CHILDREN’S HOSPITAL OF PITTSBURGH
RESEARCH HIGHLIGHTS
# Children's Hospital of Pittsburgh Case Study

## Table of Contents

1. **About Astorino/Fathom and Our Process**  
2. **The Challenge:** Why We Did It  
3. **The User Groups:** Who We Talked To  
4. **The Techniques:** How We Did It  
5. **The Results:** What We Found  
6. **The Results:** How They Influenced the Design
ABOUT ASTORINO

Founded in 1972, Astorino is an award-winning, full-service company providing architectural, engineering, interior design, and design-build services. With offices in Pittsburgh, PA, Palm Beach Gardens, FL, and Naples, FL, Astorino has built a reputation for quality design, innovative solutions and strong project management.

Ranked among the top healthcare designers in the country, Astorino offers an award-winning portfolio consisting of more than 1000 design projects internationally, which total over $2.4 billion in volume.

ABOUT FATHOM

It was our commitment to enhancing the healing process that led us to the development of our subsidiary company, fathom, whose creativity-driven process brings research, design and conceptual thinking together. fathom uses the power of emotion to communicate, stimulate and inspire. When the average person can express only 5% of his or her thoughts consciously, how can you truly determine your user’s needs — and, more importantly, design to meet those needs? Through the use of metaphors, visual imagery and an Insight Journal, the fathom process delivers a unique and revolutionary way to dig into your user’s conscious and subconscious to uncover his or her deepest thoughts and feelings so you can connect with them on a more profound emotional, intellectual and experiential level.

Early in the design phases of the project, fathom will use a variety of techniques based in psychology, neuroscience, anthropology and architecture, combined with our patented Deep Design Filter, to uncover and prioritize
design concepts. In the past four years we have used these research techniques on a variety of projects, including such healthcare projects as the VA Pittsburgh, Riley Hospital for Children and Butler Community Hospital.

fathom the ability to
• Identify users’ subconscious needs and translate them into design guidelines
• Clearly establish design priorities and save time during the design process
• Build consensus among a diverse group and facilitate decision making
• Facilitate informed decision-making during the value engineering process
• Ensure a design that responds to users’ needs while sustaining functionality and user satisfaction long into the future
The process: what we do

**RESEARCH TECHNIQUES**

- **BACKGROUND RESEARCH**
- **ONE-ON-ONE INTERVIEWS WITH COLLAGE DEVELOPMENT**
- **ETHNOGRAPHY, INCLUDING PHOTO DOCUMENTATION**
- **SENSORY ANALYSIS AND COLOR ANALYSIS**

**ANALYSIS**

Research results are collected, dissected, evaluated and examined and compiled into usable information.

**DISCOVERY SESSIONS**

Interactive group brainstorming sessions are conducted to further explore concepts identified through the analysis and to brainstorm possible solutions.

**INTERPRETATION**

Results accrued from the process to date are recorded, distilled, organized and prioritized. Design principles and guidelines are established and prioritized and design objectives refined into the most fundamental ideas, based on the relevant issues.

**INSIGHT JOURNAL**

The Insight Journal is a collection of customized design principles and guidelines brought to the surface through the *fathom* process. Combined with imagery, quotations and interview excerpts, it is a resource and inspiration for stimulating creativity and bringing designs to life.
The Challenge: Why We Did It

Children’s Hospital of Pittsburgh of UPMC (CHP) approached Astorino for a solution to its overcrowded and outdated campus. Since then, Astorino has worked very closely with fathom and with this hospital, one of the top pediatrics institutions in the country, as strategic partners to help clearly define their facility’s needs and build anew.

Because designing a children’s hospital was such an awesome responsibility, Astorino realized that using intuition alone to create the right concept may not be enough. They wanted to create a design that could potentially heal patients, provide parents with hope, and keep the staff energized day to day. How do you begin designing a hospital that can enhance the healing process?

In order to gain these deeper insights into the needs and wants of the various user groups, Astorino turned to fathom and its innovative pre-design research process. To help inform and inspire a more meaningful design for CHP, through thirty interviews and multiple brainstorming sessions with patients, parents, and staff, observation and photodocumentation, a new perspective on how a children’s hospital should look and more importantly, feel, was uncovered. By uncovering users’ thoughts and feelings about the ideal Children’s Hospital of Pittsburgh experience, the team was able to create a design that addresses the rational and emotional needs of the diverse user groups.

This 9.8 acre, 1.4 million-square-foot campus encompasses the full range of inpatient services and ambulatory care facilities. Designed with the hospital’s goal of LEED® (Leadership in Energy and Environmental Design) certification in mind, the design is sensitive to the environment and will reduce operation costs dramatically.

Architects stand on the threshold of a new era. [Using neuroscience and research in design]

The real beneficiaries are future generations who will have their environments more carefully tuned to their needs and desires.

—John Eberhard, FAIA
Executive Director, The Academy of Neuroscience for Architecture
Laureate Fellow of the College of Fellows of the AIA
Director of Research Planning for the AIA
The hospital’s Clinical Services Building was designed as a distinctive city landmark, prominently visible from various citywide vantage points. The building’s façade exudes vibrant colors through the use of natural materials, incorporating unique curved sail-like shapes.

The resulting design for the new Replacement Facility embodies the Hospital’s desire to provide a quality facility that will reinforce the strong reputation of Children’s Hospital of Pittsburgh. The end product will provide an environment designed to promote healing and where the dedicated staff will have the requisite tools to deliver state-of-the-art medical care to patients and their families for generations to come.

We believe that the methods and techniques that were used with CHP can be applied on a national (or broader) level with the potential of achieving the same results. Fathom the ability to

- Identify users’ subconscious needs and translate them into design guidelines
- Clearly establish design priorities and save time during the design process
- Build consensus among a diverse group and facilitate decision making
- Facilitate informed decision-making during the value engineering process
- Ensure a design that responds to users’ needs while sustaining functionality and user satisfaction long into the future
OUR PROCESS IS FOUNDED IN THE BELIEF THAT A PROJECT’S SUCCESS DEPENDS ON TRULY UNDERSTANDING THE USERS - THE CHALLENGES THEY FACE, THE GOALS AND DREAMS THEY HOLD CLOSE AND THE TYPE OF ENVIRONMENT THAT WILL HELP THEM SUCCEED.

Throughout this project we engaged patients, family members and staff. In order to provide un-biased and well-rounded insights, a mix of hospital experiences were sought within each of these segments. We talked to a 9-year-old girl, a 20-year nursing veteran and many in between. We talked to those that were experiencing the healing process first hand, and to those that provided their care.

We enabled the users to speak for themselves, to share their own experiences. Through the use of imagery and collage building, users were able to communicate feelings and ideas that are sometimes difficult to describe. We listened more than we talked. By listening to the needs, wants, values, hopes and fears the project team establishes a personal relationship with the users and eagerly takes on the responsibility of creating the best possible environment for these people—one that meets their unique needs.

WHO WE TALKED TO:

PATIENTS
PARENTS
STAFF
THE TECHNIQUES: HOW WE DID IT

ONE-ON-ONE INTERVIEWS WITH COLLAGE DEVELOPMENT (ZMET) CONDUCTED BY OLSON ZALTMAN ASSOCIATES

The ZMET approach recognizes that people think and communicate in complex ways that traditional methods do not capture. This technique uses various means to elicit information from research participants, with an emphasis on visual images, metaphors and emotions. Patients, staff, and family members were asked to select images that represent their feelings towards the hospital and their experience in it. In conjunction with images, the interviewer asks open-ended questions. The final result is a collage that tells a unique and honest story about the individual’s feelings and wishes for the facility.

Some example collages follow on this and the next page.

“A monster-type tree with things sprouting out...what this place feels like when you can’t get your drugs, you can’t get to dinner, you can’t get to the bathroom, you can’t get your supplies.”

“The isolated ski lift [conveys] loneliness and no support. I think some of our families arrive in that state. But the hopeful thing about this is that the rope tow is moving upward, which is hope and future.”

“Home is a comfort zone. When people come here, we should aspire to make them feel comfortable and secure.”

“The children relay a sense of honesty and adventure and fun. And that is what kids are and I don’t think we can ever lose sight of that when they come here.”
The clocks show that, while you are here, to a certain degree, time stands still. You don’t want time to stand still most of the time because, as time clicks on, you have more answers even if they are not the answers you want.”

“A bright, cheerful area. They need something that’s cheerful and happy, especially for the little kids. And then a place to gather for any group, whether it’s visitors, family or physicians.”

“I think the current hospital is a maze. You don’t know what floor to go on, which elevator to go on.”

“The ocean waves are soothing and healing and that’s what the hospital does.”

“I put the colors in the background because color is very important. It kind of sets the atmosphere for a place.”

“I made the dog blue because he’s sad and that’s the way I feel when I’m in the ICU or just can’t get out of my room.”

“The playroom is a nice place that I like being in and enjoy going in there and getting away from doctors and stuff. It’s probably the most important place for me.”

“I put the books together with the computer because I kind of do both of those things in the library and I enjoy doing them. They get my mind off of whatever may be going on.”
**DISCOVERY SESSIONS**

Interactive group brainstorming sessions were conducted with patients, staff, healthcare professionals, designers, and architects. The goal of these sessions was to solicit pertinent information, in an indirect and creative manner. This unconventional approach resulted in creative thoughts and feelings that a designer can more freely interpret with his or her own creativity and intuition.

**ETHNOGRAPHY INCLUDING PHOTO DOCUMENTATION**

Through weeks of observation and photo documentation we were able to document the daily routines and happenings of the hospital, providing us an opportunity to see and experience the life of CHP. Photo documentation provides those involved in the project to have a first-hand glimpse into the current conditions the facility.
SENSORY ANALYSIS

Design is about the total experience and embracing all five senses gives a more holistic approach to a healing environment. By prompting users to express their perceptions of CHP in an unconventional way that incorporated all five senses, the designers were able to include another layer of information in to their design that is otherwise not available.

Though color is something that should ultimately be chosen by the designers, our color expert gives them a place to start. These selections are made based on the analysis of interviews, in conjunction with the functional needs of the project and years of color research experience.

sensory analysis: color
the ideal Children’s Hospital Experience
NOT the ideal Children’s Hospital Experience
Out of our initial research, and with the aid of the ZMET collaging exercise, 1 deep metaphor and 3 supporting metaphors surfaced. The deep metaphor of **TRANSFORMATION** is supported by those of **CONTROL**, **CONNECTION**, and **ENERGY**. The more metaphors that are satisfied by a design or human objective, the more important a priority it is.

**TRANSFORMATION.** At a fundamental level, the hospital experience is about transformation from an unbalanced to a balanced state. The physical environment, not just the quality of care, affects transformation; this makes architecture essential to restoring balance.

**CONTROL.** Patients need to feel they have control over their illness and environment and staff need to feel empowered to give the best care possible. Patients need to maintain their identities and some measure of freedom/choices. Privacy is a key concept.

**CONNECTION.** There is an innate need for patients to connect with the outside world, themselves, others and even the building itself. The hospital experience is filled with connections.

**ENERGY.** There is an inherent need for certain types of energy and energy sources to get through the hospital journey. Control and connection affect energy. Architecture should maximize energy.
## Design & Human Objectives

<table>
<thead>
<tr>
<th>Priority</th>
<th>Metaphors</th>
<th>User</th>
<th>Issue</th>
<th>Related Wants &amp; Needs</th>
<th>Human Objectives</th>
<th>Design Objectives</th>
<th>Inspirational Images</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTROL</td>
<td>1. Child-Friendly / Focus</td>
<td>P,F,S</td>
<td>People desire a more child-friendly hospital. They hope that the new hospital will be more inviting and interactive for children.</td>
<td>Let kids actually be themselves - be kids.</td>
<td>People should know it is a pediatric hospital</td>
<td>Interactive art for kids. &quot;Little People&quot; furniture.</td>
<td><a href="#">Image</a></td>
</tr>
<tr>
<td></td>
<td>1. To One-self</td>
<td>C,E,F</td>
<td>Open spaces give the hospital a feeling of being child-friendly.</td>
<td></td>
<td></td>
<td>Apphetal to kids. To feel less frightened</td>
<td><a href="#">Image</a></td>
</tr>
<tr>
<td></td>
<td>2. To Family / Friends</td>
<td>P,F,S</td>
<td>Feel like a kid's room</td>
<td></td>
<td></td>
<td></td>
<td><a href="#">Image</a></td>
</tr>
<tr>
<td></td>
<td>3. To Staff</td>
<td>C,F,P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><a href="#">Image</a></td>
</tr>
</tbody>
</table>

### COLOR CODE LEGEND

- **6/19/03 Staff Brainstorming**
- **6/27/03 Family Brainstorming**
- **11/17/03 Patient Brainstorming**
- **White- Astorino In-House Brainstorming (various dates)**

### User Group Dimensions

- **Connect with family members**
- **About being in the hospital. Patient directory FRC**
- **Fit family in room**
- **Colorful nurse uniforms**
- **Hide medical equipment**
- **Technology / entertainment**
- **Interactive activities, Internet**
- **Minimize sounds from medical equipment**
- **Adjustable lighting (brightness)**
- **Pictures on wall**
- **Bulletin board**
- **Bed alcove**
- **Look outside from the bed**
- **Comfortable blankets / linen**
- **Colorful gowns / pajamas**
- **Child-friendly food**
- **Feel like a "big toy store"**

### Inspirational Images

- **Kid sized furniture**
- **Cool room! Liked all the compartments. Place for everything.**
- **Like a second home but need work / life strengthened.**
- **Meet / interact with other patients**
- **Opportunities to meet other people lessen the feelings of being alone.**
- **Knowing that you have friends and family and what is going on.**
- **Fit family in room**
- **Colorful rooms / walls**
- **Furniture arrangement in patient bedroom to be flexible, allow for multiple seating arrangements**
- **Control music system from bedside**
- **Computer / video games**
- **Child-life Babysitter**
Design & Human Objectives

**CONNECTION**

**1. To One-self**

<table>
<thead>
<tr>
<th>People need to be able to focus on themselves to maintain mental balance.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The patients are isolated from their friends, school, their outside life.</td>
</tr>
<tr>
<td>Meet some new kids their own age. Come into this room and maybe forget about being in the hospital.</td>
</tr>
<tr>
<td>Internet In-hospital e-mail Patient directory</td>
</tr>
<tr>
<td>Atrium / garden Playroom / lounge FRC Group activities room Family spa / exercise area Patient directory</td>
</tr>
<tr>
<td>Meet / interact with other patients</td>
</tr>
</tbody>
</table>

**2. To Family / Friends**

<table>
<thead>
<tr>
<th>I know it helped him. I know in my heart it helps.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family is a wonderful thing</td>
</tr>
<tr>
<td>To have them be there with us all the time that they want. Ability for family to accompany patient to medical procedures</td>
</tr>
<tr>
<td>Internet Telephones Video / web camera Cell phone accessibility</td>
</tr>
<tr>
<td>Playroom / lounge Family zone in patient room Family waiting areas</td>
</tr>
</tbody>
</table>

**3. To Staff**

<table>
<thead>
<tr>
<th>The sense of family is strengthened.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Like a second home but need work / life balance - see other staff more than husband / wife.</td>
</tr>
<tr>
<td>Knowing that you have friends and family and nurses and doctors that are standing behind you.</td>
</tr>
<tr>
<td>Consult rooms Color-code rooms to nurse station for assistance Record question for Dr to get later.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Someone to give directions To see a friendly face</th>
<th>Greeter at front door</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alone time - no family available Someone to play with</td>
<td>Volunteer Child-life Babysitter</td>
</tr>
</tbody>
</table>
**Research Result Excerpts: Sensory Analysis: Color**

**Blue**

Light blue, sky blue, blue-green
Pretty, relaxing.
(For boys’ rooms.)

- Sky blue: “I have isolated negative emotions from certain experiences about Children’s Hospital, but all in all my experience has been wonderful. I think it’s a fantastic place and I thank God that I have it.”

**Rainbow**

Mix them all together. A lot of fun colors. A roller coaster ride.

**Pastels**

Comforting. Soothing things that you’d find in Beatrix Potter books

**Green**

All-time favorite color. The hospital is not a place you are completely dreading.

**Purple**

Soothing.

**Orange**

Sunny, cheerful, optimistic.

**Red**

An exciting color. Happiness.

**White**

The exact opposite of black, and if black is bad, white is probably good.

**Pink**

For girls’ rooms.

**Caribbean Color Palette**

Bright.

**The Ideal Children’s Hospital Experience**
black
Gloomy, stormy.

It's harsh and not friendly. A downer, dark and sad. “Some people define black as dark and foreboding. It's usually the black and white sides, the good and the bad guys.”

red
“Because red is mean and red is mad.” There is no stopping, there is no such thing as ‘do not enter.’ Represents an emergency, needing to stay awake. Times of pain and anger.

dull red
annoying

white
It's a hospital color. Dull.

drab green
The colors of sickness. Medical.

bright orange
Fire. Hot.

blues
for the more somber things that happen [here]

NOt the ideal Children’s Hospital Experience
The more often a word came up in an interview, the larger it appears.

**Research Result Excerpts: Current Hospital Situation**

- Prisone/jail/cage
- Anxiety
- Trapped
- Maze
- Confusion
- Nervous
- Disjointed
- Institutiona
- Dull
- Boredom
- Hopelessness
- Impatience
- Lack of personality
- Trapped
- Time warp
- Time moves slowly/stop
- Time moves too fast (for staff)
- Loss of control
- Loneliness
- Isolation
- Cut off
- Lose touch
- No windows
Almost everything in Control and Connection has some effect on energy.

**DEPLETES ENERGY**
- Institution
- Prison/trapped
- Medical Spaces
- Inefficiency
- Lack of Privacy
- Closed-in Spaces
- Isolation
- Anxiety
- Hopelessness
- Confusion
- Slow Time (Families)
- Fast time (Staff)

**PROVIDES ENERGY**
- Home
- Escape
- Non-medical Sanctuaries
- Efficiency
- Privacy
- Open Spaces
- Communication
- Calm
- Hope
- Focus
- Fast Time (Families)
- Slow Time (Staff)
METaphors: Transformation, Control, Connection, Energy

By incorporating the design principles identified through the fathom process, the architects created a meaningful design that truly meets the needs of the users on both a physical and emotional level.

Fundamentally, the hospital is about transformation—movement from an unbalanced state to a balanced state. The idea of transformation is shown throughout the hospital in various ways. For example, the main corridor connecting the parking garage to the main lobby literally transforms as you travel through. The lighting, texture, floor and wall patterns change and support the underlying motif of a cocoon turning into a butterfly.

The supporting metaphors are those of control, connection and energy. Control is incorporated into the design of the individual patient rooms, where the children are given as much control in their rooms as possible. They are child-friendly places that are intimate and private, providing a distraction from illness and allowing an escape from the hospital environment. Connection is used as an element in the building’s façade where it changes from a very utilitarian looking building with mostly gray tones to a rich and colorful façade with which the children could emotionally identify. Energy is demonstrated throughout the hospital as well. One specific example is the design for an outdoor healing garden in which the users of the hospital can be energized while being immersed in nature and the outside world.

As a core element, this facility is designed as a model for family-centered care. Patient rooms are individual and provide a variety of accommodations for family members. The family zone is intended for overnight stay, with a sleeping surface, curtained privacy, and other amenities. Each patient unit holds a cluster of rooms centered on a common area where children and families can meet and play. Other features throughout the facility, including a variety of lounges, kitchenette, laundry facilities, chapel, school and business center, provide family members with the resources necessary to continue normal life activities while providing a level of privacy not common in hospitals.

Below: Rendering of transformation corridor
While contextual with the surrounding Lawrenceville neighborhood, and sized to be a significant landmark, the original renderings show a building clad in traditional materials, used in a traditional way. The building is handsome, but like its Oakland counterpart, there is little indication that this is a place for children.

Informed by the user research, the new facade comes to life with dynamic and organic shapes, a rich and welcoming color palette, and the use of traditional Pittsburgh materials in a much less traditional way. The CHP journey begins when a child leaves home, and this building tells him or her, from miles away, that it is a place for kids.
The collage building exercise was key to eliciting hard-to-convey ideas and feelings. Additionally, the images themselves inspired the Astorino designers when thinking about the interior and exterior color palette. In the interviews, respondents had stated their desire for a more colorful, upbeat, and exciting atmosphere in the new hospital, and their collages reaffirm this. In the end, it was the users, and even the color names, that determined the resulting palette.
Again, taking inspiration from the user collages and interviews, the design team assembled a materials palette that translates the need for upbeat, family-friendly colors and textures.
CLOCKWISE, FROM TOP LEFT: A LONG CORRIDOR BECOMES LESS MONOTONOUS THROUGH COLOR AND PATTERN; A NURSES’ STATION AND WAYFINDING; A PLAYROOM IN PROGRESS; BUTTERFLY MOTIF CARRIED INTO CURVED, TRANSLUCENT PANELS.
AT TOP: THE 4,000 SF HEALING GARDEN, WHERE USERS CAN BE ENERGIZED BY IMMERSING THEMSELVES IN NATURE, COMES TO LIFE. PATIENTS, THEIR FAMILIES, AND HOSPITAL STAFF CAN REACH THE GARDEN THROUGH A 4-STORY ATRIUM AND ITS SCREENED-IN PORCH, WITH LARGE ROCKING CHAIRS AND CALMING CEILING FANS. THE QUIET SPOTS AND MOVABLE CUSTOM-MADE FURNISHINGS—PICNIC TABLES, ADIRONDACK CHAIRS AND SWINGING BENCHES—WILL MAKE IT CONDUCTIVE FOR PATIENTS AND FAMILIES TO ENJOY THE FRESH AIR TOGETHER, AND FOR STAFF TO REJUVENATE IN THE SERENE SETTING.

AT BOTTOM: THE "TRANSFORMATION CORRIDOR," THE MAIN CORRIDOR CONNECTING THE PARKING GARAGE TO THE MAIN LOBBY. THE LIGHTING, TEXTURE, FLOOR AND WALL PATTERNS EXPRESS THE EVOLUTION OF HEALING, USING DESIGN ELEMENTS THAT SUPPORT THE MOTIF OF A COCOON DEVELOPING INTO A BUTTERFLY AND A MOTIF OF CHANGING SEASONS ON THE TERRAZZO FLOOR.
AT TOP: PATIENT ROOMS ARE CHILD-FRIENDLY AND THE CHILD HAS CONTROL OVER THINGS LIKE LIGHTING AND DISPLAY OF PERSONAL ITEMS.
AT BOTTOM: STAFF HAVE CONTROL OVER PATIENT CARE BY BEING ABLE TO SEE EASILY INTO THESE ROOMS WITHOUT COMPROMISING A FAMILY’S PRIVACY.
ABOVE: THE ATRIUM, OR FAMILY TOWN SQUARE, COMES TO LIFE. A CENTRAL GATHERING AREA, IT ALLOWS FOR EDUCATIONAL AND ENTERTAINMENT PROGRAMS, AIDED BY THE INCORPORATION OF A HUGE MOVIE SCREEN THAT DESCENDS OVER THE WINDOWS (ALSO AT RIGHT). DOORS LEAD TO THE HEALING GARDEN, AND THOSE THAT CANNOT GO OUTSIDE CAN STILL CONNECT WITH NATURE. A LABYRINTH IN THE FLOOR ALLOWS FOR CONTEMPLATION AND DISTRACTION DURING QUIETER TIMES.
The deep metaphor of Transformation and the corresponding butterfly motif have legs beyond their incorporation into the design and interiors of the facility. Check out some of these printed pieces, by both the in-house marketing team at Children’s Hospital, and the agencies they have hired.
CONCLUDING THOUGHTS

Childhood is a time of transformation, of energy and color. And for a sick child, those things are even more important. fathom’s team of research professionals are moms, dad, aunts, uncles, sisters and brothers too. We want to make healthcare facilities that make kids better. And we can take the passion and experience garnered from projects like CHP and put that to work on your next effort.

We believe that the methods and techniques that were used with Children’s Hospital of Pittsburgh of UPMC can be applied on a national (or broader) level with the potential of achieving the same results.

fathom the ability to
• Identify users’ subconscious needs and translate them into design guidelines
• Clearly establish design priorities and save time during the design process
• Build consensus among a diverse group and facilitate decision making
• Facilitate informed decision-making during the value engineering process
• Ensure a design that responds to users’ needs while sustaining functionality and user satisfaction long into the future