DRAFT
April 20, 2006

A Decision Support Tool for Health Care Systems: Open Building Patterns

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Executive Summary

A Decision Support Tool for Health Care Systems using Open Building Patterns

This research proposes the development and demonstration of a decision support tool for health care systems involved in the remodeling of existing buildings or constructing new hospitals in its network. The tool we propose, when fully developed and supported by a training program that we also propose to develop, will help health care systems to design facilities that are more systematically and consistently based on current research, more adaptable and therefore more useful over time. This is accomplished by making and using performance specifications, organized in a structure we call open building patterns.

What we propose addresses several problems shared by major health care networks:

1. **Developing and sharing knowledge, appropriately "agile" standards and design processes about human-centered care environments, among the system headquarters and its dispersed hospitals, is usually difficult;**
2. **Each project too often "starts from scratch", reinventing the wheel each time a facility planning process begins;**
3. **Hospitals are far too rigid in the face of rapid changes in health care practices, demographics, and regulations, and face differential obsolescence of technology, functional layouts and equipment, resulting in excessive costs and disruption during renovation.**

To answer these problems, we propose to work with Ascension personnel and others identified in the proposal to make and demonstrate a decision support tool in a multi-phased research program. ***Phase One*** *involves developing the structure of the proposed tool and several illustrative open building patterns.* ***Phase Two*** *will develop the Training Program, and* ***Phase Three*** *will beta test the Open Building Pattern Decision Support Tool in an actual facilities planning process.*

What we propose and why we propose it

• We will help your health care system design facilities that are more useful because they are **"change-ready".** Presently, Ascension assigns a significant budget to long-term facilities management and maintenance. We think we can reduce long-term costs of adaptation.

• We will help your facilities planners and other executives in charge of facilities design and management **reduce the waste due to the habit of starting each project from scratch**, and **improve information sharing** of lessons learned from each ministry's facilities design processes.

• We do this by developing model performance specifications called **Open Building Patterns** with a coherent structure and organization. Each Pattern is organized to allow evidence for each to be attached to the Pattern description, and then shared across the network in a systematic way.

• We propose to develop a **training program** to assist headquarters to develop **mandated open building patterns** ("default" standards with defined ranges of variation subject to approval) that local hospital design teams will be asked to use. The training program will also be used to support local facilities design teams in implementing the mandated patterns and in helping them make their own **locally derived open building patterns** suited to their local situations. This is vitally important to avoid the trap of highly prescriptive and overly rigid "templates" mandated from the central administration. It also assures the success of the Open Building Patterns approach by bringing the process to the local level.

• We will help Ascension write an RFP to implement a centralized **facilities information management system**, (similar to INFOZONE of Kaiser) in which all facilities procurement, management and operations information is lodged.

• We propose that Ascension reach an agreement with CHER (Coalition on Health Environment Research) to be project monitor of this research effort in all phases.

Because responsibility for hospital design in contemporary health care systems is distributed geographically among a large number of participants, over time, an important aspect of the proposed research is the **Training**

Program. We will develop this training program, incorporating learning modules supported by print and digital media. We will incorporate the latest methodologies including "blended distance learning", which includes face-to-face, synchronous and a-synchronous distance learning.

We understand that large health care systems – especially when operating over a large geographic area - must establish a balance between centrally mandated (or encouraged) and locally determined processes and standards for facilities design and performance. That is, a health care system composed of many quasi-autonomous hospitals needs to shape and adapt its physical facilities in a way that maintains its core identity, its standards of quality and performance, and its competitive standing. This is done in part by creating a uniform set of standards or performance measures for member hospitals.

On the other hand, system-wide managers also recognize that each hospital needs its own local identity and its own autonomy. Those controlling the capital allocation process at the system's headquarters are not always aware of the details and needs of facilities directors and administrators in each hospital in the system, and vice-a-versa. The importance of design guidance responding both perspectives (central and local) is therefore a critical factor in the idea of **Open Building Patterns** as it is explained here. A similar problem was found, for example, in developing incremental seismic rehabilitation of hospitals, where the research team found an inherent tension between the risk managers operating centrally and the facilities managers operating locally (Hattis et.al., FEMA report, 2003).

Therefore, one of the key problems our research addresses is the need for large, distributed health care systems to determine a reasonable and dynamic balance between headquarters and network hospitals, and to maintain this balance over time.

Precedents

The research proposal outlined in this document is based on a number of important concepts and precedents, the most important of which are discussed briefly in this section. A number of other pertinent sources of background information exist and a selection of them is given in the bibliography.

Patterns

One of the pioneering concepts in architectural design methods is the idea of a **Pattern Language**, developed by the Center for Environmental Structure under the direction of Christopher Alexander. Our proposal builds on that work, in ways explained below. (Alexander, Christopher. A Pattern Language, Oxford University Press, 1977)

Open Building

Open Building is an important concept that focuses on the fact that the built environment is always changing and that change tends to occur on a hierarchy of levels of intervention. This concept is drawn from observations of change in the built environment. That is, we can see that the urban structure has a longer life in general than the buildings that fill in its spaces; and that buildings have a longer life than the tenant work that fills in the floors of, for example, office buildings or shopping centers; and that once rooms are laid out, the furniture and finishes that fill in these rooms usually are replaced or moved before the walls are moved. This constitutes a hierarchy of environmental levels that structures interventions by various parties who control the work on each level. This is discussed in more detail below. (Habraken, N.J. www.habraken.com; and The Structure of the Ordinary, Form and Control in the Built Environment, MIT Press, 1998)

American Institute of Architects Guidelines for Design and Construction of Hospitals

The American Institute of Architects (AIA) and the Facility Guidelines Institute introduced the 2001 edition of the *Guidelines for Design and Construction of Hospital and Health Care Facilities* in April 2001. Considered an industry standard by architects, engineers, and health care professionals, the Guidelines set minimum program, space, and equipment needs for clinical and support areas of hospitals, nursing homes, freestanding psychiatric facilities, outpatient and rehabilitation facilities, and long-term care facilities. The document also establishes minimum engineering design criteria for plumbing, medical gas, electrical, heating, ventilating, and air conditioning systems.

The Guidelines and the methodology for revising them have been, and still are, in an evolutionary process. They are updated every four years to keep pace with new concepts and capabilities in the delivery of health care. The Guidelines are used by authorities in 42 states, Joint Commission on Accreditation of Healthcare Organizations (JCAHO), and several federal agencies. JCAHO states that the AIA Guidelines should be used during new construction.

Veterans Administration / HBS:

The US Veterans Administration operates one of the largest integrated healthcare systems with more than 1300 sites of care in the country. In 1972 the VA developed the VAH building system manual in response to a set of problems they were experiencing in the design and construction of hospitals. These problems were:

- Rising costs,
- Lengthy periods between programming and occupancy,
- Accelerating obsolescence, and
- Inadequate building performance.

The VA Hospital Building System study was a joint venture between Building Systems Development, and Stone, Marracini and Patterson, a leading architecture firm. It consists of three volumes:

1. Design Manual: intended to be a construction standard for VA hospitals. It describes a Building system Prototype design that organizes the many

complex subsystems required in modern hospitals into two basic categories, planning modules and building subsystems, and provides design scenarios and configurations by anticipating physical conditions.
2. Database: containing information on cost of existing hospitals, labor unions, laws and regulations etc.
3. Project report: containing conclusions, recommendations, design examples, cost and time analysis etc.

Since 1972, the VAHBS has been used on many VA projects. The hypothesis was that "If a hospital is designed, constructed, maintained and altered in accordance with the rules and recommendations set forth in the Design Manual, then the problems stated above will all be alleviated to some significant degree." One problem is that this hypothesis has not been systematically studied over a long time, in part because of the number of variables and their indeterminacy.

Educational Facilities Laboratory / School Construction Systems Development (EFL / SCSD)

The Educational Facilities Laboratories (EFL) was a nonprofit corporation established by the Ford Foundation in 1958. Its purpose was to help schools and colleges maximize the quality and utility of their facilities, stimulate research, and disseminate information useful to those who select sites, plan, design, construct, modernize, equip, and finance educational structures.

EFL operated several building systems projects across the country, including University Residential Building Systems (URBS) in California; Schoolhouse Systems Program (SSP) in Florida; Study of Educational Facilities (SEF) in Toronto; Recherches en Amenagements Scolaires (RAS) in Montreal; and the School Construction Systems Development (SCSD)

The purpose of the SCSD was to develop new approaches to the design and construction of schools in order to support educational practices of the future at reasonable time and cost. The 'stock components' method was developed- a standardized system of building components designed to fit together simply and easily with minimum alterations required on the job. SCSD led to the design and manufacture of a series of components for the systems that make up a school building-- structural, HVAC, lighting, interior partitions, doors and windows, etc. External walls were not considered educationally significant and were not included in the SCSD system (Marks 5). The

components were designed to meet performance specifications of the school districts and the SCSD staff judgment. The SCSD study was used in construction of twelve secondary schools and one elementary school in California (Boice, 1)

The assumptions made by the SCSD have since been re-evaluated. According to Davis "(EFL) decided that a 60 foot span, or more, rather than the traditional 30 foot one, would be most useful, that many interior partitions should be demountable,…" In the late 60's this might have been state-of-the-art, but now that needs to be reviewed. Educational trends towards open classrooms have shifted back to more acoustically controlled classroom environments that can dramatically change the appropriate bay size. When day-lighting and natural ventilation are considered, the interior dimensions may vary and consequently, change the structural bay dimensions." (Davis)

Peach Book of the Public Building Service

Another precedent we have studied is the "**Peach Book**" (1969) developed by the Public Building Service to guide procurement of facilities for the federal agency – the GSA (General Services Administration) - based on performance standards. The question was whether office buildings for the federal government be improved, delivered faster and exhibit better performance? The research to examine this question was funded by the General Services Administration. The Peach Book's goal was to develop a more rigorous format for performance specifications to aid communication between GSA and project teams. The researchers talked to people who knew how design/build processes work in the commercial market.

The Peach Book took the approach that Federal Office buildings are the same in respect to functional needs everywhere. That is, federal office space and equipment and environmental quality standards were uniform independent of location. That meant that some physical systems and spaces cold follow the same specifications (something like 50% of the total building and equipment) and the other parts were unique to each project.
The former were called "IN SYSTEM" and the later "OUT OF SYSTEM". The key was to define the interfaces between these two systems. Five projects were realized using the Peach Book before it was abandoned.

Kaiser Template Program

The Kaiser Health Systems in California has developed – starting in 2000 - the "**Kaiser Template"** to guide the construction of a large number of new hospitals in its California system over the coming decade. According to Carl Christiansen, VP of SMITHGROUP Architects and Planners, Kaiser asked his firm to assemble the patient room templates developed by Kaiser in the 1990's, and to design prototype hospitals, modifiable to a certain extent, but giving the basic "architecture" of the shell (with seismic bracing on the exterior), a basically standard envelope, basic functional zoning and adjacencies, and enabling national purchasing agreements with many vendors. The SMITHGROUP designed the first three projects using the "Template", but subsequent hospitals have been designed by other architecture firms, using the Template. Many of the hospitals construct "shell" space for future expansion. Kaiser has also implemented **INFOZONE**, a repository for all Kaiser hospital facilities information including plans, specifications, equipment vendors, and so on. Because of the Template, Kaiser can negotiate national purchasing agreements with vendors. Only those with access codes can get into INFOZONE.

Workstage (Pathways / Steelcase)

Workstage is a joint venture company between Steelcase Inc, a leading manufacturer of office furniture systems, and The Gale Company, a real estate development firm. It was founded in the early 1990's in order to provide building solutions that reduce cost and delivery time, and engineered with the building's users in mind.

The designers, manufacturers, and construction managers at Workstage have engineered a kit of parts that is efficiently and easily configurable, and surpasses the quality of conventional "Class A" construction materials and systems, with five fundamental objectives in mind: People**,** Flexibility**,** Environment**,** Speed and Cost (Workstage website)

The Workstage kit of parts consists of the entire package of engineered building plans, including the building shell in one of several styles, a structural steel framing system, raised floors, a fixed core with restrooms, elevators, and stairs, interior and furniture designs, and many other components. The result, proponents say, is a building that goes up several months sooner than conventional construction, is cheaper, and more

adaptable to quick changes. (Burton-Katzman) Workstage buildings have also won awards, including the distinguished AIA 2004 award.

INO Hospital, Bern Switzerland

The **INO Hospital** in Bern, Switzerland, is the most coherent and methodical example that we know of in which the idea of HIERARCHICAL SYSTEM SEPARATION – based on life expectancy of each "system" - has been implemented in a hospital.

This "Open Building" design and procurement strategy is based on the Canton Bern Building Department's insight that the traditional way of procuring hospitals no longer meets the needs of the client, either initially or, more importantly, over time. Change in health care standards and regulations, treatment modalities, demographics and so on are ongoing and continuous, meaning that the hospitals they operate are never "finished". They are always adjusting to the dynamics of the health care system.

The Canton Bern Building Department, acting on behalf of the client, decided therefore to partition the hospital procurement process into three autonomous "systems levels", each of which was designed by a different A/E team, and managed by corresponding teams in the Canton Bern Building Department. The building is under construction and already the approach has proved its worth, according to the Canton Bern management, even before the building is finished.

Based on this experience, the Canton Bern Building Department is developing "guidance" documents outlining the principle of "separated systems" as a procurement and decision tool that will be used in all future projects under their jurisdiction, as a matter of policy.

An Approach to Supporting Design Management

Our approach to the problems identified by Ascension – and other large, geographically dispersed health care systems - is similar to the performance specification approaches noted in some of the precedents outlined above. In that sense, what we propose is based on the principle of specifying not precise or prescribed solutions but spelling out the principles (in verbal, statistical and graphic ways) on which specific solutions should be developed.

By addressing the problem of inevitable and constant change of facilities in response to the dynamics of the health care field, our approach is most clearly modeled on the INO **Hierarchical Separated Systems** process in terms of its explicit and methodical way of addressing the problem of change and distributed design.

What we propose, therefore, builds on and extends the experiences outlined above. We add the idea of a **training program** to instruct design/build/client teams both at the headquarters of the system and at the various locations in the system, in developing and using OPEN BUILDING PATTERNS.

> **First,** like with the INO Hospital, we introduce the dimension of time and planning for change in a specific way: **Hierarchical Systems Separation**. While this is similar in some ways to the precedents noted above (VA Hospitals, SCSD), the explicit separation of autonomous systems on environmental levels has not yet been widely adopted in health care architecture. On the other hand, anecdotal evidence points to a trend very similar to a formal open building approach, and that is to build "shell space" during new construction, to provide "spill over" or "flex-space" ready to be filled later. Unlike the VA approach, we do NOT specify hardware, dimensional modules, or other "technology" as solutions.
>
> **Second**, we introduce the idea of a **Training Program** along with manuals of instruction - to support rather than replace existing design decision-making processes – both centrally and locally - that we believe are a vital part of each facility procurement process. We explain why later in the narrative.

Open Building

A pioneering concept we will draw upon is the distinction of 'levels of intervention' as applied in the so-called 'Open Building' approach in environmental and architectural design. *We therefore suggest the use of OPEN BUILDING principles – particularly the use of HIERARCHICAL SYSTEM SEPARATION - to help address the problem of almost constant change – albeit at different cycles for different parts of hospitals.* By clustering decisions and related physical systems this way, control of the inevitable uncertainties accompanying change is easier.

It can be argued that it is better – more efficient and effective - to organize all variables and dependencies, all "players" and their responsibilities as a "whole" and "at once". While this may be possible in some limited cases, most large building projects for hospitals always come into being over time, making it impossible to bring everyone around the table at the same time. The question then becomes "how should the whole be partitioned, and who should discuss what issues together, when"? The idea of autonomous levels or "system separation" is one answer to this question and can be understood as follows:

The Primary System or "Base Building" level
This level should have a durable life of 75 years (+/-). The base building is site specific and is governed by local codes, regulations and political processes. It should have a carefully determined "accommodation capacity" for variable functional configurations over the useful life of the base building, matching client investment objectives and its strategic plan. The design of a base building includes:

- The site development and site logistics/infrastructure
- The main structure and building envelope
- The pathways for mechanical installation systems
- The primary movement pathways for people and materials

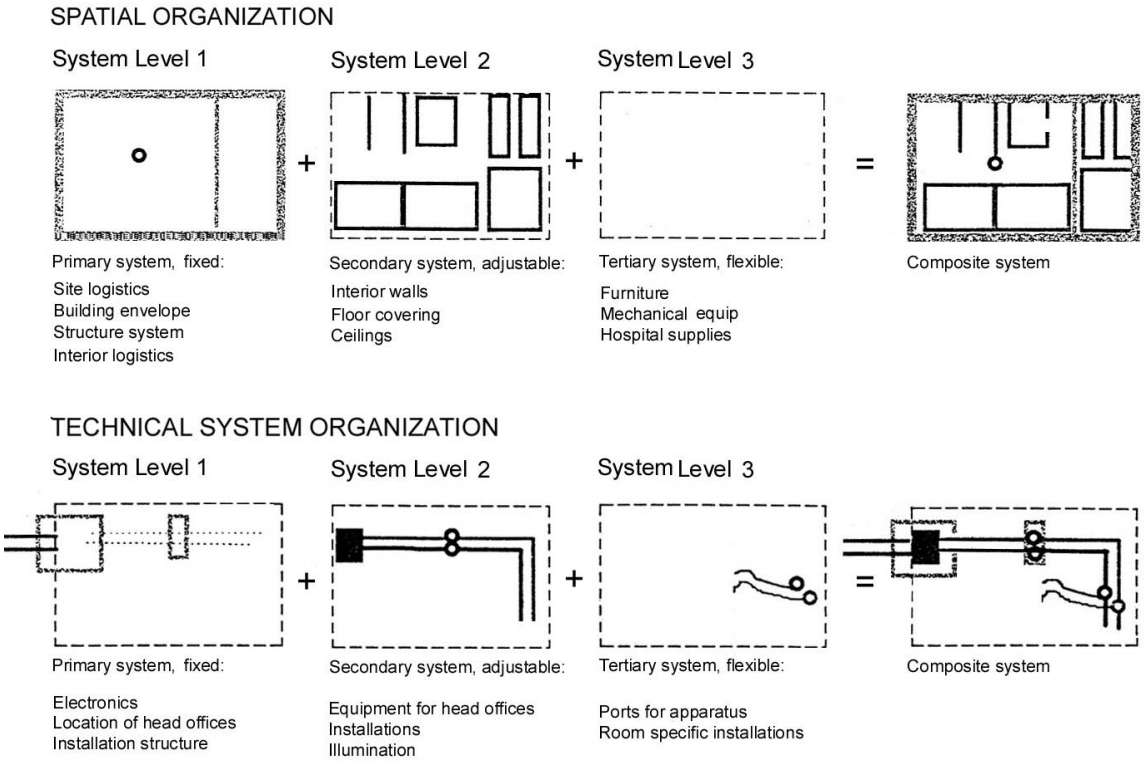
The Secondary System or "Fit-Out" level
This level should have a useful life in the order of 15 – 20 years. A specific "fit-out" installation includes:

- Interior walls, floors, suspended ceilings
- The horizontal technical installations specific to that functional layout
- Secondary circulation organizing the functional layout

The Tertiary System or "Equipment and Finishes" level

This level will have a useful life of 3-8 years, and includes much of the portable and non-building equipment, furnishings, finishes and fixtures.

- It is the most flexible
- Includes finishes
- Equipment and Furniture



ORGANIZATION OF DESIGN ON LEVELS
INO HOSPITAL . BERN, SWITZERLAND

The specific content of such "levels" are determined for each health care system or project, based on accumulated experience with and study of health care facilities. The time scale or "differential obsolescence" for each level may vary from project to project for various reasons. What technical systems and spaces are allocated to each level may also vary, but the distinction of autonomous "levels" using the idea of "System Separation" is basic.

When the boundary between these levels is ambiguous – is not carefully worked out, recorded and maintained – budgetary and technical control of inevitable change is almost impossible, as experience shows. Therefore the key to implementing an open building process is 1) identification and specification of each decision or system level and what is "on or in" each level, and 2) identification and specification of the dependency relations or interfaces – both technical and contractual - between and inside each level. This is important both for the client – in managing the project – and for the A/E teams delivering services to the client.

The primary reason this research proposal focuses on organizing a hospital in this way - with autonomous systems levels - is that the best evidence-based design standards, templates or guidelines, grounded in the most current research and testing, may become obsolete or need adjustment or replacement, based on new evidence. This means that methodical tools are needed to make the health care environment - the hospital, clinic or other facility - open to adjustment, based on new evidence-based design research, as it becomes available.

Summary

We intend to use the research effort proposed here to assess the feasibility of the "Levels" framework based on the following hypotheses:

- Levels help sort out the overwhelming complexity of hospitals into manageable decision bundles. It is a specific way to partition tasks and systems.
- Using Levels doesn't try to eliminate complexity but to organize it;
- By organizing decisions on levels (a specific cluster of elements and relations) related to their expected life or usefulness, rather than assuming all parts of the capital asset last the same length of time and are equally interdependent.
- Delivering a project based on levels requires that each level be the responsibility of a distinct team. Such teams may operate within a single service providing organization of firm, or may be distributed among distinct firms. A parallel organizational framework must be set up in the organization managing the project on behalf of the client.
- Minor renovation occupies only level 3
- Major renovation spreads across level 2 and 3
- New construction operates on all three levels

Patterns

Patterns make possible the identification, in a generic way, of architectural elements and their spatial relations that are seen as 'good' and 'desirable', while at the same time explaining why such formal elements and relations are beneficial to various stakeholders. In this way, **patterns** enable precise instructions for design that can be evaluated and compared along social and functional criteria. At the same time, the patterns allow for a wide variety of actual architectonic interpretations of the principles they embody.

In his **Pattern Language**, Alexander recorded many such patterns that he deemed universally valid for the making of 'healthy' environments. But, more importantly, his pattern method itself allows clients and architects to establish patterns about environmental qualities they can jointly agree about. This use of patterns as instruments of agreement among involved parties is what particularly attracts us.

Patterns are evident in every day built environment. They exist, independent of architects, clients or the personal preferences of users. In that sense, patterns are autonomous. Each pattern that we can observe embodies an invariant relationship – a basic, small principle. These patterns can be documented. Once a pattern is made explicit, it can be used many times to make designs, but no design using a given pattern will ever be the same twice. In that way, a pattern can be recorded in such a way that each time it is used, a variant on the principle will result. No two results – no two designs, will ever be exactly the same, but will share a certain environmental "DNA" – or a "performance specification".

We propose to adapt Alexander's pattern method to the systematic and comprehensive documentation of qualities already found in 'good' and 'curative' health care environments.

But Patterns were never proposed by Alexander to respond to change. We therefore propose to formulate MODEL patterns reflecting the needs of hospital administrations to deal with the dynamics of change and variability in their facilities, and to demonstrate their suitability and effectiveness.

We also propose to use the logic of "performance specifications" as we develop the Open Building Patterns. In fact, the Patterns developed by Alexander are a kind of performance specification but with the addition of not only empirical evidence but also drawings and other graphic media.

What is important about Patterns vs "Standards" and "Templates"

A cookie-cutter approach to facilities design, in which every facility in the network is identical at all levels or scales may be attractive, but ultimately is undesirable. Standards or templates as traditionally conceived (e.g. the Kaiser Template Program) can pull decisions toward such uniformity, and in doing so they are inevitably in conflict with the differentiation toward which dispersed facilities naturally gravitate, because of climatic variation, geotechnical conditions, urban/rural differences, and local health care demands for services. Rigid templates or standards tie everyone's hands in dealing with the inevitable variety of local forces, cultures, stakeholders, constraints, supply chains, design service providers, and so on.

They also do not respond well to changes in standards, preferences and other factors during the facility design process.

While "best-practice" and "evidence-based" conventions are critical to harmonize network functioning, partially autonomous interpretations, variations and adjustments to system-wide agreements should be possible. This is important because new, valuable ideas often percolate up from "below". In this sense, network-wide agreements should be "open source" agreements that users within the health care system can add to and improve as they are using them, because they have access to the "source code" or methodology the agreements are based on.

Each pattern is recorded or described in such a way that it serves as **a record of agreement** by those involved in each facility's design decision process. The structure of each pattern is such that the values and perspectives of many disciplines, of the medical staff, the design team, hospital administrators, and so on can be captured**.** A good pattern also establishes the criteria for long-term facility assessment and adaptation as needs and technologies change.

Each pattern is documented in such a way that empirical research findings, visualizations and/or simulations, preferences and other evidence for its

adoption can be attached to each. Again, each pattern states the context of the pattern, shows examples, and gives a description of the heart of the pattern, including the field of physical and social relationships that are required to solve the stated problem in the stated context.

Patterns can be identified, described systematically, and used methodically by design teams in reaching agreement with client teams. Once developed and agreed to, patterns serve as the basis for further detailed specification by a design team.

Linking Open Building and Patterns

We believe that the idea of Patterns is particularly suited to the dynamics of health care networks aspiring to elevating system-wide facility standards. We also believe that linking Patterns to the distinction of levels of intervention (what particular physical systems need to perform on particular levels) and, by implication, the distribution of design responsibilities (who is designing on what levels?) makes sense.

This is new. Up to now, the use of PATTERNS has been based on environmental scales without the distinction of TIME that is at the core of the Open Building idea.

The Open Building Pattern tool has two components:

1. An OPEN BUILDING PATTERN STRUCTURE:
    a. By the central system Open Building Pattern development team responsible for developing the MANDATED Open Building Patterns that each hospital design team must follow, and
    b. By each project team developing its own Open Building Patterns specific to that project's unique circumstances.
2. A TRAINING PROGRAM providing guidance on how to develop Open Building Patterns

Who writes OB Patterns?

One approach would be for the network's central planning office to develop and mandate patterns (or standards or templates) to each hospital in its system. This is the Kaiser Template approach. However, we recommend that

only some patterns be mandated by the center as standards for all its distributed hospitals.

We recommend that MOST patterns be developed anew each time a facility planning process is undertaken, by the stakeholders involved in that particular hospital's decision-making. In our thinking, the network's "central" role in this process is to disseminate to local hospitals

- A Training Program about how to formulate patterns
- Data on current best practices and research findings
- Patterns developed by other ministries as models
- And other pertinent information

Research Plan

PHASE 1: DEVELOPING MODEL PATTERNS

Goal: Developing Patterns at each System Level

Phase 1 consists of workshops the goal of which is to identify and develop **several illustrative** Open Building Patterns (OBP's) at each Level.

1. Establishing a pattern structure that is legible and easy to use and storable in a central data server.
2. Defining Separated System Levels
3. Distinguishing 'mandated OBP's' from the OBP's to be developed locally for each facility procurement process.

Proposed Work Plan

1. Preparation of workshop documents	(one month)
2. Four day workshop with all participants (8 max) at Ascension in St. Louis;	(four days)
3. Four week period of work-at-a-distance with weekly video-conferences; Draft of OB Patterns developed by Kendall, Siepel-Coates, Allison, Hattis and Hamilton and distributed to the team;	(one month)
4. Three day workshop at Ascension to critique and evaluate draft OBP's	(four days)
5. Four week period of work-at-a-distance with weekly video-conferences	(one month)
6. Three day workshop wrap-up	(four days)
	Three Months + 12 days

Deliverable:
Digital and hard copy documentation of the illustrative patterns and the process of making them. Proposed content of the report as follows.

(draft) PHASE 1 REPORT CONTENT

1. Introduction to the research project and Phase 1 of the larger research project;
2. Issues tackled in this phase (partitioning the levels of intervention in hospital facilities design; distribution of design within or between firms; ranking and classification of open building patterns; discussing which open building patterns should be "mandated" from the center and which should be "encouraged" to be developed locally, etc.);
3. How we worked in this research process;
4. The structure or template for recording open building patterns;
5. Three or four illustrative open building patterns at each "level" and why they were selected as the initial focus;
6. Suggestions for next stage (developing the training program);
7. Appendices of sources, background information, further research questions, team composition and expertise, etc.

PHASE 2: DEVELOPING THE TRAINING PROGRAM

Goal: Developing the TRAINING program for implementing the Decision Support Tool

Proposed Work Plan

1. Preparation of workshop documents	(one month)
2. Four day workshop with all participants (8 max) at Ascension in St. Louis;	(four days)
3. Four week period of work-at-a-distance with weekly video-conferences; Draft of OB Patterns developed by Kendall, Siepel-Coates, Allison, Hattis and Hamilton and distributed to the team;	(one month)
4. Two day workshop at Ascension to critique and evaluate draft OBP's	(four days)
5. Four week period of work-at-a-distance with weekly video-conferences	(one month)
6. Three day workshop wrap-up	(four days)
	Three Months + 12 days

Deliverables: a draft training program including both a hard copy manual and a digital copy, including potential digital media components.

(draft) PHASE 2 REPORT CONTENT

1. Introduction to the research project and Phase 2 of the larger research project;
2. Issues tackled in this phase (define the audience for training; understand different kinds and levels of expertise; define the desired result of the training; adopt an existing training model or develop our own
3. How we worked in this research process;
8. The structure of the training program;
9. One or two sections developed in more detail;
10. Suggestions for next stage (beta testing the program);
11. Appendices of sources, background information, further research questions, team composition and expertise, etc.

PHASE 3: BETA TESTING THE TRAINING PROGRAM + MODEL OBP'S

Goal: Demonstration Implementation of the TOOL in an Ascension Project

(Details to be determined)

Research Team

Stephen Kendall, RA, PhD Principal Investigator

Professor Kendall is a registered architect, whose academic and research career spans more than 20 years. He has a professional degree from the University of Cincinnati, a Masters of Architecture and Urban Design from Washington University in St. Louis, and a PhD in Design Theory and Methods from the Massachusetts Institute of Technology.

His research focuses on open building. His research in open building encompasses studies of new design methods, new logistics and new technology needed to make buildings more adaptable and thus more sustainable. His work currently focuses primarily on housing and health care architecture.

Robert Koester, RA, LEED (confirmed)

Professor of Architecture, Ball State University, Director, Center for Energy Research, Education and Service. Professor Koester has extensive experience in developing tools for assessing and designing buildings with a focus on building performance in terms of energy and lighting.

Douglas Reddington, AIA (confirmed)

Douglas Reddington is a Principle at BSA LifeStructures, a multi-disciplinary design firm in Indianapolis, #12 in the US in health care architecture. He has managed a number of Pebble Projects and has been a part of the development team of this proposal.

David Hattis (confirmed)

David B. Hattis is a nationally recognized expert in all aspects of building codes and building regulation and leads our building risk management assignments. Mr. Hattis is one of the founders and is President of BTI. His work includes projects related to the building regulatory system; performance analysis of new and existing buildings; the economic and financial implications of decisions related to building performance on a life-cycle basis; and the study and use of historic properties. Mr. Hattis has authored numerous reports and delivered technical papers on these subjects. He is a recognized expert in the field of building performance and regulation. BTI is in Silver Spring, MD.
http://www.bldgtechnology.com/

Kirk Hamilton, FAIA, FACHA (confirmed)

D. Kirk Hamilton, an acclaimed innovator in the field of health-care architecture, joined the architecture faculty at Texas A&M University. A distinguished scholar and fellow in both the American College of Healthcare Architects and the American Institute of Architects, Hamilton is a founding principal of Watkins Hamilton Ross Architects, Inc., a design firm headquartered in Houston, Texas.

An associate professor and faculty fellow in the Center for Health Systems and Design at the A&M College of Architecture, Hamilton is interested in evidence-based design for health care and the relationship of facility design to measurable organizational performance. He recently completed a master of science in organizational development from Pepperdine University and holds a bachelor of architecture from the University of Texas.

Hamilton has more than 30 years of experience in health facility design. He is the leader of Q Group Advisors, the consulting division of Watkins Hamilton Ross Architects. He is past president of the American College of Healthcare Architects and the AIA Academy of Architecture for Health. He is on the board of directors of the Coalition for Health Environments Research and The Center for Healthcare Design, and he serves on the faculty of the Institute for Healthcare Improvement.

Hamilton has chaired the Design Committee of the Society for Critical Care Medicine and is a co-author of the organization's design guidelines that are currently being revised. A prolific writer, he has published numerous articles on health-care design, evidence-based practice, and organizational performance.

He has authored and edited three books on health facility design and is currently working on two new books: one on guiding principles for the design of humanistic health facilities, and another, with A&M architecture professor Mardelle Shepley, about evidence-based design for critical care to be published in 2005 by Architectural Press.
http://archone.tamu.edu/college/news/newsletters/spring2005/hamilton.html

Suzanne Siepel Coates (confirmed)

Professor Siepel Coates has a Masters of Architecture from UC Berkeley. She is on the faculty at Kansas State University Department of Architecture. Her research focuses on the observation that there are connections between human health and the natural, designed and social environments. When speaking about environmental health today, people

typically refer to the establishment and maintenance of healthy livable environments for human beings – a potentially daunting task given the challenges of population growth, urban sprawl and energy use.

The main intent for her upper-level architecture studios is to explore the relationships between health and the designed environment. To this effect students will generate design proposals at various scales for environments that can support healthy ways of life. Design proposals not only address common architectural concerns such as concept, function and structure, but they will also explore humanist issues and design principles that assist in the creation of therapeutically supportive environments.
http://www.arch.ksu.edu/arch/faculty/facfiles/siepl-coates.html
scoates@ksu.edu

David Allison (confirmed)

David Allison AIA, ACHA is an Associate Professor and the Director of Graduate Studies in Architecture + Health at Clemson University, one of only two professional degree programs in the nation with a concentration in Architecture for Health. The A+H program at Clemson is nationally recognized for excellence within the profession. It is focused on preparing architectural graduates to engage in the planning and design of health care facilities, the healthful design of communities, and the healthful design of the built environment in general. Professor Allison is a registered architect in California, South Carolina, and North Carolina, is NCARB certified, and maintains a limited part-time consulting and architectural practice as time permits. He is a founding member of the American College of Healthcare Architects, serves on the AIA Academy of Architecture for Health Leadership Council, and recently completed a three-year term on the AIA/AAH National Advisory Board.

Ascension Staff (from the facilities or executive coordination group)

Another representative of an "owner" organization (e.g. Partners in Boston, Kaiser, etc)

A nationally recognized architecture firm selected by Ascension

Intellectual Property

The Intellectual Property distinguishes three products:

1. **The OBP Model Open Building Patterns and Training Program**
   (The property of Ball State University)

2. **The specific OB Patterns developed for Ascension (or another system) or by its affiliated hospitals**
   (The property of Ascension or other hospital system)

3. **The specific design and construction documents developed on the basis of the OBP Model Patterns, by a specific A/E firm, for the construction or renovation of a specific hospital project**
   (*The property of the A/E firm designing the specific hospital project)*

We need further discussion on the question of IP and assume that will take place soon among the involved parties.

Budget

(attached)

Bibliography (incomplete)

Alexander, Christopher. A Pattern Language. Oxford University Press, New York, 1977

Habraken, N.J. The Structure of the Ordinary: Form and Control in the Built Environment. MIT Press, Cambridge, 1998.

Jonassen, Jim (architect at NBBJ) in his article on "Health Facilities and Flexibility"

Kendall, Stephen. "Open Building: A new Paradigm in Health Care Architecture" in the AIA Academy of Health at http://www.aia.org/journal_aah.cfm?pagename=aah_jrnl_openbuilding_102704&dspl=1&article=article

Gray, Colin and Prins, Matthijs (ed). Value Through Design. Proceedings of the CIB W96 Architectural Management and Design Research Society. CIB Publication 280. Reading, UK, Sept 2001.

Ang, George. (ed). Measurement and Management of Architectural Value in Performance-based Building. Proceedings of the CIB W60 / W96 Joint Conference on Performance Concept in Building and Architectural Management. CIB Publication 283. Hong Kong, May 2002.

Slaughter, Sarah. "Design to increase facility capacity to accommodate change". Proposal to the National Science Foundation. October 1997.

References for VAHBS:

Development Study—VA Hospital Building System by Building Systems Development and Stone, Marraccini & Patterson. Washington, DC: U.S. Government Printing Office, rev. 1977.

Weissenstein, F. VA to streamline construction to help health system compete. Mod. Healthc. Jan 24, 1994.

SCSD / EFL

Marks, Judy. The Educational Facilities Laboratories (EFL): A History *National Clearinghouse for Educational Facilities. December 2001*

Boice, John R. A History and Evaluation of the School Construction Systems Development Project 1961-1967. Building Systems Information Clearinghouse, Educational Facilities Laboratories, Inc.

A.J. Davis**.** The Building of Research: A Center for the Study of Educational Facilities. Presented at the ARCC Spring Conference, on the Virginia Tech Campus, April, 2001

References for Workstage:

Workstage Website: www.workstage.com

Furnishing the Workplace. Architecture Week. Feb 2001. Eugene, OR

Supplier Spotlight: Workstage, Inc. Educational and Institutional Cooperative Service Inc. E&I Report - Dec 2002

Burton-Katzman Development Co., Inc , Workstage Utilize Flexible Design. 5/13/2002. Bingham Farms, MI. (http://www.burton-katzman.com/MediaView.aspx?viewID=36)

References for AIA Guidelines:

Guidelines for Design and Construction of Hospitals and Health Care Facilities by AIA Academy of Architecture for Health. Washington, DC: The American Institute of Architects, 2001.

Sprague, JG. Development of guidelines for design and construction of hospitals and health care facilities. World Hospital Health Service. 2003;39(3):35-8, 43, 45

http://www.leoadaly.com/images/lad/pdfs/Dickerman_09_2005.pdf

McMaster

Good link for Mcmaster Hospital evaluation
http://www.aia.org/nwsltr_print.cfm?pagename=aah_jrnl_20051019_change

NHS Studies in the United Kingdom related to "adaptable" hospitals

http://www.architectsforhealth.com/library/howardgoodman.html - 2005 update on the study.

http://www.hdmagazine.co.uk/story.asp?sectionCode=20&storyCode=2031962 - good article on adaptable hospital research

http://www.architectsforhealth.com/library/event-26june2003-a.html - good reference for why our research is critical

http://www.architectsforhealth.com/about.html -

http://www3.imperial.ac.uk/innovationstudies/research/healthcare - this site makes reference to the pdf of the NHS study but membership is required.

http://www.findarticles.com/p/articles/mi_qa4028/is_200110/ai_n8998329 - general info on NHS

http://news.bbc.couk/2/hi/health/4745545.stm - general info