



**FINAL PROGRESS/STATUS REPORT**  
**18 December 2006**

**IMPACTS OF THE PHYSICAL ENVIRONMENT ON HEALTHCARE**

AHRQ Grant Identification Number: #1R13HS015962-01

Dates of the project: 9/1/2005–8/31/2006

Total amount of the project: \$25,000

Goal of the project from the proposal: Conference on the impacts of the hospital physical environment on healthcare outcomes and patient and staff satisfaction.

Contact information for Principal Investigator:

**Craig Zimring, Ph.D.**

Professor

College of Architecture

Georgia Institute of Technology

Atlanta, Georgia 30332-0155

Phone: (404) 894-3915 Fax: (404) 385-2916

email: [craig.zimring@arch.gatech.edu](mailto:craig.zimring@arch.gatech.edu)

**1. Goals and indicators used to measure performance. Extent that project achieved these goals and levels of performance.**

**Goals:**

- a. *Helped create robust interest in Healthcare Environments Research that will contribute to making the very large upcoming US healthcare construction program safer; of higher quality; more effective; less stressful for patients, families, and staff; and with improved working conditions for nurses and other staff.*
  - i. A multidisciplinary group of 65 prominent healthcare thought leaders—representatives of major professional organizations, researchers, owners, architects, consultants, healthcare providers, and others—assembled in Atlanta on February 8–9, 2006, to discuss:
    1. High-priority research topics;
    2. What is needed to create a “pipeline” from research to application;
    3. Short-term and midterm actions.
- b. *Identified major research areas linking the hospital environment to patient and staff outcomes.*
  - i. Three broad research areas linking the hospital environment to patient and staff outcomes were identified prior to the HER Summit held in Atlanta. During the conference, participants were asked to focus their attention on these areas of research, including:
    1. Patient safety;
    2. Patient and family experience;
    3. Nurse/staff working conditions.
  - ii. This goal has been fully met.
- c. *Identified research priorities and opportunities within the major research areas.*
  - i. HER Summit participants were divided into nine groups, with three groups working to identify research priorities and opportunities within each of the three major research areas. The *Summary of HER Summit Break-Out Group Activities: Research Priorities, Pipeline Issues, and Action Items*, which has been prepared as part of this project, contains a detailed summary of research needs identified by Summit participants, including specific research questions, for each of the three major research areas.
  - ii. Nearly 150 research areas or specific research questions were identified during the Summit, with several cross-cutting themes. Some of these themes included the following items: 1) Develop more rigorous typologies of nurse floor layout and the effect of those types on nurse turnover, nurse walking distance and fatigue, response time, patient satisfaction, and other outcomes. 2) Evaluate the impact of single patient rooms on outcomes such as infection, patient falls, patient satisfaction, and nurse fatigue. 3) Evaluate approaches to involving patients, families, and front-line staff into the design process and how that affects the quality of care. 4) Examine the effects of various technologies (e.g., computers and PDAs, nurse call systems) on outcomes such as workplace satisfaction, patient satisfaction, privacy, patient safety,

- and nurse injuries. 5) Study how design issues (e.g., family zones, decentralized nursing stations) affect the hospital culture.
- iii. The research needs and opportunities identified will be prioritized using an online survey that draws on the expertise of Summit participants and allows them to narrow down the more extensive list of identified research needs into just a few priorities.
  - iv. This goal has been met, and additional work will continue.
- d. *Defined mechanisms for studying priority issues*
- i. Summit participants recognized that there are several barriers that must be overcome if we are to advance the field of evidence-based design and that there is a need to develop better research methods. Specifically, participants identified the following issues that need to be addressed to ensure that our mechanisms of studying priority issues are of high quality:
    1. We do not have common metrics or standardized definitions in the field.
    2. The use of simulation and modeling may be effective tools for improving design and for conducting research, but we do not yet have a good understanding of their effectiveness.
    3. Standardized post-occupancy evaluation protocols do not exist and should perhaps be developed.
  - ii. Despite the existing barriers, participants did identify some mechanisms for studying priority issues. Some examples of actions that should be taken are listed below. Additional information is contained in the *Summary of HER Summit Break-Out Group Activities: Research Priorities, Pipeline Issues, and Action Items*.
    1. Researchers should utilize existing resources and models of research, such as Kaiser's Garfield Center, Clemson University's simulation mock-ups, the Beach Center on Disabilities at the University of Kansas, etc., to conduct needed research.
    2. Identify key projects that exist and use them as examples.
    3. Tap into studies already being conducted as part of hospitals' QA/QC programs.
    4. Connect research projects that link evidence-based design research, patient-centered values/principles research, and highly reliable care research.
    5. Develop common definitions (including one for evidence-based design) and a taxonomy for the field.
    6. Identify universities that have potential multidisciplinary opportunities with programs in Architecture, Medicine, Business, Healthcare Management to study evidence-based design.
  - iii. This goal has been met. Additional discussions of mechanisms for studying priority issues will likely continue in a follow-up summit and through an online discussion forum being established on the project website.
- e. *Identified needs and opportunities for creating incentives for the best researchers to explore these issues.*

Needs and opportunities for creating incentives identified during the Summit include the following:

- i. Fully develop an evidence-based design field. This may include the introduction of a new journal or the development of certification programs for designers, consultants, and even healthcare facility decision makers (perhaps similar to LEED accreditation for sustainable design professionals).
  - ii. Approach potential funding sources to obtain research dollars, particularly for doctoral-level research.
  - iii. Recognize and publish the work of best practice examples and post-occupancy studies to generate interest in additional research.
  - iv. Create such a demand in the marketplace that design firms seek to hire employees and consultants with experience in applying evidence-based design.
  - v. This goal has been met, and additional work will continue.
- f. *Ensured understanding of differential impacts of design on priority user groups.*
- i. Considerable discussion during the Summit was focused on ensuring that evidence-based design expertise would also extend to rural hospitals and those serving uninsured or underinsured patients.
  - ii. This goal has been met.
- g. *Identified mechanisms for disseminating knowledge.*
- Mechanisms for disseminating knowledge identified during the Summit include:
- i. Develop a research primer for CEOs/VPs of facilities. (Build on the Fable Hospital, summarize the Ulrich/Zimring paper, and find a sponsor to support its development.)
  - ii. Compile evidence of cost savings associated with evidence-based design and disseminate to CEOs.
  - iii. Identify conferences that CEOs attend and present information there.
  - iv. Develop focused presentations for different groups (e.g., policy makers, insurers, general public, etc.) that include both the broad message and more specific information directed specifically at them.
  - v. Connect with training/CE programs for healthcare professionals (administrators, facilities directors, operation executives, etc.)
  - vi. Continue to publish results in a variety of publications read by architects, payers, executives, quality improvement professionals, etc. Identify what journals key decision makers read.
  - vii. Connect the Summit with the *Remaking American Medicine* programming and the work of IHI to help reframe the built environment issues as a quality improvement initiative.
  - viii. Educate consumers to make them aware of the benefits of the evidence-based design and who is practicing it.
  - ix. Tap into the pipeline that includes either the VP of Facilities or Program Manager that has been hired to manage projects. Educate and inform those who guide and manage design and construction.

- x. Educate board members through the American Hospital Association, ACHE, etc., that have governance tracts. Pay attention to providing materials for the governance activities.
  - xi. Train future administrative personnel (while studying in the universities) about healthcare design issues.
  - xii. Get the information into physicians' hands through sources such as RWJF policy papers.
  - xiii. This goal has been met, and additional work will continue.
- h. *Explored organizational partnerships and other mechanisms to jump-start research.*

Partnerships and other mechanisms identified during the Summit include:

- i. Link our efforts to other ongoing efforts at IHI, etc., to become mainstream and gain credibility.
- ii. Coordinate the efforts of Pebble, HERS, ANFA, etc.
- iii. Approach potential funding sources that may include:
  - 1. State governments
  - 2. AHA – American Hospital Association
  - 3. Government
    - 1) National Endowment for the Humanities
    - 2) National Endowment for the Arts
    - 3) VA – Veterans Administration
    - 4) Department of Homeland Security
    - 5) AHRQ – Agency for Healthcare Research and Quality
    - 6) DOD – Department of Defense/Tricare
    - 7) DHHS – Department of Health & Human Services
    - 8) CMS – Centers for Medicare & Medicaid Services
    - 9) NINR – National Institute of Nursing Research
    - 10) HRSA – Health Resources and Services Administration
    - 11) NIH – National Institutes of Health
    - 12) NIBIB – National Institute of Biomedical Imaging and Bioengineering
  - 4. Private
    - 1) Premier
    - 2) VHA – Volunteer Hospital Association
    - 3) Self-insured healthcare organizations
    - 4) Kaiser
    - 5) HMOs
    - 6) SSM Healthcare
- iv. Develop tools and resources for educating less-experienced firms and CEOs who are not yet equipped to use evidence-based approaches.
- v. Develop mechanisms for assisting small and rural hospitals with designing quality facilities. These hospitals may need:
  - o AHA, ACHE conference presentations with evidence-based design information;
  - o State healthcare/hospitals associations' cooperation (small hospitals attend these conferences);

- An analog of the county extension agents to support rural hospitals and local design firms without the evidence-based design skills;
- An association with the federal pipeline (DoD, Indian Health, VA, Public Health);
- A campaign to get leaders of organizations to become champions of evidence-based design within their organizations and support them with the best research and resources.
- vi. This goal has been met, and additional work will continue.
- i. *The synthesis papers presented in the conference and conference report will be published in a guest-edited issue of a reputable journal of public health or healthcare facilities design.*
  - i. This goal has not yet been accomplished but will be in 2007.
- ii. *In addition, a website was created for the conference to disseminate its products, including topic, goal, format, schedule, and the registration process, to a broader audience.*
  - i. This goal has been met. The website at <http://hcdesign.coa.gatech.edu> will continue to be updated and maintained.

Measurements:

- a. *The outcomes of the conference, i.e., three background papers and a position paper, will be published in a reputable journal.*

The background papers and a position paper will be submitted for journal publication in 2007. Preliminary discussions with the editor of *Environment Behavior* have occurred, and it is likely that a special issue will be submitted to this peer-reviewed journal.

- b. *In addition, the position papers and the conference report will be disseminated through the participating organizations, such as AHRQ, the Robert Wood Johnson Foundation, the Institute for Healthcare Improvement, and others, in 2007.*

The *Summary of HER Summit Break-Out Group Activities: Research Priorities, Pipeline Issues, and Action Items* is a significant portion of that final report. All materials will be made available to AHRQ, the Robert Wood Johnson Foundation, the Institute for Healthcare Improvement, and other organizations upon their completion.

- c. *As a part of the dissemination plan, the findings of the conference will also be presented to several design professional communities, including the conferences of the American Institute of Architects (AIA) and the Environmental Design Research Association (EDRA).*

Dr. Craig Zimring presented information about the HER Summit at the Environmental Design Research Association conference in Atlanta on May 6, 2006.

**2. Internal and external challenges.**

- a. No real internal challenges were encountered, but the primary external challenge was in obtaining final papers and presentations in a timely manner from some of the presenters. Email and telephone requests have been used to obtain the information.

3. ***Other support.***

- a. Additional support:
  - i. RWJF – \$25,000
  - ii. Steelcase – \$15,000

4. ***Lessons learned from undertaking this project.***

- a. A summit is an excellent forum for generating excitement, developing a network of colleagues interested in a particular topic, and identifying research needs and other important issues that must be addressed to advance a research field and design practice.
- b. It would be helpful to provide notetakers with guidance regarding the level of detail that is expected as an outcome of break-out group activities.
- c. Although the participants are very multidisciplinary in their work, perhaps it will be helpful in the future to include insurers in this professional network.
- d. The impact can be enhanced with continuing networks support through the web and other sources.

5. ***Impact of project to date. Future contacts to follow up on the project.***

- a. A great deal of enthusiasm regarding evidence-based design has been generated.
- b. A network of multidisciplinary professionals interested in promoting evidence-based design has been established.
- c. Several papers have been prepared, and presentations have been developed for the HER Summit that may be published and presented in other forums.
- d. A website for sharing information about evidence-based design research and practice has been developed.
- e. An online discussion forum is being established to further promote communication among participants and interested parties. Collaboration is expected to result.
- f. Research needs related to evidence-based design have been identified, and additional work to refine the priorities is underway.
- g. Approaches for addressing how information about evidence-based design is translated and disseminated among practitioners, designers, and researchers have been identified.
- h. It is likely, although it has not been confirmed, that Summit participants have approached their own healthcare facility projects with more attention to evidence-based design.
- i. Dr. Craig Zimring can be contacted a few years from now to follow up on the project. His contact information is:
  - [Craig.zimring@coa.gatech.edu](mailto:Craig.zimring@coa.gatech.edu)
  - (404) 894-3915 (office)

**6. *Post-grant plans for the project if it does not conclude with the grant.***

- a. The Georgia Institute of Technology plans to extend the success of the HER Summit by engaging in the following post-conference activities:
  - i. Propose a follow-on Summit for spring 2007.
  - ii. Establish smaller working groups or committees to carry on the work identified in the Summit.
  - iii. Develop an online survey for further refinement of priority research needs.
  - iv. Create an online discussion forum for participants and other interested parties.
  - v. Update and continue to maintain the website at <http://hcdesign.coa.gatech.edu>.