

## **DESIGNING CHILD-SIZED HOSPITAL ARCHITECTURE: BEYOND PREFERENCES FOR COLOURS AND THEMES**

**Verschoren, Laure (1,2); Annemans, Margo (1,3); Van Steenwinkel, Iris (1); Heylighen, Ann (1)**  
1: University of Leuven (KU Leuven); 2: A33 architecten; 3: osar architects

### **Abstract**

Hospitals tend to be associated with being ill and suffering from pain. Especially for children a hospital stay can be a poignant experience. On top of not feeling well, they have to exchange their familiar environment for the structured hospital system. Our study explored the role of architecture in making hospital stays more pleasant for children. More precisely, we investigated what child-friendly hospital architecture means from the perspective of young patients, and what role architecture plays therein. To this end, we combined observations in a child oncology ward with interviews with young patients, their parents, and hospital staff. The insights gained in this way shed a new light on findings available in literature on designing child-friendly hospital architecture. Moreover, while the literature often advances generalizing concepts, this study shows how children's experience of hospital architecture can be highly personal. As such, our study suggests that designing child-friendly hospital architecture is a matter, not so much of preferences for specific colours or themes, but of more complex design principles like flexibility and customizability.

**Keywords:** Architecture, Children, Design for X (DfX), Hospital Design

### **Contact:**

Prof. Dr.-Ing. Ann Heylighen  
KU Leuven  
Architecture - Research[x]Design  
Belgium  
ann.heylighen@asro.kuleuven.be

Please cite this paper as:

Surnames, Initials: *Title of paper*. In: Proceedings of the 20th International Conference on Engineering Design (ICED15), Vol. nn: Title of Volume, Milan, Italy, 27.-30.07.2015

## **1 INTRODUCTION**

Being admitted to a hospital is for children often a poignant experience. Suddenly they are confronted with illness or an accident, forcing them to leave their comfort zone. On top of that, they are taken out of their familiar environment to fit into the structured system of the hospital, which makes the hospital stay all the more frightening.

Most hospitals in Belgium date from the 1960s (De Wilde & Muylle, 2012), when hospital construction focused mainly on functionality with little or no attention for patients' experience (Wagenaar, 2006). Whether patients were adults or children hardly seemed to matter. Today, however society holds high expectations toward hospital care (De Wilde & Muylle, 2012). Designers, researchers and caregivers each have their own ideas about the best way to offer children medical care, and about what a children's ward in the hospital should look like. In practice, however, taking into account patients' perspective remains an important challenge. While this perspective is more and more the starting point for a hospital's construction or conversion, during the design process it often has to lay thumbs against aspects that are easier to 'prove' or calculate (Annemans et al., 2014). As a result, a key perspective is all too often forgotten: that of the young patients themselves.

The study reported here aims to investigate how children experience a hospital stay, and how architecture may contribute to improving this experience. Central to the study are the following research questions: what does child-friendly hospital architecture mean from the perspective of young patients, and what does this imply for hospital design?

In focusing on children's experience of hospital spaces, our study attempts to look through the eyes of the child as patient to understand their needs and wishes. Ultimately, it hopes to bring the child as patient into vision in the design of hospital buildings. Although a children's hospital is used by many people - patients, visitors, medical staff, nursing staff, et cetera - children can be considered its most important user group (Silaf Utkan, 2012): they are the ones who, temporarily, have to spend day and night in the hospital and recover there. If architects - or other designers, for that matter - are to design a child-friendly hospital environment, it is thus important to put children's perspective centre stage.

## **2 BACKGROUND**

The idea that a hospital's architecture contributes to patients' well-being dates back to the 18th century, and has influenced health care facility design ever since (Wagenaar, 2006). In the past decades, it attracted renewed attention from researchers studying concepts like 'healing environment' or - its hard-core variant (Wagenaar & Mens, 2009) - 'evidence-based design' (EBD). The first and most famous EBD study showed that patients recovered better after surgery when their hospital room offered a view on green (Ulrich, 1984). To our knowledge, however, relatively few studies have been conducted about the role of architecture in how children experience a hospital stay.

More than 10 years ago, Eriksen (2001) identified several factors and tendencies related to hospital design that are important in caring for young patients: 1) hospital stays become shorter, while children are treated in an ambulatory way whenever possible; 2) hospitals should pay attention to and foresee room for playing - both quietly and actively, individually as well as in group; 3) since parents play an important role in their child's healing process, their well-being should be guarded during this process as much as possible; 4) medical and nursing staff, psychologists - should have the necessary skills to cope with the varying needs of patients and their parents.

Research by Coyne (2006) showed that children have considerable concerns and fears when admitted to the hospital. Across different age groups, she found, children share four kinds of fear: fear for being separated from family and friends; for having to stay in an unknown and unpleasant environment; for undergoing examinations and treatments; and for losing their self-determination. While the second literally relates to the environment children stay in, the others could indirectly be linked to it as well: the more room for visitors, the easier it is to have company and the less children will feel separated from family and friends; the more room for different activities, the more options patients have to decide themselves what they are going to do. This seems to suggest that the environment indeed can play an important role in making a hospital stay more child-friendly.

Bischof (2008) drew attention to children's coping strategies, i.e., how children cope with difficult situations emotionally, mentally, and actively. When children are taken out of their familiar environment, and thus lose control over their own situation, they adopt certain strategies to try and deal with the situation: they try to replace negative feelings by positive ones by doing things to relax

(taking a walk or watching television), making drawings to channel their emotions, or surrounding themselves with personal and recognisable things to feel more at home. Also here the environment may play an important role: the more versatile the environment children stay in, the more opportunities they have to deal with their situation. It is this role that our study tried to gain a more articulate understanding of.

### **3 METHODS AND MATERIAL**

In order to investigate how architecture may improve children's experience of a hospital stay, we combined multiple methods: observation, face-to-face interviews, and focus group interviews.

By way of preparation, the first author - henceforth referred to as 'the researcher' - did volunteering work in a children's hospital during two weeks. Collaborating with the clown doctor allowed her to observe how a children's ward is organised from within. Working with the children themselves offered her a first impression of how they experience a hospital stay.

For the actual fieldwork, we focused on the case of a university hospital. Since its current children's wards are highly outdated - the hospital's first phase dates from the 1970s - its management was eager to gain insight into the topic to inform the construction of a new children's hospital. Studying all children's wards in this hospital was not feasible within the study's time frame, therefore we chose to work with children who have to stay in the hospital frequently and for longer periods. In dialogue with the hospital management, we decided to focus on the children oncology ward where patients frequently have to return and often have to stay. On this ward, the researcher conducted observations - first to become acquainted with the setting; second to attend to specific elements that are important in addressing the research questions; and third to observe these elements in more detail. In addition, she conducted interviews with people who could offer different perspectives on how young children experience a hospital stay.

The first, and most important perspective was that of the young patients. Since we expected that parents have a good view on how their child feels during a hospital stay, interviews were conducted with patients themselves, but also with one of their parents. To make sure that the children already had some experience with hospitalization, and to limit the scope of the study, we adopted the following selection criteria: children should have been treated for at least six months, and be between 8 and 14 years old. Based on these criteria, the ward's chair and children psychologist provided us with contact information of children and parents willing to participate. Eventually the researcher interviewed four patients who met the criteria more or less, and one of their parents: Amy (12 years old, almost 8 months treatment) and her mother, Rose (14 years, 10 months treatment) and her father, Eric (16 years, 8 months treatment) and his mother, and Sue (9 years, 5 months treatment) and her mother. (Original names have been replaced for reasons of anonymity.) The interviews were semi-structured face-to-face conversations based on open questions. Questions were adjusted to the patient's age and health at the time of the interview.

The second perspective was provided by five staff members who work with young patients in a hospital setting on a daily basis. Their perspective was consulted through a focus group interview, a data collection technique which results within a reasonable time frame in an overview of different, or similar, opinions about a theme related to which participants share relevant experiences. Participants were identified once again with the help of the chair and the children psychologist, who recruited two children psychologists, a pedagogical staff member, a head nurse, and the chair/oncologist herself. The focus group interview was moderated by the last author and observed by the researcher, who made notes. Also this interview unfolded in a semi-structured way based on open questions.

Each interview (face-to-face or focus group) was audio-recorded. Immediately after the interview, the researcher made a descriptive report. As soon as possible, she transcribed the audio recordings, so that she could still remember how the conversation had unfolded. Subsequently, the transcripts were analysed in light of research questions. Transcripts were assigned codes, categories and themes on varying levels, using concepts from literature and aspects arising from the interviews themselves (e.g., spatial organisation, interior, outdoor environment). The subheadings below reflect different aspects of the hospital environment that turn out to play a role in young patients' hospital experience.

## **4 FINDINGS**

What does a child-friendly hospital mean from the perspective of children? Judging from our findings, this meaning involves three interrelated dimensions: a) respect for children's identity and diversity (e.g., in terms of age); b) social interaction; and c) interaction with the material environment. Given our interest in how architecture may contribute to a child-friendly hospital, the remainder of the paper focuses on the latter dimension, without losing sight of its relations with the former two.

### **4.1 Spatial organisation**

When admitted to a hospital, children are confronted with a new, unknown environment. The arrival at the hospital seems to play a major role: this is the moment that the first contact is made with the environment they will stay in. Subsequently children interact with the building by navigating through it, and by looking for positive distraction during their stay.

#### **4.1.1 Arriving at the hospital**

Several of the children and parents we interviewed experienced arriving at the hospital as very overwhelming. A hospital's entrance hall accommodates considerable flows of people: visitors, patients, medical and nursing staff, cleaning personnel, et cetera. Some patients, but especially parents would prefer a separate entrance hall and waiting room for children. In particular the size of and the bustle in the university hospital's entrance hall seem to be problematic. Sue's mother compared it with a train station and, like Amy's mother, would prefer a separate reception: "Imagine you had a separate check-in point for children. That would perhaps somewhat [help]." Rose's father finds the confrontation with many ill people difficult for his daughter: "[...] perhaps they could foresee a separate registration desk for children, or for adolescents, so that they are actually confronted less with the rest of the people." Eric and his mother seemed to consider a separate entrance hall and waiting room less important, perhaps because Eric is a few years older than the other patients who participated.

Upon arrival at the hospital, patients usually need to wait before they can undergo treatment or go to the ward. Across the board, children dislike waiting and quickly get bored. Almost all interviewees pointed out that a swift arrival at the hospital and a swift patient flow could make a hospital visit or stay considerably more comfortable. Amy's mother mentioned that it is not nice when Amy has to wait too long. Also on the ward, children sometimes need to wait before getting assigned a room: "At the desk, sometimes you need to wait so long. There's such a buzz of the nursing staff."

#### **4.1.2 Way-finding and orientation**

After the first contact with the hospital, children have to go to a certain ward for an examination or stay, usually accompanied by a parent. Important at this point - for patients and visitors, but especially for children - is a clear circulation and orientation. In large hospitals wayfinding is often an issue, which can easily cause stress (Carpman & Grant, 2011). Some patients and parents we interviewed mentioned that, at first, they often had to feel their way through the hospital. Sue, the youngest patient who participated, was rather concerned about this: "If you come here for the first time, for instance, and you don't know where to go, there are only colours of arrows. So they need to write more what that is." At first, she said, she had a very hard time to find her way. Also in other interviews, patients mentioned that they did not find the colour system that clear.

#### **4.1.3 Space for positive distraction**

As mentioned, children easily get bored. Providing sufficient positive distraction requires that the hospital foresees interesting spaces, as highlighted by the staff. When asked which elements they consider important in a child-friendly hospital environment, they repeatedly brought up this theme:

"relaxation room, play room, that there are opportunities for this too";

"space where children can develop themselves and play";

"and that they have a spot where the illness-feeling or hospital-feeling can be less present for a while, [...]"

Also during the interviews with patients and parents opportunities for playing and relaxing were brought up repeatedly. Spaces frequently referred to as pleasant include the hobby and play room, music room, and library. Amy's mother especially likes that there is a room specifically for children: "I

do like it, that children have their own space in that hobby room." Many wishes expressed during the interviews relate to more room for pleasant activities. Several interviewees mentioned that it would be nice if the ward had a kind of 'snoezel' room.<sup>1</sup> The staff dared to dream even further: "A fitness room and a swimming pool, that's what we want (...) for the parents and adolescents."

Important in providing positive distraction, the interviews suggest, is that it has to be available as often as possible. Several patients and parents thoroughly regret that the play and hobby rooms are closed after office hours and during weekends. Amy finds it a pity that there are no activities during the weekend: "I'm really bored to death during the weekend." Also during the volunteering work, the researcher noticed that children regretted that the weekend was approaching. Some children asked her repeatedly whether she could come also on Saturday.

What seems to be a major problem, is the need for supervision in play and relaxation rooms. When nobody is available to supervise that the rooms are used correctly, they are closed off. The clown doctor does not work during the weekend, so the play room is closed off.

Besides in spaces intended for leisure activities, however, positive distraction might be provided also in the rehabilitation room. Many children who stay in the hospital need to make use of it, yet often they dislike rehabilitation. Nevertheless rehabilitation can also be enjoyable. Sue very much likes going to the physiotherapist because there she can dance using a video game console. For her rehabilitation is thus a rather positive experience. Also for older children this should be the case. The importance of a pleasant, interesting rehabilitation room for children was highlighted by the staff: "A pleasant rehabilitation room [...] would be supreme. For having to rehabilitate, to do physiotherapy isn't enjoyable, neither for young children, nor for adolescents [...]." The staff compare the current rehabilitation room to a gymnasium, and suggest to provide a kind of fitness club instead." If you could do that in a different, playful way, then [...] it would really [be enjoyable]." The rehabilitation room should above all encourage students to practice: "the interior, that's twice as important [as in the other rooms], that it's motivating for children."

#### **4.1.4 Openness**

As to children's interaction with hospital spaces in general, the interviews suggest that children like openness. Open spaces, such as in the outpatient ward, were considered positive by both patients and parents: "Especially because here on the outpatient ward it's also very open, you make contact with people [...]," Eric's mother pointed out. An open space offers more opportunities for exchange: children have a better overview, which adds to their feeling of control and orientation.

The staff talked about the corridors on the wards: "We have one straight, super long corridor, so that's actually very disheartening, and impressive too." The hospital corridors are spaces children often get into contact with, so also these should allow for pleasant interaction. Sometimes, however, corridors are used as storage space. The staff therefore stressed that sufficient storage space should be foreseen, so that the corridors can be kept free for children to freely walk around and play. In narrow straight corridors, however, it is unpractical for children to play. The staff suggested to foresee niches in the corridor: "There should be a kind of nook where they can play, and then you can sit next to them [as parent]." A few parents also seemed to like the idea of niches with seats in the corridor. In this way, they can sit somewhat separately, while contact with the corridor and the openness is preserved.

## **4.2 Interior**

Apart from the spatial organisation, the interior seems to play an important role in what children consider a child-friendly hospital. The interviewees often talked about the hospital's interior.

### **4.2.1 Child-friendly design**

As to the use of colour most patients and parents seemed to agree: colours should be present, but they must be calm. This is especially important to preserve a fresh and open feeling, Eric's mother

---

<sup>1</sup> 'Snoezelen' was developed in the 1970s and refers to the use of sensory rich environments, originally as a leisure resource for children with learning disabilities (Hulsege & Verheul, 1987). It typically takes place in a dedicated room equipped with various lights, moving objects, music, aromas and tactile objects. More recently, snoezel environments incorporate the use of 'high tech' strobe lights, aroma steamers, image projectors and ceiling mounted mirror balls (Chitsey et al., 2002).

explained: "yes, I do think that it should be light, otherwise you get even more the feeling of being locked up." Amy described what she would like the hospital interior to look like: "simply a light blue or so, and then a neutral tile. And then fun paintings, not too bombastic, and in the same theme. So for instance all paintings of flowers, throughout the entire hospital." Amy also knows what she really dislikes about the hospital and what definitely should be altered: "all walls should have a colour and no dotted [wall or floor material], for frankly, I find it really filthy. Up against the wall there are these white and coloured dots, and also on the floor. And here on the floor too, but then with blue tones (...) I've really had enough of it." Amy seems to associate the hospital with the typical linoleum wall and floor covering (Fig. 1, left), which she clearly would like to see changed. Amy's mother described her ideas about a child-friendly hospital environment as follows: "a pleasant environment, something that doesn't scare you, that doesn't instigate fear. Soft materials perhaps also [...]. Something that's attuned to children, and yet also to different target groups. Not only the very young children." "

The interviewees mentioned repeatedly that the current ward is tuned to young children. On the walls fish and other animals have been painted (Fig. 1, middle and right). The youngest interviewee, Sue, very much liked the paintings. Amy, who is somewhat older, did not know what to think of them: "I do like that there are wall paintings of little animals. But perhaps I also find it childish. Now I do like it, but I think that someone of 18 really does not like it." The somewhat older patients did not care for the interior of the ward at all. On a children's ward, it is thus important to provide an environment that fits all age categories present.



Figure 1. The interior of the current children oncology ward

#### 4.2.2 More like home

All patients we interviewed stressed that spaces in the hospital should radiate a homelike feeling, be it some more explicitly than others. Amy talked literally about 'feeling at home': "I think that the rooms could use more of a homelike feeling (...) A nice colour on the wall, nice curtains, with a nice pattern. Something with checks and colours, for instance. Just something colourful. Perhaps add a nice lamp and a nice little table, or little shelves, where you can put things from home to decorate it yourself (...) Just the atmosphere of home, for in the hospital [...] I really don't feel at ease [...]". The other patients talked less explicitly about the homelike feeling, but their interviews suggest that they too look for an environment like home. Sue talked about the patient room as follows: "It's also a pity, I think, that there's not really [a variety of rooms]. It's as if it's only a sleeping room, where you also eat. And then also a bathroom. So in fact not so many rooms." She seemed to like the idea of foreseeing a kind of living room in the hospital. Sue's mother brought up the lack of such a room herself: "Perhaps it's nice to have somewhere something living room-like [...] with little seats (...) that there's perhaps a TV. That you thus create a cinema-like feeling for the children." Eric referred to the notion of home indirectly: he repeatedly talked about the importance of his laptop, good internet facilities, a PlayStation or Xbox. In the hospital he thus would like the same facilities he has at home. Eric's mother talked about creating a real sleeping room for children and youngsters instead of a hospital room, with nice furniture that looks more like at home. The staff too referred to the importance of a homelike atmosphere, be it rather indirectly:

"Not too hospital-clean (...), a bit of a living room atmosphere";

"Cosy rooms, seats, a little horse they can sit on. But also again for our adolescents, again something different [...] A computer corner or a game console (...)"

"Making a room as homelike as possible will actually be very important [in the new hospital], [...] now most of them lie down in the bed because nothing else is possible."

### **4.2.3 Personalisation**

In order to make their patient room more homelike and more 'like home', patients often bring things from home. When asked what they do to personalize their room, most patients referred to hanging up cards they receive, and bringing teddy bears and books. Some think of themselves as not really doing anything to personalize their room. Rose mentioned that she never brings things from home. In the course of the interview, however, the researcher learned that Rose always brings her own pillow, a few books or a game, and usually also a laptop or tablet. Rose thus considers herself as not personalising her room, perhaps because she does not want to settle in the hospital, yet unconsciously she does bring things that make her hospital stay more like it is at home.

Personalisation was brought up as important by the staff. Enthusiastically they exchanged ideas about how personalisation could be made possible in the patient rooms: "A wall for cards", "Or a wire with cards, pictures", "In our new isolation rooms we now also have a strip painted in magnetic paint, and there they can [hang up things] with magnets, that's fun". The psychologist had just learned about a nice idea in another hospital: "That they have certain signs: boy, girl has a different sign, and age categories. And then you know when you walk around, only for who's familiar with it, it's called a tag (...) Then they see: there's someone of my age, and then they keep an eye on when someone leaves that room." In this way children can personalise their room door so that it is clear for other patients who is in the room. The tag system could be extended by indicating how children feel or what they need: "For instance, I'm resting, I'm asleep. That it shows electronically. [...]"

### **4.2.4 Furniture and sanitary appliances**

In all interviews reference was made to the 'outdated' furniture. In the hospital, children do not want boring, old-looking furniture; they want a cheerful and homelike interior. Both patients and parents seem to consider it important that the furniture does not look too 'hospital-like'. Rose's father tried to describe what it should look like: "That's of course not an easy question (...) Yes, a bit less clinical. A bit more playful I think, in a youthful way, yes."

Designing a child-sized hospital architecture can be taken literally too. This was brought up by the staff when they talked about a child-friendly hospital environment: "I had [noted down] to children's size, so making things also smaller, then I'm thinking about the younger children", "(...) supply that is tailor-made. And I do mean that rather literally at times, that things are sometimes also at children's height. I always find it great when I come somewhere and my children can go and sit on such a small toilet. That you yourself can go next to them. That's great! Or that they can wash their little hands, a lower sink. Sometimes I do miss these things. Moms need to sit next to them an entire day already." Foreseeing child-size furniture can thus help also to relieve parents.

Furniture that is well-adapted is important for another reason too: it stimulates children to leave their bed. Eric's mother noticed that it would be better if her son did not stay in bed that often: "So perhaps also [...] a small desk or table. That you're not always in that bed. For now you [Eric] are lying easily, you're usually ill too. You do have the tendency to stay in bed. Perhaps [...] a small table, a small nook, that attracts to (...) I'm going to sit there for a while." Eric fully agrees. Rose's father talked about this as well. In his view the lack of furniture is the cause that children stay in bed so often. "Then you're actually forced to go lying or sitting in that bed (...) actually there's not much else that you can do." The patients themselves too seem to consider it important that their room offers sufficient opportunities to leave the bed. Rose mentioned that she would very much like a table so that in the morning she can have breakfast at the table with her mother or father, instead of having to eat in the bed, or can play a game. Also Sue noted that she would like a table when family is visiting.

According to the staff, the wards currently are not very stimulating. They do want more and better furniture in the rooms:

"A good bed, but also a good sofa, a chair."

"A tailor-made table and a tailor-made chair, yes."

"Yes, indeed, a rug on the ground to play for the young ones (...) That they can leave [...] the bed [...]"

"Yes, yes, now they often cannot eat at a table, they sit at the window sill, the window sill is the table [...]"

During the day, a staff member contended, the hospital bed is actually often unnecessary for the children: "And a different system of beds [...]. Some children don't need the bed during the day, so if

you'd be able to fold it up (...)", "[...] that you actually have more a living room than a sleeping room".

Another element of the patient room brought up frequently is the bathroom. Several patients indicated that they prefer not to use the current sanitary supplies because they are 'filthy' and 'old'. Amy's mother finds the bathrooms currently too outdated: "Amy won't easily take a shower there. She tries to do that as much as possible at home and then limit it as much as possible here (...) because it's not pleasant those showers here, they are old and filthy and worn-out." If the bathrooms in the hospitals are to be child-friendly too, they should look beautiful and fresh. Moreover, the sanitary supplies should be adapted to all ages, Eric and his mother brought up. Also older children should be able to wash themselves easily in the bathroom connected to the room. Moreover, they would find it interesting if each ward had a bigger bathroom with a bidet: "With such a therapeutic bidet then, that you can lift and move (...) That's great to be able to wash yourself there, especially at their age."

### **4.3 Outdoor environment**

During a hospital stay, young patients seem to attach great importance to having contact with the outdoor environment. This contact can be considered as a form of positive distraction. It can arise in a direct way as well as more indirectly.

#### **4.3.1 Direct interaction with the outdoor environment**

Having the opportunity to go outside was mentioned during several interviews. Being able to go outside seems to be experienced by the children as being able to escape from the hospital for a moment. Parents and patients especially highlighted the importance of an outdoor space close to the ward, so that they do not have to go too far. Amy's mother formulated it as follows: "Then [the patients] would be able to go much faster, more directly, somewhere outside, to a little place that would be foreseen for them, even if it were only a very small mini-garden." Her description suggests that her demands are not that high, she only wants an easy way to go outside with her daughter. Amy too told about her wish for an outdoor space without making high demands: "A little terrace (...) so that you can sit outside, with some small plants and fake grass on the floor." Even the grass does not need to be real for Amy, she just wants to be able to experience the feeling of 'being outside' when staying in the hospital. The staff mentioned that it is necessary for children to physically stay in contact with the outdoor environment: "Children should be able to go outside (...)", one of the participants said, after which several others confirmed that they too consider this very important.

#### **4.3.2 Indirect interaction with the outdoor environment**

During a hospital stay, however, direct contact with the outdoor environment is not always possible. Judging from the interviews, children sometimes cannot leave the ward when they are very ill. Thus interaction should be made possible also in a less direct way. In this respect, an important aspect is sufficient daylight. Rose's father noted that it would be nice if natural daylight could enter also in the corridors on the wards. He very much regrets that this is currently not the case in the children oncology ward. In the ward's patient rooms, however, sufficient light does enter, which Rose and her father experience as very pleasant.

Besides natural daylight, the staff mentioned an interesting view as very important. Children should be able to see people, buses, movement. Also during the interviews with patients and parents the view from the window was discussed. When asked what she would prefer to see through the windows of the hospital, Amy replied very confirmedly: "A sea or a woodland. Well, just nature." Other patients and parents mentioned that they would like a view on green. Several of them seemed to attach special importance to the connection with life outside the hospital walls, and a wide view. A case in point is Eric: "(...) the entire city. Especially a wide view (...) Be it cars that are driving, then you see something happening [...]. If only you have a wider view." Rose seemed to like watching the buses that stop at the hospital, and being able to see the city. What she would appreciate, however, is some more trees. Also parents mentioned the importance of being able to continue being part of daily life, be it only by a view on it. Rose's father attributes this search for a link with daily life mainly to the fact that being ill comes with a kind of isolation: "For your world very quickly becomes very small." Patients are therefore looking for a way to break that isolation. Patients nor parents seem to have high expectations, if only there is some activity they can observe, ideally combined with green in the environment.



## 5 DISCUSSION AND CONCLUSION

Our study tried to gain insight into what a child-friendly hospital means from young patients' perspective, and how architecture can contribute to it. Our findings suggest that for young patients, a **child-friendly hospital environment** means an environment in which they can **continue daily life**. This continuation should be supported both **socially and spatially**.

On a social level, we observed that children want to stay in contact with the people they are closely connected with - their parents and by extension their family. Our study illustrated in different ways how important parents' presence is in a child's healing process. This is a central theme in most publications about children in the hospital (De Wilde & Muylle, 2012; Vollmer, 2012): children want to have their parents with them, especially when not feeling well. To maintain the link with the home environment siblings are very important too, as are other family members, friends and peers.

These social interactions can take place only to the extent they are afforded by the hospital building. During its design, attention should be paid to providing sufficient space for engaging in social interactions in a pleasant way. Spatially young patients prefer to reside in a homelike atmosphere. What is considered homelike, however, can be very personal. Hospital design can respond to this by leaving the furnishing of the room in part up to the patients, so they can create their own spot. In addition, the hospital as a whole should radiate a welcoming atmosphere. Especially on the children's ward, our study suggests, it is important to create a 'living room feeling' with cosy corners and seats. For even if some patients interviewed did not want to 'settle' in the hospital, all of them were in search for a 'homelike feeling' to spend the time they have to stay in the hospital as pleasantly as possible.

What turned out to be highly important for children in the context of child-friendly hospital architecture, is tuning the environment in on the **different age groups** present in a children's hospital. A children's ward takes care of patients up to the age of 16 or 18. Contemporary hospitals tend to focus primarily on young children. As a result, adolescents may quickly perceive the hospital environment as childish. In this respect, it is important not to use an all too specific interior with certain themes. Themes can be used, but should be well thought to avoid that they seem childish. A more abstract representation, which every child can interpret in his/her own way, might allow to create a homelike environment for children of different ages. A related topic is the need for **adapted spaces for play and distraction**. Given the current trend towards more single-person rooms, spaces for positive distraction, tuned to different ages, are important to foster social interactions in the hospital. In this way, patients can meet peers during their hospital stay, and maintain the bond with siblings.

Our findings complement insights available in literature. On the one hand, some findings reported in literature are refined by our study. A case in point is Ulrich's (1984) study, which concluded that it is important for patients rooms to have a view on green. The patients who participated in our study also seemed to appreciate a view on green, and to attach special importance to **a view on 'movement' and 'life'**. On the other hand, the highly personal experiences of the children who participated in our study add detail to the themes advanced in literature. Having one's parents around as much as possible (De Wilde & Muylle, 2012; Vollmer, 2012), being able to play and relax (Vollmer, 2012) and to go outside (Wagenaar, 2006), can be assumed to be important to almost every child. However, it is important for designers to keep in mind that the experience of every child, every individual is unique, and not to lose sight of this personal aspect. While a public building like a hospital cannot be tuned to every individual, it can offer patients **opportunities to appropriate and personalise** their own spot (the patient room) in the hospital. Although some patients said they did not do anything to personalise their room, we could observe that most of them did unconsciously. Therefore, our study suggests, it is interesting to foresee room for it.

In **conclusion**, the overarching theme brought forward by our study is children's wish to **continue partaking in 'normal', everyday life**, also in the hospital. This theme is relevant also to other care contexts than hospitals such as residential care, where people want to break the isolation of 'being ill'. Architects and other designers may contribute to this continuation by designing environments that do not look too sterile so that the hospital feeling is present less explicitly; that afford undertaking 'normal' activities like at home: playing, relaxing, meeting peers, et cetera; that allow making choices and having a feeling of control and privacy to preserve their self-dependence; and that offer a view on the life outside the hospital walls in order to partake in it indirectly. In summary, a hospital should

offer an environment where a child can stay his/herself. For instance, children should be challenged and stimulated to leave their bed such that they can continue 'normal' life as much as possible. This suggests that designing child-friendly hospital architecture is a matter, not so much of preferences for specific colours or themes, but of more complex design principles like flexibility and customizability. On a more general level, our study draws architects and other designers' attention to the interrelation between the spatial/material and the social: since all individuals are embedded in networks of social relations, through which they experience and act upon the world, no individual experience (e.g., of a hospital environment) can be understood separately from the individual's relationships with others.

A **limitation** of our study is that it focused mainly on the role of architecture in how children experience a hospital stay. Another important role, which remained underexposed, is played by the **staff** and especially the nursing staff, as they can ensure that a child feels more at home. This is something architecture cannot control, yet it would be interesting to investigate to what extent a pleasant, well thought through and carefully designed hospital environment might have a positive effect on the staff as well. If they can work in a pleasant environment, this will likely positively impact their behaviour. Moreover, our study suggests that the care **organisation** can play a determining role in how a hospital is experienced. This organisation too can be either supported or hampered by the hospital architecture. The building design is thus not the only factor, which determines whether young patients experience a hospital as child-friendly, but it does play an important role. Further research is needed to understand its potential to steer other determining factors in the right direction.

## REFERENCES

- Annemans, M., Van Audenhove, C., Vermolen, H. and Heylighen, A. (2014). How to Introduce Experiential User Data: The Use of Information in Architects' Design Process. Design's Big Debates. DRS 2014 conference, Umeå (Sweden), 16-19 June 2014 (pp. 1626-1637) DRS & Umeå Institute of Design.
- Bishop, K. G. (2008). From their perspectives: Children and young people's experience of a paediatric hospital environment and its relationship to their feeling of well-being (Unpublished PhD). Sydney: Univ. of Sydney.
- Carpman, J. and Grant. M. (2003). Design that Cares, 3rd edition. Chicago: American Hospital Publishing
- Chitsey, A.M., Haight, B.K. and Jones, M.M. (2002). Snoezelen: a mutisensory environmental intervention. *Journal of Gerontological Nursing*, Vol. 28, No. 3, 41-49.
- Coyne, I. (2006). Children's Experiences of Hospitalization, *Journal of Child Health Care*, Vol. 10, No. 4, pp.326-336
- De Wilde, L. and Muylle, J. (2012). *Dragende Muren: over het ontwerpen van een zorgende ziekenhuisomgeving voor kinderen*. Gent: MER. Paper Kunsthalle.
- Eriksen, A. (2001). Participatory Planning and Design of a New Children's Hospital. *Design & Health II – The Therapeutic Benefits of Design* (pp. 141-145). Design and Health.
- Hulsegge, J. and Verheul, A. (1987). *Snoezelen. Another World*. UK: Rompa.
- Silav Utkan, M. (2012). Children Hospital Design in Children Picture, *Procedia: Social and Behavioral Sciences*, 51, 110-114.
- Ulrich, R.S. (1984). View through a window may influence recovery from surgery, *Science*, 224, pp. 240-241.
- Vollmer, T. (2012) *Optimal Healing Environments: Researchers' Perspective*.
- Wagenaar, C. (2006). *The Architecture of Hospitals: Healing by Architecture*. Rotterdam: NAI Publishers.
- Wagenaar, C. and Mens, N. (2009). *Healing Environment: Anders bouwen voor betere zorg*. Bussum: Troth

## ACKNOWLEDGMENTS

The authors thank everybody who contributed to this study: the patients and their parents; the chair and staff of the children oncology ward and the environmental planning service at the University Hospitals Leuven; and architecture firms de Jong Gortemaker Algra, Ar-Te and STABO. This study received support from the Institute for the Promotion of Innovation through Science and Technology in Flanders (IWT-Vlaanderen) through a PhD grant of the Baekeland programme, osar architects nv, and the KU Leuven Research Council.