



CALIFORNIA  
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# Designing Safety-Net Clinics for Flexibility

*Prepared for*

CALIFORNIA HEALTHCARE FOUNDATION

*by*

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THE CENTER FOR HEALTH DESIGN

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**The Center for Health Design (CHD)** is a nonprofit organization that engages and supports professionals and organizations in the health care, construction, and design industry to improve the quality of health care facilities and create new environments for healthy aging. CHD's mission is to transform health care environments for a healthier, safer world through design research, education, and advocacy. For more information, visit [www.healthdesign.org](http://www.healthdesign.org).

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# I. Introduction

A BUILDING THAT LACKS FLEXIBILITY AND adaptability can quickly become obsolete. This is especially true in health care, where changes in user populations, services, equipment, technologies, and treatment methods have occurred rapidly in the last several decades.<sup>1,2</sup> Typical physical alterations include:

- Relocation of function;
- Refurbishment and renovation;
- Vertical or horizontal expansion; and
- Addition of space due to new demands and technologies and functional reorganization.

These types of changes affect the experience of the patient as well as the ability of the provider organization to offer care. The costs to modify existing structures can be prohibitive. Under these conditions, the need for flexibility and adaptability is paramount. This notion has recently been dubbed “long-life, loose-fit.”<sup>3</sup>

Flexibility and adaptability are not synonymous, however. Adaptability can be defined as the ability to change in response to internal or external developments, approaching the problem from the top. Flexibility involves a more solution-oriented process within a limited set of alternatives.<sup>4</sup> Adaptability allows incorporation of new and different uses over time (e.g., adding behavioral health programs), while flexibility addresses ongoing changes within the original vision or business plan (e.g., providing multipurpose rooms for increased capacity during peak periods and space for evening community programs).

Adaptability is a continuing necessity in clinics, many of which began in structures originally intended for other uses: a former home (Open Door’s Del Norte Community Health Center in Crescent City, CA) or an onion warehouse (Salud Family Health Center in Fort Lupton, CO).

This paper addresses the conceptual framework of flexible and adaptable design, considering the perspectives of both patients and provider organizations. An overview of several studies from acute care environments includes applications and examples of clinic design, with attention to the organizational response or business case. The intent is not to be prescriptive, but to offer a strategic approach to flexibility and adaptability that will facilitate a clinic’s development and growth. Despite limited research on flexibility and adaptability in health care, and none specific to clinic design, lessons from other industries and acute care environments can be extrapolated to design recommendations for facility renovation, expansion, or replacement.

## **II. Methodology**

THE AUTHORS CONDUCTED A LITERATURE review of publications and gray literature (including Web pages) on the subject of flexibility and adaptability in health care design. This involved searching multiple online databases, including EBSCO and ScienceDirect, as well as internet searches using Google and Google Scholar. Among the keywords and combinations of keywords were flexibility, flexible, adaptability, adaptable, health care design, hospital design, open building, learning building, and change-ready. The reference lists of the identified publications also yielded relevant literature.

In addition, a series of site visits and phone interviews with safety-net clinics in California and Colorado provided first-hand information about current common practices, lessons learned, and recommendations for facility design. The clinics were selected based on suggestions from the advisory committee for this project.

### III. Flexible and Adaptable Design Frameworks

THE CONCEPT OF FLEXIBILITY AND adaptability in building design is not new; the approach is used in many industries, including manufacturing, housing, and commercial development, both office and retail. Commercial development has traditionally embraced practices of adaptability, due to rapid change and churn, new ways of working, the high rebuilding costs of evolving user demands, and the effects of obsolescence.

Likewise, in health care, it is impossible to design a project based on a fixed program of requirements because the program inevitably changes in response to new medical procedures, regulations, and market conditions. These changes concern health care organizations because of rising construction costs and the need to control those costs as buildings adapt and expand over time.

Several frameworks that address flexibility and adaptability can inform the thought process for design and decisionmaking in various types of building projects. Two of those frameworks, learning buildings and open (change-ready) buildings, are closely aligned with respect to segregation of systems and components and provide the foundation for this paper.

Learning buildings, according to the framework formulated by Stewart Brand, are not designed to adapt, but they adapt anyway.<sup>5</sup> Brand expanded on the concept of shearing layers originally developed by British architect Frank Duffy (founder of the architectural firm DEGW), to propose a six-layer model. The six S's include:

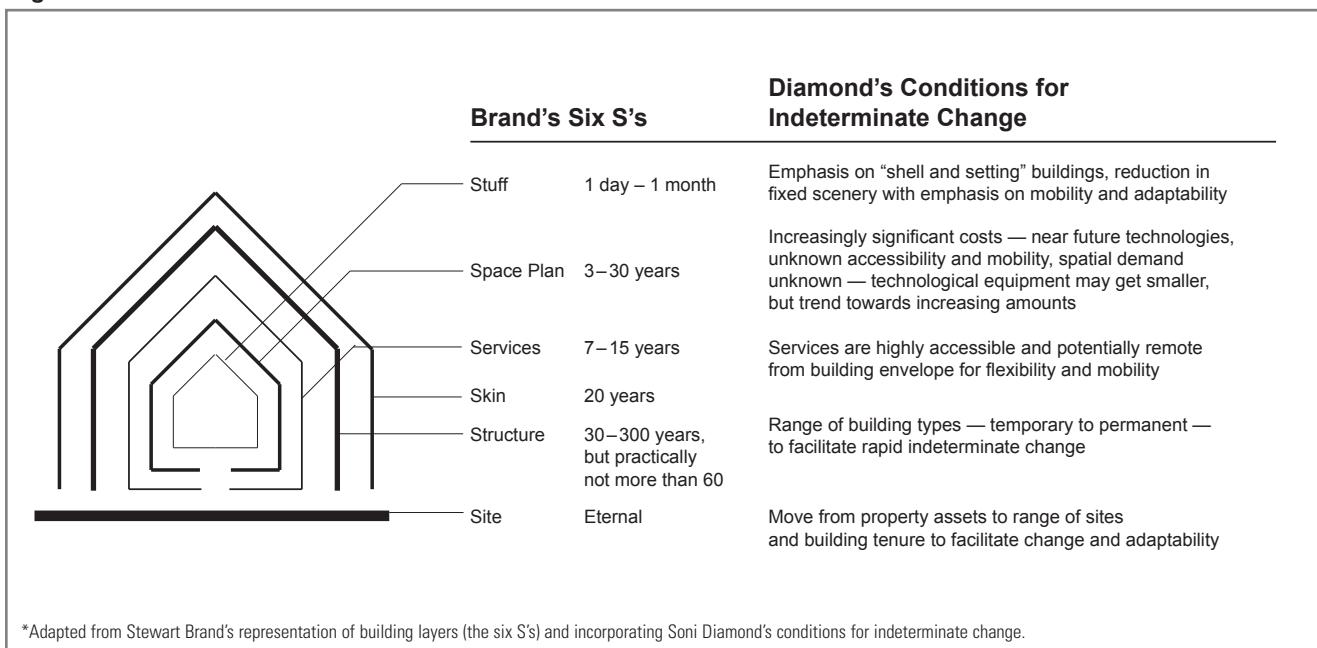
- **Site**
- **Structure:** 35 to 60 years or longer
- **Skin:** 20 years
- **Services** (cabling, plumbing, elevators): 7 to 15 years
- **Space plan:** 3 years for commercial space to 30 years for domestic
- **Stuff** (including furniture): months/weeks/days

In the 2006 Research and Development Project Report, “Rethinking Hospital Design,” commissioned by the National Health Service, Soni Diamond of DEGW further defined this construct to include the conditions of indeterminate change (see Figure 1 on page 5).<sup>6</sup>

Open or change-ready building is a multidisciplinary approach often used in housing that distributes decisionmaking at various levels of intervention ranging from the urban plan down to the details of the interior fit-out.<sup>7</sup> Projects are organized in terms of the anticipated duration of a cluster of subsystems. This avoids waste and prepares the facility for long-term manageability in concert with anticipated changes.<sup>8</sup> Therefore facilities are designed for three distinct levels:<sup>9</sup>

- The primary level is intended to last 100 years and to provide capacity for changing functions;
- The secondary level is expected to be useful for 20-plus years (allowing a changing mix of department sizes and layouts); and

**Figure 1. The Six S's\***



\*Adapted from Stewart Brand's representation of building layers (the six S's) and incorporating Soni Diamond's conditions for indeterminate change.

- The tertiary level (equipment and furnishings) is meant to last five to ten years.

The learning and open building frameworks for considering a building in layers are useful for extrapolating design recommendations from other types of health care environments.

## IV. Patient and Provider Organization Experiences

THE CONCEPTS OF FLEXIBILITY AND adaptability have important considerations for the experiences of both patients and providers. Because the various stakeholders have different perspectives on usability, the quality of a hospital building depends on its ability to absorb organizational, operational, and technical changes. The planning process should therefore incorporate the expertise of the design team and the perspectives of staff and patients to ensure a holistic view.

Provider facilities—hospitals and large ambulatory settings in particular—have traditionally been designed around specialties and departments rather than around the needs of patients. Patients often spend most of their time in these buildings waiting for something to happen, and large areas are provided for such inactivity.<sup>10</sup> This raises questions about usability, effectiveness, efficiency, and user satisfaction.<sup>11</sup>

One way to implement usability and ensure a holistic approach involves patient pathways. Different from wayfinding or traditional patient flow analysis, patient pathways are based on the recognition that a patient typically moves from unit to unit, receiving care from different groups along the way. The patient is the only person who sees the whole journey; staff see only the component for which they are responsible. The result is the poor coordination that so often typifies a patient's experience.

The traditional approach to solving care delivery problems is to ask each department to address the problems in its area. But this cannot solve problems that result from poor overall design of clinical processes and from disconnects between the stages of a patient's journey through multiple departments.

Considering the patient perspective during the design process is crucial to addressing gaps in the care provider's operational workflow.

Developing and operating a health care facility can be frustrating for providers, most of which do not have experience in design or construction. Approval is often by committee, and the procedures for responding to immediate operational or policy requirements are complex. Typically, as soon as the building's occupants move in, changes are requested.

For these providers, scenario planning is a useful way to anticipate changes. It entails a strategic thought process rather than a fixed plan. The purpose is not to identify the most likely future, but to create a map of uncertainty and to build a broad, visible understanding of the driving forces for change. This concept ensures that the strategic objectives of health care providers, commissioners, and regulators are achieved.<sup>12</sup>

Scenario planning can also highlight how different parts of the building may change at different rates, allowing a better understanding of flexible, effective space management.<sup>13</sup> As developed through workshops at the Health and Care Infrastructure Research and Innovation Centre (HaCIRIC) 2009 International Conference, it can be considered on the following three levels in terms of the likely costs, benefits, opportunities, and threats of each.<sup>14</sup>

- **Strategic level.** A planned and integrated large-scale change that could be either a whole-system change or a phased approach to subsystems change, which is also integrated into a whole-scale plan (e.g., adding services that require different types of space and equipment);

- **Tactical level.** A subsystem change that responds to a small-scale need for change or the availability of limited resources to make such a change (e.g., adding services that can be offered in the existing space with minor renovation); and
- **Unplanned or opportunistic level.** A short-term change that addresses an unforeseen need or provides a quick response to an opportunity to deliver an innovative solution (e.g., moving furniture to address family participation in care).

Just as using the patient perspective can highlight gaps in the provider workflow, scenario planning makes it possible to reconsider the potential impact on the patient experience over time. A constant balance between patient and provider perspectives is required.

Technological advances, which affect both patients and providers, have created a shift from care in traditional hospitals to ambulatory care settings. However, many outpatient facilities have become quickly outdated because of a number of factors: the rapid expansion of information technology, point-of-care testing, portable diagnostic equipment, and telemedicine. The electronic integration of patient records will change care delivery by linking disparate providers, settings, and organizations. The pace of change is encouraging increased effort to design flexible spaces that can respond to such change. For example, multifunctional treatments spaces are becoming more standard.<sup>15</sup>

Although it may be tempting to build around new technology, this is usually unnecessary if flexible support spaces have been anticipated. Technology is lightweight and flexible and can more easily be incorporated into building through advances such as wireless networks, PC tablets, and iPads. These tools give the caregiver greater ability to move between patients, processes, and services. Health care environments are also increasingly adopting cloud computing<sup>16</sup> and mobile apps, which allows more flexibility with support spaces. Whereas server rooms have sometimes become a bottleneck for adopting new technologies in the past, the future of technology may make this less of a barrier.

## V. Learning from Acute Care Hospitals

FINDINGS FROM THE LITERATURE REVIEW suggest that studies of health care design generally consider specific areas, such as emergency departments, inpatient units, or patient rooms. For the most part, these papers address some form of universal design: universal space fields, universal rooms, or acuity adaptable rooms.

### Emergency Departments

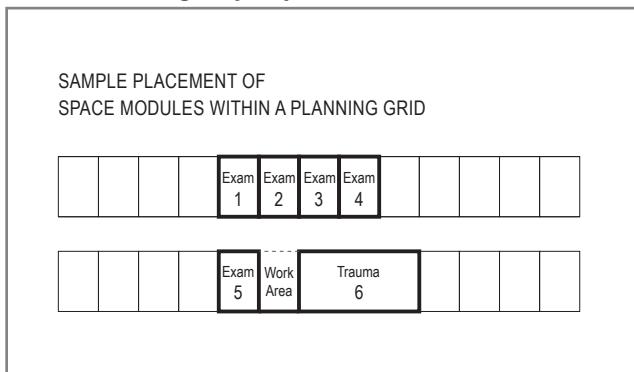
#### UNIVERSAL GRIDS

Hospital emergency departments in particular must adapt to uncertainty and change over time.<sup>17</sup> To address the need for flexible space, some EDs have implemented universal rooms and a universal space field concept,<sup>18</sup> based on short-term, mid-term, and long-term strategies:

- **Short-term.** The concept of “any patient, any room, any time” presumes that each room is designed, equipped, and staffed to accommodate each prospective use.
- **Mid-term.** For timeframes of one to five years post-occupancy, a certain degree of customization of treatment room groupings could be undertaken.
- **Long-term.** Over a period of years, as annual volumes increase beyond initial projections and design capacity, a given area can efficiently expand internally into a space previously designated for another use.

The starting point for departmental design is the universal field that accommodates long-term growth and change by establishing a module or planning grid. This grid does not represent walls (Figure 2), but establishes a logical series of relationships between horizontal and vertical circulation elements (corridors, stairs, and elevators) and structural elements.<sup>19</sup> These elements are surrounded by spaces that vary widely in their initial and long-term use and in their ability to change over time. Spaces that are unlikely to change include major mechanical, electrical, and communications rooms, while spaces most likely to change quickly include offices, waiting areas, and storage rooms.

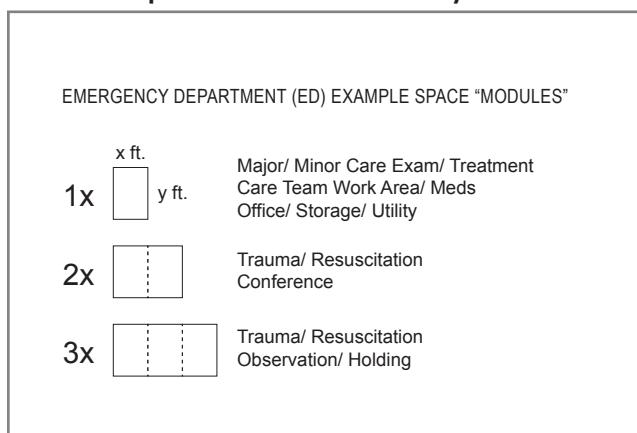
**Figure 2. Example of a Universal Grid System for an Emergency Department**



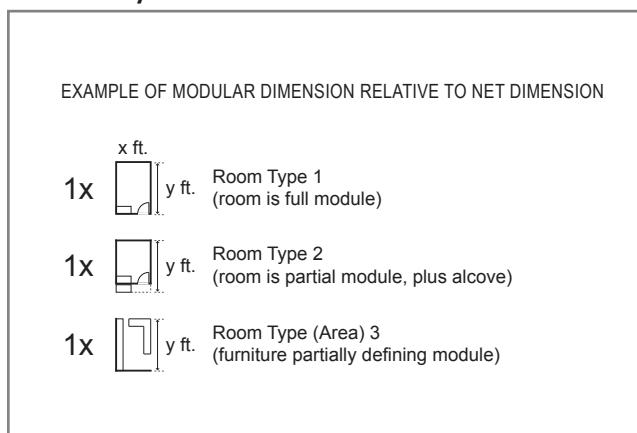
Modularity does not mandate that all rooms be of equal size. The module may be repeated to create a variation of room sizes for different purposes,

while still fitting within the grid (Figure 3), and areas requiring less space can be adjusted through cabinetry within a room or equipment alcoves on the corridor side of a room (Figure 4), so that the module is maintained, but may take on the visual appearance of a different size.<sup>20,21</sup>

**Figure 3. Modular Flexibility within an Emergency Department Universal Grid System**



**Figure 4. Flexible Layout within a Universal Grid System**



Within the ED, universal rooms that incorporate adequate storage and the same equipment in the same location provide further flexibility in function.

### Clinic Application

The ED example provides applications for both the structure and space plan layer, or primary and secondary levels, of design. The structural grid must be considered in order to develop suitable modules, which will be used over time for flexibility of function.

- **Short-term**—standardized room sizes and equipment for flexibility of care and services;
- **Short-term or mid-term**—pod groupings to provide population-based care (teams of providers with whom the patient is familiar or has had prior experience); and
- **Long-term**—expansion of high-volume or high-revenue functions.

### OPEN DOOR COMMUNITY HEALTH CENTER, EUREKA, CA

Open Door Community Health Center uses standardized room design in its facilities to ensure flexibility in treatment areas. Additionally, it has moved to a pod-based layout that supports population-based medicine in which teams of providers follow specific patients. In the plans for the Eureka center, scheduled to open in 2012–13, each pod houses the same number of offices and treatment rooms, including one larger room to accommodate additional family or special needs (see Figure 5 on page 10).

**Figure 5. Plan at Open Door Community Health Center in Eureka, CA**



In addition to standardized room design within a modular grid, modular furnishings and cabinetry can be used to maximize ergonomics and flexibility in function. These systems, which many vendors offer, include wall-mounted bracket systems for ease of installation and removal (Figure 6). Flexible mounting systems also enable the care provider to adjust computers for ergonomics or patient participation (Figure 7).

## Inpatient Units<sup>22</sup>

### VISIBILITY AND ADJACENCIES

A study addressing the design of inpatient units found nine flexibility needs that are affected by the physical design:

- Peer line of sight;
- Patient visibility;
- Multiple division and zoning options;
- Proximity of support;
- Ability to move, relocate, and interchange units;
- Ease of movement between units and departments;
- Multiple administrative control and service expansion options;
- Adjustable support core elements; and
- Expandable support core to accommodate operational changes over time (e.g., decentralization of pharmacy services).

### Clinic Application

The inpatient unit example provides several applications for clinic space planning. The clinic design should do the following:

- Preserve lines of sight for staff to care areas;

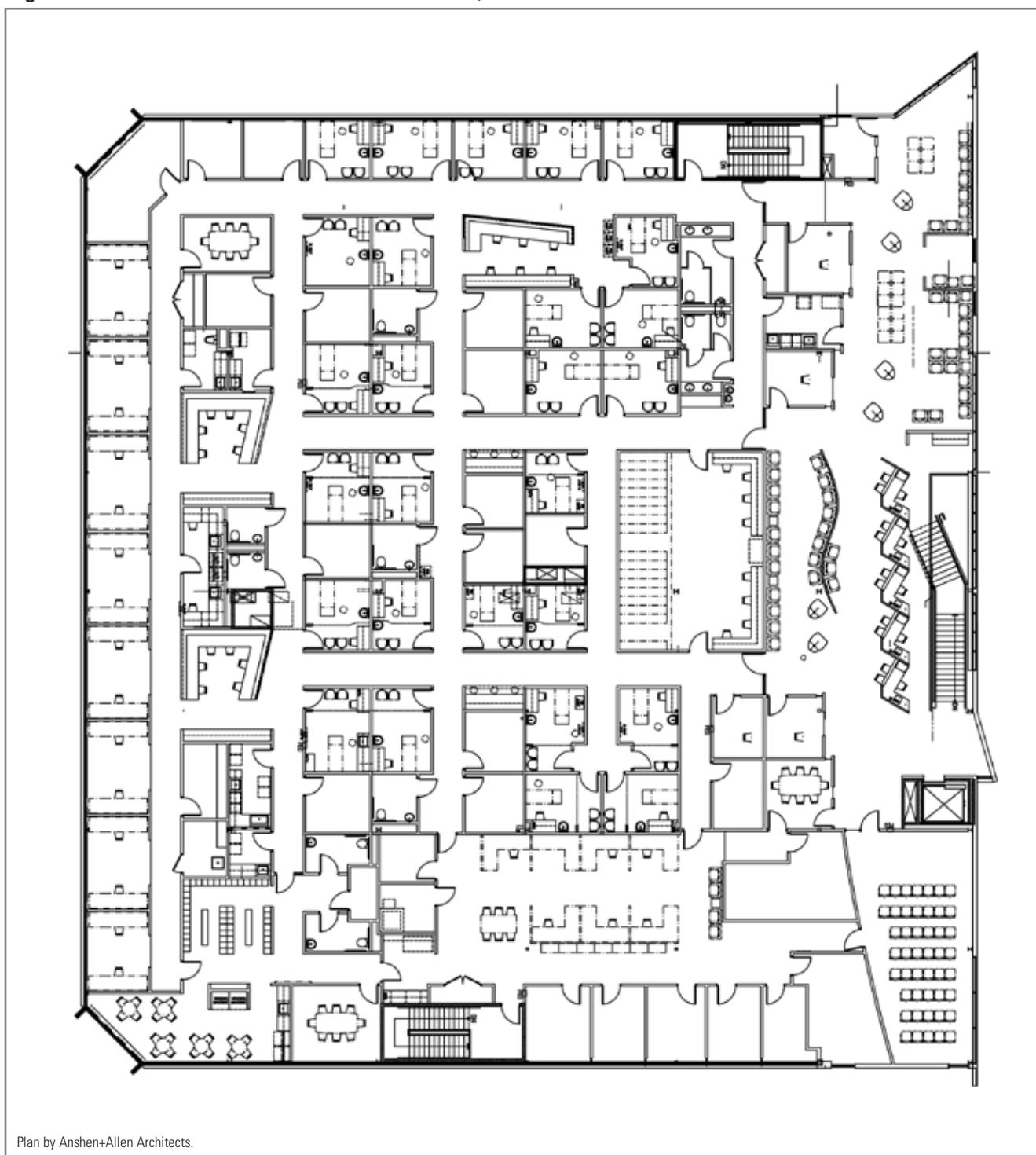
**Figure 6. Modular Casework with Bracket Mounting**



**Figure 7. Flexible Computer Mounting**



**Figure 8. Thundermist Health Center in Woonsocket, RI**



- Ensure visibility of patients in waiting areas;
- Zone functions (reception/waiting, treatment, support);
- Allow multiple uses of rooms; and
- Create easy access between wings and functions.

The following two case examples illustrate how some of these goals were carried out.

#### **THUNDERMIST HEALTH CENTER, WOONSOCKET, RI**

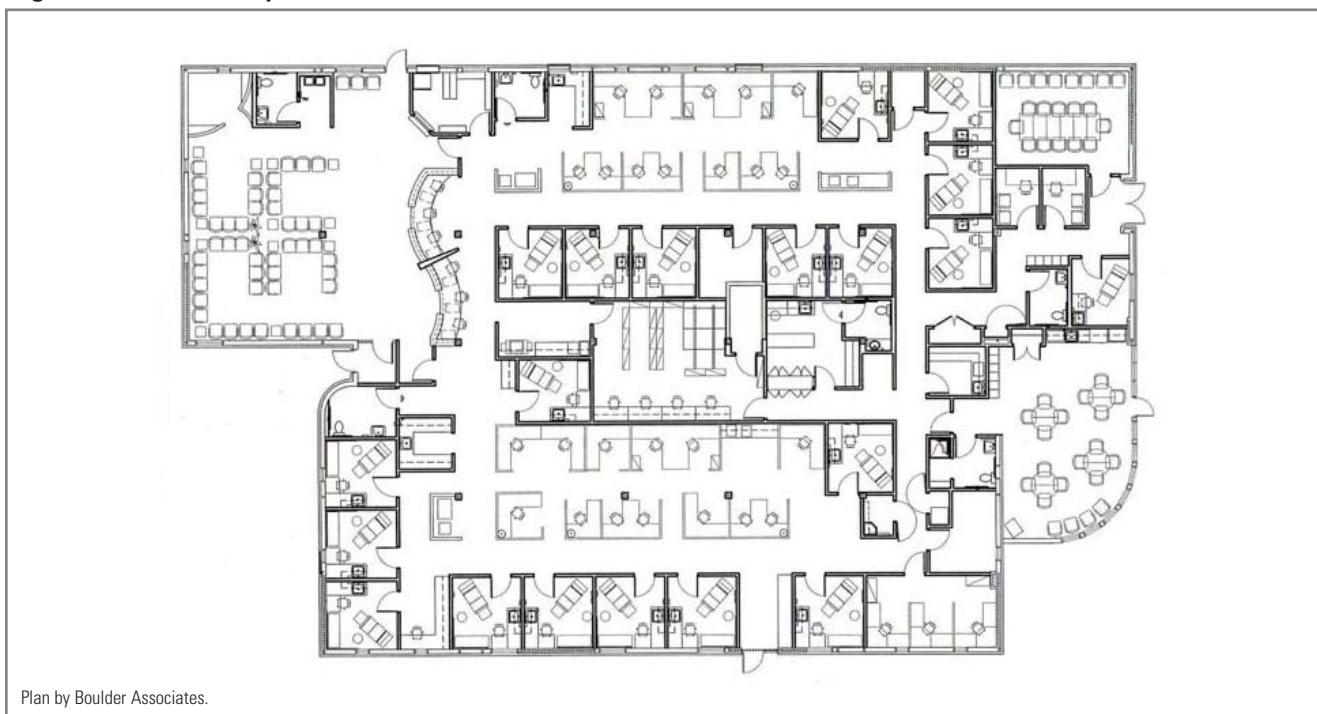
Thundermist Health Center incorporated many of these principles during the redesign of its medical offices in 1995, and the formula has held up well over time. Six free-floating, staffed check-in kiosks in the lobby/waiting area allow the presence of staff among patients in the waiting room. The focus and view are shifted to the patients, who are given pagers so they can sit in any area within the daylit space or go outside.

The clinic space is organized around three practices—women's health, pediatrics, and adult medicine—each with a medical assistant station. The goals of this design included integrating services, creating privacy, providing orientation to the outside, and maximizing light. The medical assistant's station provides a view of the main corridor, and adjacencies include clinical support rooms and provider offices. The 28 exam rooms are shared among practices and are not dedicated to an assigned provider. This ensures flexibility in scheduling and the opportunity for integrated services (Figure 8, page 12).

#### **CLINICA HEALTH SERVICES, LAFAYETTE, CO**

At Clinica Family Health Services, a pod concept supports the model of care, which involves teams serving specific patients. Low-walled modular furniture keeps clinicians within sight of the exam rooms, other staff, and the reception area (Figure 9 below and Figure 10 on page 14).

**Figure 9. Clinica Family Health Services, with Co-Located Work Areas**



**Figure 10. Co-Located Clinician Work Areas**



## Acuity Adaptable Rooms<sup>23</sup>

### MOVING CARE TO THE PATIENT

The underlying assumption of the acuity adaptable room concept is that a room is capable of supporting the complete range of care required for the patient population it is intended to serve. Care moves to the patient, eliminating the direct and indirect costs of transfers, as well as the potential for error through communication gaps during handoffs. This assumption demands a larger overall room than the traditional standards; there must be sufficient clinical space to support critical care equipment, staff, and procedures, as well a family zone to accommodate overnight stays. This model is akin to the changing acuity of care in labor and delivery to combined labor/delivery/recovery/postpartum (LDRP) rooms. However, while a larger room ensures long-term utility, it is the organization of the space and universal components of the headwall of an acuity adaptable room that determines long-term clinical adaptability.

### Clinic Application

According to the 2006 Press Ganey Report “Medical Practice Top Improvers,” patient satisfaction improves when care moves to patients. Clinics have shown a growing trend toward adopting such holistic models of care. Providing “one-stop” attention to all the patient’s needs often involves caregivers moving to the patient, rather than the patient traveling to multiple locations within the facility. This setup is supported by:

- Universal rooms—similarly sized with comparable or portable equipment to provide flexibility; and
- Pod configurations—repeatable modules of exam rooms, shared provider offices, and support spaces such as medical assistant areas.

The following example describes how one organization brings care to the patient.

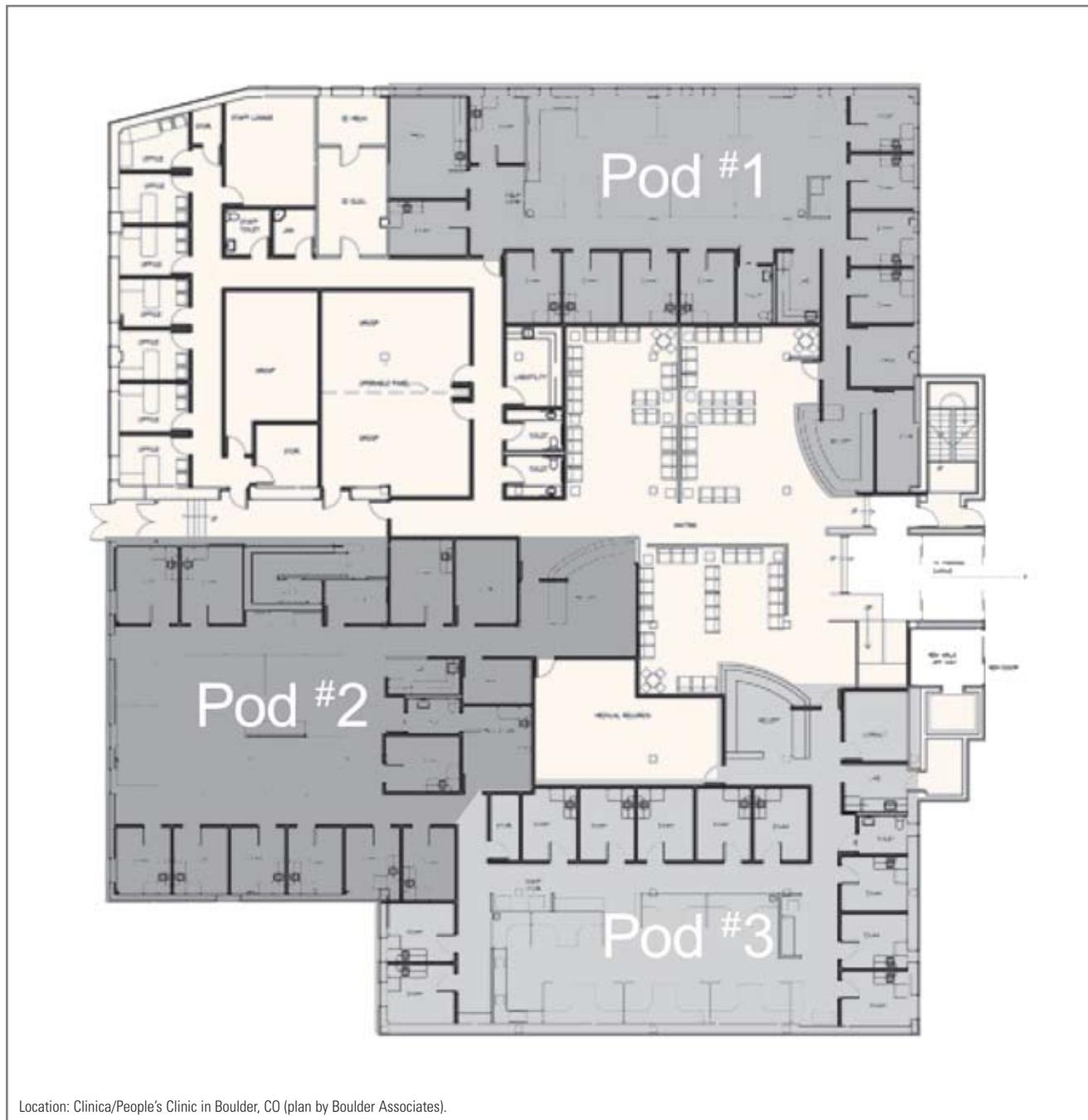
#### CLINICA FAMILY HEALTH SERVICES CLINICA/PEOPLE’S CLINIC, BOULDER, CO

Renovations to an existing building at Clinica Family Health Services in Boulder incorporate the

use of pods, which have been successfully used at three other Clinica sites (Figure 11). Patients see the same group of providers at each visit. Services such as phlebotomy, scheduling, and case management all come to the patient, who remains in one exam

room. Flags outside the room indicate which service is needed next. The layout has improved clinicians' efficiency, enabling them to care for three additional patients a day, while the continuity of care has been key to improving outcomes.

**Figure 11. Floor Plan Illustrating the Pod Concept**



## Rural Critical Access Hospitals

### Prototype<sup>24</sup>

#### INCREMENTAL GROWTH AND CHANGE

The critical access hospital (CAH) is a prototype design that acts as a health park, where building occupants and community residents participate in a restorative environment that promotes health. A CAH provides initial programmatic flexibility while accommodating future changes. Modular design allows expansion and convertibility through extended floor-to-floor heights and a spine containing circulation, electrical, and mechanical components.

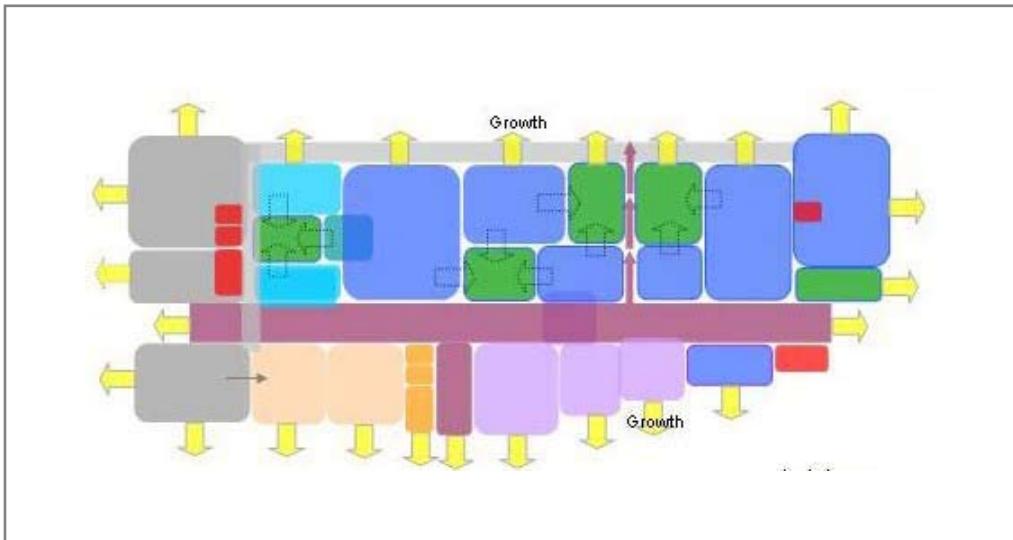
Separate points of access in the CAH prototype enable incremental growth and change while reducing disruption to adjoining functions (Figure 12).<sup>25</sup> Clinical service areas are generally unencumbered by fixed building elements such as mechanical rooms, stairs, elevators, and other features that often limit expansion options.

### Clinic Application

In applying this concept to clinic settings, considerations for growth should include:

- Site selection to allow horizontal or vertical expansion (additional acreage or zoning that permits increased height);
- Configuration of circulation to easily accommodate extensions;
- Ample width of circulation (egress stairs and hallways) for increased future volume; and
- Separate entrances and/or waiting areas specific to the team provider or area of care to reduce impact on other functions during expansion.

**Figure 12. Diagram Illustrating Future Growth Options in the CAH Prototype**



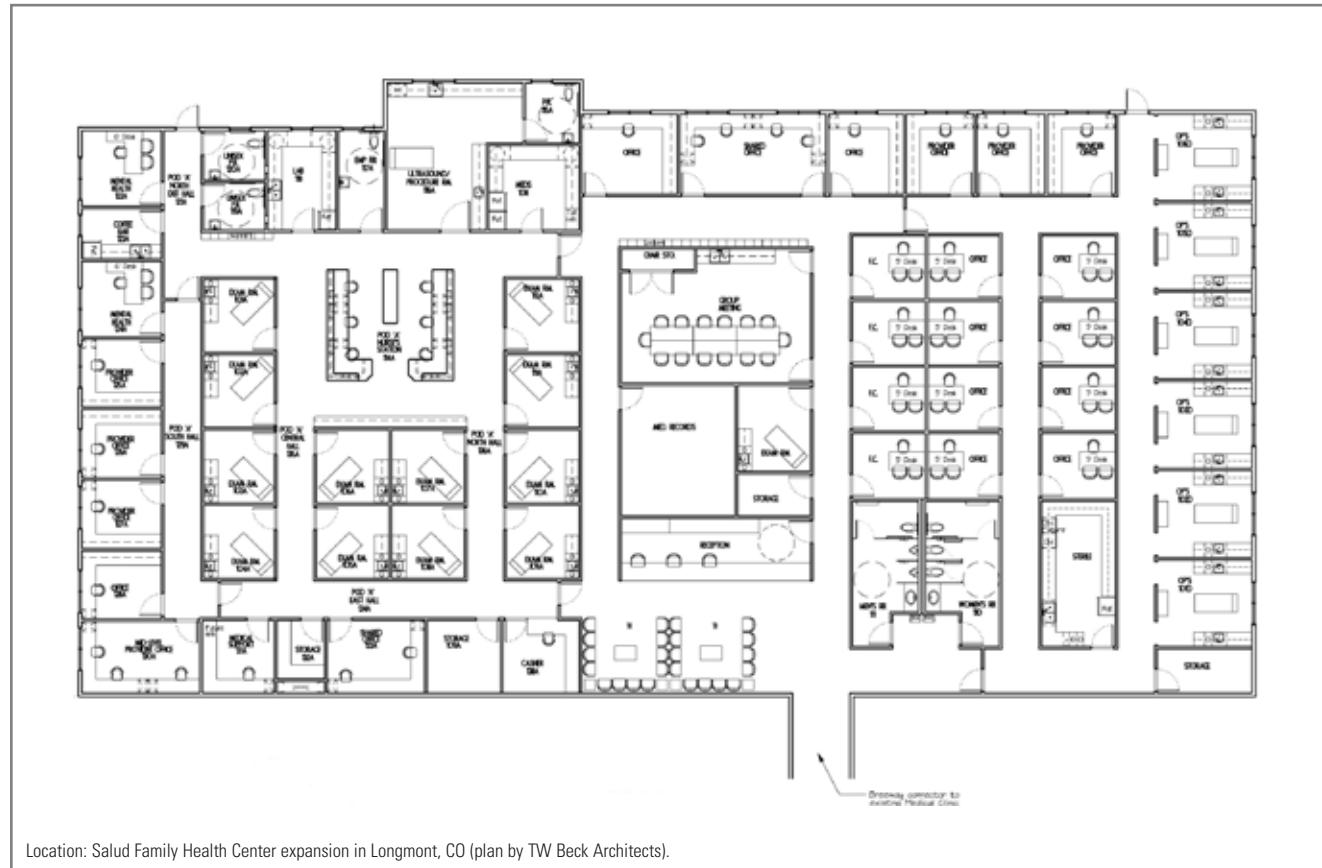
## SALUD FAMILY HEALTH CENTER, LONGMONT, CO

When the Salud Family Health Center was designed in 2003, plans were already in place for its possible future expansion. The recent addition, which is connected to the existing medical clinic via a breezeway (Figure 13), doubles the size of the facility.

## Design Components to Be Considered by the Design Team

The literature review revealed several primary elements that should be included in the design of clinics. A matrix developed by Rechel, et. al., identified specific components and varying levels of adaptability, creating a tool that facilitates separation planning methods.<sup>26</sup> This matrix has been adapted to provide general lessons for clinic design and may be most useful to a professional design team (Table 1, page 18).

**Figure 13. Breezeway at the Bottom Connects to the Original Building**



**Table 1. Design Components and Related Adaptability Considerations**

CONSIDERATIONS FOR ADAPTABILITY AND FLEXIBILITY	
<b>Access</b>	Locate site near public transportation routes. Consider purchasing adjacent or nearby land for expansion of surface parking. Structured parking infrastructure (garage) can be designed for future vertical expansion where horizontal expansion is not practical.
<b>Adjacencies</b>	Use zoning to separate public, treatment, and staff functions for improved internal circulation and privacy. Design horizontal and vertical circulation to encompass future expansion options.
<b>Building layout</b>	Design a modular grid system to allow plug-and-play development of spaces and room types.
<b>Conflicts between building elements (open building)</b>	Design to minimize conflicts between building elements. <ul style="list-style-type: none"><li>• Primary systems (life cycle: 50 to 100 years; long-term investment; unchangeable)</li><li>• Secondary systems (life cycle: 15 to 50 years; medium-term investment; adjustable)</li><li>• Tertiary systems (life cycle: 5 to 15 years; short-term investment; changeable)</li></ul> Ensure tertiary systems are easy to maintain and replace separately.
<b>Emergency exits</b>	Design egress stairs and hallway widths to satisfy current regulations and standards for several different building purposes.
<b>Equipment</b>	Standardize equipment to permit movement into different areas for flexibility in function. Use portable equipment where possible; when equipment must be fixed, design for other functions in room to maximize use.
<b>Internal walls, doors, and windows</b>	Design connections for walls, doors, and windows that are easy to mount and take down. Use minimal technical installations in walls. Standardize connections.
<b>Furniture</b>	Ensure that furniture can easily fit into most parts of the building, can be adapted to technical installations (modular systems), and can be easily moved.
<b>Loading capacity (dead load)</b>	Design floors to handle extensive dead loads (storage).
<b>Loading capacity (live load)</b>	Design floors to handle extensive live loads (community activity center).
<b>Mechanical/ Electrical</b>	Consider green and sustainable energy sources to reduce long-term costs. Design additional capacity into systems for HVAC and electrical systems (20 percent overcapacity in HVAC and 30 percent output of electrical power). <sup>27</sup>
<b>Planning</b>	Prepare for future scenarios through a master plan that documents physical expansion options.
<b>Room design</b>	Use universal design and standardization (size and equipment) to allow multiple uses for room functionality. Consider large rooms/spaces to function for multiple purposes such as community events, education, classes, etc. For additional flexibility, incorporate conference center-style room dividers to create variability in space needs.
<b>Site</b>	Consider additional land in the site purchase to allow future expansion (parking or horizontal additions). Adjacent properties can also provide potential future options for expansion.

## VI. The Business Case Through a Long-Term Lens

SAFETY-NET CLINICS RELY PRIMARILY ON government funds, foundation grants, and capital campaigns, but these resources are scarce and generally insufficient to support capital projects. The available capital financing programs have helped create a patchwork of options to fund expansion. According to the 2008 Access Capital Report, 94 percent of surveyed health centers will have to rebuild or renovate their facilities by 2013 in order to continue or expand care. Health centers will need to invest an estimated \$10.5 billion in facilities and equipment between now and 2015.<sup>28</sup>

To develop the best estimates for a long-term view at any stage of a building project, it is important to consider all cost components:<sup>29</sup>

- **Capital costs** include “first time” costs of the building project and are influenced by area, configuration, technical infrastructure (HVAC, electrical, IT), and material selection. All these decisions affect the longer term operating and maintenance costs.
  - **Operational and maintenance expenses** are the ongoing costs of operating the facility and are significantly influenced by decisions, whether material selection or workflow, made during project planning.
  - **Cleaning services** are usually contracted and are influenced by material selection and configuration of spaces. Large-volume spaces and expanses of glass or skylights typically incur additional cleaning costs that may not be considered during planning phases.
- **Energy costs** are affected by the energy efficiency of equipment and appliances, but also by the design of building envelopes, which can be susceptible to heat gains and losses. Additionally, different sources of energy, such as solar panels, can be considered and may be geographically specific. The trend toward green and sustainable design and its operational impacts are becoming well documented. One resource is the 2010 U.S. Green Building Council report, “An Open Source Searchable Database to Assess the Impact of Environmental Strategies on Outcomes in Healthcare Facilities.”
  - **Development costs** are influenced by site-specific conditions and the business plan, but also by the level of adaptability incorporated into the project. Areas of the building with a shorter service life will most likely require additional investment to reduce the costs of future adaptation.

Whole Life Analysis (WLA) provides a way to consider major design decisions. The concept grew out of the “life cycle” business case, whose initial development started several decades ago. Because the economic life of a building is best extended by adaption rather than just maintenance, adaptable buildings provide economically sound benefits over the long term. In many cases the cost of adapting existing buildings is greater than building from scratch, but the savings in the long term provide a return on investment. Slaughter sketched out the life cycles of adaptable and poorly adaptable facilities through a detailed literature review.<sup>30</sup> Her diagram

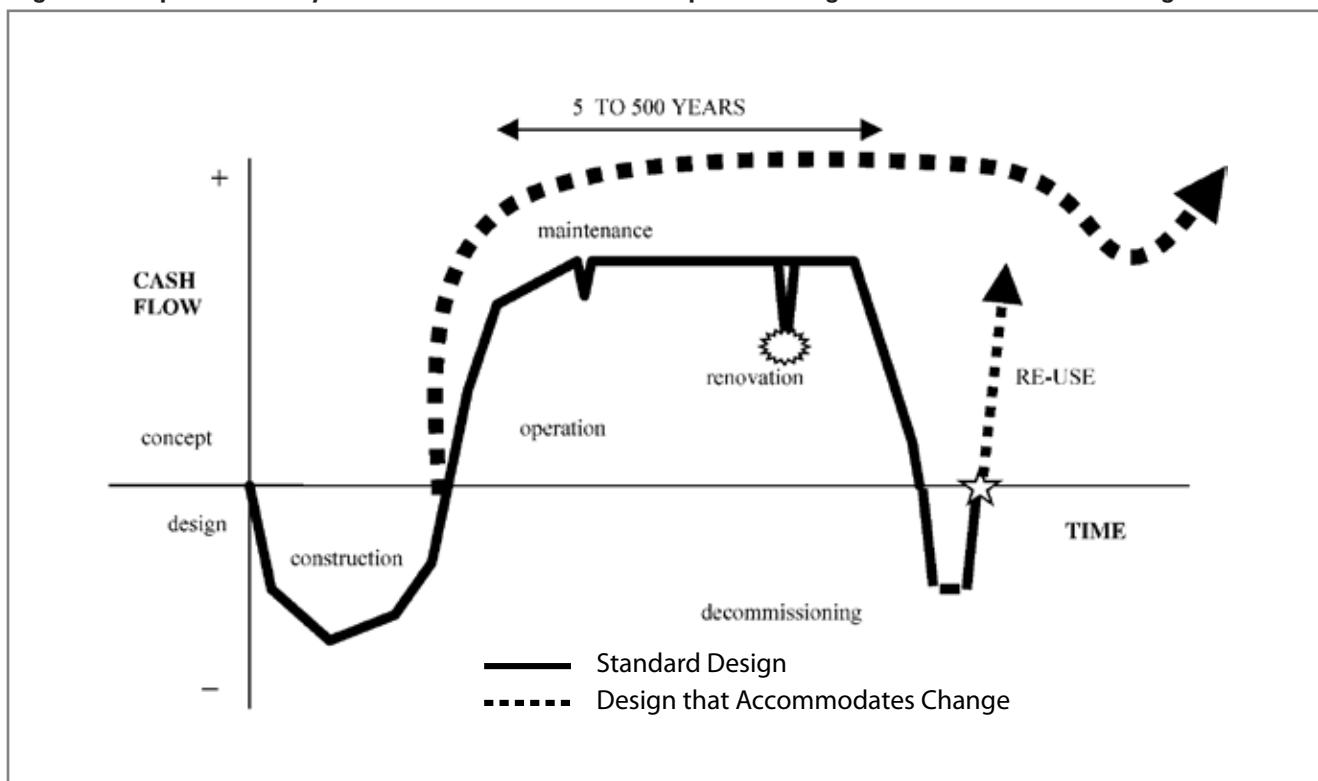
(Figure 14) illustrates that the design which is flexible for change has a positive cash flow.<sup>31</sup>

The formulas incorporate quantitative and qualitative variables, each of which is analyzed in detail. If the final answer is positive, the building adds more value for its users.<sup>32</sup>

Despite the importance of the long view in life cycle analysis, however, economic incentives still favor the short term. This is exacerbated by the fact that health care systems usually operate with one budget for new construction and another for maintenance and operations. Two “turf” competing for resources do not necessarily support the kind of investment decisions needed to prepare buildings for the long term.<sup>33</sup> A European example of the ratio between capital costs, costs in use, and the cost to do business over the life of a hospital includes ratios as high as 1:1.2:23.7 over a 60-year lifespan.<sup>34</sup>

The business case literature indicates that the major difference between flexible/adaptable buildings and other buildings is budget. More is invested in the basic structure and less on finishing, which is more susceptible to rapid change. Findings from the Norwegian Building Research Institute, which evaluated costs over time, support this conclusion. Capital cost was small relative to the three generations of services and ten generations of space plans that have the fastest churn.<sup>35</sup> By spending a bit more on flexibility and adaptability up front, you can reduce some of these longer-term costs of change. The Institute estimated that funding adaptable solutions adds 20 to 25 percent to the lowest-cost solution (one that is not at all adaptable). However, nearly every new project incorporates some adaptable features, so the cost difference is usually less.

**Figure 14. Expected Life Cycle of Facilities and Potential Impact of Design that Accommodates Change**



## VII. Conclusion

CLINICS ARE NOW IN A POSITION TO EXPAND and renew their facilities through new forms of funding. An opportunity exists to embrace designs that allow flexibility and adaptability over time with analysis of the long-term costs and implications. Research is needed on the effectiveness of universal grids and rooms from an outpatient and clinic point of view. The use of pods to provide integrated service through a population-based model of care is another area that would benefit from research studies related to community use, staff efficiency, and patient compliance. Additionally, documenting capital (first) costs, long-term operating costs, and the ability to easily expand and adapt over time is crucial in decisionmaking for future facility projects. Following are some questions to ask a design team:

1. What are our options for future expansion of the building and parking in response to growth in volumes or addition of services? Would the egress stairs and hallways still meet all codes and regulations in the event of increased occupancy?
2. Does the building's planning grid allow for changes in room configuration through the use of modular spaces (a plug-and-play system of configuring rooms and functions)?
3. What design options are being considered that would reduce the long-term operating costs of the facility (e.g., sustainable energy sources)?
4. Have excess structural, mechanical, and electrical loads been designed into the building for easy expansion? What measures have been taken to ensure that they will not need to be substantially reconfigured to support changes in layouts?
5. Are the room designs standardized to permit changes in function? How many room types best serve our program?
6. Can space designed for community functions be used for other purposes when events and classes are not in session?
7. Do we have good lines of sight between staff and patients and among staff members through clear circulation zones and functional adjacencies?
8. Does the plan support our model of care in the best way possible (e.g., services moving to the patient, rather than the patient moving around the facility)? Can it support other models of care?
9. Has the design been examined from a patient perspective? Have multiple patient and staff "journeys" been considered to ensure ease of use for multiple stakeholders?
10. Have we specified modular furnishings that can be used for multiple functions, allow ergonomic flexibility, and be mounted and removed without significant renovation or patching of walls?

Every situation and project is unique, and it is impossible to prescribe one right way to solve every problem. Because of the interests of varied stakeholders, the decisionmaking process should be iterative, with several "loops," in order to find the satisfactory alternative and adjust to changes.<sup>36,37</sup> Taking into account the patient experience, scenario planning, the business case, and potential open design strategies offers a holistic approach to maximize flexibility and adaptability over time.

## Endnotes

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Lafayette, CO

[www.clinica.org](http://www.clinica.org)

Clinica/People's Clinic

Boulder, CO

[www.clinica.org](http://www.clinica.org)

Grace Hill Water Tower Health Center

St. Louis, MO

[www.gracehill.org](http://www.gracehill.org)

Open Door Community Health Center

Eureka, CA

[www.opendoorhealth.com](http://www.opendoorhealth.com)

Salud Family Health Center

Fort Lupton, CO

[www.saludclinic.org](http://www.saludclinic.org)

Thundermist Health Center

Woonsocket, RI

[www.thundermisthealth.org](http://www.thundermisthealth.org)



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