



## Hospital architecture quality- exploratory observation on three continents

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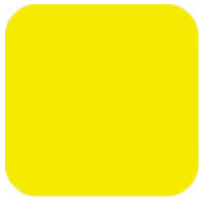
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## HOSPITAL ARCHITECTURE QUALITY- EXPLORATORY OBSERVATION ON THREE CONTINENTS

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### Abstract

**Aim:** This study is an investigation of non-clinical areas in hospital case studies in multiple locations in Europe (Norway, Denmark, UK), Asia (Thailand, Singapore) and North-America (Canada). The purpose is to explore the similarities and differences in spatial arrangement and the use of them. Architectural quality, usability and cultural context are investigated regarding the design and use of the non-clinical areas of the hospital because the areas are commonly used by patients and relatives. The aim is to examine whether a building assessment method could determine and explain the connection between people and the use of non-clinical areas in the different cultural contexts. How local culture influence the use, social interaction and the Usability and Architectural quality of the non-clinical areas of the hospital.

**Methodology:** This study is conducted as a walk-through evaluation, collection and documentation of first observation impressions at multiple hospital locations worldwide, with focus on concepts of Usability and Architectural quality. Further analysis methods include semantic differential scheme evaluation and narrative mapping with architectural drawings. The generic model and local sensitivity in each specific context are described with the use of culture and cross-cultural behaviour theories. Finally, phenomena that occur in specific non-clinical areas of the hospitals are explained with the implementation of Pattern Language concept.

**Results and discussion:** This evaluation of hospital non-clinical areas in multiple cultural contexts gives fundamental understanding of the influence of culture and well-being of patients to the design of hospitals and perceived quality and usability of architecture. Even though the hospitals are located on different continents, they share similarities as the specific types of use in the non-clinical spaces. The significant similarity in the use of those non-clinical spaces correlate with the usability concept where users and their satisfaction are the most important aspects of design and architecture quality of hospital buildings. The results from the multiple case studies form the discussions to what are the current universal typologies that form high quality hospital architecture.

### Keywords

walk-through evaluation, hospital architecture, non-clinical areas

## 1 Introduction

Hospitals are a matter of interest in most societies. This paper presents the results of exploratory observation of hospital architectural quality on three continents in order to map the quality of architecture together with the cultural differences and propose universal typologies of hospital non-clinical spaces, where architecture can promote health and well-being.

Hospital architectural design concepts have evolved rapidly since the beginning of the twentieth century. The ideal hospital was designed upon the concept where care facilities followed the needs of hospital functions (Singh & Biswas, 2018). Nowadays due to the raise of patient focused trends the concept 'design follows first patients, then functions' has been adopted. Designers, including architects are now focusing on integrating the needs of patients, hospital functions, and functionaries in hospital design (Singh & Biswas, 2018). There is also a growing body of rigorous studies to guide healthcare design regarding the improvement of patient outcomes. One of the aspects that should be focusing during the design processes is the improvement of non-clinical areas (Ulrich, Zimring, Zhu, Dubose, Seo, & Choi, 2008).

Main question of this study has been raised due to the rigorous research focusing on the relationship between the architectural quality of the hospital and patient outcomes. What are the similarities and the differences of the use of non-clinical areas in hospitals in different contexts? The investigation of several hospitals in different contexts has been conducted to explore the limited and opportunities of the implementation of the patient focused design concept but only focusing on 'non-clinical' areas. Another thorough question that has been raised for this study is; What can each hospital learn from each other and how can the knowledge of non-clinical hospital design, focusing on patient needs be exchanged between those hospitals?

This study is an investigation of non-clinical areas in hospital case studies in multiple locations in Europe (Norway, Denmark, UK), Asia (Thailand, Singapore) and North-America (Canada). The purpose is to explore the similarities and differences in spatial arrangement and the use of them. Architectural quality, usability and cultural context are investigated regarding the design and use of the non-clinical areas. In this study it means any area in the hospital that which is not a clinical or medical ward. of the hospital because the areas are commonly used by patients and relatives. The aim is to examine whether a building assessment method could determine and explain the connection between people and the use of non-clinical areas in the different cultural contexts. How local culture influence the use, social interaction and the Usability and Architectural quality of the non-clinical areas of the hospital

## 2 Theoretical framework

Architectural design of hospitals can be supported by a comparison between different spatial design solutions and evaluation of best practice cases and simulations. Few evaluation methods are specifically designed for hospitals, but many include relevant techniques (Fronczek-Munter et al, 2017).

The theory consists of three main categories: healthcare building evaluation theories and methods, as Post Occupancy Evaluation; the Evidence Based Design (EBD) and finally the theoretical frameworks regarding the relationship between architectural quality and users, Usability and Pattern Language.

## 2.1 Evaluation methods for buildings

The most known evaluation methodology for buildings is POE – Post Occupancy Evaluation. According to the definition of Preiser et al. (Preiser et al, 1988; Preiser, 1989; Preiser, 1995), Post Occupancy Evaluation is "the process of evaluating buildings in a systematic and rigorous manner after they have been built and occupied for some time". As building performance and usability assessments are complex, they require multi–method strategies using a triangulation of methods and evaluations with multiple perspectives (Lindahl, Hansen, Alexander, 2012). Further research showed that hospital projects use various evaluation methods for different reasons (Fronczek-Munter, 2013, 2017). Newest research sees POE as “one of the suite of tools to measure building performance and should be used in conjunction with other methods to evaluate all aspects of a building, including the social, psychological and physical” (Deuble & de Dear, 2014). They suggest a combination of objective building performance data and subjective satisfaction ratings to achieve a valid and reliable evaluation of a building.

There are over 150 POE techniques available worldwide (Blakstad et al, 2008; Bordass, 2006; Bordass & Leaman, 2005; Leaman, Stevenson, & Bordass, 2010; McDougall et al, 2002; Stevenson & Leaman, 2010). The numerous existing methods often have one focus area that is evaluated more accurately than others. That fact is shown in Evaluation focus flower model (Fronczek-Munter, 2013), where many of the existing evaluation methods for buildings have been mapped according to their main focus. Figure 1 provides an overview of some of the evaluation methods, grouped and placed on the Evaluation focus flower (the USEtool, POE, narratives, Semantic evaluation). The methods chosen for this evaluation are described in methodology section.

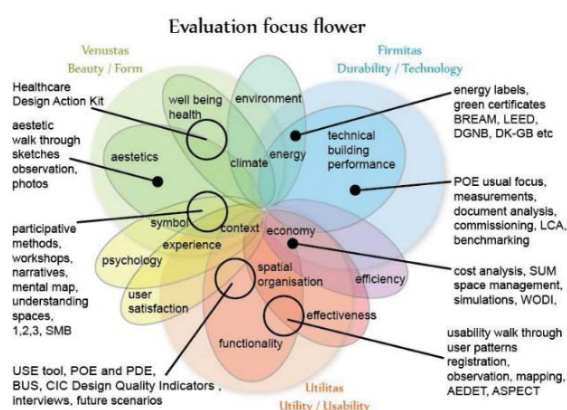


Figure 1. Evaluation focus flower model (Fronczek-Munter, 2013), with examples of evaluation methods and their main focus

## 2.2 Usability

Usability is a concept similar to functionality, but usability depends on: subjective view of users, context, culture, situation and experience (Fronczek-Munter, 2016, 2017). Most research on usability focuses on evaluating products or facilities with users, after they were developed or built. Usability evaluations of buildings are one of the ways to understand the connection between architectural solutions and the users needs, thus create better architectural design for supporting the users.

## 2.3 Pattern Language

The term 'Pattern Language' was introduced by an American architect, Christopher Alexander, where the theory is focusing on human-centred design in term of physical and social relationships. A Pattern Language is a method describing generic design practice that can be adapted in different contexts and culture. A Pattern Language (C. Alexander, S. Ishikawa, and M. Silverstein, 1977) expresses that every element of architectural function holds a general used called 'pattern' and every element can be connected from large to small scale (urban planning to ornament of room). As each society there is a particular pattern but these patterns overlap and share some similarities. The languages we used in this investigation are (1) the degree of publicness (2) healthcenter (3)circulation realms (4) hierarchy of open space (5) common areas at the heart (6) sequence of sitting spaces (7) reception welcomes you (8) a place to wait (9) half private place (10) eating atmosphere (11>window overlooking life (12) structure follows social spaces (13) natural outdoor and window.

## 2.4 Evidence Based Design - healing architecture

The development of Evidence-Based Design (EBD) concept started with a publication by Roger Ulrich in Science (R. S Ulrich, 1984) with a self-explanatory title: "A view through a window may influence recovery from surgery". Ulrich provided the definition of EBD: "the design process, which is guided by an empirical understanding of the effects of health-care physical environments on safety, efficiency, and clinical outcomes" (R. Ulrich, 2006). Ulrich presents the strong scientific foundation with over 700 rigorous studies, which gives evidence that "good design of a hospital's physical environment promotes better clinical outcomes, increases safety, and reduces stress for both patients and staff" (R. Ulrich, 2006). He presented examples of a number of parameters from research, giving evidence that architecture affects health. Similarly, healthcare design is paying attention rigorously on the needs and well-being of patients (R. Ulrich, et al., 2008).

A few examples of the EBD parameters and typical remedies are summarised below:

1) Noise, stress – remedy: single-beds, sound absorbing ceilings, 2)Safety and reducing infections (airborne and contact) – remedy: single rooms, filtration, air changes, separation of patients, wash basins and gel dispensers close to staff work paths in visually prominent locations 3) Staff fatigue – remedy: floor layouts with decentralised nurse charting, observation stations and supplies dispersed close to patient rooms, viewing windows – visual access to patients 4) Depression and pain – remedy: higher daylight exposure in patients' rooms, via effects on serotonin, building orientation, view of nature and or people with positive facial expressions.

Nevertheless, many of those elements are present in Scandinavian architectural long traditions of designing with access to daylight and views to nature.

## 2.5 Culture

Culture can play important role and influence the style of each individual architectural building (Rappaport, 2004). Culture, architecture, and design are three elements that architects, designers, and facilities managers should consider when working on an architectural complex project for example a hospital. The main purpose of design, in general, is to create environments that suit the users and is, therefore, user-oriented (Rappaport, 2004).

As this investigation is focusing on the observation of hospital non-clinical areas in several locations, we considered the cultural dimensions. One of the main cultural differences is the degree of individualism (M. Minkov, V. Blager, G. Hofstede, 2013; G. Hofstede, 2013). The fundamental issue addressed by the individualism dimension is the degree of interdependence a society maintains among its members. Northern European society is more toward the individualist while South-east Asian is more of a collectivist (G. Hofstede, et al, 1991; M. Minkov & G. Hofstede, 2012). In the individualist societies people's self-image is defined in terms of 'I' and they are supposed to look only after themselves and their direct family, whereas in collectivist societies people belong to 'we' or in groups that take care of them in exchange for loyalty (G. Hofstede, 2012; M. Minkov & G. Hofstede, 2012).

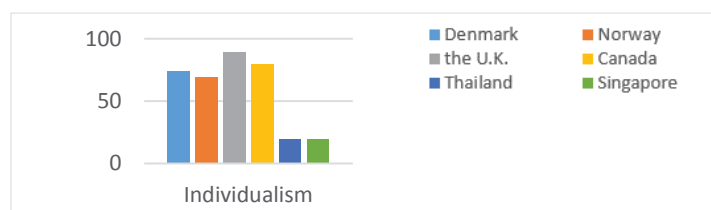


Figure 2. Cultural index scores of individualism dimension of Denmark, Norway, the U.K. Canada, Thailand and Singapore (G. Hofstede, 2013)

Another aspect that has influenced on the investigation is the healthcare system of each country. What is the first approach before patients reach the hospital and how patients access the hospital? There are vast differences in how healthcare system and medical insurance are organised. An example is Thailand, where there are no general practitioners (GP) therefore, everyone can directly access the hospitals while other countries GP is the gate keeper before patients reach the hospital. Other interesting aspect is the healthcare system whether the system is insurance based or fully subsidized by the government system. Denmark, Norway and Canada are fully or partially subsidized by the government, Thailand is a mixed system between government coverage scheme and insurance based system whereas Singapore and the U.K. is insurance based system.

### 3 Methodology

This research is conducted with qualitative research methods. The study is an empirical observation and investigation of the use of non-clinical areas of hospitals in different context. The approach of the study is inductive - particular examples are used to reach general conclusions. The case study methodology is chosen for the examination of details, for seeking answers to how and why questions and reaching conclusions from existing practices (Yin 2003). It allows testing ideas and theoretical concepts based on empirical data (Ragin and Becker 1992).

This research project began with literature review and development of the theoretical framework to review the collection of data and analysis of the study. After selecting the case studies, the investigation was conducted as a walk-through observation by one or both authors, to collect and document the first observation impression at 9 hospitals with multiple locations worldwide; (1) St Olavs Hospital Trondheim, Norway (2) Sudheds center, Copenhagen Denmark (3) Rigshospitalet, Copenhagen, Denmark (4) Maharaj Nakorn Chiang Mai hospital (5) Chulalongkorn Memorial hospital Bangkok (6) Khoo Teck Puat Hospital, Singapore (7) St Bartholomew's (Barts) Hospital, London, UK (8) New QEII Hospital, Welwyn Garden City, UK (9) Bridgepoint Hospital, Toronto, Canada. Data was collected and analysed using a combination of methods.

The similarities and differences of the architectural quality of non-clinical areas at the hospitals were compared and analysed. The study is aiming to explain the specific phenomenology regarding the use of non-clinical areas at each hospital and describe the current universal typologies that form high quality hospital architecture.

#### 3.1 Combination of evaluation methods

We applied a combination of different evaluation methods: USEtool walk-through, Reflexive photography, Narratives, pictorial narrative mapping and Semantic differential scheme. This merge of methods appears to cover multiple topics and provide better explanations and understanding of architectural quality.

USEtool (Blakstad et al, 2009, 2010), is an evaluation method with five stages, including a systematic general usability mapping and a walkthrough with more in-depth qualitative studies of specific usability topics. We use the walk-through stage with the usability focus, which gives valuable information in the usability theme and focus areas: functionality, spatial organisation, effectiveness, efficiency, user satisfaction. The result is a broad overview of the facility and the observations are well structured.

Reflexive photography is a generic method, seen both in research and practice, but also part of hospital evaluations by Maben, et al (2015), proposed for hospital staff. Reflexive photography is a type of photo-elicitation technique where research participants take photographs – formed the focus of 'reflective' discussion. The approach allows the participant to talk about the significance and meaning of photographs, which represent their perspective on the topic in question.

Reflexive photography can generate a visual record of the work environments and encourage research participants to critically analyse the ward layout, environment and facilities. It was used to prompt deeper consideration of positive and negative aspects of the spaces. The narratives were personal short explanatory written stories, combined with the photos. Additionally, we added the third method- the semantic differential scheme, which can be used as generic, but here a specific example is used (Cold, 2013), with 8 parameters as: complexity, originality, pleasantness. The results are capturing the immediate experience and evaluation of places, comparisons. Focus areas on Evaluation focus flower model are: beauty, aesthetics, symbol, psychology.



Figure 3. Example of evaluation at canteen, using three methods: Reflexive photography, narratives, semantic differential scheme

#### 4 Description of hospital case studies

The case studies have been chosen from multiple locations in Europe (Norway, Denmark and UK), Asia (Thailand, Singapore) and North-America (Canada). The overview is presented in Table 1.

Hospital name Location	Overall view	Architectural Layout	General Information
<b>St Olavs Hospital, Trondheim, Norway</b>			<b>Function:</b> Teaching hospital and regional hospital <b>Client:</b> St Olavs <b>Size:</b> 180,000 m <sup>2</sup> <b>Bed:</b> 1,366
<b>Sundheds center, Copenhagen, Denmark</b>			<b>Function:</b> Health center <b>Client:</b> Copenhagen municipality <b>Size:</b> 3,200 m <sup>2</sup> <b>Bed:</b> no inpatient departent
<b>Rigshospital, Copenhagen, Denmark</b>			<b>Function:</b> Teaching hospital and regional hospital <b>Client:</b> Rigshospitalet <b>Size:</b> 150,000 m <sup>2</sup> <b>Bed:</b> 1,120
<b>Maharaj Nakorn Chiang Mai, Thailand</b>			<b>Function:</b> Teaching hospital <b>Client:</b> Maharaj Nakorn Chiang Mai Hospital <b>Size:</b> 108,500 m <sup>2</sup> <b>Bed:</b> 2,000



<p><b>King Chulalongkorn Memorial hospital Bangkok, Thailand</b></p>			<p><b>Function:</b> Teaching hospital <b>Client:</b> Choolalongkorn University and Thai Red Cross Society <b>Size:</b>220,000 m2 <b>Bed:</b> 1,433</p>
<p><b>Khoo Teck- Puat Hospital, Singapore</b></p>			<p><b>Function:</b> Yishun district hospital <b>Client:</b> Khoo Teck Puat hospital <b>Size:</b> 110,000 m2 <b>Bed:</b>550</p>
<p><b>St Bartholomew's (Barts) Hospital, London, UK</b></p>			<p><b>Function:</b> Teaching hospital, specialist cancer and cardiac centre <b>Client:</b> Bart's Health NHS Trust <b>Size:</b> 204,387 m2 <b>Beds:</b> 388 <b>Dates:</b> 1123 - 2014</p>
<p><b>New QEII Hospital, Welwyn Garden City, UK</b></p>			<p><b>Function:</b> NHS local hospital: primary, acute and social care <b>Client:</b> NHS <b>Size:</b> 8500 m2 <b>Beds:</b> only outpatient</p>
<p><b>Bridge-point Wells Hospital, Toronto, Canada</b></p>			<p><b>Function:</b> Specialist hospital <b>Client:</b> Bridgepoint Active Healthcare <b>Size:</b> 63,170 m2 <b>Beds:</b> 480</p>

## 5 Development of Typology, Evaluations of types of rooms

Their comparisons helped us develop the Architectural typology of waiting areas, where examples are presented together with our evaluation and suggestions for high quality architecture, based on scientific literature and our observation. The typology is structured in seven following groups:

1. the large waiting area
  - 1a) large waiting area without zoning similar to airport waiting area
  - 1b) large waiting providing zones,
2. the long corridor waiting room with chairs along
3. the small area aside corridor
4. the waiting space next to window
5. the outdoor waiting, relaxing
6. the food place and canteen
7. the unplanned waiting space

## Architectural typology of waiting areas

### 1a). the large waiting area like airport

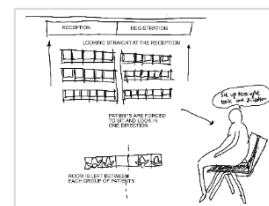
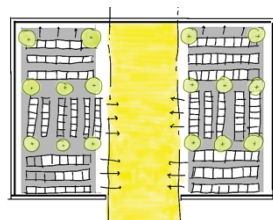
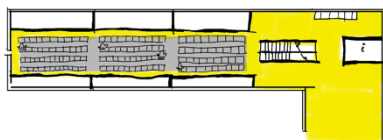


Maharaj Nakorn Chiang Mai Hospital

Rigshospital

St Bartholomew's hospital

#### Analysis drawings



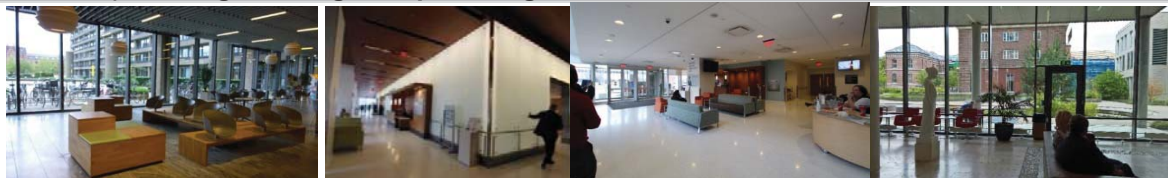
*Maharaj Chiang Mai* - the large waiting area serves the registration, cashier and pharmacy in the same waiting areas. The feeling is airport-like, crowded, stressful. The materials are plain, no activity or zones provided.

*Maharaj Chiang Mai ward waiting area* – There is a nice overview over the registration desk, light and good standard materials, but it feels crowded and there are no zones, just chairs along the walls, no daylight or view, too many posters and signs, resulting in clutter.

*Rigshospital* - Waiting areas for blood sampling registration. It is not a very large area but it looks like a waiting area in the airport with chair placed in rolls. Patients are waiting for the registration and have their blood taken. This also includes all the patients in the 'inpatient' department.

*Bartholomew's Hospital, London* - Large waiting areas in the covered atrium - Daylight from glazed roof, large airport-like feeling, large scale, seating facing many directions and provided small tables, trees, colours and high quality materials, interesting architectural design to observe

### 1b). the large waiting area providing zones,

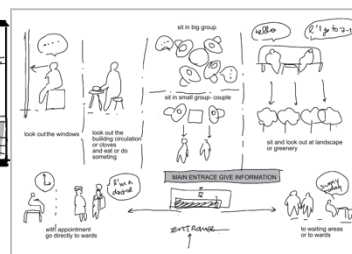
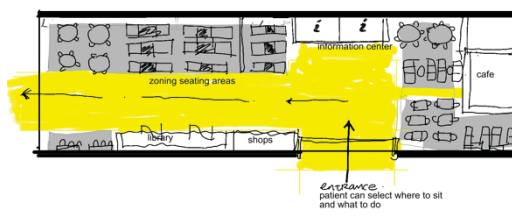


Rigshospital

Bridgepoint Wells hospital

St Olavs hospital

#### Analysis drawings



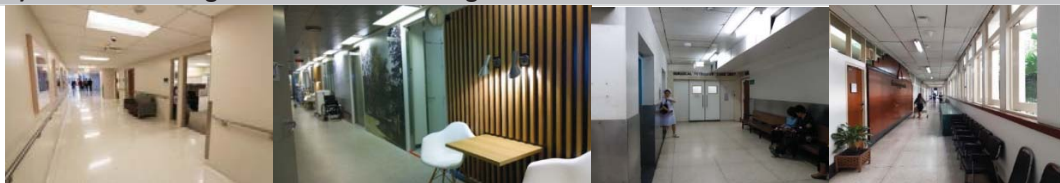
*Rigshospital, Copenhagen* - Waiting area in the hospitals main entrance hall – There are large windows with view to main entrance and city, seating is divided into zones, small scale seating facing many directions, small tables, relaxing atmosphere

*Bridgepoint Wells, Toronto* - Entrance with information/registration desk and waiting area with comfortable sofa seating at the side, along corridor, with large window and park view, partially enclosed, taken to side of the corridor with semi-private feeling. Feels both open and private.

*Bridgepoint Well hospital* - Entry ambulatory- natural circulation overview, register, relax at comfortable sofa/bench, with large windows and view over the registration desk, open, organised

*St Olavs - Ward bevegelsesenter waiting area* - Good overview over the registration desk, spacious, light and large glazed view to garden, seating zones, sculptures, plants, pleasant relaxing atmosphere, open, feels like art museum

### 2). corridor waiting room with chairs along



Bridgepoint wells hospital

Rigshospitalet

Maharaj Narkorn Chiang Mai hospital

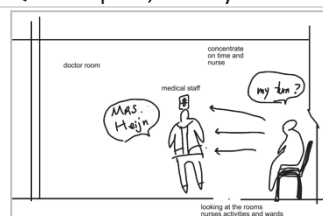
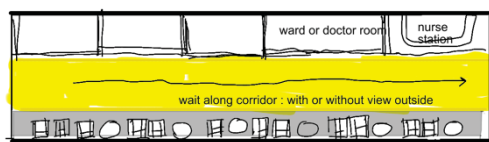


St Bartholomew's hospital

St Olavs hospital

New QEII Hospital, Welwyn Garden CityK

#### Analysis drawings



*Bridgepoint Wells hospital* - long corridor with small seating space - Functional, light colours, feels spacious but a bit sterile and exposed

*Rigshospital Copenhagen*, Small table with two chairs - Small open corridor area made comfortable, relaxing and cosy by light, wooden materials and designer lamps and chairs, feels less stressful and more like home or hotel, feels a bit dark, no views to outside

*Maharaj Nakorn Chiang Mai Hospital*, Waiting along the wall next to elevator in front of Surgical intensive care unit -

Easy to find, right out of elevator, feels very exposed – everybody walks here and looks, no daylight, plain colours and materials, no activity just waiting

*Maharaj Nakorn Chiang Mai Hospital*, Long corridor waiting at directors floor – Log row of windows providing daylight, view of garden, space, relaxing

*St Bartholomew's Hospital, London*, Waiting along the wall next to elevator and windows - Easy to find, right out of elevator, exposed, but walls turned aside and small tables provided, daylight, strong colours and different materials, busy but pleasant

*St olavs*, long corridor waiting – seating aside the open corridor, with daylight, sculptures, plants, view to garden, natural, light materials, open, calming atmosphere

*New QEII Hospital, Welwyn Garden City, UK*, - long corridor waiting, large windows providing daylight and view of garden, space for seating open to corridor, but hidden in a zone along a wooden frame, feeling private and undisturbed

### 3). small area aside corridor

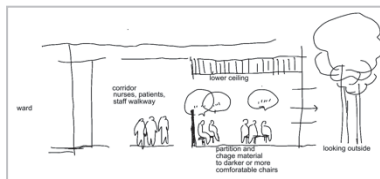
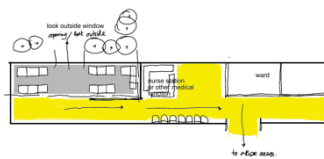


St Olavs hospital

Rigshospital

(continue to the next page)

Analysis drawings



*St Olavs Hospital*, aside corridor waiting- seating aside the open corridor hidden in a “cave” with lower ceiling, but provided daylight and view of garden, space, zone for kids, comfortable chairs looking at corridor or garden

*Rigshospital*, aside corridor -seating taken a bit aside and hidden away from the corridor, comfortable armchairs and tables, zones, colours, no daylight, feels comfortable, but dark

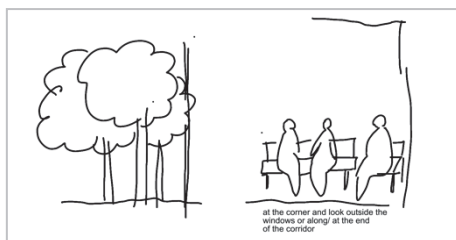
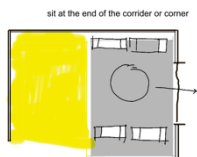
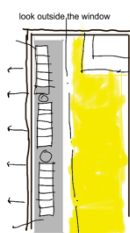
4). the Space Next to window used for waiting



St Olavs hospital

Maharaj Nakorn Chiang Mai hospital

Analysis drawings



*St Olavs hospital*- the area is used for both entry, registration, canteen and waiting, with many zones and differentiated seating materials and colours, art pieces on the walls and free-standing sculptures, large windows with view and daylight, light natural materials, seating by the window popular

*Maharaj Nakorn Chiang Mai Hospital* – large corridor space with a window, popular seating on a bench next to window, overview of space, view out, daylight

5). the outdoor garden relaxing



Khoo Teck Puat Hospital

St Bartholomew's hospital

St Olavs hospital

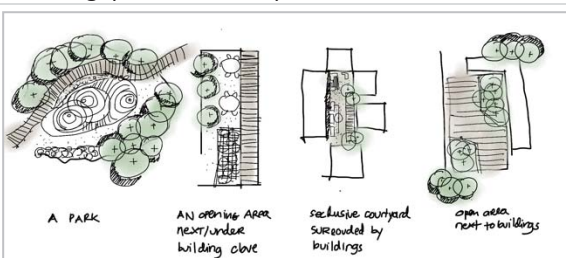


St Olavs hospital

Bridgepoint wells hospital

Sundheds center

Analysis drawing



*Khoo Teck Puat hospital* - Entrance and central square with garden. Feels relaxing, very green, surrounded by plants, birds, butterflies, water, feels like in botanical garden, lowering stress, calm, beautiful

*St Bartholomew's Hospital* - square with large fountain, trees and seating, historical site, belonging, open and inviting

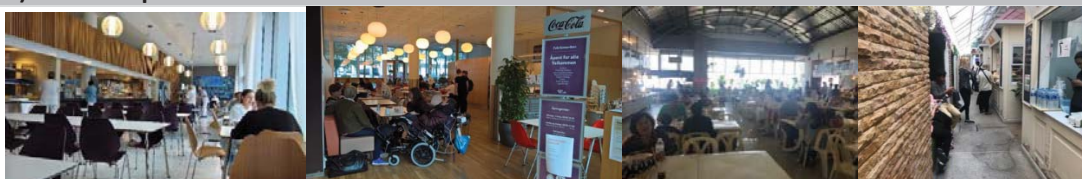
*St. Olavs hospital* - central square between medical centers, providing seating areas, trees, sculptures, different zones for seating, feeling busy - as part of the city, busses, cars, and people passing by

*St Olavs hospital* -garden outside – large garden, feeling in nature and relaxing, calming atmosphere, used by patients, relatives, staff and open to public, feeling of neighbourhood and public area

*Bridgepoint Wells Hospital, Toronto* -terrace garden - View over city and nature, relaxing, large, open

*Sundheds center, Copenhagen* - Stunning architectural quality: beauty and functionality, small intimate places to sit and rest, talk with someone, look at trees and plants, interesting and surprising shapes, small scale, high quality

### 6). the food place and canteen



St Olavs hospital

Chulalongkorn Memorial Hospital

### Analysis drawings



*St. Olavs Hospital, Kunnskabscenter, canteen* - Open, light, large full-height windows with views to outside street, open to all, both visitors and medical staff, easy accessible, located at the groundfloor

*St Olavs*, ward canteen at Mother and Child center, busy but cosy atmosphere, light and with large windows, different chairs, materials and colours, healthy food, natural materials, plants

*Chulalongkorn Memorial hospital*, patient and staff canteen – busy, with large windows with views, large variety of healthy food, simple plastic seating, plants

*Chulalongkorn Memorial hospital*, restaurants between buildings. The concept of these small food vender imitated from Thailand street food concept, using spaces between buildings previously used by homeless, small, narrow and busy, but cosy spaces, covered by transparent roofs, providing healthy food, easily accessible to everyone

### 7). the unplanned and informal waiting area



Maharaj Nakorn Chiang Mai hospital



## 6 Discussion

The presented Architectural typology of waiting areas at hospitals gives an overview of current state of spaces and evaluation of their architectural quality, based on data collected from the multiple hospital case studies and analysis based on scientific methods.

It is easy to spot differences between the hospitals on different continents, with different sizes and cultures. The main cultural difference we observed are different healthcare organisations, the family structure and collective culture, resulting in for example the large waiting rooms, feeling like airport. But more striking is the similarity of both the typical hospital spaces of high architectural quality and usability, and the challenges, as prioritizing efforts and ensuring evacuation routes, user-friendly signs, space shortages, beds and equipment stored all possible places.

The observation of case study hospitals resulted in developing of the Architectural typology of waiting areas, with the seven common types of spaces, with examples as: large waiting area like airport, the long corridor waiting room with chairs along, the outdoor waiting etc.

We found many of the spaces evaluated as pleasant, beautiful or relaxing and of high quality had a few common features, many known from Evidence Based Design, as: large windows providing daylight and view to green areas with trees, interesting seating spaces next to windows, often organized in zones, providing flexibility and choices of specific place to wait.

We found examples of successful waiting areas even along the corridor, especially if there could be organized some shelter from the traffic, in form or spatial recession, turned walls, armchair seating or locating of the seats in groups rather than along the walls.

In some of the cases we found the unplanned waiting spaces, where the location and qualities of space, as shelter from sun, view to park; were inviting the hospital visitors, especially large groups of family members, to rest and wait there, even when there was no official seating provided. The needs of the relatives have so far not been met with any particular attention, even though the nurses tell that relatives and social support are important for the patient's wellbeing and recovering process. This discussion is also known at European and American

hospitals, where changes in the patient groups are changing the demand for the secondary areas.

The study also investigated how culture is an influential factor on the experienced quality of a space design.

The combination of evaluation methods, as USEtool walk-through, Reflexive photography, Narratives, pictorial narrative mapping and Semantic differential scheme, helped in comparing and structuring the results from the observations at the hospitals and in comparing and describing the architectural quality of the specific spaces.

## 7 Conclusions

This evaluation of hospital non-clinical areas in multiple cultural contexts gives fundamental understanding of the influence of culture and well-being of patients to the design of hospitals and perceived quality and usability of architecture. Even though the hospitals are located on different continents, they share similarities as the specific types of use in the non-clinical spaces. The significant similarity in the use of those non-clinical spaces correlate with the usability concept where users and their satisfaction are the most important aspects of design and architecture quality of hospital buildings. The results from the multiple case studies form the discussions to what are the current universal typologies that form high quality hospital architecture.

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