

PASSPORT



World Usability Day 2007

November 8, 2007 • Making Life Easy!



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World Usability Day was founded to ensure that the services and products important to life are easier to access and simpler to use.

The focus for **World Usability Day 2007 -- November 8, 2007 -- is Healthcare**. Good usability in healthcare can mean the difference between life and death. Whether it's new medical devices or technologies; drug research, approval, or delivery; patient forms or medical record sharing; emergency disaster planning; increasing the functionality of hospitals; or everyday healthcare delivery, everyone is affected by usability in healthcare.

This year, we are excited to present the first World Usability Day Passport that supports the focus on healthcare and usability. This Passport is a collection of stories that illustrate the challenges facing us in healthcare systems worldwide. These stories demonstrate solutions vital to our everyday lives.

This Passport includes great examples of technology services and products; some that are already in the marketplace, while others illustrate prototypes in research and development. These stories talk about practical solutions such as delivering insulin to diabetic patients, without the mess and stress of daily injections and blood tests and medication management for children with Cystic Fibrosis.

Stories are one of the oldest and most vivid ways people share information. They are a way to connect and create community. We encourage you to become part of the World Usability Day community by visiting our website **worldusabilityday.org** and submitting your story on healthcare and usability. We hope that you find meaning and learn something new from these stories.

Thank you to our World Usability Day Passport sponsors imc² and Project HealthDesign, the Robert Wood Johnson Foundation and to our many contributors. We appreciate your helping us make World Usability Day a success.

Elizabeth Rosenzweig
Founder
World Usability Day

Caryn Saitz
Executive Director
World Usability Day



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HEALTHCARE AND USABILITY

Fast Facts. We live in an exciting time; the advances in science and technology are positively effecting so many aspects of our lives today, healthcare being a great example. Systems are being developed to make patient records more accessible, simplify drug delivery, and provide critical information about disease, injuries, and treatment, to patients and caregivers.

In addition to big advances in healthcare systems there are serious hazards, the biggest one is in medical errors. This is an area where a mistake can mean the difference between life and death. Since healthcare is fundamentally a system with many working parts, errors can be seen as a systems' problem. This type of thinking supports the user centered design approach and insures the highest usability.

Medical errors can range from issues with patients receiving the wrong medication, procedure, diagnosis, or treatment. Often these mistakes are because a healthcare provider has incorrect or insufficient information. Errors are often blamed on humans, when in fact it is usually the systems that are not working properly. ⁽¹⁾

- Estimated number of deaths per year in the U.S. hospital system attributable to medical error- 98,000 ⁽²⁾
- Medical errors rank fifth among leading causes of death in the U.S. ⁽²⁾
- More then one million serious medication errors occur everyday in the U.S. hospitals ⁽³⁾
- 74% of online consumers consider one or more care-related decisions complex ⁽⁴⁾
- 71% of online consumers think one or more health plan-related decisions complex ⁽⁴⁾
- 63% of online consumers consider one or more Rx-related decisions complex ⁽⁴⁾

We are inspired by stories such as the ones found in this passport. Each of the following stories illustrates creative, realistic and broad thinking solutions to the enormous challenges found in today's healthcare systems.

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PROJECT HEALTHDESIGN

Rethinking the Power and Potential of Personal Health Records, a national initiative funded by the Robert Wood Johnson Foundation with additional support from the California HealthCare Foundation, is helping to create the next generation of user-friendly personal health records (PHRs) and PHR applications.

Health care institutions and software developers currently offer an array of personal health record (PHR) products that give patients access to institutional health care records or help them compile freestanding collections of personal health observations. While this move toward paperless systems is a significant step in the right direction, most PHRs derived from institutional records generally become inaccessible to patients when they change providers, while those that are freestanding rarely integrate well with institutional records. And, because many current PHR products are proprietary in nature, most consumers cannot build on or customize existing PHRs to fit their widely varied health needs.

ROBERT WOOD JOHNSON FOUNDATION
COLLEGE ROAD EAST PRINCETON, NJ 08543
www.rwjf.org

Leaders of Project HealthDesign aim to move the field toward a broader vision of how PHRs might help consumers lead healthier lives. The program is directed by Patricia Flatley Brennan, R.N., Ph.D., professor of Nursing and Industrial and Systems Engineering at the University of Wisconsin-Madison. In developing the project, she and others wanted the design of PHR technologies to be an outgrowth of specific patient needs and preferences. This type of user-centered design will ensure that the products will ultimately be wanted and used by consumers.

The Project supports nine teams made up of technology designers, health experts, informaticians and researchers. Their efforts have been shaped and informed by groups of end users – patients and their caregivers – at every stage of the process. Ultimately, Project HealthDesign teams are designing practical applications for PHRs that go beyond simply storing medical records to be tailored to specific health needs and easily fit within consumers' busy lives.

Project HealthDesign



Robert Wood Johnson Foundation

THE CHALLENGE

When breast cancer is diagnosed, patients often find themselves overwhelmed by the details of the illness without understanding information being presented to them, when decisions need to be made or what the ramifications are. The result is that physicians tend to manage everything in a directive process and patients can feel lost in the process.

The University of California, San Francisco - Center of Excellence for Breast Cancer Care has been trying for many years to solve this problem and find a solution to help ease patients' anxiety.

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
CENTER OF EXCELLENCE FOR BREAST CANCER CARE
SAN FRANCISCO, CALIFORNIA
www.ucsf.edu

THE SOLUTION

The Project HealthDesign solution to this problem is to develop a PHR to help breast cancer patients better understand and proactively coordinate their care. The University of California, San Francisco team spoke with patient and physician focus groups to see what type of PHR they needed in their daily lives. The PHR prototype the team is working on would be used throughout patients' treatments and care regimens with the ability to integrate a range of data – upcoming doctor's appointments, prescriptions, questions to ask, etc., into patients' own electronic appointment calendar.

The application also will generate a series of links and prompts with additional information to help guide patients' planning and decisions. This PHR tool will let the user know what to expect and when to expect it and by giving them the information they need when they want it, where they want it and how they want it. For example, depending on what will happen at her appointment, the PHR system can help a breast cancer patient understand what her energy level is likely to be after the appointment and what the next step in the care process will be.

THE CHALLENGE

Vanderbilt University has been exploring another problem – medication management for a child who has Cystic Fibrosis. A child with CF often has many caretakers interact with him or her over the course of a day: a parent or guardian, a school nurse, a teacher, etc. The child usually relies on each of these people to distribute needed medications. The challenge is how to coordinate care amongst all of the different care takers while empowering the child to play an active role in their own care and medication management.

VANDERBILT UNIVERSITY
NASHVILLE, TENNESSEE
www.vanderbilt.edu

THE SOLUTION

The Project HealthDesign solution to this problem is to develop a personal health record to connect disjointed care teams (school nurse, parents, primary care givers) through a PHR application designed to deliver continuous care to children with Cystic Fibrosis. The team is developing a PHR application for caretakers of children – both at home and in schools – to track medications, alert parents when doses have been taken, manage refills, and more. Team members developed a medication distribution device disguised as a teddy bear to work with the PHR. The device dispenses medications to kids at established intervals and can notify parents and others when the drugs are – or are not – taken. The team chose a teddy bear since it is a toy that is commonly carried around by many small children, thus carrying less social stigma than a traditional “medical device.”

The University of California, San Francisco - Center of Excellence for Breast Cancer Care and Vanderbilt University are just two of the nine grantee teams working on designing products that consider the needs and priorities of end users as a driving motivation. The aim of these PHR tools and applications is to improve people's health, empower them to better manage their care, and make their lives easier and simpler.

To learn more about these designs and what the other grantee teams are working on, visit www.projecthealthdesign.org.



THE CHALLENGE

Shire wanted to maximize the company's opportunity to promote its recently launched drug, Lialda, as well as support its more established product, Pentasa, during DDW 2007 – the largest event on the calendar for gastrointestinal (GI) professionals. To further its quest to be a strategic partner and use interactive solutions to help clients reach other goals key to their success, imc² created a communication channel that would live beyond the booth and enable Shire's sales team to provide effective support for this crucial professional market and strengthen their relationships within the healthcare professional community.

IMC²

12404 PARK CENTRAL DR., STE. 400 DALLAS, TX 75251 USA

www.imc2.com



THE SOLUTION

Understanding Shire's goals and objectives, imc² developed a strategic approach to take full advantage of the immense opportunity at the DDW conference while also ensuring that the event blended seamlessly with the company's ongoing marketing and sales program.

The insight that proved crucial to Shire's success was our realization that the information value hierarchy – the relative importance of each component of the whole message – varied from one individual to another. Based on this information, imc² structured its approach to allow prospects to exercise control over the scope and depth of their engagement by layering content in a series of affiliated, yet ultimately self-contained modules. imc²'s system ensured that Shire's conference team wasn't overwhelmed by the high volume of foot traffic visiting their booth. In addition to the communications, database, educational gaming and interactive software that imc² delivered for the conference, Shire's booth included:

- Kiosks for badge scanning, database opt-in, videos and gaming
- Tablet PCs for e-detailing
- Touchscreens for gathering information



The user-centric experience was novel and fun, but more importantly, it was personally meaningful and specifically relevant to each individual customer.

RESULTS

From the very first day of the conference, it was clear that our work would shatter both imc²'s and Shire's expectations – resulting in a blockbuster hit that was wildly popular with the audience. Shire exceeded its database opt-in goal for the entire conference on the first day. Traffic and engagement also demonstrated the high degree to which the healthcare professional community embraced the concept, and the constant flow of visitors into the booth was noticed by everyone present at the conference, including an influential financial analyst who relayed his observation about Shire's success at DDW in a "buy rating" report.



While getting noticed is nice, following up a first impression with a complete experience provides an incalculable advantage in the marketplace. The database opt-in and other contacts from the event helped the company leverage its investment to maximum effect after the conference.

imc²'s total conference solution for Shire represents not merely a leap forward in event support, but ultimately a triumph of innovation, imagination, coordination, attention to detail and technical execution.



THE CHALLENGE

In U.S. hospitals wall outlets for medical gases are color coded -- green wall outlet for oxygen and yellow outlet for room air the wall outlets require a “Christmas tree” shaped plastic adapter in order to connect tubing to deliver gas to the patient. Common practice involves using color-coded yellow and green adapters, which sometimes were mismatched – yellow adapter attached to the oxygen wall outlet, green adapter attached to the room air outlet (see Figure). These mismatches increase the likelihood that a care provider will connect tubing to the wrong gas, since the provider looks to the color of the adapter as they connect the tubing to it.

DEPARTMENT OF VETERANS AFFAIRS
WASHINGTON D.C.

www.va.gov



Solving a Problem with Color

Helping Clinicians Make the Right Choice Every Time

THE SOLUTION

To reduce the likelihood of such mix-ups, the VA's National Center for Patient Safety introduced clear plastic adapters to replace the yellow and green ones that led to mix-ups. This cost effective solution works with the existing hospital infrastructure for the piping used to deliver these gases and forces the care provider to look directly at the wall outlet to identify and select the medical gas outlet, reducing the risk of mix-ups.



THE CHALLENGE

Insulet's challenge was expand the use of Continuous Subcutaneous Insulin Infusion (CSII) - commonly known as insulin pump therapy - among patients with insulin-dependent diabetes.

CSII is widely considered to be the most physiological and most advanced of all insulin therapies. CSII has been shown to provide numerous advantages to people with insulin-dependent diabetes relative to multiple daily injection therapy, including the best glycemic control and increased lifestyle flexibility.

In spite of these advantages, the use of CSII is limited. Presently, only 21% of people with Type 1 diabetes in the US use CSII therapy, largely due to complicated, costly, and obtrusive conventional insulin pump technology. Conventional insulin pumps have list prices ranging from \$5,000 to \$6,500 as an upfront investment, and require up to 42 inches of tubing and extensive training time by the healthcare provider. These barriers have limited the adoption of CSII therapy among diabetes patients.

INSULET CORPORATION
BEDFORD, MASSACHUSETTS
www.myomnipod.com

THE SOLUTION

Developed with extensive feedback from people with diabetes and healthcare professionals, Insulet's OmniPod® Insulin Management System is specifically designed to address the barriers presented by conventional insulin pumps and expand the use of CSII therapy.

Cleared by the FDA in 2005, the OmniPod System combines the proven health benefits of CSII with blood glucose monitoring in an easy to use, wireless two-part system with no tubing, automated insertion and a built-in blood glucose meter. This innovative system eliminates the need for daily insulin injections, replaces conventional insulin pumps and offers people living with diabetes unprecedented freedom, comfort, convenience and ease in managing diabetes.



SOLUTION CONTINUED:

The OmniPod System is the first and only continuous insulin delivery system of its kind. Unlike conventional insulin pumps, the OmniPod System has just two, fully integrated wireless components:

- The OmniPod – a compact, lightweight, self-adhesive insulin pod that is worn discreetly on the skin beneath clothing. The OmniPod delivers continuous and “on-demand” doses of insulin, based on instructions transmitted wirelessly from the Personal Diabetes Manager. The OmniPod features an automated cannula (thin tube) insertion system, which is virtually pain free, for reduced insertion errors and increased consistency and comfort.
- The Personal Diabetes Manager (PDM) – a wireless, menu-driven, hand-held device (similar in size and look to a PDA) that programs the OmniPod with customized insulin delivery instructions, features a built-in Freestyle® blood glucose meter, and automatically stores diabetes management records.

The OmniPod System is easy to use, and has the fewest steps to starting insulin delivery of any commercially-available CSII system. The user fills the OmniPod with the amount of insulin needed for up to three days. During fill, the PDM wirelessly downloads the patient's personalized insulin delivery instructions to the OmniPod. Next, the user applies the self-adhesive OmniPod to the skin.

Then the user presses start on the PDM to insert the small tube (cannula) beneath the skin and begin insulin delivery. The OmniPod is worn continuously and discreetly, including when dressing, showering, exercising and swimming, for up to three days. When the insulin supply is depleted or at the end of three days, the user deactivates the OmniPod, then fills and applies a new one.

The OmniPod System also features a unique pay-as-you-go pricing structure that eliminates the large upfront cost associated with conventional insulin pumps, makes CSII therapy more accessible to patients, and reduces the risk of investing in CSII therapy for third-party payors.



THE CHALLENGE

Intermountain Healthcare's system comprises 21 hospitals, plus clinics, health plans and affiliated physicians. Part of Intermountain's commitment to deploying the latest and most effective technology revolves around its expanding user experience program. The core of this program has been Intermountain's classic two-room usability lab plus a classroom-sized "observation room" at the renowned Primary Children's Hospital. The lab was used to examine the usability of Web sites, online content, and healthcare applications. Like many traditional labs, it once had state-of-the-art hardware but is now beginning to show its age. All of the metrics the usability team needed when it conducted a study had to be counted manually from low-resolution recordings of test sessions. The process was time-consuming, costly, and presented opportunities for varying estimations and interpretations. Another major hurdle the team faced was getting clinicians to the lab to conduct testing. Intermountain's network stretches hundreds of miles across Utah and Idaho.

INTERMOUNTAIN HEALTHCARE
SALT LAKE CITY, UTAH
www.intermountainhealthcare.org

THE SOLUTION

Intermountain led a trial of TechSmith's Morae and immediately realized several benefits including the portability of taking a user experience testing solution into the field to visit clinicians on-site where they could conduct more sessions and test more clinicians. Not only did Morae give the usability team greater capabilities, but they also realized tremendous cost savings by not having to pay for clinicians' travel expenses to Intermountain's fixed lab. They also saved tens of thousands of dollars just on the initial cost of Morae versus trying to update or replace their old hardware equipment.

Just days after the initial Morae trial, Intermountain and GE teamed up to begin their massive new software development partnership with GE's usability team. After watching some of Intermountain's tests, GE Healthcare chose to deploy Morae for its own use. In the following weeks, GE and Intermountain usability specialists and analysts traveled to clinics throughout Utah, Indiana, and Oklahoma, gathering data from about 35 clinicians representing a variety of healthcare facilities. Morae gave Intermountain and GE Healthcare usability and design professionals the ability to capture the 360° user experience.

SOLUTION CONTINUED:

Morae recorded the clinician's voices, their faces, and all the interaction that happened on the computer screen as they used the medical software. And since the recording is digital, the quality is perfectly clear. Hundreds of hours of digital video were recorded using Morae.

Once all the initial testing sessions were completed, both teams convened back in Utah to compile and analyze the data. With Morae's built-in Rich-Recording Technology (RRT), all the user and system data is immediately synchronized during the testing sessions, making it possible for the teams to later conduct extremely detailed and thorough analysis. They were able to look at time-on-task, mouse clicks, key strokes, total mistakes, and hundreds of captured comments. The initial analysis took only two days, something that would have taken weeks to process without Morae.

The tests provided important user information, much of which is still being studied as the partnership designers continue developing a new desktop based on emerging technology. The teams are also carefully studying usability of existing GE, Intermountain and IDX products to provide benchmarks for emerging new products. Morae allows the teams to measure the legacy products' work models and compare results. In that way, much of what's best of the older products can be implemented in the newer products.



THE CHALLENGE

One of the most important issues in health care today has to do with communication. The majority of health care communication still takes place on paper, a system that has changed little since the 1950s. Many software systems have been developed to aid in health care communication, but they are largely impractical due to their limited function and inefficiency. In 1998, Catalis decided to tackle the major problem: how do you get a huge amount of clinician information into a computer without slowing down the physician? Moreover, how do you do this with computers that rely on 1970s technology like the mouse, keyboard, and hyperlink?

CATALIS, INC.
AUSTIN, TEXAS
www.TheCatalis.com



THE SOLUTION

To fix the lack of communication in health care, Catalis researched academic studies involving how clinicians use computer systems. The end result is the Accelerator™ Graphical Health Record, a system that mimics clinician work patterns and allows physicians to take highly complex clinical information and easily port it into a computer without having to use a mouse or keyboard. In essence, we created an iPod in a world of Walkmans.

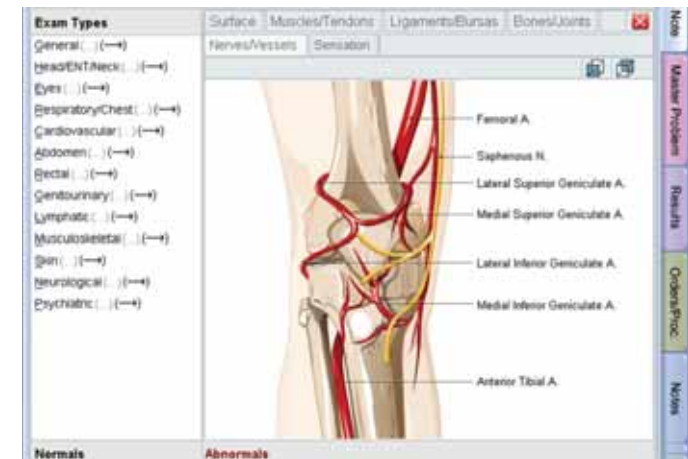


SOLUTION CONTNUED

We designed our software after watching physicians use both computers and paper. We decided that instead of building a computer system that required training the physician, we would build a system that would minimize the need for training in the first place. Designed specifically for a tablet PC, Accelerator uses point-and-click technology that mimics a physician's pen on the paper. We find that our physicians are fully productive with Accelerator in one day while competitive products can take up to six months.



Accelerator has many features that differentiate it from other Electronic Health Records. The most notable difference is the graphical interface that allows physicians multiple ways to diagnose a problem. In addition to carefully organized and customizable lists of complaints, a physician can click on a detailed homunculus to document complaints, order X-rays, etc. There is no typing involved in Accelerator, and even the most illegible handwriting will be recognized, so the transition from paper to EMR is natural and intuitive. Another appreciated difference is the sophisticated Natural Language Generation engine that quickly transforms the data entries into English prose. This saves the physician time and money, since there is no need for lengthy dictations and expensive transcription services.



THE CHALLENGE

Pediatrics is the neglected orphan of the U.S. biomedical industry. Pediatric clinicians, their institutions, as well as parents or home care givers of the patients need to adapt and improvise with products that were developed for treating adults. In some cases, they have to forego needed treatments altogether for lack of products that could be readily manufactured.

Representing only 5-10% of the total U.S. healthcare market, pediatrics is further subdivided into 5-6 submarkets – ranging from the pre-term baby to the teenage mom. Barriers to getting products approved for this market are high, since human subject protection standards for pediatric clinical trials are very exacting, as they should be. The number of patients at a given institution may be too small for even a simple clinical trial, so that study groups need to be aggregated across multiple institutions, each with its own institutional review process. As a result, most major biomedical industries have been averse to investing in innovation for pediatric care. Traditional technology transfer programs, even very successful ones at elite pediatric research centers like Children's Hospital Boston, find that companies that license their patents and technologies develop them for adult care.

INSTITUTE FOR PEDIATRIC INNOVATION
BOSTON, MASSACHUSETTS
www.pediatricinnovation.org

THE SOLUTION

Institute for Pediatric Innovation (IPI) is a nonprofit organization dedicated to transforming these unmet clinical needs into viable product opportunities for investors and industries. Key to its success will be driving innovation toward demonstrated needs, involving end-users at all stages, leveraging human and financial resources that do not require a return on investment, employing novel collaboration models for product development, and presenting the biomedical industries with products that are aimed at validated markets and are already developed and tested.

IPI is organizing a small nation-wide consortium of first-tier pediatric centers with which to collaborate. The consortium serves as a microcosm of the pediatric market and will participate in design and development of product opportunities. The innovation model starts with determining user needs by querying nurses, allied health professionals, and physicians who are involved in day-to-day patient care. In some cases, the process includes parents and patient advocates. IPI is correlating information about user needs with statistical data on clinical operations to help identify the most important clinical needs. IPI will work together with care providers and a resource network of experts in design, marketing, product development, regulatory affairs, angel investing, and corporate strategy, to translate user needs to product concepts through a novel Product Imagination process.

SOLUTION CONTNUED

We will establish priorities for the products based on their potential for clinical impact, sustainability in the market-place, and our consortium's ability to add value in their development. For the selected products, we will develop detailed Product Opportunity Analyses. This will involve fully characterizing the product's potential impact on patient care; market size, pricing, and entry needs; clinical use requirements; technology architecture; product development plan with cost, timetable, benchmarks, and co-development partners; intellectual property; and proposed transaction model - in other words, a complete financing package. Depending on product type, the Product Opportunity Analysis may include developing simple product prototypes.

Product category, target patient population, and other factors will determine which type of funding source we will address to finance product development. From our past experience, we know that some of the opportunities will be attractive enough to secure investment from angel investors or from companies. One company is currently funding IPI to employ end user needs analysis, Product Imagination, and Product Opportunity Analysis to develop a pipeline of new medical device technology for neonatal care. Other products will be packaged for funding from government sources like the NIH or FDA, including Small Business Innovation Research or SBIR grants. Still others will be addressed to single disease oriented foundations.

IPI will play an active role in the product development phase, in collaboration with commercial entities that have the needed infrastructure. IPI consortium members will participate in defining end-user design requirements and product specification. Consortium members will have the first right to participate in clinical validation trials, subject to managing any potential conflicts of interest. IPI and its collaborators will license the developed products to companies that have the manufacturing and sales capability to provide the products to the pediatric market as a whole.

Royalty arrangements between the parties involved are based on two principles: First, maximizing the chance that products will be successful, and second, fostering a spirit of fairness and an incentive for future collaboration. Over time, IPI hopes that its share of royalties may reduce reliance on grant funding and enable to invest in developing important products for which there is no other sponsor.





Give your users a voice

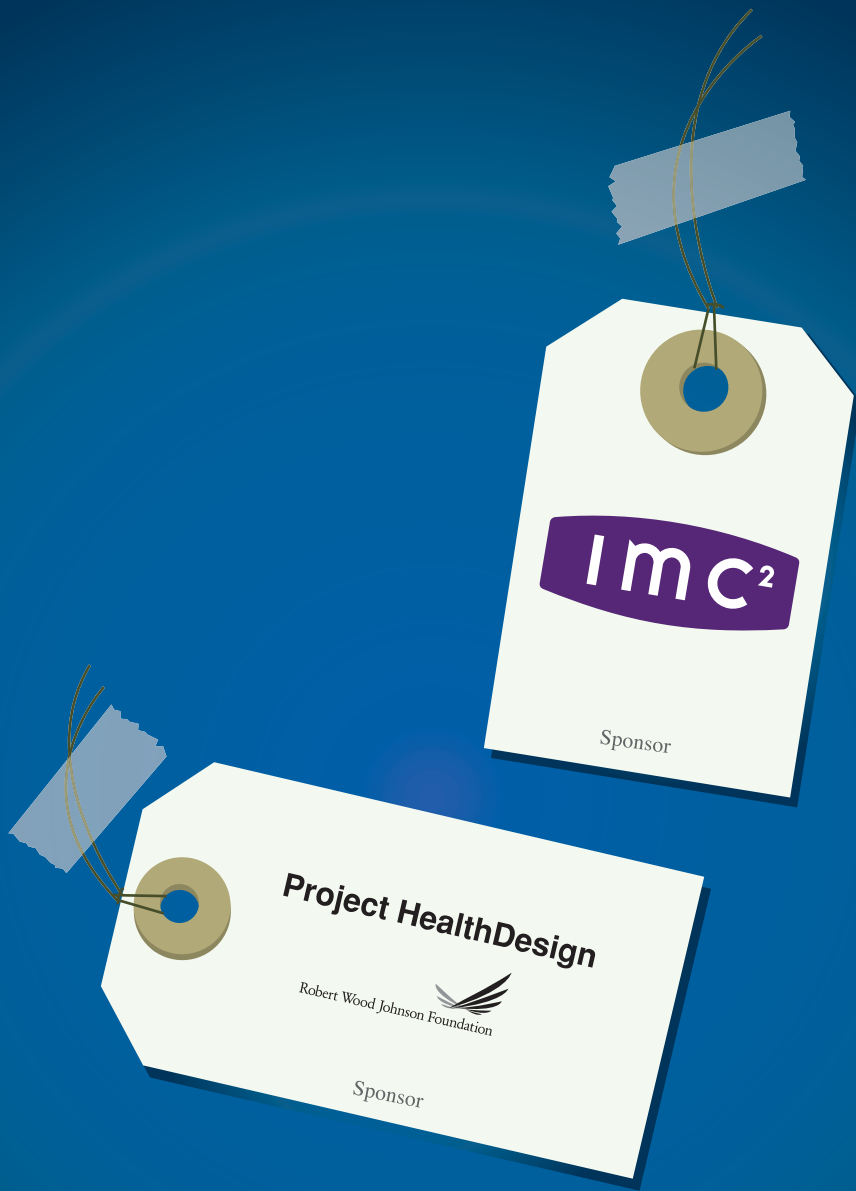
World Usability Day was founded to ensure that the services and products important to life are easier to access and simpler to use.

The focus for **World Usability Day 2007** is Healthcare.
EVERYONE is affected by usability in healthcare.

Visit www.worldusabilityday.org and see how you can get involved from your desk, at your office or in your home on **November 8th** and EVERYDAY.

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