introduction

• what is ebd
• what is edac
• why is it important
• how can you use it
• examples
• questions
what is ebd?

“process of basing \textit{decisions} about the built environment on \textit{credible} research to achieve the best possible \textit{outcomes}”

Center for Health Design
EBD is:

- Patients
- Staff experience
- Operational costs
‘informed design decisions’

conventional design:

• analysis, past experience, precedent
• educated assumptions, subjective

vs.

evidence based design:

• based on credible research
• based on empirical evidence
• takes the guesswork out of decisions
‘credible research’

empirical evidence
measurable & quantifiable results

• scientific rigor
• formal protocols
• peer reviewed
• credible sources
• ethical
‘credible research’

- relevance
- validity
- reliability
- confounding variables
best possible outcomes

3 objectives:

- to improve patient safety
- to improve patient outcomes
- to improve staff outcomes

using environmental measures
best possible outcomes

• improve patient safety through environmental measures
  o reduce hospital acquired infections
  o reduce medical errors
best possible outcomes

- improve patient outcomes
  - reduce pain
  - improve patients’ sleep
  - reduce patient stress
  - reduce depression
  - reduce spatial disorientation
  - improve patient privacy/confidentiality
  - foster social support
best possible outcomes

• improve staff outcomes
  o decrease staff stress
  o increase staff effectiveness
  o increase staff recruitment
  o increase staff retention
<table>
<thead>
<tr>
<th>Design Innovations</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well-located and highly visible hand hygiene stations*</td>
<td>Reduce patient falls</td>
</tr>
<tr>
<td>Water feature in lobby</td>
<td>Reduce medical errors</td>
</tr>
<tr>
<td>Operable windows in patient rooms*</td>
<td>Reduce hospital-acquired infections</td>
</tr>
<tr>
<td>Like-handed rooms*</td>
<td>Reduce patient/visitor stress</td>
</tr>
<tr>
<td>Large windows (natural light in most spaces)*</td>
<td>Reduce nurse stress</td>
</tr>
<tr>
<td>Lighting (artificial)**</td>
<td>Reduce physician stress</td>
</tr>
<tr>
<td>Large private rooms with family space**</td>
<td>Reduce length of stay</td>
</tr>
<tr>
<td>Large doors in patient rooms/bathrooms*</td>
<td>Reduce drug usage</td>
</tr>
<tr>
<td>Internal courtyards**</td>
<td>Improve communication</td>
</tr>
<tr>
<td>Decentralized/shared care giver workstations*</td>
<td>Reduce patient/intrahospital transfers</td>
</tr>
<tr>
<td>Bathroom (in patient room) on headwall with handrail*</td>
<td>Improve patient/visitor satisfaction</td>
</tr>
<tr>
<td>Artwork (nature photographs) in patient rooms*</td>
<td>Improve nurse satisfaction</td>
</tr>
<tr>
<td>Acuity-adaptable rooms*</td>
<td>Improve physician satisfaction</td>
</tr>
<tr>
<td>Accessible roof gardens**</td>
<td></td>
</tr>
</tbody>
</table>

*Indicates features that are aligned with the outcomes.
ebd design process

• draws upon existing research

• conducts new research

• share/publish research
ebd process
ebd partners

- CEO and Board
- Researchers
- Community Partners
- Vendors
- Staff
- Patients and Families

architects?

designers?

contractors?
what is edac?

• an internationally recognized program that awards credentials to individuals who demonstrate an understanding of how to apply an evidence-based process (EBD) to the design and construction of healthcare settings
edac advocate firms

• 25 ‘advocate firms in North America’

• 25% of healthcare team is edac accredited

• Parkin is an advocate firm
conceptual model for ebd

Level 1
analyzing literature in order to follow the related environmental research
reading the meaning of evidence in relationships to the project

Level 2
projecting outcomes of design decisions based on research
measuring results through analysis of implications, construction of a logic chain from decision and future outcome, to reduce arbitrary decisions

Level 3
reporting the results publicly, writing or speaking about results, subjecting methods and results to others who may/not agree

Level 4
publishing the findings in reviewed journals
collaborating with academic or social scientists
improve patient outcomes

• reduce environmental stressors
• provide positive distractions
• enable social support
• give a sense of control
reduce environmental stress

- noise
- distance
- wayfinding
reduce environmental stress

- noise
  - loud disturbances
  - background noise
reduce environmental stress

noise reduction

• sound-absorbing ceiling tiles
• elimination of overhead paging systems;
• create “on-stage/off-stage” areas

Study to determine ways to reduce noise.
  o improvement in the quality of patient’s sleep from 4.9 to 7.3 (scale 1 to 10)
  o nurses went home from their shift feeling less stressed.

Saint Alphonsus Regional Medical Center in Boise, Idaho  CHD
reduce environmental stress

noise reduction

• impact on infection control
  surface materials potentially compromise infection control
  The sound sleep study, CHD 2010

• material selection
  evidence suggests that hard floors with acoustical grade ceiling tiles may be more effective at reducing maximum noise levels than is carpeting”.
  Palomar Medical Center (PMC) West, HCD, 2012
reduce environmental stress
reduce environmental stress
reduce environmental stress
reduce environmental stress

distance

• decentralized care stations
• access to supplies
• access to equipment
• walking distances
distance

- decentralized care stations
- access to supplies
- walking distances

Trillium Health Centre - Mississauga site

- evidence showed that nurses provide more direct care time in the new wing versus the old wing
- there were fewer interruptions in their workplace

CHD research report, June 2012
reduce environmental stress

distance

• decentralized care stations vs. centralized
• access to supplies
• walking distances

• decentralized stations decreased and redistributed time spent on phone, computer, and administration asks
• less time was spent consulting with other medical staff
• social interactions were significantly higher in centralized units

HERD Journal, 2010
reduce environmental stress
reduce environmental stress

wayfinding

• entry and exits
• theme or visual story
• lighting
• material changes

• provide a unique feature at entry. This serves as a cue on entry, but more importantly, provides assurance to the visitor on the exit.
• each floor can be developed with a specific visual story or theme.
• lighting and floor pattern aid navigation.

C. McCullough 2012
reduce environmental stress
reduce environmental stress
provide positive distractions

• art opportunities and programs
• water features
• views and access to nature
• music
provide positive distractions

art opportunities and programs

- nature art
- reducing restlessness

- patients prefers and responds positively to representational nature art, abstract or ambiguous art can elicit stressful reactions
  R. Ulrich, C. Zimring, 2008

- simple visual intervention, like still and video art, (serene nature images) can improve the patient waiting experience in the ED
  U. Nanda, 2010
provide positive distractions
provide positive distractions

water features

• indoor or outdoor
• infection control

• Water features affect all five senses
  C. McCullough, 2012

• Rogers’ re-view (2006) found no empirical study linking a waterborne infectious disease or nosocomial out-break to the indoor placement of water feature in hospitals.
  R. Ulrich, C. Zimring, 2008
provide positive distractions
provide positive distractions
views and access to nature

- pain reduction
- reduces stress

- exposing patients to nature can produce substantial and clinically important alleviation of pain
- real or simulated views of nature can reduce stress and improve outcomes.
  R. Ulrich, Zimring, 2008 C.

- sunlight show positive effects on length of stay, mortality rate, perceived stress and pain.
  K. Dijkstra, 2009
provide positive distractions
provide positive distractions
provide positive distractions

music

• pain reduction
• reduces stress

• a combination of nature scenery with classical music reduced both pain and self-administered sedation during colonoscopy
  R. Ulrich, C. Zimring, 2008

• when compared to no music or popular music, classical music can be effectively used in waiting rooms to reduce feelings of anxiety and stress prior to treatment.
  K. Dijkstra, 2009
provide positive distractions
provide positive distractions
provide positive distractions
enable social support

• family involvement
• ethnic and cultural understanding
enable social support

family involvement

• single rooms
• meeting areas
• space impacts

- single-patient rooms and private discussion areas can facilitate communication
- lounges, day rooms, and waiting rooms with comfortable, movable furniture arranged in small, flexible groupings.

R. Ulrich, C. Zimring, 2008

- Providing enough space for families to participate in the caregiving process.

C. McCullough, 2012
enable social support
enable social support

ethnic and cultural understanding

• hierarchical nature
• decision making
• personal space

• the role of family and social relationships in healthcare decision making and care giving varies among different cultures.
• consultation spaces and exam rooms large are enough to accommodate multiple family members.
• Provide multipurpose spaces for educational, social, and cultural activities.

A. Keller, E. Taylor, 2011
enable social support
enable social support
enable social support
give a sense of control

- privacy
- lighting
- noise
give a sense of control

privacy

- single rooms
- waiting room layouts
- acoustical performance

- patients in single-bed rooms benefit from increased privacy.
  R. Ulrich, C. Zimring, 2008

- improve patient privacy and confidentiality by grouping furniture in waiting areas with dividers between them.
- Provide walls in areas where patients would be expected to disclose confidential information.
  C. McCullough, 2012
give a sense of control
give a sense of control
give a sense of control

lighting

• sleeping patterns
• glare
• heat

lighting is an important factor affecting sleep/awake patterns
flexible light controls with various lighting intensities might be considered.
R. Ulrich, C Zimring, 2008

Although natural lighting is ideal, it is sometimes hard to control and can cause uncomfortable glare and heat.
C. McCullough, 2012
give a sense of control
give a sense of control
give a sense of control

noise

- sleep disturbances
- observation

- those with shifting contours (towel dispensers, door close, toilet flush, ice machine) tended to be more arousing than those with continuous contours.
- solution available for decreasing patient noise exposure is closing room doors.

the sound sleep study, CHD 2010
questions?

• Lynne Wilson Orr
  Principal
  Parkin Architects Limited
  lwo@parkin.ca

• Erinn Haley-Stevenson
  Associate
  Parkin Architects Limited
  haley@parkin.ca