



 THE CENTER FOR HEALTH DESIGN[®] Research Coalition

CRITICAL ISSUES IN HEALTHCARE ENVIRONMENTS

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ABSTRACT

Context

The catalyst for this study was the need to establish research agenda for healthcare environments. A critical step prior to selecting the important research questions, is establishing criteria and methods for the selection process. However, the choice of topics to be researched and the selection of interventions to be tested in healthcare environments are often determined by investigators and sponsors in a pre-scientific way.

This study focused on critical problem areas and unresolved issues as the universe of topics from which viable, important research questions can be generated. These questions can form a systematic, problem-driven research agenda. Ultimately, the research information will lead to more informed design, improved environments, and better healthcare.

Objective

The objective of the project was to identify and describe critical issues in three healthcare environments—hospital, ambulatory, and long-term care settings, specifically focusing on issues and problems which have a bearing on the physical environment.

Methods

A survey questionnaire was developed to address the study questions. The questionnaire was disseminated nationally via a web-based survey. The respondents could select to address one or more of three setting types—hospital, ambulatory, or long-term care environments. Respondents were asked to rank issues among and within six potential domains of issues, and add open-ended comments. The probes led to the last key question in the survey, “What is the most critical issue in healthcare environments?”

Participants in the survey included 639 individuals from 15 types of stakeholder groups, of which 443 addressed the hospital setting, 103 addressed the ambulatory care setting, and 93 addressed the long-term care setting.

Findings

The survey findings addressed four themes: critical issues, locations where problems occur, the relationship between problems across facility types, and how different stakeholders responded. Over 100 most critical issues in healthcare environments were identified. Top ranked problems included patient care and safety issues, such as hospital acquired infection (HAI), errors, and falls; patient and user satisfaction issues, such as reducing stress, increasing physical, social, and psychological comfort; and operational efficiency issues, focusing on patient care flow and care procedures. Specific places associated with either more or greater problems—or both—in all facilities were generally spaces where the most significant patient care was delivered, such as patients' rooms, treatment and exam rooms, diagnostic and treatment spaces, preoperative and recovery spaces, and staff work areas. Waiting areas and parking areas were places where user satisfaction issues also became evident along with outdoor activity areas in long-term care. All settings shared many issues, but the extent and focus of shared problem areas varied significantly among care settings. In addition, each setting type had its own unique issues. The study revealed that different groups of stakeholders assessed differently many problems in healthcare environments.

Significance

By highlighting critical issues in need of intervention, the findings can also provide a road map for setting the priorities for research questions related to these interventions whenever new information and discovery are required.

1

INTRODUCTION

1.1 What are the most important, high-priority research questions in healthcare environments?

The catalyst for this project was the need to establish a research agenda for healthcare environments. Prior to setting the agenda, criteria and methods for selecting the most appropriate research questions had to be established. Then, research projects and dissemination of evidence-based, applied information could follow.

Before it became part of The Center for Health Design, the Coalition for Health Environments Research (CHER) selected research topics to fund and findings to disseminate based on intuition. CHER had the dilemma of selecting the most important items from a long list of candidate questions.

Examples of candidates questions:

- *What are the environmental features and affordances which make a better family zone in a hospital patient room?*
- *Which lighting sources, types, and configurations result in improved patient health outcomes?*
- *How can the hospital working environment be made more responsive to the special needs of an aging work force?*

Without a method and criteria for selection, it was difficult to select one or two questions from many compelling and interesting questions such as the ones listed above. We concluded that a verifiable framework was needed—a road map for a more informed process to identify, sort, prioritize, and select important research questions.

1.2 Why do we need to know both what the unresolved problems and issues are and where they are?

The focus on **problem areas** and **unresolved issues** in healthcare environments assumes that an intervention is needed—in some situations urgently. Clearly, not all problems require new information to facilitate action. However, informed decisions for intervention often require new information, which in turn calls for discovery by research. Likewise, interventions by innovations—most often based on working hypotheses—require verification by research.

Therefore, it was logical to focus on critical problem areas and unresolved issues as the universe of topics from which viable, important research questions can be generated. These questions can form a systematic, problem-driven research agenda.

1.3 What is the link between domains of information and research questions relevant to healthcare environments?

A Conceptual Framework of **Information Levels** was developed for this project: Below are examples of information levels and their relationship to this study's structure and goals. Columns A to D represent a logical hierarchy as well as a linear sequence. The bottom row provides specific topic examples.

Table 1 Information Levels and Topic Examples			
A. DOMAINS OF INFORMATION	B. TOPICS	C. GENERAL QUESTIONS (addressed by organizational, clinical, environmental, and/or other factors)	D. RESEARCH QUESTIONS RELEVANT TO ENVIRONMENTAL DESIGN
Patient Care Patient treatment, recovery, healing, clinical outcomes	Disrupted sleep patterns	How to improve patients' sleep and circadian cycles?	The impact of white noise in a nursing unit on night-time sleep disruptions

1.4 An exploratory study

An exploratory study was conducted in 2006 to establish the parameters of the project and to develop a framework for the eventual survey. The study included:

- A review of selected literature addressing the most critical issues and challenges in healthcare environments (see References)
- Informal interviews with 22 professionals representing diverse disciplines—physicians, hospital workers, researchers, support industries, and others
- A review of proceedings of selected conferences focused on healthcare environments (ASHE/AIA-AAH PDC, HC DESIGN, AIA-AAH, and others)

A literature search was conducted to locate recent (within the past 4 years) articles addressing critical issues facing healthcare environments. Most of the literature dealt with emerging trends and projected challenges, but current and predicted problems were evident in many of the literature sources. The literature provided few direct, but many indirect, links between problems and the physical environment and design.

The main relevant topics and issues identified in 12 articles were:

- Patient care issues, primarily safety
- Patients and user satisfaction, expectations, and demands
- Rapid changes in information and medical technology, nanotechnology, and pharmaceutical developments
- Work force issues
- Efficiency
- The quality and efficiency of emergency care services
- Our aging population and its impact on health environments
- Federal regulations and regulatory impact on the hospital environment
- Emergency preparedness, and the lack of
- Environmental impact and conservation

Content analyses of the findings from the exploratory study—literature review, interviews, and other sources—yielded the following framework for the survey.

1.5 A framework for the survey

Table 2 describes six primary domains distilled from the exploratory study. These domains served to frame the survey instrument. Likewise, frequently mentioned topics associated with the domains were used as a starting point for selected probes in the survey. The intent was not only to get respondents' reaction to the survey items, but to elicit their topics of concern in open-ended questions at the end of each domain section.

Table 2 Issues in Healthcare Environments – basic domains and selected topics	
BASIC DOMAIN	TOPICS ASSOCIATED WITH POTENTIAL ISSUES AND PROBLEMS
1. Patient care issues Addressing users' clinical, treatment, and recovery concerns	The healthcare setting as a patient care and/or living environment: <ul style="list-style-type: none"> • Patient treatment, healing, recovery, clinical outcomes, length of stay, pain control and physical comfort, sleep patterns • Patient safety and security—hospital acquired infection, errors, falls
2. User satisfaction issues User-centeredness concerns, such as reducing stress, increasing physical, social, and psychological comfort	The health facility experience: <ul style="list-style-type: none"> • Personal, emotional, and social needs, such as orientation and way-finding, privacy, autonomy, social contact, emotional comfort, communication, and information • Responding to users' cultural diversity • Responding to users' special group needs, such as Bariatric patients, children, the elderly
3. Operational efficiency	<ul style="list-style-type: none"> • Doing things better • Saving time, energy, money, emotional resources
4. Accommodating change and innovation	<ul style="list-style-type: none"> • Accommodating rapid advances in medical and information technology • Accommodating advances in medical procedures and practices • Accommodating organizational and medical culture change
5. Responding to disasters	<ul style="list-style-type: none"> • Preparedness for natural and 'man made' disasters and pandemic or epidemic events.
6. Environmental impact	<ul style="list-style-type: none"> • Energy use • Solid waste and toxic materials • Water use • Air quality and pollution • Use of non-renewable materials

2

THE SURVEY

2.1 The study's research questions

1. The study was designed to answer the following questions:
2. Which **domains** and **topics** are being identified as the most pressing problem-areas in healthcare environments?
3. Which **place-types**, such as emergency departments, are associated with more or greater problems, or both?
4. How similar or different are the patterns of responses regarding issues in acute care settings vs. ambulatory settings vs. long-term care settings?
5. How do different stakeholders, such as physicians, architects, equipment manufacturers, respond to these questions? Do different disciplinary perspectives correlate with different patterns of responses? If so, what are the implications for research and design practices?

2.2 Survey Methods

A survey questionnaire was developed to address the study questions. Prior to distribution, the survey was pre-tested with members of the CHER research board, who were asked to consider the clarity and relevance of all the survey elements. Based on their input, modifications were made to the instrument in an effort to maximize reliability and the validity of the results. The questionnaire was disseminated nationally via a web-based survey. Clemson University's Survey Research Laboratory at the Department of Sociology provided the platform for the survey and technical support, including statistical analysis of the data collected. The survey was conducted between June and September of 2007.

The Survey Instrument

See a copy of the survey instrument in Appendix B.

Differentiating Between Care Settings

The survey was structured in three streams to distinguish between these settings:

- Acute care settings(hospitals)
- Long-term care settings
- Ambulatory care settings

After selecting one of the settings, the respondent was directed to a specific set of questions appropriate for that setting. After completing a stream, the respondent was given the opportunity to answer questions relevant to the other settings.

Domains and probe items: The survey was structured to introduce the six potential domains of problems identified above and to provide relevant examples of possible issues. An introductory statement was provided at the beginning of each domains' questions to keep the respondents focused on how specific problems (listed below) were related to, or were influenced by, the design of the built environment. Respondents were asked to rate each problem on a 5-point scale ranging from 1: Not a problem to 5: Major problem. A “Don’t know” option was offered as well. The survey was designed to focus on issues and problems in healthcare settings that were related either directly or indirectly to the design of the environment. The introductory statement and prompt questions for each domain are described below.

Patient care problems: *A primary charge for healthcare organizations and facilities is to optimize therapeutic outcomes and patient safety. The following lists represent patient care topics that might be influenced by the design of the built environment. Which ones involve the most pressing problems?*

Patient safety and security:

- *Hospital acquired infections*
- *Medication and treatment errors*
- *Falls*

Patient treatment, healing, recovery, and clinical outcomes:

- *Recovery rate and length of stay*
- *Pain control and physical comfort*
- *Sleep patterns*

The hospital experience – user satisfaction problems: *Care providers strive to optimize patient, family, and staff satisfaction by addressing social, psychological, and other non-clinical aspects of care. The following lists represent user satisfaction topics that might be influenced by the design of the built environment. Which ones involve the most pressing problems?*

Responding to patients' personal, emotional, and social needs:

- *Orientation and way-finding*
- *Communication and information*
- *Physical privacy*
- *Confidentiality of information*
- *Social contact*
- *Emotional contact*
- *Responding to users' cultural diversity*

Responding to users' special needs:

- *Bariatric patients*
- *Newborn and children*
- *Elderly*
- *Family and visitors*
- *Staff members*

Operational efficiency: *The following list represents important operational efficiency problems that might be influenced by the design of the physical environment—doing things better, cheaper, faster, and more responsibly. Which ones involve the most pressing problems?*

- *Use of energy*
- *Use of supplies, materials and products*
- *Use of human resources*
- *Use of space and buildings*
- *Use of information, communication, and media*

Accommodating change and innovation: *The following list represents important aspects of change and innovation that might be influenced by the built environment. Which ones involve the most pressing problems?*

- *Accommodating rapid change in medical technology*
- *Accommodating rapid change in information technology*
- *Accommodating rapid change in medical procedures and practices*
- *Accommodating organizational and medical culture change*
- *Accommodating program changes in response to changes in reimbursement*
- *Accommodating changes resulting from regulation*

Responding to disasters: *Preparedness for natural and man-made disasters and pandemic or epidemic events is an on-going concern. The following list represents topics concerning disaster responses that might be influenced by the design of the built environment. Which ones involve the most pressing problems?*

- *Incident command*
- *Decontamination*
- *Triage*
- *Treatment zones*

The following list represents types of incidents that might impose different demands on the design of the built environment. Which ones involve the most pressing problems?

- *Transportation and industrial accidents*
- *Natural disasters (such as, hurricanes, floods, earthquakes, etc.)*
- *Chemical spills*
- *Biological and nuclear terrorism*
- *Management of a hospital impacted by events*

Environmental issues: *Hospitals' impact on the environment is an area of increasing concern. The following list represents environmental topics that might be influenced by the design of hospitals. Which ones involve the most pressing problems?*

- *Energy and power management*
- *Water management*
- *Solid waste management*
- *Toxic waste management*
- *Use of renewable building materials*
- *Improvement of indoor air quality*

Open-ended domain questions: *An open-ended question followed each series of domain prompt questions. It was worded similarly to the patient care question as follows:*

Are there other (for example, patient care, user satisfaction) topics related to the design of the (hospital, ambulatory care facility or long-term care settings) you consider to be pressing problems?

This question allowed the respondents to identify other problems of concern within each domain not covered by the prompt categories.

In addition to respondents' ranking of these issues, the prompt questions also served as indirect probes leading to the final, key question in the survey, "What is the most critical issue in healthcare environments?"

Location of problem areas in hospitals: After addressing specific prompts and open-ended questions in each topical domain, respondents were then asked to locate problem areas in the setting. This was intended to anchor problems to specific physical sites where research could be ultimately directed. Locations were organized into three types of places:

- Specific patient care spaces, such as patients' rooms and diagnosis and treatment spaces
- Departmental areas, such as nursing units and diagnostic and treatment units; or facility types in the case of ambulatory and long-term care settings
- Public areas, such as corridors, lobbies, and exterior areas

Once respondents identified a specific location, they were asked to identify which domain of issues were of concern in a given location.

The content portion of the survey ended with an open-ended question about the most critical issue. This was followed by a question intended to identify which healthcare environments the respondent was affiliated with.

2.3 The Respondents

Respondents were recruited using a variety of mechanisms including personal e-mails to relevant mailing lists, e-newsletters, and links on web sites, facilitated by over 20 cooperating organizations (see acknowledgments). An attempt was made to reach out to respondents through a cross section of professional and advocacy organizations in healthcare representing design professionals, healthcare professionals, the health industry at large, and consumer groups. Each participating organization was mailed the introductory paragraph and the link to the survey. Some of the organizations sent a direct blast e-mail to their mailing list; others posted an announcement with a link to the survey in an e-newsletter, while others posted an announcement, including the link, on the home page of their web site.

Participants in the survey included 639 individuals, of which 443 addressed the hospital stream, 103 addressed the ambulatory care stream, and 93 addressed the long-term care stream. If these recruitment mechanisms produced a sample that

approximates a random sample from the intended populations (individuals from a variety of disciplinary orientations involved in healthcare environment and aware of problems), the overall margin of error for the study would be +/- 3.9%. The largest group of respondents in this sample was nurses (17.7%), followed by healthcare administrators (13.5%), and architects (10.5%). Patients (0.6%) and consulting engineers (0.3%) had the smallest representation in this sample.

Respondents' professional affiliation and perspectives are described in Table 3.

Table 3 Affiliation of Identified Respondents		
CATEGORY	N	PERCENTAGE
1 Patient	4	0.6
2 Patients' family member	7	1.1
3 Nurse	113	17.7
4 Physician	14	2.2
5 Hospital service or maintenance worker	5	0.8
6 Healthcare administrator	86	13.5
7 Health facility engineer or planner	29	4.5
8 Health regulation or policy maker	9	1.4
9 Architect	67	10.5
10 Interior designer	19	3.0
11 Consulting engineer	2	0.3
12 Landscape architect	8	1.3
13 Product industry professional	13	2.0
14 Healthcare environments researcher, educator, knowledge promoter	45	7.0
15 Other	63	9.9
16 Affiliation unknown*	155	24.3
Total	484	100.0

* Respondent did not respond to affiliation question.

3

ANALYSIS AND FINDINGS

This section includes an overview of the survey analysis and a summary of the findings. Subsequent sections 4 through 7 address each of the four research questions by their respective data and analysis. The analysis and the findings are presented from two sources in the survey for each of the facility tracks. The first source is represented in a series of tables (Tables 4, 6, and 8) and is a ranking of the prompted issues as problems within each domain. Each of those tables is followed by an analysis, sorting, and domain classification of the open-ended responses to the last survey question, “What is the single most critical issue?” (Tables 5, 7, and 9). Critical issues are covered by both the ranking of responses to the prompt questions and responses to the most critical issue in each track. This is followed by an analysis of locations where problems occur, the relationship between problems across facility types, and how the various stakeholders responded.

3.1 Analysis

The detailed analysis for each of the research questions is presented in the appendix. Along with descriptive statistics, tests of statistical significance are reported where appropriate. In Tables A1-A3, T tests are used to compare the average rating of each of the specific problems. In each domain the lowest average rating is used as a benchmark, and all problems rated significantly higher than the benchmark for that domain are flagged with an asterisk. Because all areas were judged to be somewhat problematic, that is, no problem was consistently given a rating of 1 (Not a problem), comparing all areas to the lowest ranked is a way to identify those problems that set themselves apart from the minimal level of concern that any of the issues received. Similarly in Tables A4-A6 in each type of location specific physical areas rated significantly more problematic than the least problematic area in that type of location are indicated with an asterisk. Finally, in Tables A8 and A9 chi-square tests are used to indicate significant differences among types of respondents (health administrators, design professionals, and researchers) in the proportion of each group that consider specific problems to be major problems.

3.2 Summary of findings

Top Issues by Facility Type

Over 100 critical issues in healthcare environments were listed by respondents in the final most critical-issue open-ended question. The top issues, by facility type are summarized below.

Hospital settings—most frequently identified most critical issues and problems included:

- **Patient care issues**, such as addressing users' clinical, treatment, and recovery problems
- **Patient safety and security issues**, such as hospital acquired infection, errors, and falls
- **Patient and user satisfaction issues**, addressing user-centeredness concerns—both patient and family—such as reducing stress and increasing physical, social and psychological comfort
- **Operational efficiency issues**, focusing on patient care flow and care procedures

Place types associated with more and/or greater problems in hospitals included patients' rooms, nursing units, waiting rooms, and emergency rooms and departments.

Ambulatory care facilities—most frequently identified most critical issues in ambulatory settings included:

- **Patient and user satisfaction issues**, focusing on users' coming and going—access, parking, and way-finding
- **Adaptation to change**, particularly concerning information technology, medical technology, and innovations

Place-specific problem areas in ambulatory care settings included patient zones, such as treatment and exam rooms, high tech diagnostic and treatment zones, preoperative and recovery spaces, and waiting areas.

Long-term care facilities—most frequently identified most critical issues in long-term care settings included:

- **patient and user satisfaction issues**, focusing on the need to de-institutionalize residents' environment and on accommodating family needs
- **re-thinking resident room design** and **accommodating culture change**

Place-specific problem areas in long-term care settings included resident's rooms, staff control and work areas, and outdoor activity areas.

Common concerns: Responses indicate that hospitals, ambulatory, and long-term care settings share many issues, such as operational efficiency and better use of staff and human resources, but the extent and focus of shared problem areas vary significantly among care settings. In addition, each setting type had its own unique issues.

Stakeholders perceptions: Different groups of stakeholders (care providers, administrators, environmental designers, and others) assessed many problems in healthcare environments differently.

Limitations of the Study

The study had one significant weakness that contributed to a lower participation rate and led partially to another weakness—limited control of the sample.

The length of the survey and attrition: The length and level of detail in the study was probably a contributing factor in attrition and loss of some respondents. The cost-benefit valuation of the respondents' burden associated with detail and depth vs. ease of response associated with brevity was considered; a calculated risk was taken with the current structure of the survey. The researchers struggled with balancing the need for a cross section of information with the need for completing the survey.

In addition, broadcasting the survey to a wide variety of targeted audiences had some difficulties. While a number of organizations agreed to announce and provide a link to the on-line survey available to their constituencies, in many instances, the link was buried in a newsletter, web site, or sent as a blast e-mail along with

other content. The existence of the survey was therefore not made as visible as the researchers would have liked it to be.

Limited control on the sample: The respondents identified themselves as affiliated with various, defined stakeholder groups. The total number of respondents was sufficient to conduct analysis and draw instructive and useful conclusions. However, because of the survey distribution method, we had only partial control of respondent sampling. The sample was, therefore:

- An opportunity sample rather than a random sample of each stakeholder group. The total number of respondents was much smaller than hoped for and therefore may not accurately reflect the priorities of the industry as a whole. While the number of voices providing input was higher than other forms of input to date, the researchers were looking for responses to be much greater—in the thousands.
- Not proportionally representative of the respective stakeholder groups—nurses were better represented than physicians, relative to their numbers in the work force. Almost a quarter of respondents did not identify their background.
- The interpretation of data, especially on the open-ended most critical question, was less than exact as responses had to be interpreted and categorized from sometimes vague or confusing wording and covering diverse concerns ranging from focused to broad.

4

TOP ISSUE

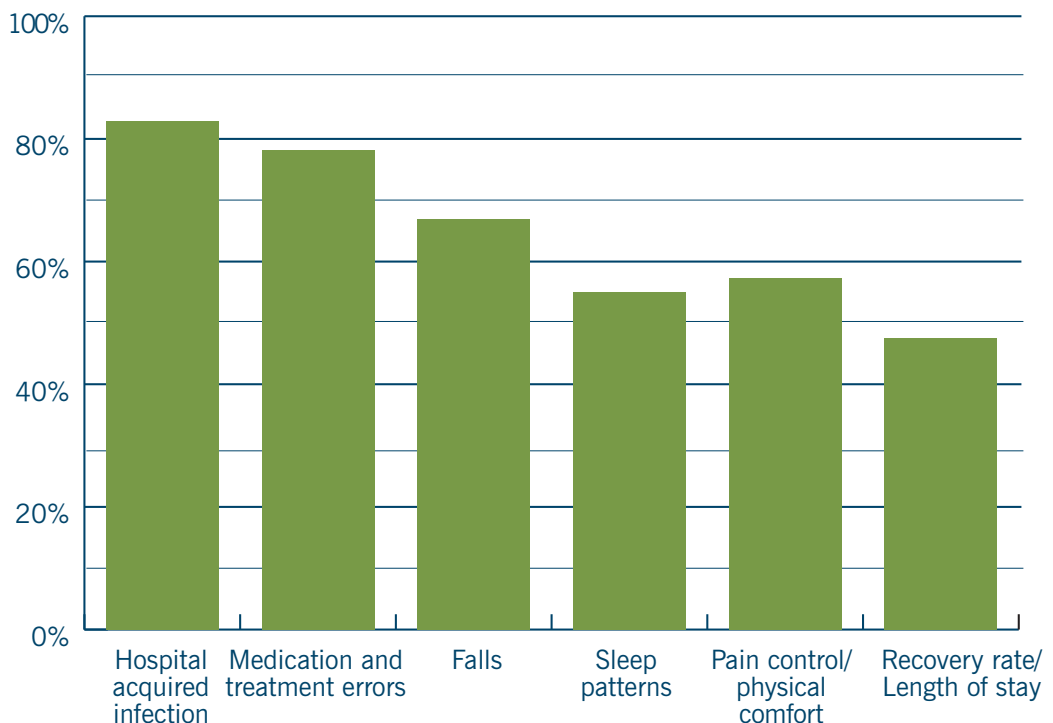
Which domains and topics are being identified as the most pressing problem areas in healthcare environments?

The survey was structured to introduce six potential domains of problems within each of the three facility type tracks. Prompt questions were developed for each domain and were derived from the preliminary study. In addition to respondents' ranking of these pre-identified issues as problem areas, examples served as probes leading to an open-ended question at the end of each domain and the last, key question in the survey, "What is the most critical issue in healthcare environments?"

4.1 Hospital setting

The prompted questions in each domain identified how respondents ranked problematic environment-related issues. Patient care issues such as hospital acquired infections and medication and treatment errors ranked highest (Figure 1), while the leading user satisfaction issues included communication and staff needs. The use of human resources was the top operational efficiency issue

FIGURE 1
Hospital Setting –
percentage of respondents
that define patient care
problems as serious*



* Serious Problem – ranked either 4 or 5 on scale where 1 = 'Not a problem' and 5 = 'Major problem'

followed by use of buildings and space. Changes in information and medical technology rated highest under the ‘accommodating change’ domain. All responses in the remaining domains fell well below the level of concern for the top issues in patient care, user satisfaction, operational efficiency, and change.

As shown in Figure 1, hospital acquired infection, followed by medication and treatment errors were perceived as the most serious problems by the largest group of respondents.

The complete ranking data of issues within each of the six domains in hospital settings can be found in Table A1 in Appendix A. Table A1 also identifies the percentage of respondents who identified a particular issue as a serious problem. Table 4 below highlights the top ranked issue in each domain in hospital settings.

Table 4 Hospital Setting – top ranked issues by domain	
DOMAIN	TOP RANKED ISSUE
Patient care problems	Hospital acquired infections
User satisfaction problems	Communication and information
Operational efficiency	Use of staff and human resources
Accommodating change and innovation	Accommodating change in information technology
Responding to disasters	Managing a hospital impacted by disasters
Environmental issues	Improving indoor air quality

Open-ended responses: In addition to the prompted responses, over 100 most critical issues in healthcare environments were listed by respondents. Top ranked issues in hospitals were those pertaining to **patient care**, addressing users’ clinical, treatment, and recovery problems; **patient safety** and security including hospital acquired infection, errors, and falls; **patient and user satisfaction**, addressing user-centeredness concerns, such as reducing stress, increasing physical, and social, and psychological comfort; and finally **operational efficiency**, focusing on patient care effectiveness, influence on work patterns, and care procedures. Operational efficiency issues—better use of staff and human resources, and many other topics—were shared by all three setting types. Table 5 (on the following page) identifies the top issues in hospital settings as reported in the open-ended responses.

Table 5 Hospital Setting – top issues in open-ended responses

RANKED DOMAINS*	SUBORDINATE ISSUES**
1. Patient care issues	Safety issues: <ul style="list-style-type: none"> • Hospital acquired infections • Errors • Falls • Environmental correlates of safety: unsafe work and workspace design • Environmental correlates of safety: distractions, such as noise, crowding
2. Patient and family satisfaction issues	Patient and other user satisfaction issues, with a focus on stress reduction and comfort enhancement: <ul style="list-style-type: none"> • Improving patient-centered care and accommodations • Patients' physical privacy; information confidentiality • Communication with care providers; being informed • Reducing negative distractions, primarily noise • Better accommodations to promote family interaction • Responding to older patients' needs • Responding to bariatric patients' needs • Improved 'coming and going'—way-finding, access, and parking
3. Accommodating change	The ability to accommodating changing needs over the life of the built setting: <ul style="list-style-type: none"> • Coping with emerging medical technology and care delivery innovations: • Real-time information flow; integrating information technology • Accommodating change in retrofitted older buildings • Adopting to change; flexibility for future needs
4. Operational efficiency issues	Workforce issues - use of staff and human resources (with implications to environment and the organization): <ul style="list-style-type: none"> • Aging staff issues • Labor shortages—increased workload, risks, and stress • Direct care worker satisfaction • Communication among all direct care providers Cutting costs and increasing productivity: <ul style="list-style-type: none"> • Under-optimized patient care procedures • Under-optimized workflow and staffing issues
5. Place-centered issues	Emergency departments and emergency rooms: <ul style="list-style-type: none"> • Slow triage and diagnosis • Problems associated with emergency rooms increasingly being a major entry to the hospital; over crowding • Long waiting in substandard conditions • Problems with greater exposure to potential infections • Physical security, violence, and security of access Nurses stations and work space: <ul style="list-style-type: none"> • Problems with traditional nurse stations • Problems with decentralized solutions—satellite stations and portable work platforms • Issues with the larger environmental context—nursing unit configurations, environmental conditions—air quality, poor lighting, conflicting activities, visual distractions, auditory distractions Regulations affecting most place types: <ul style="list-style-type: none"> • Sometimes obsolete, ineffective, or irrelevant; restrictive • Putting high demands on existing facilities; increasing and changing space requirement

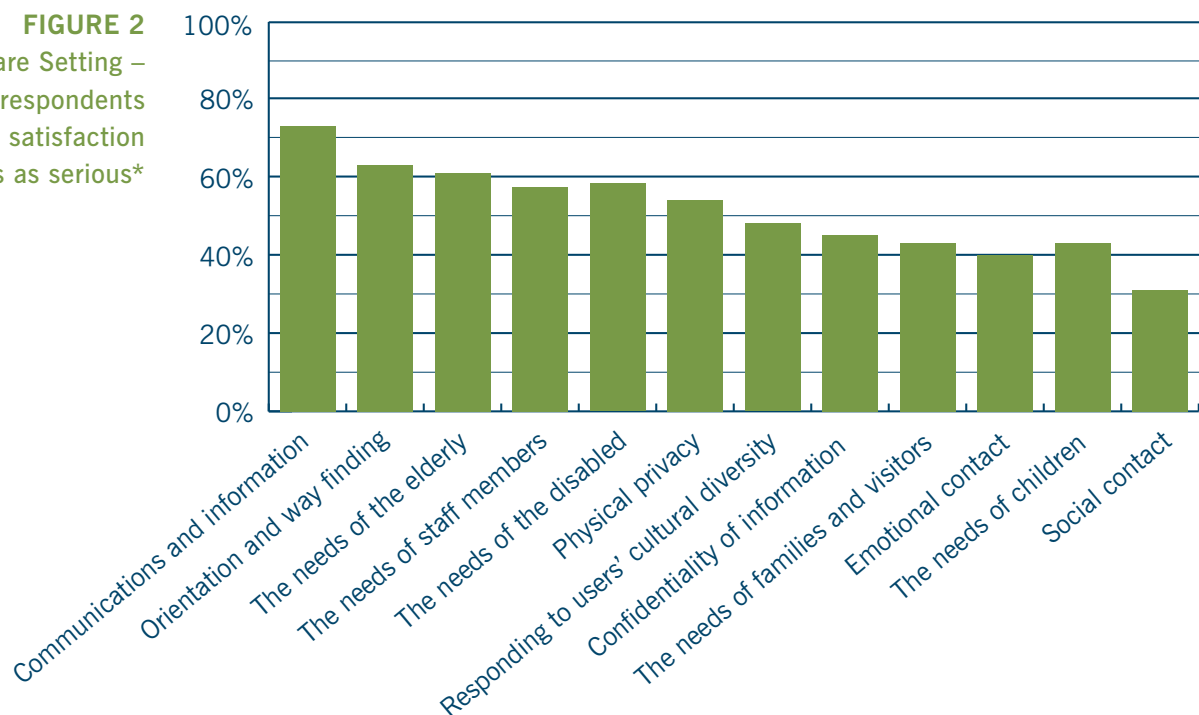
* Ranked domains are from tables 10, 11, 12, most critical issue

** Analysis of open-ended responses and Table 14 Top problems – across all domains in each of the three settings

4.2 Ambulatory Care Settings

The prompt issues in the ambulatory care track received lower scores across the board for responses of 4 or 5, indicating the issue was a major problem. As with hospitals, medication and treatment errors ranked high relative to other responses in the patient care domain, while concerns over facility acquired infections dropped from first to third place. Communication remained the top concern under user satisfaction, while orientation and way-finding moved up in the rankings (Figure 2). Under operational efficiency, staff and human resources continue to be more of a concern than buildings and space, with both still at the top of the list. Likewise, information and medical technology issues paralleled hospital setting responses as top concerns in the accommodating change domain.

FIGURE 2
Ambulatory Care Setting –
percentage of respondents
defining user satisfaction
problems as serious*



* Serious Problem – ranked either 4 or 5 on scale where 1 = 'Not a problem' and 5 = 'Major problem'

The complete ranking data of issues within each of the six domains in ambulatory care settings can be found in Table A2 in Appendix A. Table A2 also identifies the percentage of respondents who identified a particular issue as a serious problem. Table 6 (on the following page) highlights the top ranked issue in each domain in ambulatory care settings.

Table 6 Ambulatory Care Setting – top ranked issues by domain

DOMAIN	TOP RANKED ISSUE
Patient care problems	Medication and treatment errors
User satisfaction problems	Communication and information
Operational efficiency	Use of staff and human resources
Accommodating change and innovation	Accommodating rapid change in information technology
Responding to disasters	No significant responses.
Environmental issues	Improving indoor air quality

Open-ended responses: The top ranked open-ended “most critical” responses tied to ambulatory settings were patient and user satisfaction issues, focusing on users’ coming and going—access, parking, and way-finding; and adaptation to change, particularly concerning information technology and medical technology and innovations. Table 7 below identifies the top issues in ambulatory care settings as reported in the open-ended responses.

Table 7 Ambulatory Care Setting – top issues in open-ended responses

RANKED DOMAINS*	SUBORDINATE ISSUES**
1. Patient satisfaction issues	<p>Coming and going:</p> <ul style="list-style-type: none"> • Way-finding • Parking and access • Waiting times and space <p>User experience:</p> <ul style="list-style-type: none"> • Accommodating the family • Noise mitigation <p>Accommodating users under high distress:</p> <ul style="list-style-type: none"> • Communication and information • Positive distractions and choices
2. Accommodating change	<ul style="list-style-type: none"> • Adopting medical technology • Adopting and integrating information technology
3. Place-centered issues	<ul style="list-style-type: none"> • Entry, screening and waiting zones • Diagnostic imaging • Pre op and operating rooms • Exam rooms
4. Operational efficiency issues	<p>Workforce issues - use of staff and human resources (with implications to environment and the organization):</p> <ul style="list-style-type: none"> • Aging staff issues • Labor shortages, such as increased workload, risks, stress • Direct care worker satisfaction • Communication among all direct care providers

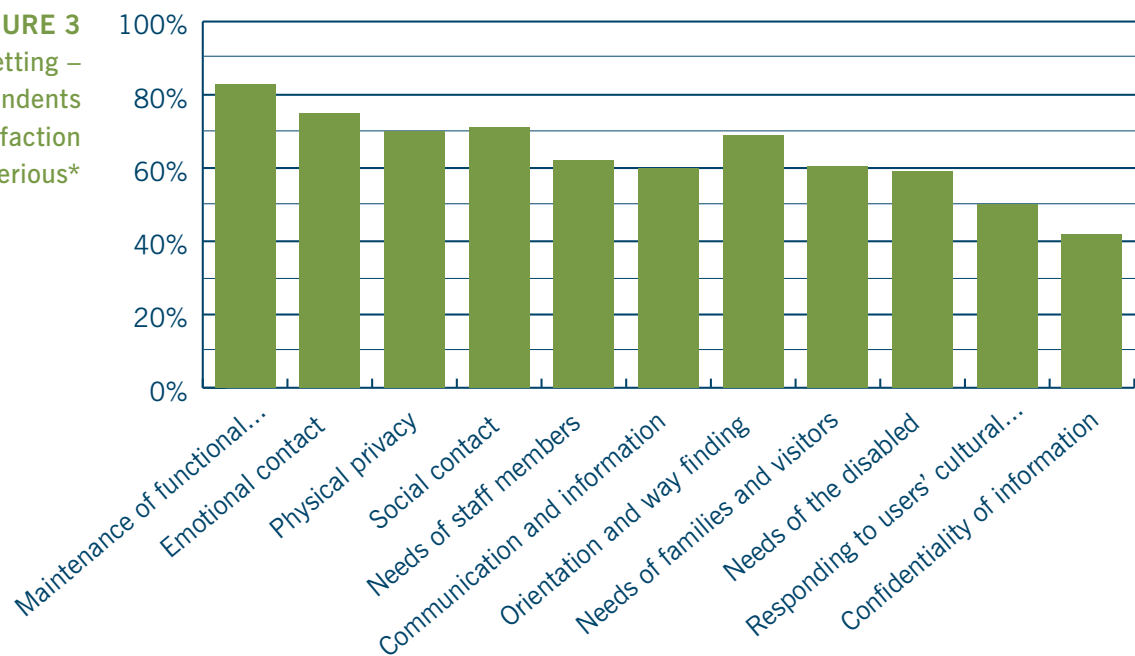
* Ranked domains are from tables 10, 11, 12, most critical issue

** Analysis of open-ended responses and Table 14 Top problems – across all domains in each of the three settings

4.3 Long-term Care Settings

Similar to the issues in hospital settings, the prompted issues in the long-term care track, had a greater range of scores across the board for responses of 4 or 5, indicating the issues were a major problem. Compared to the rankings in hospital settings, medication and treatment errors dropped relative to other responses in the patient care domain, while concerns about falls rose to the highest ranking. Maintaining functional independence, emotional contact, and privacy were the top concerns under user satisfaction (Figure 3). Under operational efficiency, staff and human resources continued to be a shared concern with other setting types. Technology concerns under accommodating change dropped significantly, while regulation and organizational and medical culture were listed as top concerns.

FIGURE 3
Long-term Care Setting –
percentage of respondents
defining user satisfaction
problems as serious*



* Serious Problem – ranked either 4 or 5 on scale where 1 = 'Not a problem' and 5 = 'Major problem'

The complete ranking data of issues within each of the six domains in long-term care settings can be found in Table A3 in Appendix A. Table A3 also identifies the percentage of respondents who identified a particular issue as a serious problem. Table 8 below highlights the top ranked issue in each of the domains in long-term care settings.

Table 8 Long-term Care Setting – top ranked issues by domain	
DOMAIN	TOP RANKED ISSUE
Patient care problems	Falls
User satisfaction problems	Maintaining functional independence
Operational efficiency	Use of staff and human resources
Accommodating change and innovation	Accommodating organizational and medical culture change
Responding to disasters	No significant responses.
Environmental issues	Improving indoor environmental quality

Open-ended responses: Top ranked most critical responses in long-term care settings were **patient** and **user satisfaction issues**, focusing on the need to de-institutionalize residents' environment, accommodating family needs, **re-thinking resident room design**, and **accommodating culture change**.

Table 9 Long-term Care Setting – top issues in open-ended responses	
RANKED DOMAINS*	SUBORDINATE ISSUES**
1. Patient satisfaction issues	<ul style="list-style-type: none"> Resident-centered care; deinstitutionalized accommodations Environment contributing to quality-of-life aspects, such as functional independence, engagement, and privacy Residents' control over environment; residents' choices
2. Place-centered issues	<ul style="list-style-type: none"> Better patient-room design Integrating the outdoors into the care environment Nursing unit spatial design
3. Accommodating change	<ul style="list-style-type: none"> Accommodating medical and organizational culture change
4. Patient care issues	<p>Safety:</p> <ul style="list-style-type: none"> Falls Facility acquired and nosocomial infections Safety issues of the cognitively impaired <p>Treatment:</p> <ul style="list-style-type: none"> Bedsore

* Ranked domains are from tables 10, 11, 12, most critical issue

** Analysis of open-ended responses and Table 14 Top problems – across all domains in each of the three settings

4.4 The Single Most Critical Issue

Following are detailed responses to the last question in the survey, “What is the most critical issue in healthcare environments?” The open-ended raw responses were divided by type of setting—hospital, ambulatory care and long-term care. A total of 239 individuals identified one or two issues as the most critical areas. After coding these responses, a total of 217 issues were classified for hospitals (Table 10), 37 issues for ambulatory care facilities (Table 11) and 49 issues for long-term care facilities (Table 12). Manual coding and content analysis categorized each response to either one of the six domains used in the study, or to new domains as appropriate. Further analysis grouped similar responses under sub headings, for example, Safety - falls.

Table 10 Hospital Setting – single most critical problem

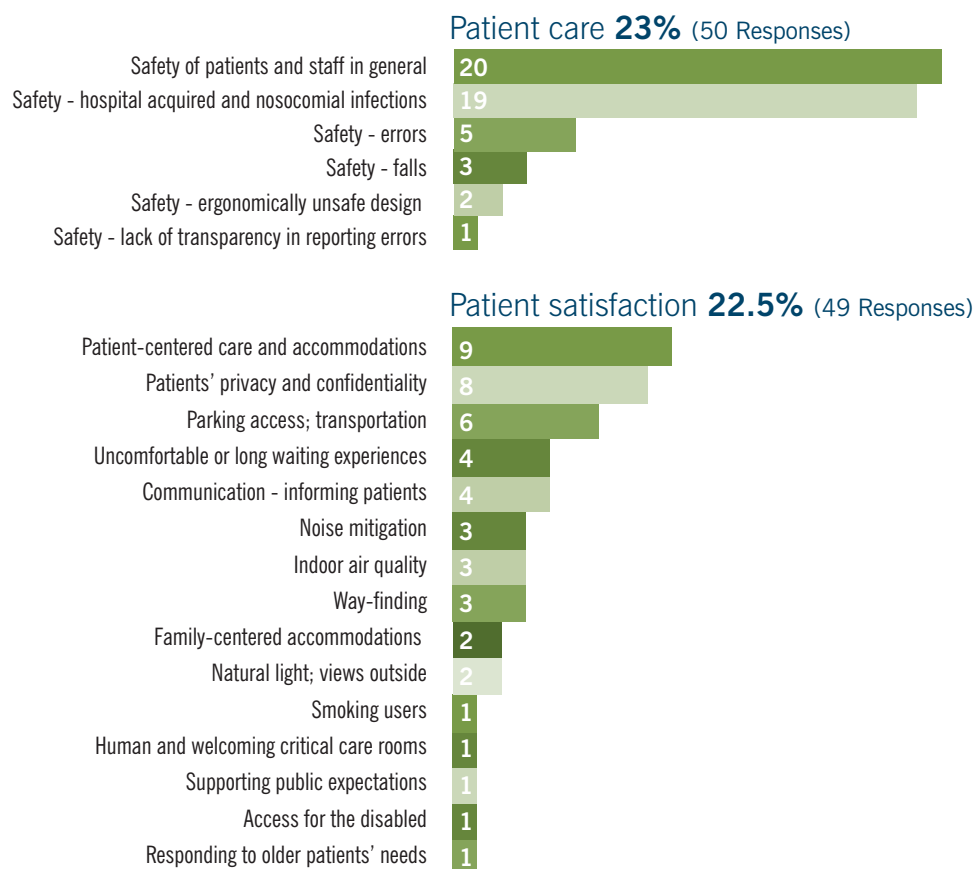


Table 10 Hospital Setting – single most critical problem (Continued)

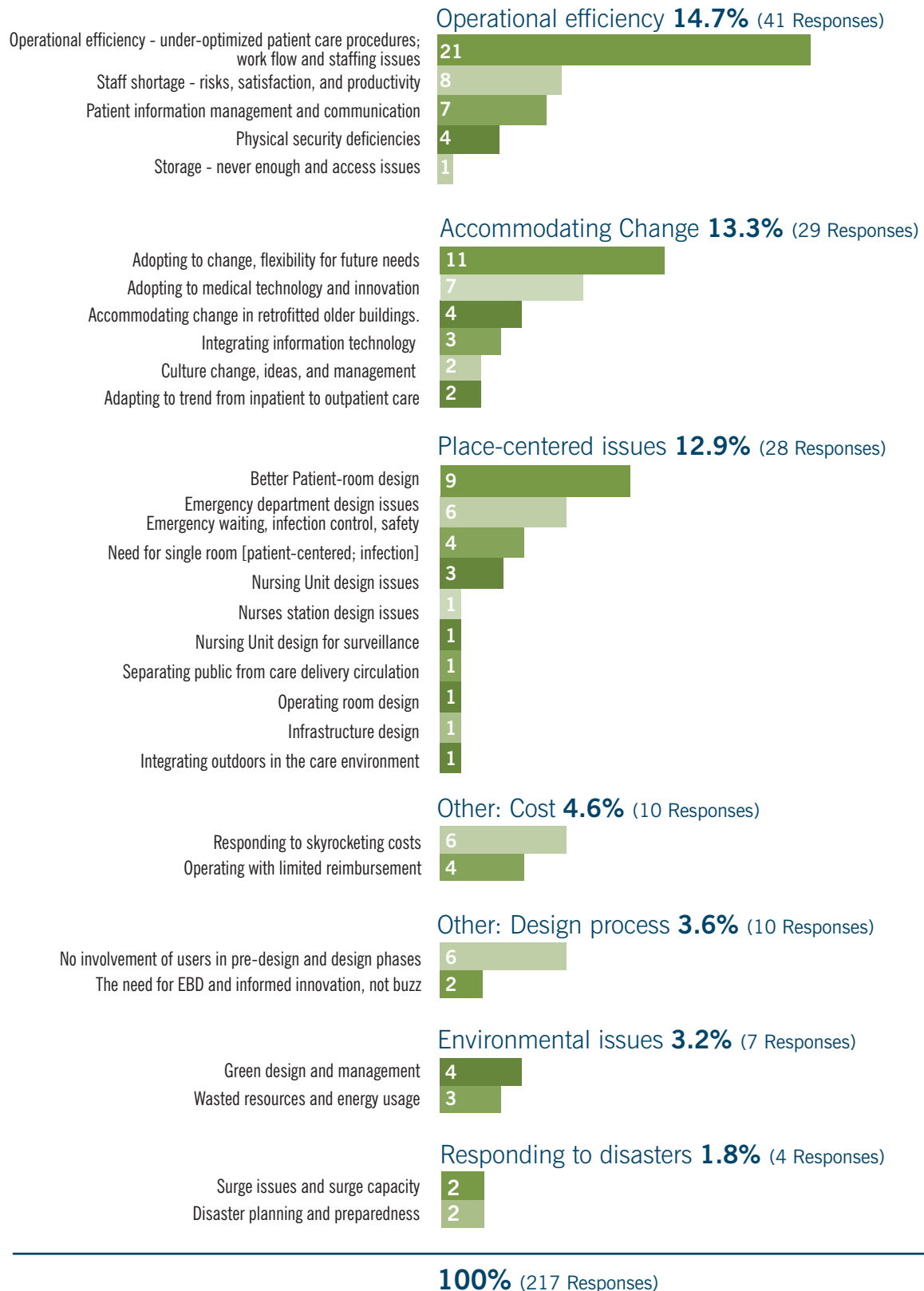


Table 11 Ambulatory Care Setting – single most critical problem

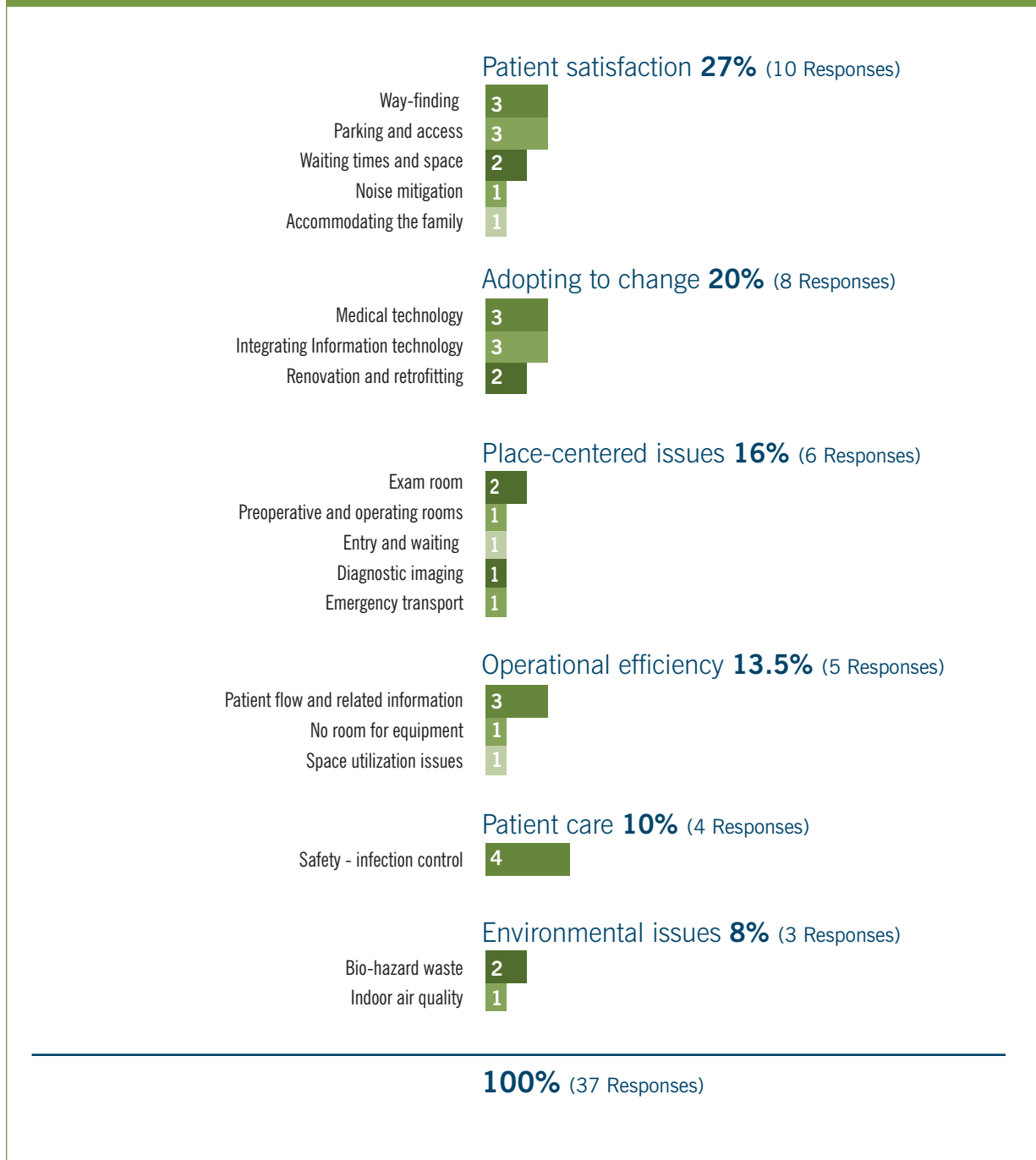
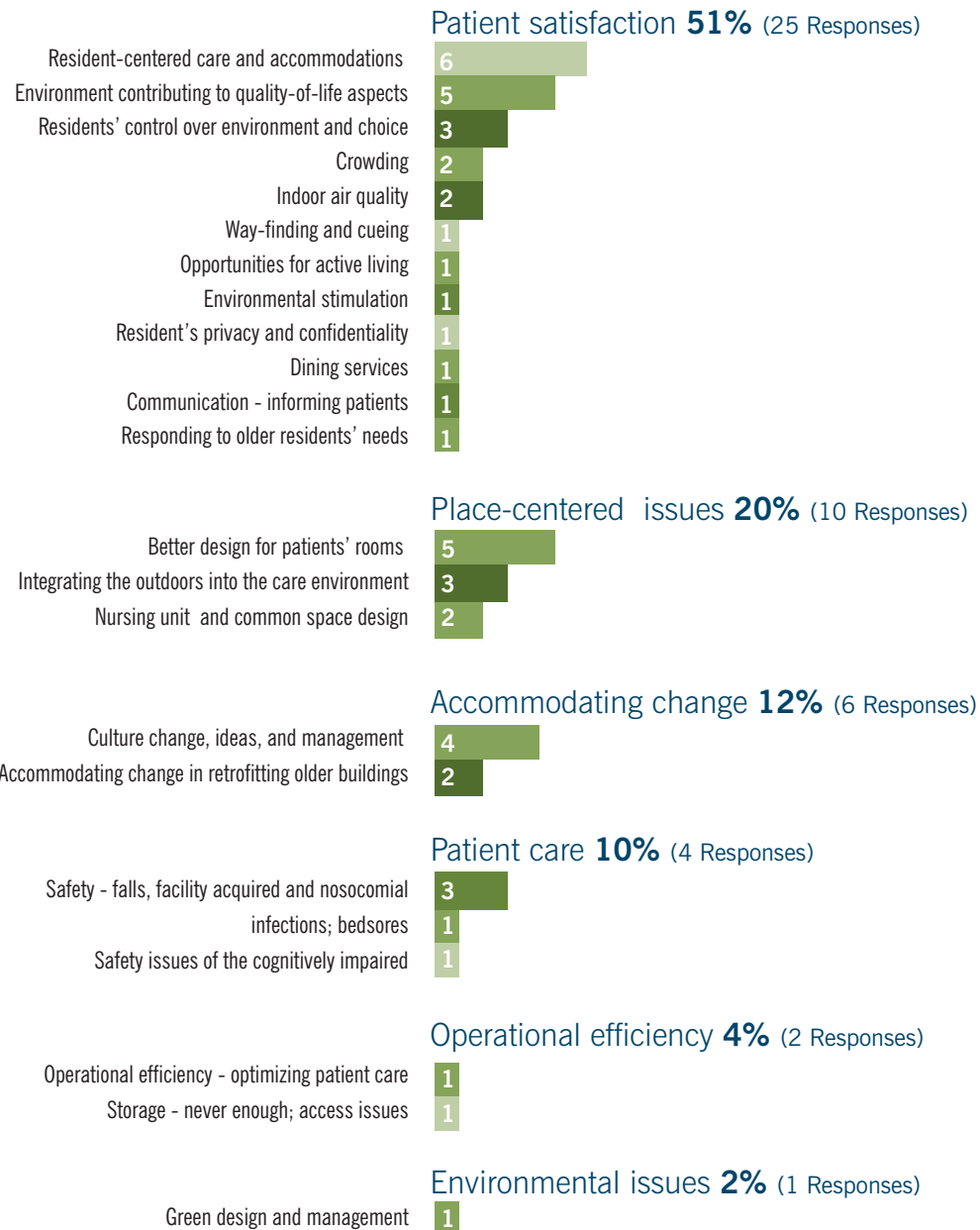


Table 12 Long-term Care Setting – single most critical problem



100% (49 Responses)

5

TOP ISSUE

Which locations are associated with more significant and/or a greater number of problems?

The questions in this part of the survey are important for two reasons. First, focusing on specific geographic locations in the facility is one approach that can sharpen the focus when conducting built-environment research. Secondly, given the limited resources for conducting health environment research, it is critical to identify the places where research is most needed and significant. Research should be focused first on those places within healthcare settings where problems concentrate, are common, and have the potential for greatest adverse impact if not mitigated.

Respondents were asked to rate different hospital places, units, and spaces on a 5-point scale, where 1 is “Not problematic” and 5 is “Very problematic.” The column titled “Highly Problematic” in Table A5 in Appendix A provides the percentage of individuals who rated a specific place, unit, or space with either a 4 or 5. Those individuals who rated a particular location as “Very problematic,” (rating of 5), were then given a follow-up question to determine whether this rating was based on issues of patient care, user satisfaction, operational efficiency, accommodating change, responding to disasters, or some other basis.

Although some problems were facility-wide, many other problems converged in particular locations, or had more critical manifestation in those particular locations. For example, patients’ rooms in hospitals were top ranked and were the locus for safety issues, noise issues, communication issues, and a host of other problems. Table 13 below summarizes the findings for the most problematic location in all three settings. Responses to the question, “Most problematic location” (Table A5, A6, and A7 in Appendix A) show the top ranking problem locations among the three setting types. These results are echoed in the analysis of open-ended responses to “Most critical issue” and by the open-ended comments.

5.1 Key Findings

Problematic Locations in Hospital Settings

Results are based on a total of 355 respondents who provided ratings for one or more hospital locations. Ranking of problematic hospital locations can be found in Table A5 in Appendix A.

Specific Spaces or Rooms: Patients' rooms topped the list, rated as highly problematic by 52.7% of the respondents. The extreme ratings of hospital places as very problematic was closely tied to issues of *operational* efficiency.

Departments or nursing units: Emergency rooms and departments topped the list, rated as highly problematic by 67.6% of the respondents, followed by nursing units at 59.7%. The extreme ratings of hospital units as very problematic has closely tied to issues of patient care and operational efficiency.

Public areas: Parking topped the list of problematic spaces and was rated as highly problematic by 44.2% of respondents, followed closely by waiting rooms at 40.2%. The extreme ratings of hospital public spaces as very problematic was closely tied to issues of user satisfaction.

Problematic Locations in Ambulatory Care Facilities

Ratings of one or more ambulatory care facility locations were provided by 79 respondents. Ranking was provided by facility type, as well as specific problematic areas within ambulatory care facilities. Ranking of problematic hospital locations can be found in Table A6 in Appendix A.

Facility types: Ambulatory surgical facilities topped the list, rated as highly problematic by 55.7% of the respondents, followed by urgent care centers at 43.3%.

Specific areas: Treatment and exam rooms and preoperative and recovery spaces topped the list of problematic areas and were rated as highly problematic by 46.8% and 45.7% of respondents, followed by waiting rooms at 39.1%. The extreme ratings of specific areas as very problematic was closely tied to issues of patient care in treatment and exam rooms, user satisfaction in pre- and post-procedure areas, operational efficiency in procedure spaces, and accommodating change.

Problematic Locations in Long-term Care Facilities

Facility types: Skilled nursing facilities topped the list, rated as highly problematic by 70.0% of the respondents.

Specific areas: Residents' rooms topped the list and were rated as highly problematic by 70.3% of respondents, followed by staff control and work areas, and outdoor activity areas. The extreme ratings of specific areas as very problematic was closely tied to issues of user satisfaction, patient care, and operational efficiency.

Table 13: Summary of Locations Identified as Most Problematic

	SPECIFIC PATIENT SPACES	DEPARTMENTS	PUBLIC SPACES
Hospital setting	Patients' rooms	Emergency rooms and departments Nursing units	Parking Waiting rooms
Ambulatory setting			
<i>Facility Types:</i>			
Ambulatory surgical facilities	Treatment and exam rooms		Waiting rooms
Urgent care centers	Pre operative and recovery spaces		
Long-term care environment			
<i>Facility Types:</i>			
Skilled nursing facilities	Resident's rooms Staff control and work areas		Outdoor activity areas

6

TOP ISSUE

How similar or different are the patterns of responses regarding issues in acute care settings vs. ambulatory settings vs. long-term care settings?

While the delivery of healthcare is a shared mission for the three care setting-types, the premise is that basic differences exist among them due to their many different characteristics. For example, patients' short-term stay and wide swings in physical and clinical acuity in hospitals; residents' long-term stay issues, physical and cognitive frailty in long-term cares; high level of traffic and issues associated with 'coming and going' in ambulatory care settings.

A clearer view of problem patterns, as viewed by respondents addressing each of the three settings, may shed light on which problems are shared by all settings and which problems are a priority in one particular place-type but not in others.

6.1 Key Findings

Comparison of care settings

Analysis of open-ended responses, responses to the question "Which is the most critical issue" (tables 10, 11, and 12), and "Top ranking issues across domains by three settings" (Table 14) show clear patterns of similarities and differences among the three setting-types.

Most problem areas are shared by all setting-types. However, the extent and focus of several specific problem areas vary significantly among care settings.

Patient care issues—safety and infections—topped the list in hospital settings, but a specific patient care issue—falls—is ranked highest in long-term care settings (see Figure 4).

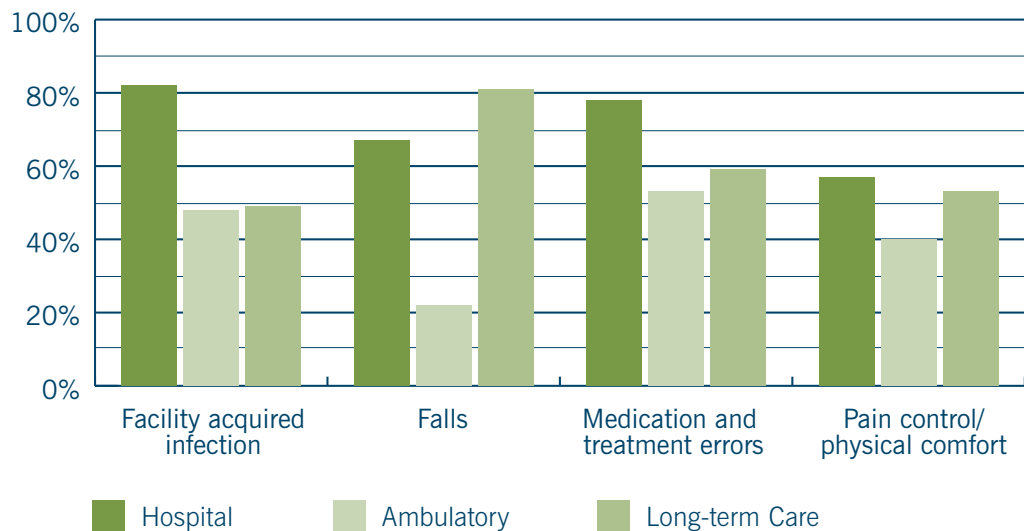
Patient satisfaction issues account for over 50% of long-term care concerns (Table A11 in Appendix A). Patient concerns in long-term care settings have a very different focus compared with hospital and ambulatory care setting responses. The main concerns are maintenance of residents' functional independence, engagement, and improvement of residents' living conditions vs. stress reduction and increased comfort in hospitals, and way finding, access, and stress reduction in ambulatory care settings.

Organizational culture change—the trend toward resident-centered care and its impact on design—is also mostly relevant to and ranked high at long-term care.

Ambulatory care setting respondents were concerned mostly about adaptability to change, primarily the rapid changes in information and medical technology.

The significant variability of problem areas among care settings has implications for agenda-setting and selection of most productive research questions.

FIGURE 4
Comparison of Serious*
Patient Care Problems
Across Settings



* Serious Problem – ranked either 4 or 5 on scale where 1 = 'Not a problem' and 5 = 'Major problem'

The results in Table A5 in Appendix A combine findings from tables 1 through 3 to highlight the most problematic issues in each setting, regardless of domain. Items that were rated as serious problems (as indicated by a rating of 4 or 5 on the 5-point scale) by 70% or more of the respondents are included in Table 14. Based on this criterion, a narrower range of issues were identified in the ambulatory care setting (3 problems) than in either hospital (9 problems) or long-term care settings (8 problems).

Table 14 Top Problems¹ – across all domains in each of the three settings

HOSPITAL SETTING	RANK	MEAN	SERIOUS ² PROBLEM
Use of staff and human resources	1	4.35	86.6%
Hospital acquired infection	1	4.29	82.2%
Accommodating change in information technology	1	4.16	79.3%
Medication and treatment errors	2	4.14	77.8%
Communication and information	1	4.14	80.1%
Use of space and buildings	2	4.09	76.8%
Accommodating change in medical technology	2	4.03	75.4%
Responding to staff member needs	2	4.00	73.7%
Accommodating organizational and medical culture change	3	3.98	70.2%
AMBULATORY CARE SETTING	RANK	MEAN	SERIOUS ² PROBLEM
Use of staff and human resources	1	4.05	73.4%
Accommodating rapid change in information technology	1	3.98	74.2%
Communication and information	1	3.95	73.2%
LONG-TERM CARE SETTING	RANK	MEAN	SERIOUS ² PROBLEM
Maintaining functional independence	1	4.35	83.3%
Falls	1	4.31	80.6%
Accommodating organizational and medical culture change	1	4.14	75.6%
Emotional contact	2	4.05	75.6%
Use of staff and human resources	1	4.05	73.8%
Physical privacy	3	3.98	70.1%
Social contact	4	3.94	71.8%
Physical comfort	2	3.91	72.0%

¹⁾ Top problems – more than 70% of respondents rated the problem as serious

²⁾ Serious problem – combined ranking of 4 and 5 on scale where 1 = “Not a problem” and 5 = “Major problem”

7

TOP ISSUE

How do different stakeholders assess problems in healthcare environments?

The premise behind the question is that stakeholders with different disciplinary perspectives might view some issues differently, due to training, professional orientation, focus of experience, and a variety of other reasons. If so, there should be significant implications to both research and design practices.

In the following analysis (tables A8 and A9 in Appendix A), respondents were grouped into four groups:

Direct care professionals – nurses, physicians, hospital workers, etc.

Health administrators – facility directors, administrative workers, etc.

Design professionals – architects, interior designers, landscape architects.

Researchers – researchers, educators, knowledge promoters, etc.

Table A8 is based on 360 respondents who assessed the degree to which one or more hospital areas were problematic. Table A9 is based on 73 respondents who did the same for long-term care facilities.

7.1 Key findings

Different Groups of Stakeholders do Assess Problems Differently

Statistically significant differences were found between respondent groups in their assessment of problems (Table A8 in Appendix A). These differences relate primarily to issues of user satisfaction, where eight specific problems are seen differently according to respondent type. Significant differences according to respondent type are seen with regard to two specific problems in each of the domains of patient care, accommodating change and environmental issues. In the problem domains of patient care—user satisfaction and environmental issues—the significant differences in responses indicate that **design professionals and researchers are more likely to view these issues as being more acute than would direct care providers or hospital administrators.**

Limited input from direct care providers to programming and design

Open-ended responses consistently voiced concern (mostly by direct care respondents) for their low level or limited—and often missing—input into planning and design. Some respondents openly criticized the insensitivity of the design professionals to user’s experience in the ‘trenches’.

Implications to research and design practices

The analysis of stakeholders responses suggest several broad implications to research and design practices, wherever a professional opinion and judgment are part of the process. Some examples for these situations are:

- Planning committees for programming and the design of facilities
- Focus groups and expert panels to generate ideas
- Consensus groups to determine research priorities

While it is an accepted norm to assemble multi-disciplinary teams for these tasks, awareness of disciplinary biases is very important in shaping the groups of opinion makers. The findings underscore **the need for inclusive and balanced representation of the relevant disciplinary perspectives in decision making.**

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APPENDIX A: TABLES AND FIGURES

Table A1 Hospital Setting: Ranking of most pressing problems by type of problem¹

In Table A1 the prompted items in each domain for the hospital setting are ranked by the mean score provided by respondents where 1 is “not a problem” and 5 indicates a “major problem.” The differences between the means of items vary from domain to domain and never exceed one unit on the five point scale. However, as detailed below, in each domain the observed difference between the least problematic and the most problematic items are statistically significant. In other words, while none of the issues are wholly unproblematic, some are significantly more problematic than others. The results presented in Table A1 were collected from pages 4 through 15 of the hospital track of the survey; 443 individuals responded to one or more items on page 4 and 339 to one or more items on page 15.

The column headed “Serious Problem” lists the combined percentage of respondents who answered a 4 or 5 to each of the items. For example, 82.2% of the respondents rated “Hospital acquired infection” as a 4 or a 5 on the scale from 1 to 5, with 5 being the most serious problem. In most cases, ranking according to the percentage indicating an item was a serious problem would be identical. In a few instances there would be minor differences in rankings (for example, between sleep patterns and pain control and physical comfort) if the percentage value were used. Minor differences of this type result when there is greater variation in responses and the relatively large proportion of 4s and 5s are balanced out by a relatively large number of 1s and 2s.

Asterisks flag statistical differences for each item relative to the lowest ranked item.

Table A1 Hospital Setting: Ranking of most pressing problems by type of problem¹

PATIENT CARE PROBLEMS	RANK	MEAN	SERIOUS PROBLEM
Hospital acquired infection**	1	4.29	82.2%
Medication and treatment errors**	2	4.14	77.8%
Falls**	3	3.82	66.9%
Sleep patterns**	4	3.58	55.4%
Pain control and physical comfort**	5	3.56	57.1%
Recovery rate; length of stay	6	3.43	48.2%
USER SATISFACTION PROBLEMS	RANK	MEAN	SERIOUS PROBLEM
Communication and information**	1	4.14	80.1%
Responding to staff member needs**	2	4.00	73.7%
Bariatric patient needs**	3	3.88	68.9%
Physical privacy**	4	3.83	68.3%
Elderly-specific needs**	5	3.79	67.2%
Orientation and way-finding**	5	3.79	61.8%
Responding to family and visitor needs**	7	3.69	60.8%
Responding to users' cultural diversity**	8	3.49	51.9%
Emotional contact**	9	3.47	50.9%
Confidentiality of information**	10	3.42	52.0%
Newborn and children-specific needs	11	3.31	49.3%
Social contact	12	3.25	39.9%
OPERATIONAL EFFICIENCY	RANK	MEAN	SERIOUS PROBLEM
Use of staff and human resources**	1	4.35	86.6%
Use of space and buildings**	2	4.09	76.8%
Use of information, communication, and media**	3	3.87	70.5%
Use of supplies, materials, and products**	4	3.84	67.2%
Use of energy	5	3.70	62.6%
ACCOMMODATING CHANGE AND INNOVATION	RANK	MEAN	SERIOUS PROBLEM
Accommodating change in information technology**	1	4.16	79.3%
Accommodating change in medical technology**	2	4.03	75.4%
Accommodating organizational and medical 'culture change'**	3	3.98	70.2%
Accommodating change in medical procedures and practices**	4	3.83	68.1%
Accommodating changes resulting from regulation	5	3.71	59.5%
Accommodating changes resulting from reimbursement changes	6	3.70	59.8%

¹) Serious problem – combined ranking of 4 and 5 on scale where 1 = “Not a problem” and 5 = “Major problem”

** p < .01. *p < .05

Table A1 Hospital Setting: Ranking of most pressing problems by type of problem ¹ (Continued)			
RESPONDING TO DISASTERS	RANK	MEAN	SERIOUS PROBLEM
Managing hospitals impacted by events**	1	3.89	67.8%
Natural disasters(hurricanes, floods, earthquakes, etc.) **	2	3.76	62.4%
Decontamination**	3	3.69	60.6%
Biological and nuclear terrorism**	4	3.63	57.1%
Triage**	5	3.62	60.4%
Treatment zones**	6	3.58	56.6%
Incident command	7	3.26	44.3%
Chemical spills	8	3.20	37.4%
Transportation and industrial accidents	9	3.16	35.9%
ENVIRONMENTAL ISSUES	RANK	MEAN	SERIOUS PROBLEM
Improving indoor air quality**	1	3.86	68.3%
Energy and power management**	2	3.82	68.2%
Toxic materials management**	3	3.80	65.1%
Solid waste management*	4	3.69	60.2%
Water management	5	3.60	55.8%
Use of renewable building materials	6	3.55	54.9%

¹⁾ Serious problem – combined ranking of 4 and 5 on scale where 1 = “Not a problem” and 5 = “Major problem”

* p < .05 ** p < .01

Table A2 Ambulatory Care Setting: Ranking of most pressing problems by type of problem¹

As is the case with Table A1 on Hospitals, in Table A2 the prompted items in each domain for ambulatory care settings are ranked by the mean score provided by respondents where 1 is “not a problem” and 5 indicates a “major problem.” Here, the differences between the means of items in the patient care domain, as well as in the user satisfaction domain, exceed one unit on the five point scale. In the other domains the differences are more modest, but in each instance, the observed difference between the least problematic and the most problematic items is statistically significant. The results in Table A2 come from pages 4 through 13 of the ambulatory care facilities track, with 103 individuals responding to one or more items on page 4 and 80 responding to one or more items on page 13.

Table A2 Ambulatory Care Setting: Ranking of most pressing problems by type of problem¹

PATIENT CARE PROBLEMS	RANK	MEAN	SERIOUS PROBLEM
Medication and treatment errors**	1	3.55	53.1%
Pain control**	2	3.27	40.6%
Facility acquired infections**	3	3.20	47.6%
Recovery rates**	4	3.13	39.8%
Falls	5	2.76	22.8%
USER SATISFACTION PROBLEMS	RANK	MEAN	SERIOUS PROBLEM
Communication and information**	1	3.95	73.2%
Orientation and way-finding**	2	3.65	62.9%
Elderly needs**	3	3.63	60.8%
staff member needs**	4	3.59	56.8%
Disabled needs**	5	3.57	57.7%
Physical privacy**	6	3.47	54.6%
Responding to users' cultural diversity**	7	3.35	47.4%
Confidentiality of information**	8	3.30	45.4%
Family and visitor needs**	9	3.28	43.9%
Emotional contact*	10	3.14	39.4%
Children-specific needs	11	3.09	43.2%
Social contact	12	2.90	31.3%
OPERATIONAL EFFICIENCY	RANK	MEAN	SERIOUS PROBLEM
Use of staff and human resources**	1	4.05	73.4%
Use of space and buildings**	2	3.94	66.0%
Use of information, communication and media	3	3.62	59.1%
Use of supplies, materials and products	4	3.59	55.3%
Use of energy	5	3.52	50.6%
ACCOMMODATING CHANGE AND INNOVATION	RANK	MEAN	SERIOUS PROBLEM
Accommodating rapid change in information technology**	1	3.98	74.2%
Accommodating change in medical technology**	2	3.76	63.4%
Accommodating organizational and medical culture change	3	3.65	58.7%
Accommodating program changes resulting from reimbursement changes	4	3.54	50.5%
Accommodating changes resulting from regulation	5	3.52	51.6%
Accommodating change in medical procedures and practices	6	3.47	46.7%
ENVIRONMENTAL ISSUES	RANK	MEAN	SERIOUS PROBLEM
Improving indoor air quality**	1	3.78	61.2%
Use of renewable building materials*	2	3.41	48.8%
Energy and power management*	3	3.40	47.1%
Toxic materials management	4	3.28	42.0%
Solid waste management	5	3.12	37.8%
Water management	6	3.06	34.1%

¹) Serious problem – combined ranking of 4 and 5 on scale where 1 = “Not a problem” and 5 = “Major problem”

** p < .01. * p < .05

Table A3 Long-Term Care Setting: Ranking of most pressing problems by type of problem¹

In Table A3 the prompt items in each domain for long-term care facilities are ranked by the mean score provided by respondents. Here, the differences between the means of items in the user satisfaction and accommodating change domains exceed one unit on the five point scale. In the other domains the differences are about .75 units and in each instance, the observed difference between the least problematic and the most problematic items is statistically significant. The results in Table A3 come from pages 4 through 13 of the long-term care facilities track, with 93 individuals responding to one or more items on page 4 and 69 responding to one or more items on page 13.

Table A3 Long-Term Care Setting: Ranking of most pressing problems by type of problem ¹			
PATIENT CARE PROBLEMS	RANK	MEAN	SERIOUS PROBLEM
Falls**	1	4.31	80.6%
Physical comfort**	2	3.91	72.0%
Sleep patterns*	3	3.72	63.2%
Medication and treatment errors	4	3.65	59.0%
Pain control	5	3.52	53.0%
Facility-acquired infections	6	3.42	48.8%
USER SATISFACTION PROBLEMS	RANK	MEAN	SERIOUS PROBLEM
The maintenance of functional independence**	1	4.35	83.3%
Emotional contact**	2	4.05	75.6%
Physical privacy**	3	3.98	70.1%
Social contact**	4	3.94	71.8%
The needs of staff members**	5	3.80	63.1%
Communication and information**	6	3.78	60.2%
Orientation and way finding**	6	3.78	68.2%
The needs of families and visitors**	8	3.67	59.5%
The needs of the disabled**	9	3.56	58.8%
Responding to users' cultural diversity*	10	3.37	50.6%
Confidentiality of information	11	3.09	42.0%
OPERATIONAL EFFICIENCY	RANK	MEAN	SERIOUS PROBLEM
Use of staff and human resources**	1	4.05	73.8%
Use of space and buildings**	2	3.86	69.4%
Use of energy	3	3.49	46.2%
Use of information, communication and media	4	3.45	57.9%
Use of supplies, materials and products	5	3.25	38.0%

¹) Serious problem – combined ranking of 4 and 5 on scale where 1 = “Not a problem” and 5 = “Major problem”

** p < .01. * p < .05

Table A3 Long-Term Care Setting: Ranking of most pressing problems by type of problem ¹ (Continued)			
ACCOMMODATING CHANGE AND INNOVATION	RANK	MEAN	SERIOUS PROBLEM
Accommodating organizational and medical 'culture change'**	1	4.14	75.6%
Accommodating changes resulting from regulation**	2	3.79	67.5%
Accommodating change in information technology**	3	3.61	59.2%
Accommodating program changes to changes in reimbursement**	4	3.41	53.4%
Accommodating change in medical procedures and practices	5	3.19	37.0%
Accommodating change in medical technology	6	3.09	36.8%
ENVIRONMENTAL ISSUES	RANK	MEAN	SERIOUS PROBLEM
Improvement of indoor air quality**	1	3.91	67.9%
Energy and power management**	2	3.61	56.9%
Use of renewable building materials*	3	3.38	47.9%
Water management	4	3.36	48.6%
Solid waste management	5	3.33	53.6%
Toxic materials management	6	3.04	42.0%

¹⁾ Serious problem – combined ranking of 4 and 5 on scale where 1 = “Not a problem” and 5 = “Major problem”

** p < .01. * p < .05

Table A4 Top problems¹ across all domains in each setting

The results in Table A4 combine findings from Tables A1 through A3 to highlight the most problematic issues in each setting, regardless of domain. Items that were rated as serious problems (as indicated by a rating of 4 or 5 on the 5 point scale) by 70% or more of the respondents are included in Table A4. Based on this criterion a narrower range of issues were identified in the ambulatory care setting (3 problems) than in either hospital (9 problems) or long-term care settings (8 problems).

Table A4 Top problems¹ across all domains in each setting

HOSPITAL SETTING	RANK	MEAN	SERIOUS² PROBLEM
Use of staff and human resources	1	4.35	86.6%
Hospital acquired infection	1	4.29	82.2%
Accommodating change in information technology	1	4.16	79.3%
Medication and treatment errors	2	4.14	77.8%
Communication and information	1	4.14	80.1%
Use of space and buildings	2	4.09	76.8%
Accommodating change in medical technology	2	4.03	75.4%
Responding to staff members' needs	2	4.00	73.7%
Accommodating organizational and medical 'culture change'	3	3.98	70.2%
AMBULATORY CARE SETTING	RANK	MEAN	SERIOUS² PROBLEM
Use of staff and human resources	1	4.05	73.4%
Accommodating rapid change in information technology	1	3.98	74.2%
Communication and information	1	3.95	73.2%
LONG-TERM CARE SETTING	RANK	MEAN	SERIOUS² PROBLEM
The maintenance of functional independence	1	4.35	83.3%
Falls	1	4.31	80.6%
Accommodating organizational and medical 'culture change'	1	4.14	75.6%
Emotional contact	2	4.05	75.6%
Use of staff and human resources	1	4.05	73.8%
Physical privacy	3	3.98	70.1%
Social contact	4	3.94	71.8%
Physical comfort	2	3.91	72.0%

¹⁾ Top problems – more than 70% of respondents rated the problem as serious

²⁾ Serious problem – ranked either 4 or 5 on scale where 1 = “Not a problem” and 5 = “Major problem”

Table A5 Hospital Setting: Ranking of most problematic locations

Table A5 Hospital Setting: Ranking of most problematic locations				
	RANK	MEAN	HIGHLY ¹ PROBLEMATIC	MOST OFTEN VERY PROBLEMATIC AS A MATTER OF...
Specific spaces or rooms				
Patient rooms**	1	3.45	52.7%	OE
Operating rooms	2	3.12	40.2%	OE / AE
Treatment and exam rooms	3	3.12	37.7%	PC / OE
Diagnostic imaging rooms	4	3.04	35.0%	AC
Departments or Units				
Emergency**	1	3.71	67.6%	PC / OE
Nursing units**	2	3.56	59.7%	PC / OE
Critical care units**	3	3.49	57.4%	PC
Surgery**	4	3.26	43.3%	OE
NICU's**	5	3.06	39.4%	PC
Imaging**	6	2.99	32.3%	AC
Birthing units**	7	2.88	26.1%	PC
Rehab services	8	2.69	20.1%	US
General or Public Areas				
Parking**	1	3.20	44.2%	US
Waiting rooms**	2	3.09	40.2%	US
Corridors**	3	2.87	30.5%	US / PC
Exterior site areas	4	2.61	19.8%	US
Entry and lobby sites	5	2.57	20.9%	US / OE

¹⁾ Highly problematic – combined ranking of 4 and 5 on scale where 1 = “Not problematic” and 5 = “Very problematic”

PC = patient care, US = user satisfaction, OE = operational efficiency, AC = accommodating change

** p < .01. * p < .05

Table A6 Ambulatory Care Setting: Ranking of most problematic locations

Table A6 provides a summary of responses to questions regarding problematic locations in ambulatory care settings. Ratings of one or more ambulatory care facility locations were provided by 79 respondents. The Table is divided into two panels: the upper panel presents results for *types* of ambulatory care facilities and the lower considers *specific areas* within all ambulatory care facilities. Follow-up queries regarding the basis for very problematic ratings were only considered valid for the *specific areas* and thus were not asked with regard to types of facilities.

Table A6 Ambulatory Care Setting: Ranking of most problematic locations				
	RANK	MEAN	HIGHLY ¹ PROBLEMATIC	MOST OFTEN VERY PROBLEMATIC AS A MATTER OF...
Specific Types of Ambulatory Care Facilities:				
Urgent Care Centers**	1	3.33	43.3%	
Ambulatory Surgical Facilities**	2	3.31	55.7%	
Medical Office Buildings**	3	3.15	46.6%	
Community Oriented Primary Care Centers**	4	3.14	42.0%	
Ambulatory Cancer Care Centers**	5	3.00	36.8%	
Ambulatory Care Imaging Centers**	6	2.92	31.0%	
Ambulatory Physical Rehab Centers**	7	2.78	28.9%	
Wellness Centers	8	2.45	12.8%	
Specific Patient Care or Public Areas in Ambulatory Care Facilities:				
Treatment and exam rooms**	1	3.21	46.8%	PC
Pre operative and recovery spaces**	2	3.17	45.7%	US / AC
Waiting rooms**	2	3.17	39.1%	US
Parking**	4	3.06	47.7%	US
Diagnostic imaging rooms**	5	3.00	39.2%	OE
Operating rooms**	6	2.97	35.2%	OE / AC
Entry/lobby	7	2.61	18.2%	US
Corridors	8	2.56	20.8%	US / OE
Exterior site areas	9	2.49	24.1%	AC

¹⁾ Highly problematic – combined ranking of 4 and 5 on scale where 1 = “Not problematic” and 5 = “Very problematic”

PC = patient care, US = user satisfaction, OE = operational efficiency, AC = accommodating change

** p < .01. * p < .05

Table A7 Long-term Care Setting: Ranking of most problematic locations

Table A7 reports data on problematic locations in long-term care settings. The upper panel of Table A7 looks at types of facilities and the lower panel describes responses to areas in facilities.

Table A7 Long-term Care Setting: Ranking of most problematic locations				
	RANK	MEAN	HIGHLY ¹⁾ PROBLEMATIC	MOST OFTEN VERY PROBLEMATIC AS A MATTER OF...
Specific Types of Long-term Care Facilities:				
Skilled Nursing Facilities**	1	4.02	70.0%	
Assisted Living Facilities**	2	3.37	47.1%	
Group Homes	3	3.15	40.3%	
Hospice Facilities	4	3.07	36.2%	
Continuing Care Retirement Communities	5	3.00	32.9%	
Specific Areas in Long-term Care Facilities:				
Residents' rooms**	1	3.81	70.3%	PC / US
Staff work and control areas**	2	3.52	59.2%	OE
Outdoor activity areas**	3	3.48	59.1%	PC / US
Circulation areas**	3	3.46	54.3%	US
Dining facilities**	5	3.46	51.5%	US / OE / AC
Indoor activity areas**	6	3.43	59.4%	PC / US
Entry areas	7	2.71	19.2%	US / OE

¹⁾ Highly problematic – combined ranking of 4 and 5 on scale where 1 = “Not problematic” and 5 = “Very problematic”

PC = patient care, US = user satisfaction, OE = operational efficiency, AC = accommodating change

** p < .01. * p < .05

Table A8 Statistically significant differences in the assessment of problems in hospitals according to respondent type

Table A8 Statistically significant differences in the assessment of problems in hospitals according to respondent type				
	DIRECT CARE	HEALTH ADMINISTRATORS	DESIGN PROFESSIONALS	RESEARCHERS
Patient Care Problems				
Hospital acquired infection**				
Not a major problem	26.0%	16.8%	7.8%	9.1%
A major problem	74.0%	83.2%	92.2%	90.9%
Sleep patterns*				
Not a major problem	45.7%	48.4%	35.5%	21.2%
A major problem	54.3%	51.6%	64.5%	78.8%
User Satisfaction Problems				
Orientation and way finding**				
Not a major problem	46.7%	36.5%	21.3%	35.3%
A major problem	53.3%	63.5%	78.8%	64.7%
Communication and information**				
Not a major problem	30.3%	12.5%	10.0%	15.2%
A major problem	69.7%	87.5%	90.0%	84.8%
Physical privacy*				
Not a major problem	38.5%	37.5%	18.8%	27.3%
A major problem	61.5%	62.5%	81.3%	72.7%
Social contact**				
Not a major problem	70.8%	63.8%	42.9%	50.0%
A major problem	29.2%	36.2%	38.8%	50.0%
Emotional contact**				
Not a major problem	55.7%	56.0%	34.2%	35.5%
A major problem	44.3%	44.0%	65.8%	64.5%
New-born and children specific needs**				
Not a major problem	65.0%	55.7%	28.6%	40.0%
A major problem	35.0%	44.3%	71.4%	60.0%
Responding to families' and visitors' needs*				
Not a major problem	48.0%	38.5%	30.9%	27.3%
A major problem	52.0%	61.5%	69.1%	72.7%
Responding to staff members' needs*				
Not a major problem	24.4%	35.4%	17.3%	15.2%
A major problem	75.6%	64.6%	82.7%	84.8%

** p < .01, * p < .05

Table A8 Statistically significant differences in the assessment of problems in hospitals according to respondent type (*Continued*)

	DIRECT CARE	HEALTH ADMINISTRATORS	DESIGN PROFESSIONALS	RESEARCHERS
Accommodating Change and Innovation				
Accommodating changes from reimbursement*				
Not a major problem	28.9%	45.7%	51.4%	40.0%
A major problem	71.1%	54.3%	48.6%	60.0%
Accommodating changes from regulation*				
Not a major problem	33.9%	38.5%	54.5%	37.9%
A major problem	66.1%	61.5%	45.5%	62.1%
Environmental Issues				
Energy and power management**				
Not a major problem	45.0%	28.1%	10.1%	37.9%
A major problem	55.0%	71.9%	89.9%	62.1%
Improvement of indoor air quality*				
Not a major problem	36.0%	35.2%	20.0%	36.7%
A major problem	64.0%	64.8%	80.0%	63.3%

** p < .01, * p < .05

Table A9 Statistically significant differences in the assessment of problems in long-term care facilities according to respondent type

Table A9 Statistically significant differences in the assessment of problems in long-term care facilities according to respondent type				
	DIRECT CARE	HEALTH ADMINISTRATORS	DESIGN PROFESSIONALS	RESEARCHERS
Orientation and way finding*				
Not a major problem	30.0%	48.0%	8.0%	30.0%
A major problem	70.0%	52.0%	92.0%	70.0%
Responding to users' cultural diversity*				
Not a major problem	40.0%	65.4%	25.0%	55.6%
A major problem	60.0%	34.6%	75.0%	44.4%
Accommodating changes from regulation*				
Not a major problem	10.0%	22.2%	52.2%	44.4%
A major problem	90.0%	77.8%	47.8%	55.6%
Use of renewable building materials*				
Not a major problem	40.0%	76.0%	36.4%	50.0%
A major problem	60.0%	24.0%	63.6%	50.0%

** p < .01, * p < .05



APPENDIX B: THE SURVEY INSTRUMENT



Critical Issues in Health Care Environments Survey

The objective of this survey is to identify and describe critical issues in health care environments/settings for ambulatory, acute and long-term care. Your answers are confidential. Upon completion of this study, a summary of the findings will be accessible to you on the Center for Health Design (CHD) website. To thank you for taking the time out of your day to fill out this survey, the CHD would like to offer you a substantial discount on one downloadable research report available on the CHD website. Details will be available at the end of the survey. Thank you!

To start the survey, learn more about this project or ask for further information, click below.

START THE SURVEY >>



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Critical Issues in Health Care Environments

A research initiative by the Coalition of Health Environments Research [CHER], now part of the Center for Health Design (CHD)

This study is centered on issues and problems that have a bearing on the design of health care environments. Your responses will help us identify important research questions, leading to evidence-based, design information addressing critical issues. Ultimately, the information will lead to a more informed design, to improved environments, and to better health care.

If you would like additional information regarding your rights as a participant, you may click on the confidentiality statement link at the bottom of the page at any time during the survey.

If you have any difficulties starting the survey, please contact us at: jwitte@clemsun.edu

Your opinion matters to us, and we greatly appreciate your participation.

[CLICK ONCE TO CONTINUE]
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Confidentiality Statement



This survey is being sent to diverse respondents' groups: Health care providers, environmental design professionals, health facilities-related industries, public-interest groups and users, and other relevant parties.

We have organized the questionnaire to address issues in three different place types.

Please indicate which setting you would like to serve as the basis for the questions you receive. You may select the category that represents your disciplinary training, your current work place, or simply where you see the most pressing issues, regardless where you come from or what you practice.

Hospitals



Ambulatory Care Settings



Long Term Care Settings



Note: at the end of the survey you will have the opportunity to select another one of these three setting to evaluate.

[CLICK ONCE TO CONTINUE]
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Patient Care Problems

A primary charge for healthcare organizations and facilities is to optimize therapeutic outcomes and patient safety. The following represent patient care topics that may be influenced by the design of the built environment. Which ones involve the most pressing problems?

Patients' safety and security

	Not a problem 1	2	3	4	Major problem 5	Don't know
Hospital acquired infection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Medication and treatment errors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Falls	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Patients treatment, healing, recovery, clinical outcomes:

	Not a problem 1	2	3	4	Major problem 5	Don't know
Recovery rate /Length of stay	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pain control/ physical comfort	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sleep patterns	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



[CLICK ONCE TO CONTINUE]

Patient Care Problems

Are there other patient care topics related to the design of the hospitals you consider to be pressing problems?

[CLICK ONCE TO CONTINUE]

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The Hospital Experience: User Satisfaction Problems

Care providers strive to optimize patient, family and staff satisfaction by addressing social/psychological and other non-clinical aspects of care.

The following represent user satisfaction topics that may be influenced by the design of the built environment. Which ones involve the most pressing problems?

Responding to patients' personal, emotional and social needs

	Not a problem 1	2	3	4	Major problem 5	Don't know
Orientation and way finding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communication and information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical privacy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confidentiality of information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social contact	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emotional contact	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Responding to users' cultural diversity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Responding to users' special needs:

	Not a problem 1	2	3	4	Major problem 5	Don't know
Bariatric patients' needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Newborn and children-specific needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Elderly-specific needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Responding to families' and visitors' needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Responding to staff members' needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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User Satisfaction Problems

Are there other user satisfaction topics related to the design of hospitals you consider to be pressing problems?

[CLICK ONCE TO CONTINUE]
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Operational Efficiency

The following represent important operational efficiency problems that may be influenced by the design of the physical environment: doing things better, cheaper, faster, more responsibly

Which ones involve the most pressing problems?

	Not a problem 1	2	3	4	Major problem 5	Don't know
Use of energy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use of supplies, materials and products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use of staff and human resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use of space and buildings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use of information, communication and media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[CLICK ONCE TO CONTINUE]
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Operational Efficiency

Are there other operational efficiency topics that may be influenced by the design of hospitals you consider to be pressing problems?

[CLICK ONCE TO CONTINUE]
 >>>

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Confidentiality Statement



Accommodating Change and Innovation

The following represent important aspects of change and innovation that may be influenced by the design of the built environment.

Which ones involve the most pressing problems?

	Not a problem 1	2	3	4	Major problem 5	Don't know
Accommodating rapid change in medical technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accommodating rapid change in information technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accommodating rapid change in medical procedures and practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accommodating organizational and medical "culture change"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accommodating program changes in response to changes in reimbursement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accommodating changes resulting from regulation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[CLICK ONCE TO CONTINUE]
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Accommodating Change and Innovation

Are there other topics about how hospital settings accommodate change and innovation you consider to be pressing problems?

[CLICK ONCE TO CONTINUE]
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Responding to Disasters

Preparedness for natural and 'man-made' disasters and pandemic/epidemic events is an on-going concern. The following represent topics concerning disaster response that may be influenced by the design of the built environment.

Which ones involve the most pressing problems?

	Not a problem 1	2	3	4	Major problem 5	Don't know
Incident command	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decontamination	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Triage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Treatment zones	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Responding to Disasters

The following represent types of incidents that may impose different demands on the design of the built environment.

Which ones involve the most pressing problems?

	Not a problem 1	2	3	4	Major problem 5	Don't know
Transportation and industrial accidents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Natural disasters(hurricanes, floods, earthquakes, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chemical spills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Biological and nuclear terrorism	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Management of a hospital impacted by events	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Responding to Disasters

Are there other disaster response topics related to the design of the built environment you consider to be pressing problems?

[CLICK ONCE TO CONTINUE]
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Environmental Issues

Hospitals' impact on the environment are areas of increasing concern.

The following represent environmental topics that may be influenced by the design of hospitals. Which ones involve the most pressing problems?

	Not a problem 1	2	3	4	Major problem 5	Don't know
Energy and power management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Water management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Solid waste management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Toxic materials management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use of renewable building materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improvement of indoor air quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Environmental Issues

Are there other environmental topics related to the design of hospital facilities you consider to be pressing problems?

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Locations of Problem Areas in Hospitals

In addition to identifying significant problems, we are also interested in locating where these problems tend to concentrate within hospitals.

Which of the following patient care spaces represent greater concentrations of problems or unresolved issues?

	Not problematic 1	2	3	4	Very problematic 5
Patient rooms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Treatment and exam rooms	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operating rooms	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Diagnostic imaging rooms	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Locations of Problem Areas in Hospitals

Which of the following patient care departments or units represent greater concentrations of problems or unresolved issues?

	Not problematic 1	2	3	4	Very problematic 5
Nursing units	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Birth units	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
NICU's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Critical care units	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Surgery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Imaging	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emergency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rehab services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Locations of Problem Areas in Hospitals

Which of the following public areas represent greater concentrations of problems or unresolved issues?

	Not problematic 1	2	3	4	Very problematic 5
Entry/lobby	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Corridors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Waiting rooms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Parking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exterior site areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Patient rooms

You identified patient rooms as a critical problem area within the hospital. Do you see this as a matter of... (check all that apply)

- ☐ Patient care
- ☐ User satisfaction
- ☐ Operational efficiency
- ☐ Accommodating change and innovation
- ☐ Responding to disasters
- ☐ Other

Specifically, what is the problem?

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The Most Critical Issue

Now that you have identified a series of problems with respect to the design of health care environments, what would you consider the most critical problem?

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Thank You!

Your input regarding the built environment for hospitals is much appreciated. Would you like to answer a similar series of questions about another health care setting?

- ☐ Yes, the built environment for ambulatory care
- ☐ Yes, the built environment for long term care
- ☐ No, I'd like to finish up

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Finally, please tell us something about yourself.

Which of the following best describes your affiliation with health care environments?

If other, please describe.

Select
Select
Patient
Patient's family member
Nurse
Physician
Hospital service or maintenance worker
Health care administrator
Health facilities engineer or planner
Health regulation or policy maker
Architect
Interior designer



Thank You!

Thank you for participating in this important survey! We know your time is valuable, so The Center for Health Design (CHD) would like to offer you a one-time 50% discount on a research report download to thank you for completing the survey. To select your research report, log in to <https://www.healthdesign.org/users/login.php>. If you do not already have an account with CHD, you will be asked to register.

Click "add to cart" for the report you would like to purchase. Select "View your shopping cart" to check out. Be sure to enter the discount code "CHER_CI" before proceeding to payment. If you would like to purchase more than one report, the discount will be applied to the most expensive item. If you have any questions, please feel free to contact The Center for Health Design at 925.521.9404.

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