People-focused innovation in healthcare

How Philips Design supports development of solutions for the ever-changing healthcare landscape

PHILIPS

Contents

Abstract

Our lifestyles are increasingly out of balance and we are placing our health at risk through unhealthy habits. We are ageing as a population and more likely to suffer from chronic diseases as we get older. As a result, our healthcare systems are under increasing demand for costly and complicated care. Yet, with their limited resources and traditional models, they are already struggling to meet existing demand. In short, the healthcare industry is in crisis and facing paradigm change. However, there are plenty of opportunities for innovation within this crisis.

Philips Design supports Philips in delivering healthcare end-user value through innovation. Over the past two decades, Philips Design has developed a people-focused innovation approach that has generated tangible proof-points of the Philips Healthcare promise of 'People-focused, Healthcare simplified' across the home and hospital healthcare domain. It is an approach that is driven by qualitative research, applies design thinking to identify innovation opportunities, and leverages design skills to propose solutions with measurable end-user value. It has proved relevant in business processes ranging from strategy to product development, and has successfully supported both short and longer-term innovation.

This paper describes the mindset, methods and tools used in this approach, citing examples from Philips Design to illustrate the strategic contribution and value that design can offer in healthcare innovation.

1 Taking care in a time of complexity

1.1 Our world in transformation

We are living in a world that is undergoing immense change and transformation, driven by socio-dynamic forces so rapid that we struggle to keep up, let alone feel any sense-of-control over our future. These changes are affecting everything from energy to transport, food to health.

"Every few hundred years in Western history there occurs a sharp transformation. Within a few short decades, society rearranges itself; its worldview (paradigm), its basic values, its social and political structures, its arts, its key institutions. Fifty years later there is a new world."
Peter F. Drucker, Post-Capitalist Society

As individuals we are surrounded by increasing convenience and choice, and expect to achieve more quality from life with less effort. 'Quick-fix' solutions fulfill our immediate needs; the short term is a lot easier to grasp when the future seems so unpredictable. Social structures are disintegrating and reforming, family units are dispersing, yet there are more ways to connect with more people than ever before. Traditional institutions like the state, church or hospital, which once helped us navigate through our lives and make personal choices, are no longer equipped to lead us through this complex world; we are left feeling insecure and compelled to find our own new support systems.

Technology might liberate us through timesaving solutions, but our bodies are beginning to show signs of the stresses and strains of such a lifestyle. As we become less 'productive', this weakens the very economies that support such a way of life. This is not a sustainable situation.

"An estimated 13.4 million working days a year in the UK are lost to stress, anxiety and depression, and 12.3 million to back and upper limb problems. £11.5bn in 2002 was paid out in wages to absent employees and on additional overtime and temporary staff cover"
Paul Roberts, 2004 IHC report 'Absenteeism - Industry's Hidden Disease'

1.2 Our lives at risk

Amid all this change, do we really know how we feel? We are confused about our own priorities and knowing what makes sense for us personally. Unhealthy lifestyle habits have led to an increase in disease risk factors: over-consumption and a poor diet; reduced physical activity as we perform more knowledge work; increased stress as we deal with change and overwhelming choice; and insufficient sleep and relaxation as we find it harder to unwind and switch off from the buzz.

Even if we do hear and recognize the warning signs of our ill health we may not know what to do about it, and even if we do, we may not be convinced that we can change our own lives, so accustomed have we become to adapting ourselves to suit our circumstances instead.

We are an increasingly grey population, and are generally living longer - albeit afflicted with chronic diseases. This is true in both the developed as well as the developing world. The transitions we require to adjust to new health levels, as we age or develop chronic illnesses, are amplified in light of these socio-cultural changes.

1.3 Our healthcare systems at breaking point

These dynamic forces of change batter the healthcare industry from different angles. As the population becomes ever larger, more widely distributed and diversified, and as we suffer the costly consequences of increasingly damaging lifestyles, the result is greater demand on a system already straining to bursting point. Traditional models of healthcare are breaking down and being challenged as they simultaneously face pressure to adapt while confronting several systemic obstacles to change.

"Participants [in healthcare] compete to shift costs to one another, accumulate bargaining power, and limit services. This kind of competition does not create value for patients, but erodes quality, fosters inefficiency, creates excess capacity and drives up administrative costs."
Michael E. Porter & Elisabeth Olmstead Teisberg, 'Redefining Healthcare'

Clinical teams are facing increased pressure to perform more efficiently, consistently and safely in delivering improved outcomes. They need to be able to stay up-to-date with clinical advances, and communicate effectively with patients as well as an increasingly networked global peer group. Workforce recruitment, retention, burnout and ageing are all factors confronting today's healthcare providers.

"The nursing workforce is ageing. Over the next 10 to 15 years [industrialized] countries will experience a large exodus of nurses from their workforce as nurses retire just at a time when demand for nursing and healthcare is on the rise; one of the reasons being the growth in the older population."
International Centre for Human Resources in Nursing, 'An Ageing Nursing Workforce'

Hospital management teams face impossible choices to balance cost and quality of care. Healthcare processes tend to be complex, filled with redundancies and characterized by bottlenecks that ultimately affect quality and effectiveness. League tables and new quality-of-care metrics pressurize facilities to perform in new ways and with tougher financial and legal constraints.
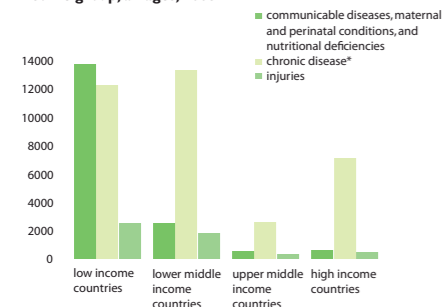
Healthcare institutions are steeped in tradition, organized in silos and clearly-defined professional hierarchies. As care shifts outwards into new areas, delivering optimal care means working across settings and with new care roles. This requires time-consuming organizational change, to create an open and innovative mindset that can foster new modes of professional collaboration.

Hospitals were once the sole portals of healthcare, reflecting the identity and lifestyles of the communities they served. Now, however, they must differentiate their services from new competitors such as pharmacies and standalone clinics that occupy the healthcare space between hospital and home. Hospitals strive to formulate distinct healthcare brands in order to generate loyalty in both patients and staff.

People bring their expectation for choice with them when they need healthcare services. They may confidently challenge clinical opinion, shop around globally for healthcare solutions and consider alternative approaches. Yet, at the same time, they need support in personal healthcare decision-making because they still experience a certain degree of anxiety in this new, fragmented care landscape.

It would be no exaggeration to conclude that, given these factors, the global healthcare industry faces a crisis, a paradigm change. However, there are plenty of opportunities for innovation within this crisis.

Projected deaths by major cause and World Bank income group, all ages, 2005

- communicable diseases, maternal and perinatal conditions, and nutritional deficiencies
- chronic disease*
- injuries

Projected foregone national income due to heart disease, stroke and diabetes in selected countries, 2005-2015

Fig. 1 Graph showing a rising incidence of diseases in both the developed as well as the developing world: diabetes mellitus, strokes, cardiovascular disease, obesity and cancer.

2 The innovation challenge for healthcare

Today's healthcare landscape is a challenging arena. Organizations are in search of successful and sustainable innovation strategies differentiate from the competition and create viable solutions that offer improved healthcare experiences for patients and care providers in the short to longer-term. At the same time the financial system needs to be sustainable.

Many challenges in healthcare demand a diverse mix of skills, knowledge and competences which is beyond the capability of most individual businesses. Companies therefore have to think in terms of new models of innovation that include partnerships, acquisitions or strategic alliances equip themselves for the healthcare challenges ahead.

In the following sections of this paper we will describe how Philips is repositioning and equipping itself to respond to some of these challenges. In particular, we will look at the role and competences of Philips Design in supporting businesses to develop sustainable innovation strategies and solutions that can improve healthcare experiences for both patients and professionals.

Some of the key innovation questions within healthcare include:

- Why do people struggle to change their lifestyles to live healthily, even when they know the facts about healthy living?
- What stops care teams from being able to deliver optimal care and how can obstacles to improved quality of care be overcome?
- Where are the cost bottlenecks in care delivery? Why and how do they form? Can they be eased?
- What will people want from clinical technologies such as on-body bio-sensing or genetic screening? How will this impact professional practice?
- How can healthcare stakeholders make strategic decisions when the forces of change in healthcare are so diverse and the future so unpredictable?

3 The Philips context

"In a world where complexity increasingly touches every aspect of our daily lives, we will lead in bringing 'sense and simplicity' to people."

Philips is a diversified health and well-being company, focused on improving the quality of people's lives through the timely introduction of meaningful innovations. As a world leader in healthcare, lifestyle and lighting, Philips integrates technologies and design into people-centric solutions, based on fundamental customer insights and the brand promise of "sense and simplicity".

"People-focused, healthcare simplified"

Philips Healthcare aims to simplify healthcare by focusing on the people in the care cycle – patients and care providers. Through combining human insights and clinical expertise, they aim to improve patient outcomes while lowering the burden on the healthcare system. Philips delivers advanced solutions for health professionals, to meet the needs of patients, and to give consumers access to affordable healthcare in hospital or at home.

"It is our intention to design solutions that harness technology so as to genuinely improve the quality of people's lives and make them happier."

Philips Design is a design consultancy guided by the principle of 'value for people through valuing people'. Its in-house global team of people researchers, socio-cultural trends analysts and design researchers study the world at a societal, cultural and individual level to identify macro paradigm shifts, socio-cultural trends and people's daily needs and desires.

As one of the world's largest design consultancies, Philips Design brings this together with a wide range of design disciplines including interaction design, product design, ambient experience design, information design, service design, digital media design and communication design.

"Ultimately, we are deluding ourselves if we think that the products that we design are the "things" that we sell - rather than the individual, social, and cultural experience that they engender and the value and impact that they have. Design that ignores this is not worthy of the name."
Bill Buxton, Principal Researcher, Microsoft Labs

This combination of human sciences and design disciplines under one roof creates a unique innovation competence; researchers who can understand the tangible implications of their findings for business innovation, and designers whose creative processes are driven by empathy for what makes sense for people's lives.

Philips Design is the brand custodian for Philips, ensuring the brand values of "sense and simplicity" are translated into a design identity that can be expressed consistently and with integrity across the Philips portfolio.

These fundamental characteristics of Philips Design make it eminently suitable as a strategic partner that adds value to business.

Fig. 2 Philips Design's Healthcare Innovation teams comprise multiple disciplines from human sciences and design.

4 A design-approach to healthcare innovation

"Design is no longer just about form any more but is a method of thinking that can let you to see around corners...Design Thinking is the new Management Methodology"

Bruce Nussbaum, Founding Editor, Innovation & Design, Business Week

4.1 Healthcare innovation context

Traditionally the main drive of healthcare design at Philips Design had been in the professional domain, with a focus on the needs of the clinical end-user. However, as new societal needs emerged and reshaped healthcare, this was detected and translated by Philips Design:

• Healthcare designers, working to improve the human experience in healthcare, intuitively realized that to truly impact patient experience in a hospital they would need to design beyond the boundaries of the medical equipment and consider the design of the environment around the machine. Ambient Experience started as an internal design research project which explored the value of such a design strategy and resulted in the first Philips Business Unit on the basis of a design-lead innovation program.

• Researchers who had been tracking global socio-cultural changes began to see the emergence of a whole new field of opportunity in personal healthcare. An internal design research theme was initiated to explore new value propositions for Philips in this arena. It was also decided to invest and participate in a 4-year EU-funded consortium research project called MyHeart, whose aim was to develop personal healthcare applications for preventing and managing cardiovascular disease.

• Interaction and product designers researched methods to take people's experiences as the starting point for innovation design. For example, Nebula is an interactive projection system designed to enrich the experience of going to bed, sleeping and waking up. The aim was to create an atmosphere in the bedroom that encourages and enhances rest, reflection, conversation, intimacy, imagination and play.

The way in which Philips Design detected and translated the trends taking place in society and culture demonstrates two key strengths that have innovation value; firstly, an innate ability to comprehend socio-cultural change from a human perspective, and secondly to translate this understanding into tangible value propositions.

Fig. 3 Ambient Experience

Fig. 4 My Heart

Fig. 5 Nebula

4.2 Key characteristics of a successful innovation mindset

Philips Design has developed a people-focused innovation approach that is driven by qualitative research, and which applies design thinking and skills to identify and respond to innovation opportunities across the full bandwidth of healthcare, from consumer to professional. It is a flexible approach that can serve a range of business processes ranging from pre-development and business strategy through to product development and brand communication. It also supports both short- and longer-term innovation horizons.

Focus is given to creating the optimal conditions for innovation in healthcare, which has more to do with team dynamics and mindset than standard processes and tools. We will describe the key characteristics of a successful healthcare innovation mindset, and will also introduce the approach and a set of methods and tools used for healthcare innovation research, design and consulting. Project examples will be used as illustration.

Challenge
Consider people and their health in the context of daily life, and seek to understand the real impact on lifestyle over time.

Listen
Gather multi-stakeholder perspectives including challenges, motivations, drivers and barriers.

Confront
Untangle the complexity of each healthcare journey without trivializing or over-simplifying the clinical or lifestyle context.

Collaborate
Form multi-disciplinary teams with knowledgeable stakeholders: patients, families, patient organizations, clinicians, care teams, insurance companies, technologists, clinical scientists, marketers, engineers, designers and market researchers.

Trust
Enable the flexibility for appropriate disciplines to lead certain phases of the innovation process when this can enable the team as a whole to make the next step.

Act
Watch how the healthcare landscape is changing, learn about the drivers and barriers, and advise partners about taking managed risks.

Learn
Assess the impact of insights, concepts and prototypes on human experience, clinical outcome and business metrics in order to better define and achieve innovation success.

Fig. 6 Innovation design consultancy in healthcare can be seen as the means by which a rich mixture of inputs are managed and guided through a complex and unpredictable creative process.

5 Identifying value through design thinking

5.1 Understanding a changing healthcare landscape

Healthcare trends research in Philips Design has become more interactive and participatory, often combined with insights research and innovation design activities to make better sense of complex trends. Collaboration with experts from relevant fields is essential to be able to quickly and deeply understand a healthcare topic. Typical desk research and expert interview tools are often supplemented with multi-disciplinary working sessions with experts and professionals who bring additional relevant trends from business, clinical science and technology. This allows initial insights to be validated and enriched to form a more robust and shared set of hypotheses and assumptions.

The intention of trend studies is to provide broad and rich inspiration and research-based directions for innovation teams to consider; this is often a backdrop to in-depth people and context research. The translation of trends findings into interactive innovation tools, such as framework posters or trends cards, allows teams to interact with the content, play with it and trigger critical thinking.

The Future Hospital was a project that mapped the future healthcare landscape onto the historical timeline of hospitals. Analyzing several key trends in lifestyle and healthcare — and considering a proprietary set of key socio-dynamic forces shaping our world — a framework was established to describe the possible ways in which hospitals could evolve in the future. The intention was

to offer foresight to guide the evolution of the strategic relationship of Philips with hospital customers, as well as a broader context in which to understand its business in an evolving healthcare landscape.

Personal Healthcare Landscapes 2016 was a trends activity in the My Heart project. Combining expert interviews, desk research and a one-day workshop with healthcare policy and industry experts Philips Design facilitated the shaping of four future healthcare landscapes. The landscapes were used as a fore-sighting tool, to challenge and sharpen a number of cardiovascular healthcare propositions and assess their business potential in an uncertain future.
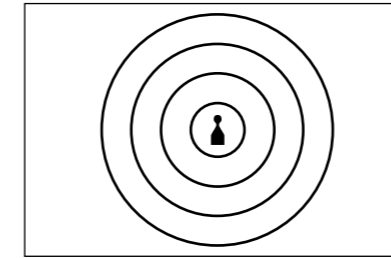
"The landscapes capture many of our hopes and fears about our future and will hopefully give policy makers food for thought as they try to make choices for us. "
Business Expert quote, My Heart

Socio-cultural scanning techniques were also applied to shed light on the context of cancer in the Ambient Experience Oncology project. This led to a broader understanding of the perceptions of cancer in society and provided a valuable backdrop to in-depth investigations with cancer patients and care teams.
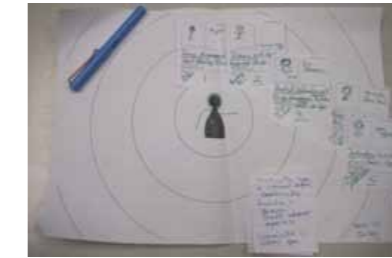
A trendscape of selected key trends, validated together with experts, was used to discuss the possible impact and consequences of disruptive trends for the overall business landscape relating to colo-rectal cancer screening.

| template | exercise execution | exercise completion |

Fig.8 'Imaginaries' allow patients to describe with candor and dignity the sensitive and painful changes they experienced during cancer treatment.

5.2 Engaging and understanding multiple stakeholders

Health can be an emotional and confrontational topic that reveals people's insecurities and leaves them feeling vulnerable. Talking to patients and their loved ones about healthcare experiences requires specific skill and delicacy. Healthcare is by nature an unpredictable climate and one that can contain challenging circumstances or contexts. Working with care teams whilst they are delivering care requires credibility, flexibility and discretion.

Faced with such challenges, Philips Design has developed a number of appropriate methods and tools to understand people and health.

Research tools to understand needs and values
Research tools have been developed that use the best of both people research and design research techniques.

Simple, visual tools are most successful at empowering patients and care providers to share their stories in safe, easy and yet rich ways. People become the creators of their own narrative. Some patients have described research sessions as comforting and cathartic.

For clinical care teams, generative sessions using visual and interactive tools help to reveal bottlenecks in care delivery that they might feel individually and subjectively but struggle to pin point specifically and collectively. Visual research tools provide a shared language between research and design disciplines, assisting in the more accurate translation of research findings into design directions.

Fig.9 Definition of personas includes coping strategies and design implications.

Societies						Healthcare matrix					
	Empowered Society	Communal Society	Experience Society	Fear Society	Irresponsible Society		Empowered society	Communal Society	Experience Society	Fear Society	Irresponsible Society
						Healthcare response	Consumer care	Connected care	Pampering care	Reassuring care	Public care
						Hospital role	Flexible Supplier	Facilitator	Hospitality	Health Icons	Health planner
						Hospital form	Catalogue shop	Osmosis	Stage vibrant	Safe haven	School
Summary Description	Self-referential Explorative Change lifestyles Fitness & success	Belonging New networks Co-creation Multi-disciplinary	Journeying Adventure Sensing New things	Surviving **Control** Being secure Outside threats	Egocentric Avoid ownership Wasteful **Splurging**	Patient view	Customer King	Expert patient	Expert teams	Victim	Indulgers
						Professional view	Service Provider	Expert teams	Steward - Host	Guardian	Herder
	Technological developments	Breakdown of safety networks	Rise of the Creative class?	Speed of change & developments	Affluenza		Health Avatar	Cultural Care	Experience groups	Total care chains	Health Education
Key Societal Drivers	Knowledge economy	Open source & innovation	Mental stimulation overload	Emerging economies	From nurture back to nature?	Possible directions	U 2 Care Care 2 U	Osmotic Spaces	Health journey	Branded care	Mass health screen & planning
	Cost pressure on healthcare	Towards a care-continuum	Reconnection with the body						Fun flow	Genetic fears	Mobile health Regions

fig.7 The Future Hospital

Capturing experiences over time

To consider healthcare experiences realistically, research teams need to account for changes in needs, attitudes and behavior over time. Shadowing and ethnographic observation tools have been effective at capturing key moments in the healthcare journeys of both patients and clinical staff. Imaginaries have also proved to be powerful tools which allow people to describe their personal transformations — physical, emotional and social — as their health changes.

Panel session exercises with patients and staff have used the timeline interactively, asking people to project their issues, needs, thoughts and desires directly onto the framework. By sharing the notion of a timeline, researchers and designers find another common vocabulary to increase collaboration and shared understanding.

Research tools to evaluate insights and concepts

Philips Design's multiple-encounter approach is a valuable tool for experience research, and has been used effectively with patients in personal healthcare research activities. It allows researchers to capture the chronological development of people's needs, issues and behavior. It also fosters dialogue to create expert user groups, building the trust that can lead to deeper, richer insights. As a project progresses, insights, concepts and even prototypes can be tested through this methodology to allow for iterative enrichment of new propositions.

Fig.10 Storyboards were used to conceptualize workflow solutions.

As the healthcare industry faces new measures of clinical outcome, quality of care and performance-related incentives, there is a growing shift towards evidence-based approaches in healthcare design. Qualitative and quantitative methods to assess the impact of insights, concepts or solutions are carried out with third-party research agencies to offer objective evaluation according to industry metrics and standards, such as those being developed for clinical experience testing by the Center for Health Design in the USA.

Models to understand people's experiences in healthcare

Philips Design has created three main models to support understanding stakeholders in healthcare. They provide valuable starting points in the scoping and analysis phases of a healthcare innovation project. Used in combination, these three models offer businesses a powerful and flexible framework for understanding people's needs in healthcare for any disease, context or situation.

The models take into account that healthcare experiences impact lifestyle, that people need support during any type of health transition, and that healthcare journeys often take place across many different locations yet people perceive and recall the experience as a single entity.
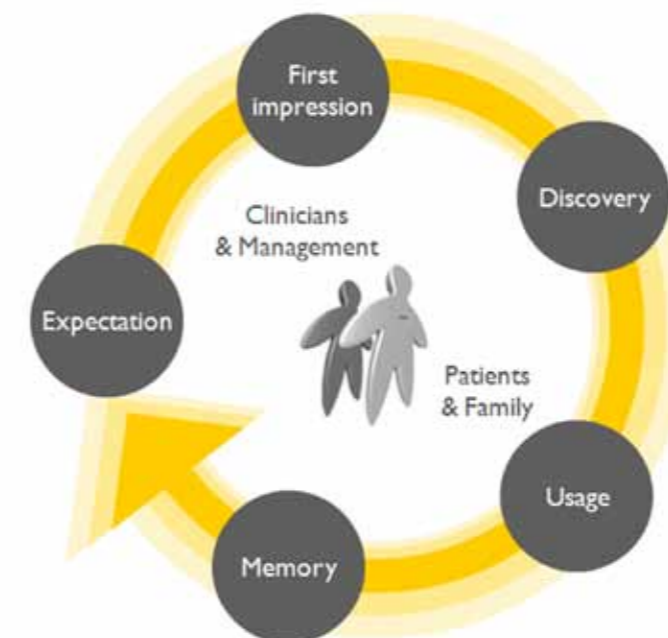

Fig.11 A model to understand people's healthcare experiences in a clinical setting, from expectation through to memory.

5.3 Capturing care contexts

Understanding people's experiences and needs demands ways to also capture their environmental context and conditions. This includes the pace, rhythm and flow of activities and behavior as well as specific contextual qualities of multi-sensorial experience: lighting, textures, sounds, layout, objects, style, signage and scents.

As care settings expand beyond the hospital to include new areas, so too do research tools need to evolve to effectively capture and communicate the diverse qualities that shape the experiences people have when staying in, working in and visiting these spaces.

With the realization that design could positively impact people's healthcare experiences by also considering the healthcare environment itself, design research techniques were integrated to enrich and deepen the level of contextual research.

Research teams were created in which new mixes of disciplines were brought together in order to get a better grasp of the context. Architects and interior designers were able to draw connections between spatial needs and design qualities, whilst interaction designers saw links between activities, spaces and tools. Ethnographers provided yet another layer of contextual information, using observation to identify people's behavioral patterns in relation to healthcare contexts.

A context is also characterized by the pace of experience and activities that take place; an A&E department at midnight in a 24-hour city has a different pace than a chemotherapy waiting room at midday or a neo-natal intensive care unit in the early hours of the morning. Philips Design's healthcare innovation teams could sense the differences intuitively and developed new audiovisual ways to capture and communicate these insights to understand the context at a deeper level.

Care landscape
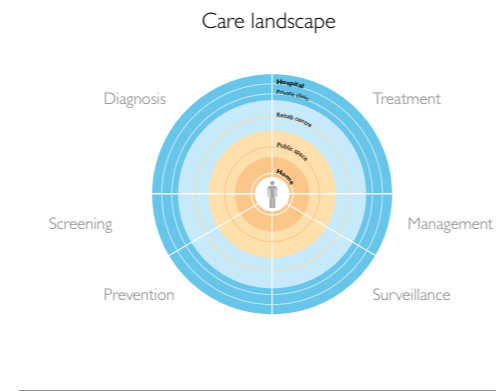
Patient experience zones

- Hospital
- Rehab
- Public space
- Home
- Indirect route
- Direct route

Stakeholders

Patient (child, young adult, woman, man, senior)	Bystander
GP	Emergency services telephone operator
Neurologist	Emergency services personnel (ambulance driver)
Radiology staff (nurse)	Emergency department physician
Interventionalist	
Insurance company	Family / partner
Intensive care staff	Emergency department staff (nurse)
Rehab specialists	Stroke unit staff (nurse)
Rehab physician	Pharmacist
Health centre	Neuro surgeon
Homecare (thuiszorg)	Intensive care physician
Social worker	Employer
County council (for benefits)	
INR staff	

Fig.12 A model that places the person in the centre of a care cycle, revealing that lifestyle is impacted by health and raising important human issues that need to be addressed at specific tension points.

5.4 Creating experience flows

Different layers of insights — stakeholder-related, contextual, informational, clinical, economic and technological — are gathered during the research stage. Philips Design generates the stakeholder and contextual insights itself, but other layers of insights are collated from the project team which includes clinical scientists, technologists and economists.

Synthesis of these multiple layers of information can be complex, and analysis often requires a collaborative, iterative and multi-step approach. Co-analysis with project partners, client team and sometimes healthcare stakeholders can be most effective, bringing experts together to process insights and define strategic conclusions.

Philips Design translates such insights in a distinct and unique way compared to other innovation disciplines. Design thinking helps to make sense of these multiple layers of insights and allows the processing of what can often be complex, inter-dependant findings. Two key principles guide this synthesis and articulation of insights — to be interactive and to be visual. For example, visual representation can reveal further depth of insight into innovation territories by combining multiple perspectives and creating a holistic view on the human experience of the situation.

The Experience Flow poster is a healthcare innovation framework and the primary tool used to articulate layered insights. Complex healthcare journeys can be visually represented, discussed, challenged and enriched by multi-disciplinary innovation teams. In essence the tool allows the team to walk through the healthcare journey, as seen through the eyes of multiple stakeholders: patients, loved ones and clinical care teams.

This framework is successful at making sure that everyone in the innovation team is properly aligned with regards to what they know and what they realize they do not know or need to know. As such, it can serve as a trigger for teams to further share and exchange knowledge, adding to the framework and helping complete the picture of understanding together. Supporting tools can be used to articulate specific layers of insights: visual mood boards, stakeholder maps, personas or profiles, issue cards and trendscapes can be created and used flexibly depending on project requirements.

Women's healthcare / Pregnency slice

Fig.13 A model to connect people's care cycle journey with a lifestyle cycle.
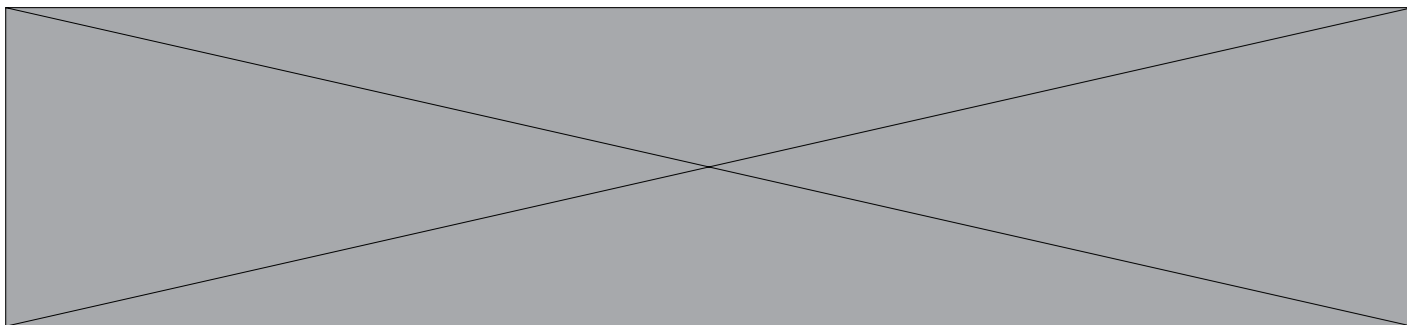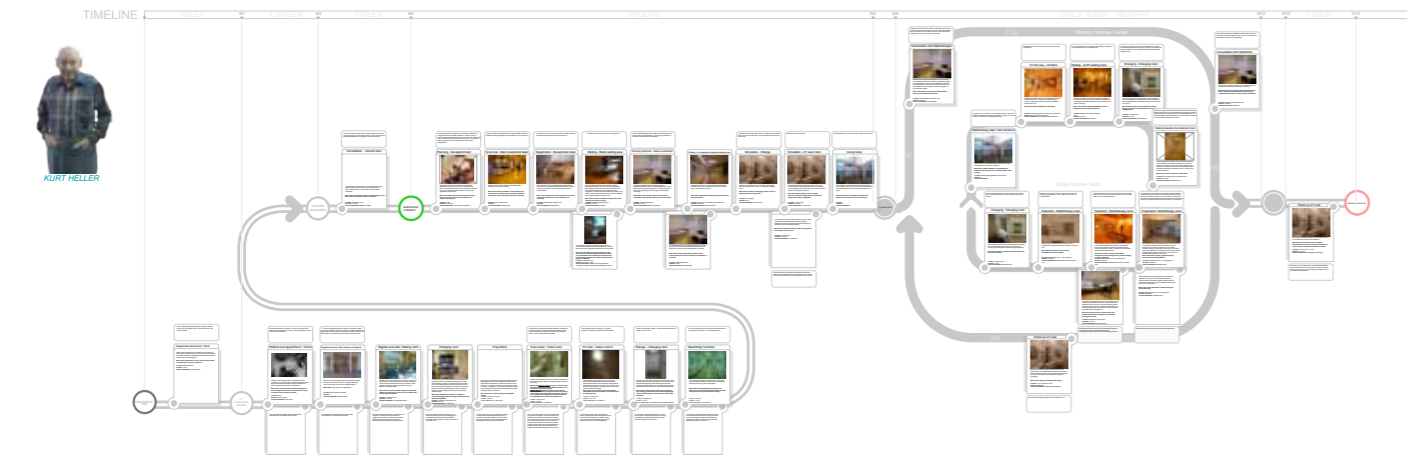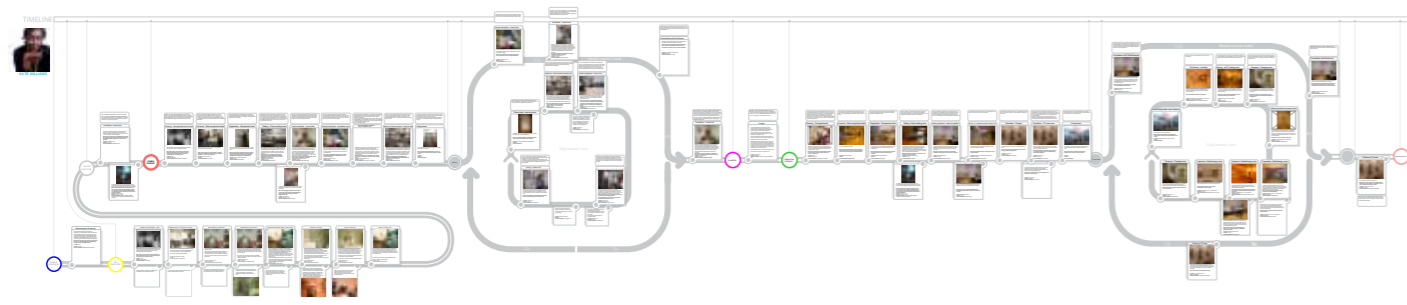
Fig.14 The first project in which Philips Design dealt with a detailed disease level experience flow, Ambient Experience Oncology delivered a series of experience flow posters to present cancer treatment pathways.

6 Developing value through design skills

6.1 Designing for healthcare experiences

Experience design combines several disciplines to create a total system solution which harnesses product, interaction, user interface, environment and multimedia design. Using a proprietary experience design model — which considers healthcare experiences from expectation to memory — the idea is to create the right combination of people, spaces and enablers over time. Enablers can include technologies, services and contextual elements such as sound and light.

Healthcare designers are involved directly in the research stage of innovation projects, so that during the design phase they can empathize with stakeholder experiences and translate needs into solutions which maintain the context of the original insight. Through synthesis workshops they collaborate with the multi-disciplinary innovation teams to identify opportunity areas that emerge from the Experience Flow framework where innovation could bring positive change. These areas become the focal points for Philips Design's in-depth ideation and concept creation.

There is a certain degree of magic required during the creative process, so it is important to create the conditions in which a team feels relaxed, informed, inspired and free to create. It also helps to provide relevant yet surprising creative triggers as described in the previous section. These are fed into the ideation process at key moments to maintain the creative pace.

The results of the design phase can be on product, system or strategic level. As we began this paper hearing how healthcare is facing systemic and paradigm change, healthcare innovation projects increasingly deliver system-level solutions and visions. This means that existing touch-point point solutions are integrated into future visions to enable a feasible development roadmap.

Storytelling is the ultimate result of ideation. 2D storyboards, animated Flash demos or 3D renderings are used to communicate initial experience scenarios and proposed new healthcare experiences.

Developing an idea through hands-on prototyping allows designers to get a feel for the experience firsthand. This is carried out in close collaboration with technologists, engineers and scientists, as well as external technical experts from diverse disciplines such as fashion & textiles, graphic animation and computer generation. The tools, techniques and possibilities offered by these collaborating disciplines can stimulate creativity and innovation opportunities further.

The human aspect of healthcare experience guides the ideation phase and the translation of insights to design themes, qualities and solutions. However, there is another important factor at work within the healthcare design team; a shared set of professional and brand-related values that safeguard the human-focused integrity of solutions.
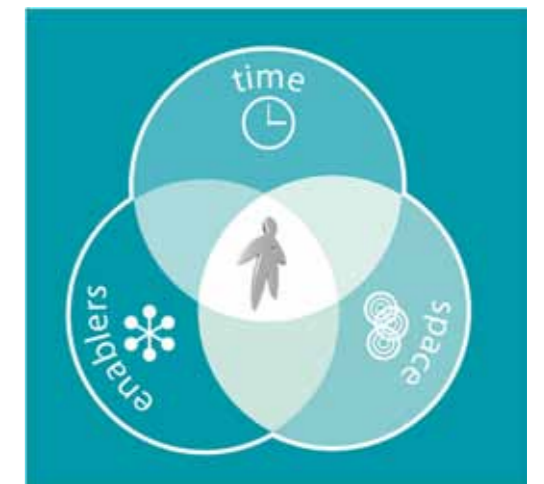

Fig.15 Experience Design considers people, spaces and enablers over time.

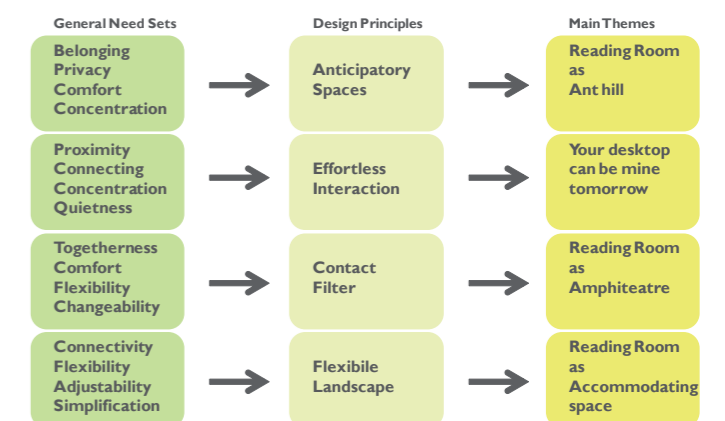| General Need Sets	Design Principles	Main Themes
Belonging Privacy Comfort Concentration	Anticipatory Spaces	Reading Room as Ant hill
Proximity Connecting Concentration Quietness	Effortless Interaction	Your desktop can be mine tomorrow
Togetherness Comfort Flexibility Changeability	Contact Filter	Reading Room as Amphiteatre
Connectivity Flexibility Adjustability Simplification	Flexibile Landscape	Reading Room as Accommodating space

Fig.16 In the Reading Room 20/20 project, research insights were translated into design themes to guide the creation of solutions.
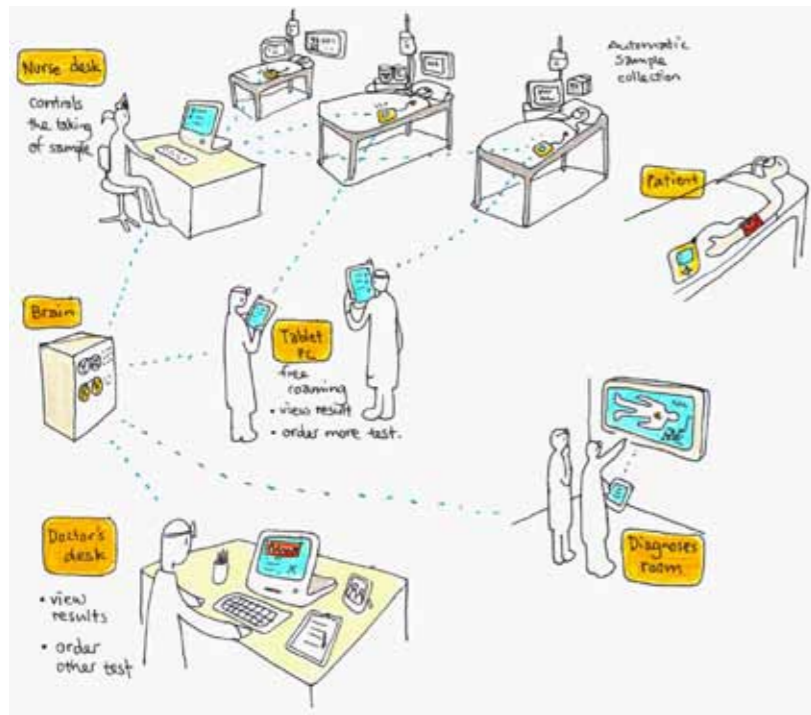
Fig.17 Storyboard scenario's from a research project on molecular diagnostics.
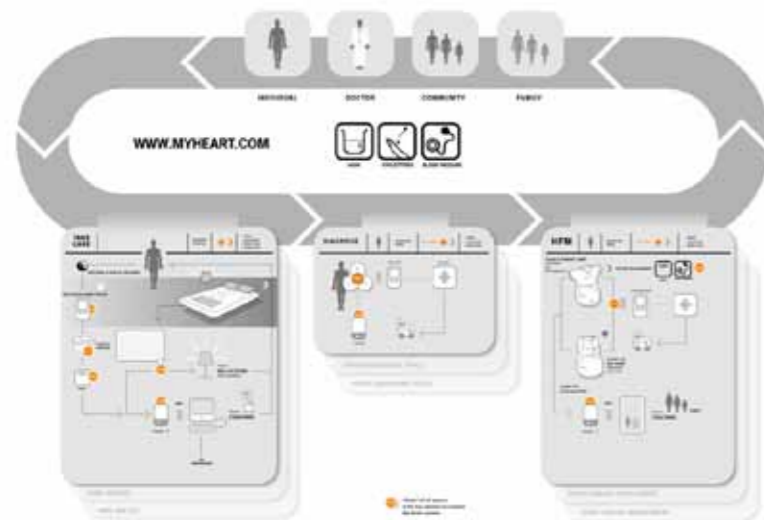

Fig.18 Connected Care translated insights of personal healthcare into a healthcare system that includes both disease management and self care.

Fig.19 Next Simplicity's Celebrating Pregnancy experience demonstrator was created through an iterative process of interaction prototyping to determine the optimum way of conveying 'sense and simplicity'.

7 Communicating value through design articulation

7.1 Communicating measurable end-user value

We assume that business value in healthcare comprises fundamental human value, essential clinical value, brand value and - possibly most important of all given the cost constraints on today's healthcare systems - economic value.

In this final section we share two key case studies from Philips Design's healthcare innovation portfolio that were developed using the innovation approach described in this paper. They are examples of how Philips Design can contribute to measurable end-user value in healthcare through the creation of tangible design propositions for both clinical professionals as well as patients and their loved ones.

7.2 Ambient Experience Pediatric CT Suite

Fig.20 Advocate Lutheran General Children's Hospital, (Chicago, US).

In 2004 Philips Design was asked to improve the pediatric CT scanning experience. Advocate Lutheran General Children's Hospital, (Chicago, US) participated in a co-creation process. A typical examination room is cluttered with clinical equipment, including a scanner that could easily seem ominous to a small child. The task of the CT technician is to ensure that as many children as possible complete a successful examination quickly and safely. Children need to lie still and hold their breath during the procedure to ensure optimum image quality. This is difficult for many sick children who are likely to be in pain, restless and upset. Sedation is used but this compromises patient safety and affects throughput time for the procedure, as additional recovery time is needed.

Applying the concept of human-focused healthcare and a research-driven innovation approach, Philips Design proposed a new CT system design to support children, their parents and the CT technician from preparation to completion of the exam. Two driving insights to improve the child's experience came from research with pediatric specialists: narrative engages children in experiences and provides a natural role for parents in storytelling; and if a child understands what will happen and why, in simple terms, then it is more likely to be compliant.

The Kitten Scanner is a toy CT scanner. By choosing a toy and placing it into the scanner, children are shown an animated story to help them understand the procedure in an entertaining way. They can see that if the toy is shaken in the scanner the image distorts so they know they must lie still to get a good image. The toy selected by the child is used to trigger personalization of the exam room with animated projections and lighting effects. The technician can use these effects to guide children through the procedure.

Independent qualitative and quantitative evaluation proved that the solution had significant clinical and experiential impact. Sedation rates for children aged 3-7 years were reduced by 30-40%, which represented a marked improvement in patient safety. Meanwhile efficiency/throughput of treatment planning was improved by 15-20%.

Fig.21 The Kitten Scanner.

7.3 Reading Room 20/20, RSNA 2007

In 2007 Philips Design created an experience demonstrator to communicate a vision of the reading room of the future for the Radiological Society of North America's (RSNA) exhibition. A reading room is a professional space in a radiology department of a hospital where radiologists read imaging exams to provide diagnoses. It is typically a quiet, dark and busy environment shared by several radiologists, although it should be accessible to serve the hospital's clinical needs.

Philips Design carried out seven hospital visits to gather stakeholder and contextual insights. We identified a need to support personalization of workspaces, remote collaborative working, improved mental and physical comfort and the possibility to work concentrated and alone as well as in conference with peers. Insights were translated into three key design strategies: an I-space to create a personalized climate, a U-and-I-space to support collaboration with colleagues, and a We-space to support remote collaboration. A prototype allowed visitors a tangible experience of this future vision.

Radiologists can personalize the lighting, sound levels and temperature of their workspace. They can use voice control, gestural and touch screen interfaces projected onto the reading room tabletop to view images alone or with colleagues. They can share image files, manage their workflow and consult peers via a video-conference system projected onto the room wall. Intuitive interaction and integrated technologies ease comfort, reduce stress and improve concentration and quality of work experience.

Philips Healthcare evaluated The Ambient Experience Reading Room of the Future quantitatively and qualitatively, with over 200 clinical visitors to the demonstrator at RSNA 2007. They were positive that the concept would improve their overall work experience in terms of a quieter workspace in which to concentrate, improved ways to share clinical data as well as remotely collaborate with peers.
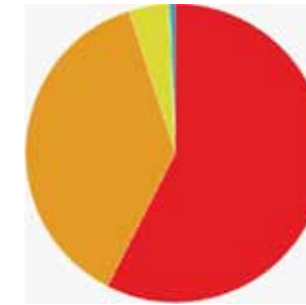

Fig.22 Reading Room 20/20 I-space.

Fig.23 Reading Room 20/20 U-and-I-space.
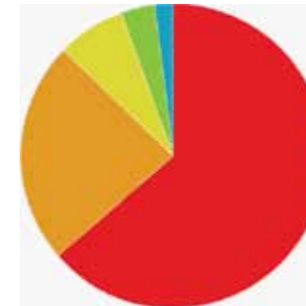

Fig.24 Reading Room 20/20 We-Space.

"Philips Reading Room concept can improve access and sharing of diagnostic info"

- Strongly Agree – **57.7 %**
- Agree – **37.6 %**
- No Opinion – **4 %**
- Disagree – **0.4 %**
- Strongly Disagree – **0.4 %**

"An electronic workspace that can be personalized for the individual"

- 1 (Very important) – **63.8 %**
- 2 – **23.7 %**
- 3 – **7.2 %**
- 4 – **3.6 %**
- 5 (Not very important) – **1.8 %**

"Philips Reading Room concept can improve remote collaboration"

- Strongly Agree – **57.7 %**
- Agree – **37.6 %**
- No Opinion – **4 %**
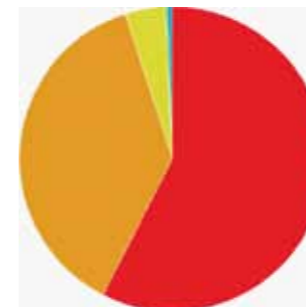- Disagree – **0.4 %**
- Strongly Disagree – **0.4 %**

Fig.25 Reading Room 20/20 evaluation with 200 Radiologists.

8 Conclusions

The healthcare industry is in crisis and facing paradigm change. Within this context of paradigm change lays opportunities for innovation. Philips Design's research-driven innovation approach in healthcare delivers business value by:

- Understanding the changing healthcare landscape to ensure innovations can withstand future forces of change.
- Involving patients, families & clinical staff in the innovation design process to deepen the value of solutions and accurately uncover needs, issues and values.
- Carrying out on-site research which supports the belief, understanding and commitment of multi-disciplinary innovation teams.
- Layering stakeholder, contextual, clinical, economic and technological insights to build a rich picture of the healthcare innovation landscape.
- Applying design thinking to unlock complexity and design skills to reveal opportunities for innovation.
- Translating insights into tangible and experiential propositions with design qualities that maintain integrity with respect to human needs.
- Promoting a bold and open attitude to innovation that gives room for each discipline to excel and enjoy the freedom to innovate.

The business benefits include:

- Creating a common vision to generate strategic alignment.
- Relevance for a range of business processes and innovation timeframes.
- Leveraging the collective knowledge and skills of a multi-disciplinary team.
- Generating confidence to make choices within a changing healthcare landscape.
- Engaging healthcare customers in co-creating their future.
- Creating credible research-based consultative selling tools.
- Creating differentiating branding opportunities for hospital customers.

The innovation approach continues to evolve as Philips Design's healthcare teams apply this approach in new global markets, work with new stakeholders, partners and clients, investigate new health topics and identify opportunities for new technologies. With the healthcare landscape changing continuously, there is no shortage of innovation challenges nor opportunities to improve people's experience of healthcare.

Authors

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About Design Research at Philips Design

Design research is a key area in the Philips Design portfolio, providing knowledge, competences and capabilities to create distinctive design services with a competitive advantage. The design research program recognizes the need to respond to a new world, new economies, emerging needs and expectations of people by exploiting intelligent adaptive technologies in relevant ways.

About Philips Design

Philips Design, with branch studios in Europe, the USA and Asia Pacific, is one of the largest and longest-established design organizations of its kind in the world. Its creative force of some 400 professionals, representing more than 35 different nationalities, embraces disciplines as diverse as psychology, cultural sociology, anthropology and trend research in addition to the more 'conventional' design-related skills. These professionals strive to create relevant and meaningful solutions that satisfy people's needs, empower them and make them happier. All of this while respecting the world in which we live.