

Title of paper:

## **What does EBD mean to the work of the healthcare architect?**

Author:

Stefan Lundin SAR/MSA\*

\*Doctoral student, Center for Healthcare Architecture and Department of Architecture, Chalmers Institute of Technology; and White Architects

Paper submitted to the conference:

***ARCH 12: ARCHITECTURE / RESEARCH / CARE / HEALTH***

Chalmers, Gothenburg, November 12-15, 2012

Corresponding author:

Stefan Lundin

[stefan.lundin@white.se](mailto:stefan.lundin@white.se)

October 2012

### **ABSTRACT:**

---

EBD (Evidence-based Design) is a "buzzword" among hospital planners and architects in Sweden today. Everyone has heard of it, but few know what it is and no one has yet truly applied it.

EBD has its roots in the USA during the nineties and the turn of the century, and is indebted to evidence-based medicine (EBM). Knowledge about EBD has become a must among architects in the US healthcare market. As is the case in the field of medicine, its proponents suggest that design should also to a greater extent be based on evidence.

In this study EBD is considered as two partially separate phenomena. Firstly, the research results that indicate a connection between the physical environment and its impact on health care outcomes; secondly, the methodology that describes how research should be integrated into the planning process.

Within the "EBD movement" there is great confidence in the possibilities of science and research. But what does EBD mean for the work of the healthcare architect? This study points out that there will be no fast or dramatic change. Planning and building will, even in the future, mainly be based on decisions that are not directly connected to evidence. However, a better informed process will lead to better buildings and in the long run a larger body of evidence.

## 1. Introduction

I am a practitioner. During the past decade I have had a particular interest in building for mental health. Trying to describe what might have caused a decrease in the use of restraints and an increase in wellbeing among patients in one of my projects forced me to think about the outcomes of the physical environment. It became a part of the anthology *Architecture as Medicine – the Importance of Architecture for Treatment Outcomes in Psychiatry* (From and Lundin, 2009). These reflections lead me into the issue of EBD, although in the past, my confidence in architectural research in general has always been low.

Among architects, there is a strong belief in the effects of architecture on our wellbeing and even healing. It has also been a “received wisdom” in the history of architecture. Examples from ancient Greece and places like Delphi and others are mentioned as places having “healing dimensions”. Florence Nightingale’s work is well known. During the Crimean war, she reflected on the importance of aspects of the physical environment such as daylight, fresh air and a simple vase with a few eye-catching flowers. With Hans Selye’s work on stress and the publication of Roger Ulrich’s article *View through a Window May Influence Recovery from Surgery* (1984) we “start to scratch the surface” in our attempt to know why and how a certain environment could be “healing”. Today’s proponents of EBD are expecting great progress from future research within the field of architecture.

Research has increased during the last centuries and decades and the benefits on everyday life. “Research” is, in some sense, nowadays a part of one’s everyday life. Children are said to carry out “research” in problem-orientated education. Teenagers know how to write abstracts and reports, and even in traditional vocational education theoretical reports have become mandatory. In almost every profession, the quality of products and services is due to quality systems and continuous improvement. An overall methodological approach to everything we do, with measurements and evaluations, with influence from academia and research, seems to be the future. Learning is supposed to be life-long and we tend to, to a much greater extent, look upon our life and behaviour “from the outside”.

However, the progress within different areas is not the same. The “natural sciences” have made great progress within for example physics, mechanics and medicine, while the “humanities and arts” have been less successful, often struggling with methodological issues. There is an on-going discussion among scientist characterized by the long trends of *rationalism* contra *romanticism* within the scientific society. Along with this discussion there has always been a discussion of art versus science, the subjective against the objective. Together this has certainly influenced the debate within the field of architecture and also the discussion on evidence-based design.

## 2. Method

This study is primarily based on how EBD is described in research reviews and literature from the United States. These reviews and books often have a connection to *The Center for Health Design*, formed in 1993. This is a centre formed to show how “design could be used to improve patient outcomes in healthcare environments”.

## 3. Evidence-based design

### 3.1 EBD – what it is

In the literature there are many different definitions, some of which refer to evidence based medicine. But for now let us just use a short and very concise explanation of EBD as *evidence-based design* or *design based on evidence* – simple as that. For my further discussion it is initially important to make a distinction. *Evidence* could then be either

- widely known in the design society and available for immediate application, or
- searched for within every new building project to be used there.

### 3.2 Evidence for an immediate application

In this part of the text, we will look for the body of *currently existing evidence*, evidence that is available today to be applied in the design of new healthcare facilities. However the use of evidence is not linked just to healthcare. It could be applied in other design areas like environments for learning, retail and other. But it seems reasonable that the use of evidence-based design is most requested and used in healthcare design, which has to do with its connection with the tradition of medical research.

#### 3.2.1 Outcomes

Outcomes connected to the physical environment are first and foremost related to the patient - maybe the first thing to spring to mind when you are talking about architecture for healthcare or “Healing architecture”. However, they also concern parents, siblings and relatives. The outcomes also relate to the staff, as well as the healthcare organization as a whole. The outcomes in humans could be measured both as *psychological*, like well-being, and *physical*, such as for instance, blood pressure. On the organization level it is primarily about *economy*.

For this illustration I use one research review as an example; *A Review of the Research Literature on Evidence-Based Healthcare Design*, probably the most well-known and well-respected review today. In the table below you can find the several different outcomes picked to capture or represent healing architecture. (Ulrich, et al., 2008, p. 53).

1. Reduced hospital-acquired infections
2. Reduced pain
3. Improved patient sleep
4. Reduced patient stress
5. Reduced depression
6. Improved patient privacy and confidentiality
7. Improved communications with patients and family members
8. Increased patient satisfaction
9. Decreased staff injuries

Please note that the measured outcomes are partly overlapping. For example, *Patient satisfaction* is probably a result depending on several of the numbered outcomes, for example reduced pain, improved sleep and privacy. The number of outcomes is depending on the used set of scientific criteria (I will come back to that later on). If you use a “lower standard” for evidence there will be another seven, giving a total number of sixteen outcomes.

10. Reduced medical errors

What does EBD mean to the work of the healthcare architect?

11. Reduced patient falls
12. Reduced length of stay
13. Improved social support
14. Decreased staff stress
15. Increased staff effectiveness
16. Increased staff satisfaction

### 3.2.2 Physical interventions

But which are the physical interventions that could bring about the desired outcomes? In the concluding chapter, *Conclusions and Design Recommendations*, a number of design strategies and interventions that can influence outcomes are also listed in the table mentioned above. If you want to be sure about the outcomes, using a “higher standard of evidence”, you will find six. However one intervention might impact several outcomes. The first figure in parentheses below indicates the impact of the interventions using a “higher standard”, the second using a “lower”.

1. Single bed-rooms (5/12)
2. Access to daylight (1/8)
3. Appropriate lightning (1/11)
4. Views of nature (2/7)
5. Noise-reducing finishes (1/10)
6. Ceiling lifts (1/1)

Using the lower standard, the number of interventions will increase by 5 to a total number of 11.

7. Family zone in patient rooms (-/7)
8. Carpeting (-/3)
9. Nursing floor layout (-/2)
10. Decentralized Supplies (-/1)
11. Acuity-adaptable rooms (-/5)

TABLE 1: SUMMARY OF THE RELATIONSHIPS BETWEEN DESIGN FACTORS AND HEALTHCARE OUTCOMES											
Healthcare Outcomes \ Design Strategies or Environmental Interventions	Single-bed rooms	Access to daylight	Appropriate lightning	Views of nature	Family zone in patient rooms	Carpeting	Noise-reducing finishes	Ceiling lifts	Nursing floor layout	Decentralized supplies	Acuity-adaptable rooms
Reduced hospital-acquired infections	**										
Reduced medical errors	*		*				*				*
Reduced patient falls	*	*	*		*	*			*		*
Reduced pain		*	*	**			*				
Improved patient sleep	**	*	*				*				
Reduced patient stress	*	*	*	**	*		**				
Reduced depression		**	**	*	*						
Reduced length of stay		*	*	*							*
Improved patient privacy and confidentiality	**				*		*				
Improved communication with patients & family members	**				*		*				
Improved social support	*				*	*	*				
Increased patient satisfaction	**	*	*	*	*	*	*				
Decreased staff injuries								**			*
Decreased staff stress	*	*	*	*			*				
Increased staff effectiveness	*	*	*	*			*		*	*	*
Increased staff satisfaction	*	*	*	*			*				

\* Indicates that a relationship between the specific design factor and healthcare outcome was indicated, directly or indirectly, by empirical studies reviewed in this report.

\*\* Indicates that there is especially strong evidence (converging findings from multiple rigorous studies) indicating that a design intervention improves a healthcare outcome.

What does EBD mean to the work of the healthcare architect?

Table 1:

*Summary of the relationships between design factors and healthcare outcomes*  
(Ulrich, et al., 2008, p.53).

Please note that there are no discussions of the relative importance of each intervention. Which is the more important of *Access to daylight* versus *View of nature*? What requirements are connected to *Noise-reducing finishes*? As an architect you have to assess “the weight” of each such intervention or the mix of them.

### 3.2.3 Can you prove it? The strength of evidence

In ordinary life you often need proof to be convinced. Does this work or not - and if it does – why and how? In the natural sciences you might get that proof. In a court you might be sentenced if the proof is “beyond any reasonable doubt”. But when it comes to medicine or the humanities nothing is really certain. Instead of the stronger term *proof*, the weaker *evidence* is used. You actually work with different levels of evidence - well known to doctors but probably surprising for many architects.

In *The status report* from 1998, the strength of evidence is discussed although different evidence levels are not used. In the research review from 2004, no difference in evidence strength was reported. However in the review from 2008, used above, two levels were used. One that

*“Indicate that there is an especially strong evidence (converging findings from multiple rigour studies) indicating that a design intervention improves a healthcare outcome”.* (Ulrich, et al., 2008, p. 53)

and another one which

*“Indicate that a relationship between the specific design factor and healthcare outcomes was indicated, directly or indirectly, by empirical studies reviewed in this report”.* (Ulrich, et al., 2008, p. 53)

The use of different quality levels is quite common in the EBD-literature, for example in *A visual guide to Evidence-Based Design* where there are three different levels (Malkin, 2008, p. 4).

If you go into the field of medicine you will find a specially developed evidence grading system called *GRADE* (*Grading of Recommendations Assessment, Development and Evaluation*). The development of this system started in 2000, in order to find a system that would avoid confusion by replacing several older ones with their different shortcomings. The overall quality of evidence is categorised in four levels:

- High
- Moderate
- Low
- Very low

(<http://www.gradeworkinggroup.org/FAQ/index.htm> 120723). This system is also used by the Swedish SBU Kunskapscentrum för hälso- och sjukvården (<http://www.sbu.se/sv/Evidensbaserad-varld/Om-SBUs-metodergranskning/GRADE1-/>)

What does EBD mean to the work of the healthcare architect?

This means that the used criteria for inclusion, the method and the assessment are very important for the final conclusions. As mentioned, the three research reviews initiated by *The Centre for Health Design* are used as a backbone in this article. However other reports had come to different answers. For example the Danish *Helende arkitektur* uses 36 different outcomes, *følgevirkning* in Danish (Frandsen, et al., 2009, p.15), *Evidence for Innovation 20* (NACHRI, 2008, p.6) while *Sensory environment on health-related outcomes of hospital patients (Review)* stated that there is no evidence at all connecting environmental interventions to healthcare outcomes except for music.

*For other aspects [except music, author's remark] of hospital environments, there are not very many well designed studies to help with making evidence-based design decisions. The studies that have been included in this review show that physical changes made to 'improve' the hospital environment on the whole do no harm. (Drahota, et al., 2012, p.2)*

### 3.2.4 A fast growing body of evidence?

In EBD literature, the body of evidence is often described as rapidly growing. For example in *A review of The Research Literature on Evidence-Based Healthcare Design*:

*The state of knowledge of evidence-based healthcare design has grown rapidly in recent years (Ulrich et al, 2008, p.1)*

The number of citations has increased from around 650 in the review conducted in 2004 to nearly 1200 in the 2008 sequel. The number of articles that are referred to increased from approximately 200 to 480 (author's estimate).

It thus seems likely that research within this field has increased. But what about the results: are they rapidly growing? Let us start by looking in to the three reviews initiated by *The Center of Health Design*. In *the Status report*, from 1998, four different "design principles" are suggested to be applied pragmatically:

1. Quiet in the CCU (Critical Care Unit)
2. Music during Minor Surgery
3. Air quality
4. Exposure to daylight and sunlight

Under each of these four headlines there are some further details. In the review from 2004 it is stated that "The large research literature surveyed in this report point to several actions we can take immediately:" (Ulrich, et al, 2004, p. 26-27)

1. Provide single bedrooms
2. Adaptable-acuity rooms
3. Installing high-performance sound-absorbing ceiling
4. Eliminate noise sources
5. Views of nature
6. Other positive distractions
7. Develop way-finding systems
8. Improve ventilation through the use of improved filters

What does EBD mean to the work of the healthcare architect?

9. Improve ventilation through ...special attention to appropriate pressurization
10. Improve ventilation through ...special vigilance during construction
11. Improve lightning
12. Full spectrum lightning
13. Design wards and nurses' station to reduce staff walking and fatigue

Thus the new principal findings are related to

- Single bed room
- Adaptable- acuity room
- Positive distractions
- Way-finding systems

In the review from 2008 the physical interventions are listed in a table (see reference below)

1. Single bedrooms
2. Access to daylight
3. Appropriate lightning
4. Views of nature
5. Noise-reducing finishes
6. Ceiling lifts
7. Family zone in patient rooms
8. Carpeting
9. Nursing floor layout
10. Decentralized Supplies
11. Acuity-adaptable rooms

Thus the new principal findings are related to:

- Family zone in patient rooms

Taken away from the latest list are:

- positive distractions
- way-finding

It is difficult to compare the different reviews and produce a clear and fair interpretation of the suggested physical interventions. I have no intention or knowledge to make an own estimation of "the amount of evidence". However my point is to show that there has not been a fast growing body of new findings, although the "quality of evidence" may have increased, as well as the number of research studies. *Fast* is a relative notion. This field of research has to be regarded as young, compared with more "traditional" science, whether you consider Ulrich's "View-article" from 1984, the formation of the Center for Health Design in 1992 or "the Status report" from John Hopkins in 1998 as a starting-point.

The amount of evidence is not large and it does not seem to grow as rapidly as the proponents had hoped. In the 2008 review, seven positive outcomes with "strong evidence" were reported and another four with "low evidence", making a total number of eleven (11) Compared to the 1998 "Status report", ten years earlier, the numbers increased from four (4). Thus an increase by less than one (1) evidence a year. The argument that you always have to look for new and updated evidence is only relevant to a certain extent!

What does EBD mean to the work of the healthcare architect?

### 3.3 EBD is not a product; it is a process

#### 3.3.1 Introduction

So far we have looked upon the amount of evidence linking physical intervention to healthcare outcomes. In this part I will deal with EBD in the sense of *an applied method* – how the search for evidence and its application will contribute in a planning process together with the client and user. Maybe this is what actually should be called EBD - not the particular, and isolated, evidence. However, there is a deliberate intention to look for new. In that way “the EBD method” is also a part of a cumulative process.

#### 3.3.2 Evidence based medicine

As Evidence-based Design has a heritage and obligation to medicine I find it natural to start with a description of *Evidence-based Medicine (EBM)*. EBM is a term used within the field of medicine only since the beginning of the nineties. The method was developed at McMaster University in Canada, where the pedagogical method for “problem-based teaching” was also developed during the sixties. (Nordenström, 2004 p.11). I was surprised that a field where research has been “a natural part of the profession”, was introduced so late. According to Peter Aspelin, it was initially hard to establish the method within Swedish healthcare, although today it has found its form and few question it. One of the misconceptions was that treatment followed by *just* evidence was to be used. (Nordenström, 2004, p.7)

The birth of the internet, and its connection to databases, was a precondition for the growth of EBM. Suddenly it was possible to quickly gather current up-to-date information from the whole world and its research community. Today you can find about 15 million medical articles and about 5000 medical journals on the internet. It is estimated that just 10-15% of what is published today will have a lasting scientific value and half of today’s medical body of knowledge will be outdated, inaccurate or irrelevant within ten years. (Nordenström, 2004, p.10) That predicts a very fast growing body of evidence! You can find articles in a large number of searchable databases (Nordenström, 2004, p.29-33). There are, however, limits to the availability of different databases as they are “owned” by universities, journals and companies.

The meaning of EBM is to integrate clinical knowledge with the best available scientific findings. The definition often used is the one by Sackett and colleagues from 1996:

*Evidence-based medicine is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients*  
(after Hamilton and Watkins, 2009, p.77)

#### 3.3.3 The process definition

As previously described, the number of scientific articles within our field is small and limited compared with the ones in medicine. In the 2008 literature review there were about 480 references to different articles. The total number of relevant articles was nearly 1200 (Harris, 2008, p.3). As a very crude comparison, that would make the size of the “body of knowledge” 0.01 % of the one of medicine. This comparison should, of course, be questioned. but still it might give us some perspective on the amount of research in different fields. To my knowledge, there is just one database on evidence-based design within healthcare building - the *Ripple database*, supported by Kaiser Permanente, the largest managed care organization

What does EBD mean to the work of the healthcare architect?

in the United States. The database can be found under the homepage for *The Center of Health Design* (<http://ripple.healthdesign.org/about>).

Initially I “defined” EBD simply as design based on evidence. But there are other definitions used by for example CHD (the Center of Health Design) and EDAC (evidence-based design accreditation & certification) . The definition often used today is the one strongly influenced by Evidence-based medicine:

*“Evidence-Based Design is a process for the conscientious, explicit, and judicious use off current best evidence from research and practice in making critical decisions, together with an informed client, about the design of each individual and unique project.”* (Hamilton and Watkins, 2009, p.9)

The above emphasizes the *current* best evidence, that each project is *unique*, and that the client has to be *informed*. From the definition of EBM we can recall the *current* results, that each patient is *unique* and that the patient has to be *informed*, and of course that it is a *process*.

### 3.3.4 The nine-step evidence-based design process

“EBD is not a product; it is a process” (Hamilton and Watkins, 2009, p.10). In the book *Evidence-based design for multiple building types* you can find the table *Evidence-based design process* (Hamilton and Watkins, 2009, p.210), describing *WHR Architects’ nine-step evidence-based design process* (© Kirk Hamilton and WHR Architects Inc.)

1. Identify the Client’s goal
2. Identify the Firm’s goal
3. Identify the Top3-5 key Design Issues
4. Convert Design Issues to Research Questions
5. Gather information (Benchmark Examples, Literature Sources, Internal studies)
6. Critical interpretation of the Evidence
7. Create Evidence-based Design Concepts
8. Develop Hypothesis
9. Select Measures

These nine steps show us a method characterized by inter disciplinary cooperation and the involvement of the client and the user with their goals and demands in focus. But it is also characterized by a more scientific way to look upon evidence by way of searching information, critical interpretation and measuring the success or failure of the stated hypothesis.

When we stand in front of a design issue we have to put efforts and imagination to work to ask the question “in the right way” - to make it researchable. The gathered information has to be looked upon with critical eyes and the interpretation of this information and the transforming of evidence to a design concept is “a very crucial point”, according to me. Creating a hypothesis and measuring the outcomes is a part of the chain to take a step from the specific project to a more general level. It is also at the same time an attempt to achieve a more scientific standard – a higher level of rigor for the architect’s way of work.

What does EBD mean to the work of the healthcare architect?

### 3.3.5 From *supported hypothesis* to *evidence*

However, the supported hypothesis cannot easily obtain the status of “proof” or “evidence”.

*“The language used here asks the designer to determine whether the design hypothesis was “supported” or not. Because this usually involves the application of social science measurement involving complex physical variables and human behavior, it should be noted that one should rarely attempt to “prove” something to the satisfaction of a scientist. Design practitioners should avoid the temptation to claim their measurements have proved anything.”* (Hamilton and Watkins, 2009, p.30)

and

*“... such a collection of studies can close in on an answer that will suffice for future decisions but will never offer “proof” or causality. We may know what happened but we may never be able to pinpoint what specific variable or combinations caused it to happen.”* (Hamilton and Watkins, 2009, p.219)

It is well-documented that it is hard to find reliable scientific methods determining connecting? physical interventions to healthcare outcomes. (for example Ulrich, 2012, p . 6-)

### 3.3.6 The paradox

How can you call a design process evidence-based when you make hypotheses about the outcomes of the physical intervention? It is kind of a paradox. You actually do not know what the outcomes will be in the end. Regarding the small amount of evidence connecting physical interventions to healthcare outcomes, how often will hypotheses be supported and how many of them will become evidence in an academic evaluation?

### 3.3.7 Another type of evidence?

Could *Evidence-based design for multiple building types* be read in any other way than that there are great expectations for a fast growing body of evidence? Sometimes I feel like I am getting it all wrong when reading *The Practitioner’s Guide to Evidence-Based Design*. Is it the same kind of evidence we are talking about?

Within an applied activity it is sometimes hard or impossible to handle strict requirements. You have to take a more practical approach and look for what could be regarded as “credible”. This is described in *The Practitioner’s Guide to Evidence-Based Design* published by *The Center for Health Design*.

*Science frequently asks questions such as: Can we identify the precise cause an effect? Do we understand the mechanism that links a cause to an effect?*

*In the applied practice of EBD we commonly ask a somewhat different, yet related, set of questions: Do we have the credible results that can help us create designs to achieve the key goals of our clients and stakeholders. Can we make reasonable predictions (author’s emphasis) about how a design will function in a given*

What does EBD mean to the work of the healthcare architect?

*situation with a given care process and culture?* (Harris, et al., 2008, p.5)

In this position you have to make assessment after discussions with the client and users to find solutions. It is regarded as an advantage to have additional supporting information that is new and partly different from that already existing within the group. It might help to get insights and can contribute to more informed decisions.

*The point is to use the best studies available to make more informed decisions. When good research studies are unavailable, you must rely on other forms of intelligence. Such sources may not be as rigorous, but they can effort insights grounded in knowledge that is broader than one's own experience* ((Harris, et al., 2008, p .14)

This reasoning is a lot more “practical” and quite different from the more “academic” position in *Evidence-based design for multiple building types*.

*The interpretation of research results is as much art as science. It is not a mechanistic or formulaic process, in which you "punch in numbers" and out pops an answer. But neither is it an individual art. Making sense of research results requires the collective efforts of people with different perspectives and experiences. Together these individuals can discuss what the results mean as well as how the findings can be applied to a specific project.*  
(Harris, et al., 2008, p.17)

As already mentioned, *A Practitioner's Guide to Evidence-Based Design* is more pragmatic and its demands are easier to meet. You are asked to use your personal interpretation, and even “art” is suggested to be a part of the process.

*" They must learn to make a decision on the basis of incomplete knowledge..."* (Hamilton and Watkins, 2009, p.215)

Looking at the EBD process some proponents on “the academic wing” talk about research that should inform the design-decisions, while the “the practitioner” shows a more practical approach. They talk about other types and sources of information that can give” insight” or information that are more than just your own. That makes two quite different interpretations of the EBD-process.

## 4. Conclusion

Among researchers, there are differing opinions on whether any scientific evidence regarding the impact of the physical environment on the outcomes of healthcare exists at all. This is of course a central question for scientists as well as practising architects.

Certain research regards as crucial criteria which architects have already employed in their work for a long time – more or less consciously. The current evidence base is, irrespective of the criteria for evidence, small, and does not constitute a tool of any practical importance in the work of the architect in searching for a “healing architecture”.

What does EBD mean to the work of the healthcare architect?

To systematically increase the foundation, scientific or not, for better substantiated discussions and decisions in connection with the design of healthcare facilities is a positive thing. To, in addition, more systematically try to predict and evaluate the outcomes should conceivably also lead to better individual projects and over time an increase of the common evidence base.

## 5. Discussion

To increase the understanding of how the physical environment affects healthcare is of course interesting. The question is, however, at what point in time and at what level of knowledge will such insight gain any practical relevance to the architect's work? Or will, in fact, scientific insight always be preceded by intuitive understanding and practical application? Early scientific evidence, within many fields including medicine, has been regarded with great scepticism, and science has often not been deemed capable of developing in such a way that it would form a useful tool in practical work. My impression is that the level of knowledge within evidence-based design is increasing only slowly, despite the great expectations of the proponents of the EBD movement. It would surprise me if it came to play a prominent role in the architect's work in the next few decades – perhaps ever! Perhaps it is the case that evidence enters our consciousness gradually, and forms a natural but subconscious part of the knowledge basis for our work?

Today, increasing importance is attached to the planning of healthcare facilities. The reasons for this are likely many. Among other things I feel planning tasks are becoming ever more complex, which in itself necessitates an increase in planning resources. But is it not the case that a growing insight regarding the impact of healthcare facilities on the outcomes of care is becoming ever more important? Better information is obtained to highlight the importance of broad, multidisciplinary teams and active participation from those on the frontline of healthcare. In the EBD literature I have come across, however, the “design dialogue” (*Designdialog* in Swedish) itself is not emphasised in the same way that it is in Sweden today. Here, the understanding of the importance of a two-way “facility and activity development process” grows through the dialogue between architects, healthcare professionals and management.

...

It is my opinion that there is a rationalistic perspective on architecture in the wake of EBD! In my study of evidence-based design I have found a more or less implicit negative picture of “the traditional architect”. It is often there “beneath the surface”, and probably mostly unconscious. The criticism might be understood in a “rhetoric situation” advocating a partly different way of architectural work.

EBD is characterized by a strong belief in science – if an epithet like that could be used for a movement which advocates proof or evidence as a base of acting. The faith in science within the field connecting physical interventions to healthcare outcomes is strong - maybe stronger among enthusiastic proponent than among more cautious researchers.

*Continued expenditure for structures whose layout, ambience, and appurtenances are informed by guess, fad, or the personal preferences of designers, administrators, healthcare professionals, or even patients themselves – absent solid efforts for aesthetic leanings an unsupported theories with*

What does EBD mean to the work of the healthcare architect?

*outcomes data to the extent scientifically possible – is frivolity we can no longer afford. (Rubin, 1998, p.ix)*

*Outcomes-based healthcare environmental design theory will mature only after years of scientifically informed dialogue among designers, clinicians, and patients. (Rubin, 1998, p.17)*

To advocate a behaviour that assumes acting according to proof or evidence of course reflects a doubt to made decisions in a subjective or intuitive way - especially esthetical ones. Esthetical values does not seem to be a part of an evidence-based architecture. Sometimes a picture is painted of an architect sitting in an ivory tower, egocentric and immoral, a person putting a personal esthetical interest in front of the clients' goals and the building "performance".

*EBD is not about hospitals that are simply nicer or fancier than traditional hospitals. Rather, the focus of evidence-based design is to create hospitals that actually help patients recover and be safer, and help staff do their jobs better. (Ulrich ,et al., 2004, p.26)*

I am, however, convinced that esthetical and other subjective or intuitional decisions are a vital part of the architect's work and of great importance for developed proposals. That does not, however, mean that such decisions could not be made after detailed discussions with the client and users. But it means that you cannot ignore or deny the fact that architecture *solely* built on evidence is unscientific. I can also made clear that although architecture is said to be "a mix of art and science" (Hamilton and Watkins, 2009, p.ix) for some proponents this is no more than "lip service". It is obvious that "the EBD movement", at least so far, has paid little interest to these matters.

Arbitrariness is often said to be the effect of letting you be led by your feelings or by your intuition. And of course intuition and an artistic approach is a powerful but necessary tool that can be misused. But it has to be used! Intuition is a force in architecture as well in science and a scientific work. Einstein claims that there is no logical way to find elementary and universal laws. It can only be reached through intuition built on a friendly understanding of the experience (after Pirsig, 1978, p.265).

In a June 2012 workshop Kirk Hamilton reported that a highly respected physician claimed only 15% of current medicine is based on evidence, so Hamilton speculated that only 5% of potentially useful evidence might be available for architecture.

Finally I will end up with a quote from a small Swedish book in which I found great interest. It concerns medicine but I think it might just as well have been about architecture or evidence-based design. The name of the book is *Evidensbaserad Medicin - i Sherlock Holmes fotspår* ( *Evidence-Based medicine – in the footprints of Sherlock Holmes*). The author Jörgen Nordenström, claims if Mr. Holmes has lived today he would probably be surprised by

*...the evidence-base for treatment of many diseases is in many cases still limited (Nordenström, 2004, p.1, author's translation)*

And his biggest frustration should probably have been this sentence

What does EBD mean to the work of the healthcare architect?

*... medical problems can almost never be solved only through a logical process.* (Nordenström, 2004, p.1, my translation)

## References

- Drahota, A. et al., 2012  
*Sensory environment on health-related outcomes of hospital patients (Review)*  
 Cochrane Database of Systematic Reviews 2012, Issue 3. Art No.: CD005315. DOI:  
 10.1002/14651858.CD005315.pub2.  
<http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD005315.pub2/pdf>
- Frandsen, A. K. et al., 2009.  
*Helende arkitektur.*  
[http://vbn.aau.dk/files/17765285/Helende\\_arkitektur.pdf](http://vbn.aau.dk/files/17765285/Helende_arkitektur.pdf)
- From, L. and Lundin, S., 2009.  
*Architecture as Medicine – the Importance of Architecture for Treatment Outcomes in Psychiatry.*  
 ARQ – Stiftelsen för Arkitekturforskning
- Hamilton, D.K. and Watkins, D.H., 2009.  
*Evidence-based design for multiple building types.*  
 Hoboken, NJ: John Wiley & Sons
- Harris, D. D. et al, 2008.  
*A Practitioner's Guide to Evidence-Based Design.*  
 Concord, CA: The Center for Health Design
- Malin, J., 2008.  
*A Visual Reference for Evidence-Based Design.*  
 Concord, CA: The Center for Health Design
- NACHRI and The Center for Health Design, 2008.  
*Evidence for innovation. Transforming children's health through the physical environment.*  
 Alexandria, VA: National Association of Children's Hospitals and Related Institutions
- Nordenström, J., 2004  
*Evidensbaserad Medicin - i Sherlock Holmes fotspår.*  
 4<sup>th</sup> ed. Karolinska Institutet University Press
- Pirsig, R.M. 1978  
*Zen och konsten att sköta en motorcykel (The original English title; Zen and the art of motorcycle maintenance – an inquiry in values, 1974).*  
 Stockholm, Sweden
- Rubin, R., 1998.  
*Status report (1998): An investigation to determine whether the built environment affects patients' medical outcomes.*  
<http://www.healthdesign.org/sites/default/files/Built%20Environment%20Affects%20Patients%20Medical%20Outcomes.pdf>
- Ulrich, R. et al., 2004.  
*The Role of the Physical Environment in the Hospital of the 21<sup>st</sup> Century: A Once-in-a- Lifetime Opportunity.*  
[http://www.saintalphonsus.org/pdf/cah\\_role\\_physical\\_env.pdf](http://www.saintalphonsus.org/pdf/cah_role_physical_env.pdf)
- Ulrich, R. et al., 2008.  
*A Review of the Research Literature on Evidence-Based Design.*  
 (From The White paper series 5 out of 5)  
<http://www.healthdesign.org/chd/research/review-research-literature-evidence-based-healthcare-design>
- Ulrich, R., 2012.  
*Evidensbas för vårdens arkitekter 1.0. Forskning som stöd för utformning av den fysiska vårdmiljön.*  
 Centrum för vårdens arkitektur, Chalmers Tekniska Högskola

What does EBD mean to the work of the healthcare architect?