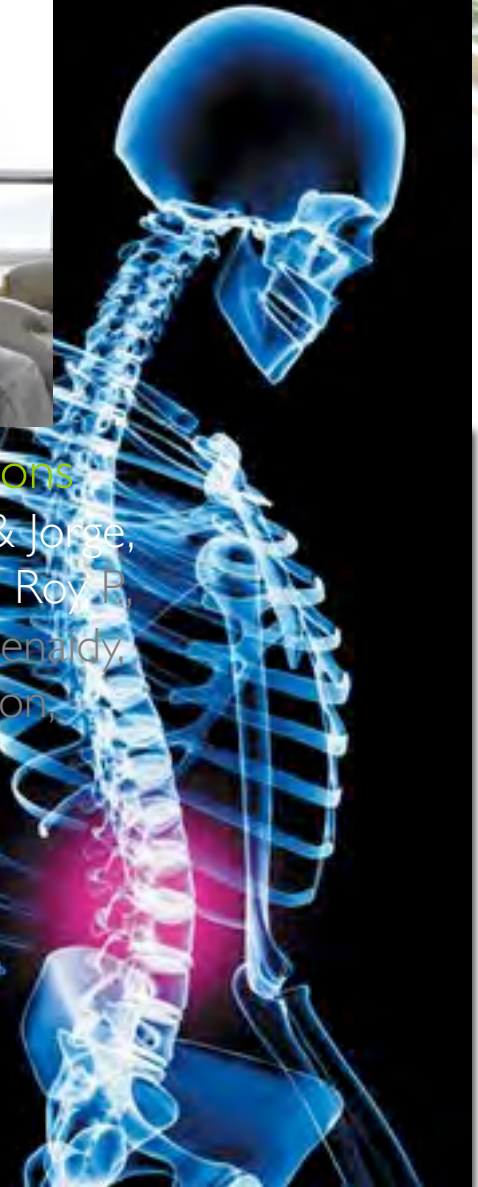
- Basic value
- Functional value
- Economic value
- Ecological value
- Strategic value
- Local value

- Organization
- Functionality
- Technical aids
- Good lighting
- Comfort



Back pain & ergonomic interventions

Alexandre, de Moraes, Corrêa Filho & Jorge, (2001) Caboor, Verlinden, Zinzen, Van Roy B, van Riel & Clarys, (2000) Daraiseh, Genaidy, Karwowski, Davis, Lambough & Huston, (2003) Garg & ... (1992)



What we know

Value

- Basic value
- Functional value
- Economic value
- Ecological value
- Strategic value
- Local value

- Organization
- Functionality
- Technical aids
- Good lighting
- Comfort

Performance

- Safety & Security
- Production support
- Compliance with laws
- Energy & Sustainability

Seasonal light/relevance of light

Booker, Roseman (1995); Buchanan, Barker, Gibson, Jiang & Pearson (1991); Richards & Bairnsfather, (1988); Girardin, (1992) Czeisler, Allan, Strogats, Ronda, Sanchez, Rios et al. (1986); Eastman, Young, Fogg, Liu & Meaden (1998)

Building System

- Materials
- Space-plan
- Interior
- Services
- Site
- Skin



What we know

Value

- Basic value
- Functional value
- Economic value
- Ecological value
- Strategic value
- Local value

- Organization
- Functionality
- Technical aids
- Good lighting
- Comfort

Performance

- Safety & Security
- Production support
- Compliance with laws
- Energy & Sustainability

Comfort

...

Building System

- Materials
- Space-plan
- Interior
- Services
- Site
- Skin

End result

A document:

- The theoretical foundations for the HEZO project.
- The literature review required for the publication of articles throughout the development of the HEZO project.



Thank you

University of Applied Sciences, Utrecht, Netherlands

Helianthe Kort

Centre de recherche de l'Institut universitaire de
gériatrie de Montréal

Jacqueline Rousseau, Sylvie Belleville



