

# Health Care Design: Current and Potential Research and Development

June H. Park

*Translated by Kate Hunter*

## Introduction

Health, no longer an individual's private matter, but also a precious resource in society, can be "designed." This article investigates the contribution design can make to health care, concentrating primarily on the various research and development perspectives that health care design offers in connection with chronic illness.

## Design and Health Care

Reflecting on design in the context of medicine and health care is relatively new. The research project carried out by Bruce Archer in the early 1960s, which eventually led to the "King's Fund Bed"—a prototype of all modern hospital beds—counts among the first instances of design in medicine. In the meantime, in a wide array of more or less established situations in medical practice, design has made an important difference; this area of specialization is now known as medical design.<sup>1</sup> In industrial design, many medical aids and devices have been developed for patients, doctors, and nursing staff, or even as capital goods for hospitals and doctors' practices. The design of clinics and rehabilitation centers—both their architectural and interior design—makes various contributions to improvements in therapy and care processes. E-Health is an umbrella term for concepts ranging from teleradiology, telemonitoring, and e-counseling to efforts to form a network for the health care system. These concepts involve Information and Communication Technology (ICT)-supported system design, which is also connected to the desire to digitalize patient data allow multiple points of access for several health care sectors.<sup>2</sup> Furthermore, service design is trying to use the methods of empirical social research to develop concepts aimed at the optimization or new development of medical treatment or care processes. Neologisms, such as "co-design" or "participatory health care design" express that the clients' experiences and patient participation are taking on greater meaning.

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1 In 2008, Kiel's Muthesius Kunsthochschule became Germany's first university to introduce medical design in its master's program in industrial design.

2 IKB Deutsche Industriebank AG and Prognos AG, *Die Gesundheitsbranche: Dynamisches Wachstum im Spannungsfeld von Innovation und Intervention* [The Health Care Sector: Its Dynamic Growth under Conflicting Requirements between Innovation and Intervention] (Düsseldorf: 2007).

Looking at medicine in the context of design may initially seem unusual. However, when medical action is considered from another viewpoint, various elements often ascribed to design can be found in it. Interpreting symptoms and reconstructing a patient's suffering by means of anamnesis, both of which can help lead to a diagnosis, are characteristic not only of scientific rationalism, but also of hermeneutic interpretation and even of creative inspiration. Any therapy prescribed and begun after diagnosis is actually at the core the creation of a set of health-promoting measures to be taken. Indeed, design and redesign of any given course of therapy is constantly required for any patient, in any stage of illness. Here, the patient takes on an important role. The longer the illness phase lasts, the more decisive active self-care becomes for the patient's health. In the case of chronic illness, which can last until a patient's death, self-management plays a key role. Patients are the most experienced experts with respect to their own illness and their individual therapy. Awareness of the great potential here that has yet to be completely exploited is on the rise.

Ultimately, health care can be considered an aspect of health-policy system design.<sup>3</sup> The German health care system, which comprises more or less separate sectors for inpatient and outpatient treatment, care, medical technology, and the pharmaceuticals market—not to mention the statutory and private health insurance systems—is quite complicated. Many areas could be improved. The introduction and further development of integrated care, mobile care, home care, and self-care are examples of improvements aimed at changes to the structure of the health care system. A well-founded reason can be named for subjecting the entire health care system to the principles of design: the desire to reduce health care costs and simultaneously to increase quality of life. Therefore, the importance of design as a catalyst for health care design is both legitimate and promising.

### Concepts of Health

On the one hand, health is a valuable commodity. As the German philosopher Arthur Schopenhauer claimed at the beginning of the nineteenth century, "Health outweighs all other commodities to such a drastic extent that truly, a healthy beggar is happier than a sick king." On the other hand, health is also a construct. In fact, it is a design object. No predetermined goal can be established for health; rather, all goals are situational and individual. But one-sided, mechanistic views of health and healing often dominate, both in medicine and in everyday life: health as the absence of sickness; healing as the restoration of physiological and organic functions. In the following section, I discuss three concepts of health that are relevant to chronic illness and that could provide direction for the future development of health care design.

3 See June H. Park, "Design und Gesundheitssystem," [Design and the Health Care System] in *Öffnungszeiten, Papiere zur Designwissenschaft* [Opening Times, Papers for the Science of Design] 24 (2010): 48–51.

### *Palliative Care Model*

Over time, four main areas have developed in medicine: treatment, rehabilitation, prevention, and palliation. Palliative care is not about curative treatment; rather, it is about relieving physical, psychological, social, and spiritual suffering in a patient who is most likely mortally ill to allow the best possible quality of life for the patient's remaining time. Palliative care gives hope to patients and their families.<sup>4</sup>

Both palliative medicine and hospice work are types of palliative care. In fact, palliative care is far more complex than end-of-life care. Active counseling to restore and maintain quality of life is an indispensable form of support for patients long before they enter the final phase of life. With this goal in view, a clear separation of the tasks involved in treatment, rehabilitation, prevention, and palliation is questionable. The increasing influence of palliative care in a variety of areas requires the further development and differentiation of the knowledge and practice of palliative care in an interdisciplinary context—one in which design might be able to make unexpectedly creative contributions, such as in the fields of service and process design. This prospect of design would bring with it the challenge of rethinking and redefining the concept of human-centered design. Moreover, further development in the terminology and theory must be encouraged to achieve more argumentative rigor, differentiation, and depth in design and to facilitate interdisciplinary communication.

### *Trajectory Model/Corbin and Strauss Model*

Nursing expert Juliet Corbin and sociologist Anselm Strauss developed the "Trajectory Model" based on the results of empirical research carried out over a span of 30 years according to the principles of grounded theory.<sup>5</sup> This model offers a unique way to examine the situation of people who have a chronic illness. Chronic illnesses, such as cancer, cardiovascular diseases, HIV/AIDS, diabetes mellitus, and multiple sclerosis do have certain things in common, despite their individual characteristics in terms of type and gravity. The trajectory model shows eight different yet typical phases of illness.

According to this model, chronic illness can be influenced by targeted work. The model's "work" lines include biographical work, illness work, and everyday life work. These mean: maintaining or rebuilding a liveable life plan and a likeable self-image, providing medical treatment and care, and equipping patients with the knowledge of effective self-management. The central question of the model is how chronically ill people can be helped to control their illnesses to such an extent that quality of life is maintained for them and their families. The aim of this model,

4 Dieter Siebrecht, *Visionen der Förderung von Palliativmedizin* [Vision of Promoting Palliative Medicine], Unpublished manuscript (Kiel: 2010), 2.

5 See Kornelia Grötken and Eva Hockenbecker-Belke, "Das Trajekt-Modell. Im Mittelpunkt der chronisch kranke Patient als aktiver Partner" [The Trajectory Model. At the Center the Chronically Ill Patient as an Active Partner], in *Die Schwester/Der Pfleger* [The Nurse] 04 (2006): 270–74; P. Woog, *The Chronic Illness Trajectory Framework, the Corbin and Strauss Nursing Model* (New York: Springer Publishing Company, 1992); And A. Strauss et al., *Chronic Illness and the Quality of Life*, 2nd ed. (St. Louis: Mosby, 1984).

then, is the practical implementation of case management. The task of case management is to fulfill the great needs of patients' and their families for support in terms of clarification, planning, coordination, and organization and then to use these identified needs as a foundation for a needs-oriented and inter-institutional treatment path. At this point, the "designerly way of thinking," or "design thinking," provides valuable impulses for the training of care personnel and case managers so that they can better support patients in developing individual life plans and daily routines. Deliberately subjecting therapy development and case management, as human-centered design, to a design process would likely not only confirm existing practices, but also possibly reveal weaknesses in them and open up new aspects and new possibilities for care. In this way, general didactics of design are desirable, particularly if they focus on the role of design as a catalyst in innovation and can be used in an objective way in other applied sciences.

### *Salutogenesis*

Antonovsky's concept of salutogenesis was developed in the 1970s as a criticism of biomedical models of sickness and prevention.<sup>6</sup> The concept expands the pathogenetic approach, which concentrates on the cause of a disease, by adding a salutogenetic perspective, which focuses on the cause of health. Why do people stay healthy in the face of ever-present threats to health? Why are people able to recover from illness? Why do people not become sick, even when faced with great pressure? In focusing on these questions, Antonovsky determined that people possess or can develop inner strength, which he called generalized resistance resources that cannot be explained at the biomedical level. Antonovsky also generated the health–sickness continuum, on which health is treated as a dynamic state that requires regulation. The loss of health can be understood as a naturally occurring process that can be constantly adjusted in the direction of health. From this perspective, the support and activation of a person's generalized resistance resources becomes just as important in health maintenance as the elimination of the causes of illness themselves. A sense of coherence, which is represented by a pervasive, lasting, and dynamic feeling of confidence, is an important element of the generalized resistance resources.

When the cause of a chronic illness cannot be eliminated, the concept of salutogenesis takes on great importance—particularly for younger patients. The three aspects of the sense of coherence—comprehensibility, manageability, and meaningfulness—together are an ideal area of research and development for health care design because they present a new scope for design that falls explicitly outside the realm of medicine.<sup>7</sup> The potential effects on

6 A. Antonovsky, "The Sense of Coherence: Development of a Research Instrument" in *Tel Aviv University, Newsletter and Research Reports* 1 (1983): 1–11.

A. Antonovsky, *Salutogenesis. Zur Entmystifizierung der Gesundheit* [Salutogenesis. Unravelling the Mystery of Health], Translated by Alexa Franke (Tübingen: Dgvt-Verlag, 1997).

7 Andrea Grabert, *Salutogenesis und Bewältigung Psychischer Erkrankung: Einsatz des Kohärenzgefühls in der sozialen Arbeit* [Salutogenesis and Coping with Mental Illness: Use of Sense of Coherence in Social Work] (Lage: Jacobs Verlag, 2007), 97.

health education are appealing. However, targeted attention would have to be given to design's potential, including active efforts in research and development, in cooperation with potential partners and corresponding public agencies.

The three examples identified—palliative care, the trajectory model, and salutogenesis—and key terms, such as “quality of life,” “health-sickness continuum,” “illness work,” “biographical work,” “everyday life work,” and “sense of coherence,” provide a wide range of conceptual and practical starting points for health care design. Two concepts are prominent in these perspectives: first, the holistic perception of health and its processual character, and second, the potential for patient self-management.

### Theoretical Foundations of Health Care Design

To expand the idea of health care design in a consistent way, a theoretical framework aimed at enabling and improving practice is required. Such a framework would allow for measuring the value of any theory of health care design on the basis of whether and how the resulting artifacts could be validated. This approach as a rule does not pose any difficulties when the measurability of physical effects is emphasized; psychological effects, meanwhile, are to a larger extent individual and cannot easily be generalized. Ultimately, the evidence arising from both quantitative and qualitative data is central to research and development work in health care design. Thus, evidence-based design must be applied from a foundation of reliable data on design criteria for architectural, interior design, and technical environments.<sup>8</sup> Finally, patients must take center stage in health care design and be given access to authentic and individual findings concerning their therapy experiences.

These demands can best be met using the approach of grounded theory.<sup>9</sup> In grounded theory, the logical reasoning would be hypothesis or abduction.<sup>10</sup> Charles Peirce introduced the term “abduction” to scientific theory to complement the ideas of deduction and induction. He describes abduction as “the process of forming an explanatory hypothesis.” In this process, “the surprising fact C is observed. But if A were true, C would be a matter of course. Hence there is some reason to suspect that A is true.”<sup>11</sup> Ideally, the “researcher” in the application of grounded theory would actually be the patient. Grounded theory provides access to a qualitative research method that allows a unified theory to be generated from many individual cases and data. Corbin and Strauss developed their trajectory model, which presents a theory of the progression of chronic diseases, in this way. Grounded theory also makes conceivable the notion that various theories of health care design, such as models and processes

8 The Center for Health Design, in Concord, CA, has done pioneering work in this field.

9 Barney G. Glaser and Anselm L. Strauss. *Grounded Theory. Strategien qualitativer Forschung* [The Discovery of Grounded Theory. Strategies for Qualitative Research], Translated by Axel T. Paul and Stefan Kaufmann (Bern: Huber Verlag, 1998).

10 Charles Sanders Peirce, *Collected Papers*, CP 5.171. According to Peirce, the founder of modern general semiotics, abduction is a creative, instinct-guided process, unlike deduction or induction. With abduction we imagine hypothetical rules to come to new ideas. A recursive process using abduction requires minimal data, meaning that it is suitable for everyday use.

11 *Ibid.*, 5.171, 5.189.

to strengthen the sense of coherence (i.e., comprehensibility, manageability, and meaningfulness), can be accessed in line with salutogenesis.

Another useful term in discussing theory development in the context of health care design is “theoretical design.”<sup>12</sup> Theoretical design is not a design concept (plan for a design concept); nor is it theory design (development of a theory), nor design theory (a theory about design). The relationship of theoretical design to design corresponds more or less to the relationships between theoretical biology and biology, theoretical medicine and clinical medicine, and theoretical physics and experimental physics.

Theoretical design serves in the development of thought frameworks. As in Peirce’s work, these frameworks can also be called hypotheses, or assumptions that make surprising or inexplicable facts seem comprehensible. Within a thought framework or hypothesis, immaterial artifacts (e.g., methods, strategies, or concepts) can be developed that solve specific problems or that allow for better or simply different ways of dealing with the problems. Examples of theoretical design can be found in various areas, including research design, developing rules for games, and urban planning. These design processes all take place within a particular thought framework: research design in the framework of the ability to be objective, developing rules for games in the framework of the potential facets involved in the joy of the game, and urban planning in the framework of the various existing city development philosophies. These thought frameworks, or frameworks in general, are shaped and malleable artifacts, even when they seem to be anchored in society and appear normative.

According to Marx W. Wartofsky, artifacts can be categorized into three groups: primary, secondary, and tertiary.<sup>13</sup> In reality, the three categories are mutually interdependent. Primary artifacts include everything that arises from human activity devoted to fulfilling a need or purpose. They are intentions made material and include tools, products, behavior, and language. Secondary artifacts are representations of primary artifacts, created for the purpose of maintaining or transferring the skills required for the production and use of the primary artifacts. This group covers drawings and models of objects; designs and plans of processes; and concepts and strategies for behavior. Tertiary artifacts are the frameworks in which secondary artifacts arise and can be tested. These frameworks are imaginary spaces and can be understood as methodologies, visions, or worldviews.<sup>14</sup> Tertiary artifacts are characterized by the fact that they can engender radical alternatives to what already exists.<sup>15</sup>

Primary and secondary artifacts can be perceived by the senses, but tertiary artifacts can be accessed only theoretically. Theoretical design describes a research and development realm

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- 12 June H. Park, “Theoretisches Design: Gestaltung jenseits der Objekte” [Theoretical Design: Design beyond the Objects] in *Positionen zur Designwissenschaft* [Positions for the Science of Design], eds. Felicidad Romero-Tejedor and Wolfgang Jonas (Kassel: Kassel University Press, 2010), 89.
  - 13 Marx W. Wartofsky, “Perception, Representation, and the Forms of Action: Toward an Historical Epistemology” in *Models: Representation of the Scientific Understanding* (Dordrecht: D. Reidel Publishing Company, 1979).
  - 14 Yrjö Engeström, “Die Zone der nächsten Entwicklung als die grundlegende Kategorie der Erziehungspsychologie” [The Zone of Proximal Development as the Fundamental Category of Educational Psychology] in *Jahrbuch des Inst. für Marxist. Studien und Forschungen* [Yearbook of the Institute for Marxist. Studies and Researches] 10 (1986): 151-71.
  - 15 Olav W. Bertelsen, “Elements of a Theory of Design Artefacts, a Contribution to Critical System Development Research,” (PhD diss, Aarhus University, Aarhus, 1998).

for tertiary artifacts, which can be described as hypotheses of understanding, assessment, and coping from which secondary artifacts (e.g., models, methods, and strategies) can be derived.

As soon as it is integrated into daily life a design object—whether a product or a service—is always a hybrid of primary, secondary, and tertiary artifacts. For example, a bicycle as a primary artifact is a material solution to the need for mobility. As the mute ambassador of itself (as a secondary artifact), it constantly presents its serviceability. Finally, in an unspectacular and nostalgic way, it embodies the vision of the post-fossil age (tertiary artifact).

Meaning also falls in the realm of tertiary artifacts. In the concept of theoretical design, meaning—both social and individual—can be shaped. Here, we are dealing not with naturally occurring meaning, but with constructs of meaning.<sup>16</sup> Secondary artifacts (i.e., immaterial models, methods, and strategies) are embedded in a comprehensible framework of meaning. Moreover, they must already carry a construct of meaning within them that is: (1) *perceptible*, (2) *comprehensible*, and (3) *acceptable*. A model, method, or strategy that cannot be invested with meaning before it is used will not be accepted. The development of secondary artifacts, if it is to succeed, must go hand in hand with the development of constructs of meaning: tertiary artifacts. The qualitative criteria for constructions of meaning are therefore perceptibility, comprehensibility, and acceptability. Fundamentally, this construction is exactly what happens in product design, where the meaningfulness of product features or products is considered during the design process. The deeper meaning, which must be inferred at the cognitive level, is overridden by the obvious and therefore immediate perceptibility of the aestheticized product surface. The art is in making the meaning comprehensible at the immediate level of perceptibility—an important topic in product language,<sup>17</sup> as well as in product semantics.<sup>18</sup> In theoretical design (i.e., in the design of tertiary artifacts), meaningfulness dominates the foreground as the true core of design. Meaningfulness is the precondition that allows tertiary artifacts to be ascribed any plausibility at all.

Meaningfulness in health care design does not deal explicitly with constructing meaning for a sick person. Rather, it concerns the development of meaningful methods and strategies that can support as much as possible the illness work, everyday life work, and biographical work along the health-sickness continuum of a chronically ill patient. To this end, Antonovsky gives meaningfulness the greatest relevance for the sense of coherence in the concept of salutogenesis. A comparison of the conceptual instruments of salutogenesis and of theoretical design shows that they are related at the theoretical level.

16 June H. Park, "Design als Sinnkonstruktion: eine systemtheoretische Skizze des Design, ein Beitrag zur Kunst- und Medienwissenschaft" [Design as Construction of Meaning: a Systems-Theoretical Outline of Design] (PhD diss., Braunschweig University of Art, Braunschweig, 1995).

17 Jochen Gros, "Einführung" in *Grundlagen einer Theorie der Produktsprache, Heft 1* ["Introduction" in *Fundamentals of a Theory of Product Language, volume 1*] (Frankfurt am Main: University of Art and Design, Offenbach, 1983). Jochen Gros, "Symbolfunktionen" in *Grundlagen einer Theorie der Produktsprache, Heft 4* ["Symbolic Functions" in *Fundamentals of a Theory of Product Language, volume 4*] (Frankfurt am Main: University of Art and Design, Offenbach, 1987).

18 Klaus Krippendorff and Reinhart Butter, "Product Semantics: Exploring the Symbolic Qualities of Form," *Innovation, The Journal of the Industrial Designers Society of America* 3, 2 (1984): 4-9.

The three components of the sense of coherence in the concept of salutogenesis are:

*Comprehensibility – Manageability – Meaningfulness.*

The three qualitative criteria of the constructs of meaning in the concept of theoretical design are:

*Perceptibility – Comprehensibility – Acceptability.*

This overlap of terminology and theoretical relatedness are remarkable, not least because the concepts of salutogenesis and theoretical design arise from two completely different disciplines—namely, medical sociology and design theory. Nevertheless, they obviously converge at the conceptual level. Their theoretical relatedness can be explained by the fact that both concepts ascribe a leading role to meaning. When we assume that artifacts can support and promote the sense of coherence—a pervasive, lasting, and dynamic feeling of confidence—then also seeing the five terms of perceptibility, comprehensibility, manageability, acceptability, and meaningfulness as mutually interdependent, general criteria for human-centered design is not much of a stretch.

### **Impulses of Design**

What would concrete impulses look like that could be diffused from design into other disciplines? The Hochschule für Gestaltung in Ulm has a concrete image of what such impulses look like. The idea behind the young but influential HfG Ulm was the “realization of socially meaningful design tasks and the cultivation of ways of living in our technical age.” This vision statement, written in 1953, is astoundingly current and yet still forward-looking, and not only for design. The fundamental challenge and goal have not changed: The focus still is about “ways of living.” In the sense of the early spirit of Ulm, however, the question can be formulated more accurately: How can the impulses of design be socially meaningful and productive? The answer is by continuing to develop the fundamentals of design, at both the theoretical and practical levels. With a focus on health care, I suggest describing the primary contribution of design as “radicalizing,” based on this reason: As soon as design emerges from the narrow crafts of shaping, styling, or visualizing and devotes itself to more broadly understood tasks, such as service design, process design, or social design, and thus enters areas of other disciplines, including medicine, nursing science, or social work, the question of the competency of design hangs in the air. As a rule, representatives from both inside and



outside the discipline see it in its artistic competence. This attitude is understandable but regrettable in that it closes off interesting research perspectives right from the start.

With this limited view in mind, the term “radicalization” would be a concise but expansive communication strategy in the context of interdisciplinary cooperation—one that would push design competence beyond its artistic borders to signify a strategically conceptual expertise instead of an aesthetically performing one. Radicalization would be especially pertinent in three aspects: (1) radical creativity, (2) radical life planning, and (3) radical individualization.

#### *Radical Creativity*

The idea of taking a creative or playful approach to a disease seems inappropriate or even wrong. But when chronic illness means that the concepts and perspectives of patients and their families about living must be rethought and, where possible, radically corrected, then false consideration may not be particularly helpful. Radical creativity, which is able to break taboos and conventions, could lead to new solutions and unexpected scenarios for management work that are completely unimaginable for many non-patients.

#### *Radical Life Planning*

In cases of chronic illness, inpatient hospital stays take up only a fraction of the time in the long term, except in the acute phase. Patients, as part of their regular outpatient care, must be equipped with the knowledge required for effective self-management. Methods and strategies are needed that prove their worth in the patient’s everyday routine. Radical life planning sets the quality of the patient’s current everyday life as its design task and asks how self-management can be seamlessly integrated into the patient’s concrete, everyday routine without having any stigmatizing effect.

#### *Radical Individualization*

No single unified therapy is effective for everyone; rather, a unified therapy framework is called for. A definitive individual course of therapy is derived from extensive cooperation with the patient. Thus, the patient carries a certain amount of responsibility. The role of being decision-making co-developers of their own personal therapy must be comprehensible and, what’s more, acceptable to patients. Radical individualization in this situation represents a principle diametrically opposed to universal design. Here, a participatory design is needed that is radically adapted to the needs of a patient and his or her everyday conditions. Furthermore, the design should keep therapy work to a minimum.

### Conclusion

Health care design has great potential and promising starting points for investigating topics such as health or quality of life, which are already considered design objects in certain areas of health care. A holistic view of health and the central role patients play are constitutive topics in health care design. The concept of theoretical design can provide new research impulses for health care design that lead to improved or new models, methods, and strategies. Managing chronic illness, as suggested, requires models, methods, and strategies that can be tailored to fit any particular patient's daily routine. Health care design updates and clarifies the human-centered design aspects of meaningfulness, empathy, and participation. Grounded theory and abduction form the methodical foundation of research and development. From this perspective, health care design enables design research to produce strategic and theoretical impulses in an interdisciplinary working context, above and beyond artistic competence. The development of new processes and instruments can be expected as a result, further consolidating the interdisciplinary areas of research and development. New job profile combinations might also arise from this research—for instance, in the overlapping areas between design, medicine, nursing, and social work.

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