Service in the Healthcare Sector
“Our aim is to move medical data – not patients, doctors, or material.”

Prof. Dr. Manfred Dietel
Summary

Health is our most precious possession. Demographic developments and increasing costs in the healthcare sector necessitate new approaches to protecting and restoring human health. Academic research and technological developments are keys to this task. Therefore, healthcare research is one of 17 fields in the German Federal Government’s High-Tech Strategy for Germany.

The primary challenge for innovation is to enhance health, while recognizing the limits posed by the increasing costs of health care. New innovations are simultaneously addressing both issues: improving care, and controlling expenditures.

Two trends in the healthcare sector: telemedicine and sports activity

Modern information and telecommunication technologies encourage the development of innovative concepts in the healthcare sector. Telemedicine – which overcomes spatial and temporal distances between people working on the same health problem – is one of these concepts. Alongside numerous other institutions, the Charité - University Medicine Berlin and the TU Berlin are pursuing solutions in this, and other areas, with the support of the Federal Ministry of Education and Research (BMBF).

A second important innovation is integrating services and products to motivate healthy activities. One approach facilitates integrating sports and exercise into people’s everyday lives. The SPRINT project, supported by BMBF, provides an example of this kind of hybrid innovation – it is investigating how individual health programs can use mobile information systems.

Important for businesses

Research and technology are important inputs to healthcare, which must now give special attention to meeting the needs of aging patients and managing costs. For example, this report discusses:

- Telemedicine to support more effective use of medical resources
- Motivating individuals to be more involved in activities that support health.

These innovations require partnerships between scientists, companies, and users. However, acceptance for innovations on the part of all interested groups is not easy to obtain, especially (as in the case of telemedicine) when the innovation is discontinuous.
Service in the Healthcare Sector

I. The challenge

Debates on healthcare policy frequently focus on financing and affordability, with the result that the potential for innovation within the healthcare sector is often neglected. While two macroeconomic trends in society attract more innovation – increasing social demand for the gift of good health, and scientific advances that lead to new treatment possibilities – there is often a conflict between progress in the world of medicine, and the rising costs of healthcare.

Telemedicine, which connects medical providers with information and communication technology, not only makes a contribution to the improvement of medical care, it also increases efficiency while cutting costs. Dr. Thomas M. Helms, member of the managing board of the German Foundation for the Chronically Ill, underlines its significance:

"Telemedicine can optimize safety, mobility, and quality of life ... through the improvement of diagnostics and the coordination of treatment strategies. Additionally, healthcare costs can be reduced through a lower level of emergency calls, doctor contacts, and in-patient hospitalization."

II. Telemedicine – a discontinuous service innovation

Overcrowded waiting rooms in rural doctors’ surgeries illustrate that telemedicine is not merely an innovative form of patient care, but is a practical organizational necessity. Given the severe shortage of doctors in several German states, for example Saxony-Anhalt, telemonitoring is an attractive means of supporting optimum patient care. Of course, as service solutions are developed, they also can be used in the many other contexts around the world in which there is a shortage of medical care.

The description of telemedicine found here is based on papers presented at a conference on “Innovation in Healthcare” supported by the Federal Ministry of Education and Research. It was held in Berlin on December 7, 2007, in cooperation with Charité – University Medicine Berlin, and the TU Berlin. Presentations emphasized that telemedicine is a discontinuous innovation for the improvement of current healthcare service, as well as, research on new health services.

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Telemedicine

Telemedicine uses information and communication technology to overcome spatial and/or temporal distances between medical personnel working on a single problem (see M. J. Field, 1996).
cal innovation. The field of healthcare and nutrition plays a prominent role here."

In a second presentation at the conference titled “Yearning for health and fitness: telemedicine as the motor of innovation in medical services,” Dr. Peter Hufnagl outlined the objective of “moving data, not patients, doctors, or material.” His work is also carried out in cooperation with the Charité Berlin, and the Telemedicine Center.

Presenters at the Innovation Forum also note that developers of telemedicine solutions must remain aware of challenges of successful implementation and further development. Prof. Dr. Hans Georg Gemünden, Chair of Innovation and Technology Management at the TU Berlin said, in particular that “while great progress has been made to encourage the proliferation of telemedicine…there is a need for innovation networks linking medicine, technology, the sciences, and users.” Dr. Carsten Schultz, supervisor of the working group at the Chair of Innovation and Technology Management at the TU, emphasized that “innovation processes in telemedicine are highly complex and require the support of innovation management.” He pointed especially to an “increase in the innovative abilities of hospitals” the importance of “aligning medicinal requirements and technological possibilities, with the (need to) guarantee interoperability of different telemedicine systems.”

Figure 1 represents a summary of the central challenges in the telemedicine innovation process, which are discussed in more detail below.

**Challenge 1: Increasing the innovative ability of organizations and individuals**

Telemedicine must be supported by medical care providers if it is to become part of everyday clinical life. The foundation of successful implementation is the hospital on the organizational level and actors within hospitals on the individual level. It is important that a hospital possess an innovation strategy. As described in the introductory chapter on “Service Innovation” in this publication, an important aspect of this strategy is to establish a culture in which discontinuous ideas can be implemented.

The ability of individual actors plays a prominent role alongside this organizational level effort. There must not only be a general willingness to try something new, but also the willing-

**Why is telemedicine a discontinuous service innovation?**

The term “discontinuous innovation” is used to describe innovations providing a completely new utility that cannot be compared to existing products, processes, or services. According to this definition, telemedicine can be classified as a discontinuous innovation on the basis of four criteria:

1) Technology: telemedicine services are based on new technological principles.

2) Market/customer: telemedicine services represent a new method of treating illnesses and thus create new markets.

3) Organization: telemedicine services require rethinking structures and processes on the part of organizations involved.

4) Environmental context: telemedicine services require new infrastructure, new standards, and new social values.

Background

ness to acquire needed new qualifications. From the aspect of the health-providing organization, this means developing new training opportunities for both health care professionals, and those in managerial positions. It also must be kept in mind that telemedicine can provide support during the entire clinical history of a disease, from early diagnosis, through rehabilitation. It is therefore necessary to provide telemedicine training for all those involved in each stage of the process.

**Challenge 2: Developing open cooperative care systems**

Telemedicine services evolve at interfaces between numerous actors – in other words, providers are embedded in open innovation systems that are based on the division of labor. Dr. Carsten Schultz emphasizes that an active exchange of information and close cooperation between scientists, users, and providers of telemedicine services must be created to provide the milieu for innovation.

For example, initial results from a project supported by the German Federal Ministry of Education and Research (BMBF) titled “Successful business models for telemedicine services” show new concepts for diagnosis and evaluation from interaction between scientists and users. The implementation of these concepts, and also their standardization and qualification, requires further interaction between scientists and providers. These interactions increase value creation.

Because telemedicine services are extremely specific innovations, it is important that the demands and requirements of potential users also are taken into account. However, as in many other areas of service, it is difficult for most potential users of telemedicine to formulate exactly what they need from products and services that do not yet exist. For this reason, the concept of lead users plays a central part in user-provider interaction in telemedicine. Examples of lead users taking a substantial part in the development of new techniques and methods can be found in the areas of robotics and navigation systems. In healthcare, lead users are actively involved in the development of prostheses and other innovations.

**Challenge 3: Acceptance**

A few years ago, the direct doctor-patient relationship was the prime form of interaction in the healthcare sector. Nowadays, new information and telecommunication media enables diagnosis, treatment (including surgical operations), and subsequent care (including therapy) to be undertaken via indirect virtual channels. However, numerous studies on the use of virtual teams show that a virtual form of interaction does not always meet with great enthusiasm. Rethinking on the part of service providers, as well as users, therefore, is necessary if the full potential of telemedicine services is to be realized.
Background

It is important that those attempting to develop the technical side of telemedicine services understand why their efforts are often viewed with skepticism. Telemedicine services potentially endanger users’ most precious possession, namely their health. Offering a technical solution is not enough. A connection must be made with the broader health context perceived by the customer. This means addressing expectations developed in previous care, as well as desires for health in the future.

The introduction of telemedicine also brings changes for the medical partners involved, i.e. doctors or therapists. Telemedicine not only changes some working methods, it also reorganizes healthcare organization and processes. Providers are confronted with the problem of convincing patients of the advantages of telemedicine services. They have to process new kinds of information and interact with more professionals than in the past. They must even learn new ways to invoice the patient for the services performed.

Targeted information campaigns can help to increase the acceptance of telemedicine, by both patients and providers. Further research projects are also required to improve comprehension of the phenomenon of telemedicine. In addition to the need for acceptance of telemedicine by immediate providers and their patients, a broader set of service providers must be involved. The advantages of telemedicine services can only be utilized on an optimum level if the complete healthcare chain – health insurance companies, medical specialists, hospitals, pharmacies, general practitioners, convalescent homes, therapeutic medicinal practices, and so on – have access to the appropriate IT equipment and are interlinked in a network. The chain can only be as effective

Hybrid value creation

Hybrid value creation integrates product and service—it is a systematic bundling of traditionally separate offers that often emphasize customer experience and involvement.
as its weakest link, and thus acceptance of the principles of telemedicine is a major issue.

III. Hybrid value creation in the healthcare sector

An increasingly important innovative trend in the healthcare sector is the integration of products for preventive health measures and associated services, known in brief as hybrid value creation. A project supported by BMBF called “SPRINT – Systematic Design for the Integration of Product and Service - hybrid value creation”, is carrying out research in cooperation with the Chair for Information Systems at the TU München (WINFO, Prof. Dr. Helmut Krcmar), the Chair for Preventive and Rehabilitative Sports medicine at the TU München (Sports medicine specialist and Medical Director Prof. Dr. Martin Halle), the Center for Leading Innovation & Cooperation at HHL, the Leipzig Graduate School of Management (CLIC, Prof. Dr. Kathrin Möslein) and the Center for Digital Technology & Management (CDTM). The project is investigating how the implementation of individual health programs can be supported by integrated and cooperative mobile information systems.

SPRINT is conceptualizing comprehensive personalized health coaching through the intelligent dovetailing of services (personal contact with trainer and/or doctor) and products (IT-based training and lifestyle advice) via the Personal Health Manager. The objective is to incorporate sports and exercise individually, but inexpensively, into the everyday structure of life. The Personal Health Manager - a personalized health coaching program - combines elements that are utilized in training (e.g. heart rate monitors) and individualized supervision through a personal trainer. It is a comprehensive and high-quality sports, nutrition, and wellness program that can be adapted for individual users. A mobile terminal permits the recording, monitoring, and controlling of individual training and lifestyle elements. Personal consultation with the trainer and/or health coach takes place periodically. If necessary, a modification of the program is made at this time. The developers envision that the system could be utilized by companies to improve the quality of life and performance of their employees. It is also attractive to health service providers, fitness studios, and individual customers desiring special services.

Figure 2 shows an example of a possible hybrid product-service combination developed by SPRINT. In this case, the service utilized - cycle training - includes recordings within the framework of the service. The person exercising receives an individualized training plan that outlines performance targets. This experience can be enhanced through the integration of online communities in which individuals exchange training experiences.

Fig. 2:
Prof. Dietel, what are the challenges for the healthcare sector of today?

Factors such as demographic change and the accompanying increase in chronic illnesses have pushed the financial and qualitative problems of medicinal care into the foreground of public and government attention. We are working on a variety of projects that focus on increasing the innovative potential of actors involved in the healthcare sector, and on the continuing optimization of patient care through the implementation of the latest information and communication technologies. Through the intelligent interweaving of new technologies and services, outstanding achievements can be made within the area of medical care. Telemedicine is extremely important here.

What problems are encountered within the healthcare sector when telemedicine is not available?

The much praised case and disease management programs that are intended to guarantee structured treatment processes only approach one side of the problem. Frequently, not all information is transferred between different doctors involved in treatment. This results in double investigations that create a time delay before treatment can commence and also increases costs. This is only one example of many.

Why is telemedicine research at the Charité of primary significance in the development of innovative services within the medicinal field?

The Charité has three campuses that have to synergistically work together in a network. This cannot function without sophisticated telemedicine, and its coordinated communication technology. The aim is the continual optimization of patient care through the operation of intelligent information systems - particularly within the area of image-guided processes.

The objective for the future in the field of medicinal care is quality of treatment through information management. The quality and sustainability of patient care can be improved through the involvement of telemedicine, which has benefits for the entire process (of patient care). Experiences in individual areas can be centrally bundled. That provides the opportunity to standardize solutions that are subsequently universally deployable. However, it must be admitted, that the Charité is, at present, only on the way towards the achievement of an optimized structure. An optimal system has not yet been achieved here or - according to my experience - at any other major university hospital in Germany.

How would you summarize the aims of the Telemedicine Center at the Charité in one sentence?

We aim to move medicinal data - not patients, doctors, or material.

What is the distinguishing factor of services offered at the Charité Telemedicine Center?

We offer top-performance medicinal services in Charité institutions around the clock, seven days a week, and worldwide. This includes expert consultancy services, e.g. in diagnostic telepathology of problematic tumor cases, and the continuous monitoring of cardiac patients. Both services support direct and indirect intervention during specialized operations.

Can you give a practical example of the successful implementation of a telemedicine project?

One example is the project "StrokeNet." Partners in this project include Charité, TU Berlin (DAI Labor), MEYTEC GmbH, the Berlin fire brigade, and the patient transport firm SMH 19221 Krankentransport GmbH. We have developed a mobile communication network for emergency services for the treatment of stroke patients. The process begins in the ambulance, utilizing specially developed information and communication technology that can help reduce potential secondary damage. The optimization of the process chain includes pre-clinical diagnosis, the logistic decision for admittance to the relevant clinic, and acute care during the stay in hospital. All partners involved - the emergency team, the StrokeUnit, and cooperating hospitals to the Telemedicine Center - must be in communication with one another at all times and have access to relevant data. StrokeNet is focused on mobile communication beginning in the ambulance: transmitting relevant medicinal data in real time, and setting up necessary network services between all partners involved in the care of stroke patients. This is one project of many others within the substantial field of telemedicine that can save lives.
StrokeNet
The Telemedicine Center at the Charité hospital (TMCC) has earned, since its establishment in 2004 a strong reputation from successful completed projects, and further projects that are still in progress. An example is the project “StrokeNet”, a collaboration between the Charité, TU Berlin (DAI Labor), MEYTEC GmbH, the Berlin fire brigade, and the patient transport firm SMH 19221 Krankentransport GmbH, in which a mobile communication network for emergency services for the treatment of stroke patients has been developed. This process is already underway in the ambulance, through the utilization of specially developed information and communication technology which optimizes treatment and can help to reduce potential secondary damage. The optimization of the process chain, includes the entire area of (pre)-clinical diagnosis, the logistic decision for admittance to the relevant clinic, and acute care during the stay in hospital. This process requires that all partners involved – from the emergency team, the StrokeUnit and cooperating hospitals, to the Telemedicine Center – are in communication with one another at all times and have access to relevant data. StrokeNet, is focused on mobile communication and the ambulance: they transmit relevant medicinal data in real time, and set up necessary network services and data communication between all partners involved in the care of stroke patients. This is a project that can save lives.

Airborne telemedicine: medical emergency on board
A situation that no-one wishes to experience: a medical emergency during an airline flight. However, Dr. Hufnagl, from the Telemedicine Center at the Charité Berlin, stresses that the number of medical emergencies during flights is increasing. This is due to the operation of increasingly large aircraft with a higher number of passengers, longer flight times, and a larger volume of older air passengers.

In order to be prepared for airborne emergencies, Charité Berlin and a partner airline are currently developing equipment for the transfer of vital parameters via broadband internet. The service enables a medical team on the ground to provide relevant help in the case of a medical emergency. If an emergency call is received, the medical call-center supports medical care on board by monitoring the patient’s vital functions. It supervises medical procedures by the flight crew via video conference, provides direct doctor to air passenger (patient) communication, and supports the cockpit (for example, in decisions regarding rerouting for an unplanned landing).
Telemedicine in the premature baby ward
Premature babies often require special care apparatus after birth. That can be difficult for parents who cannot spend the intensive time they expect with their new baby, especially for parents who do not live in the vicinity of the hospital providing specialized care. In order to offer parents the possibility of comprehensive contact with their children at all times, thereby reducing separation anxiety, the Berlin Charité campus has installed seven cameras in the premature baby ward that can help parents and relatives bridge the gaps between hospital visits.

To monitor the baby round the clock, parents need only a computer and a password to a special program that permits access to video recordings that are transmitted live via a server on the internet. The project, entitled “Sternchenstunde” (literally “tiny magic moment”), is made possible by the children’s charity Deutsche Kinderhilfe Direkt e.V., the company Arcor, and the IT firm EDV-Kriegel. The aim of the project is to support the creation of a relationship between families and babies who sometimes spend months undergoing complicated hospital procedures. “This project permits a relationship with the baby beyond the confines of the hospital. The recordings are only interrupted during necessary care procedures or operations,” explains PD Dr. Jörg Reichert, who is responsible for the unorthodox project in the clinic (Source: Adrienne Kömmner, Berliner Morgenpost, February 6, 2008).

Virtual microscopy: new opportunities in tissue diagnostics
In addition to telemedicine that directly benefits the patient, virtual healthcare is also opening up new opportunities for research and diagnostics. Virtual microscopy is a prime example. The firm VMscope GmbH evolved from the project “Meducase”, supported by the German Federal Ministry of Education and Research. It is developing microscopy solutions for hospitals, research laboratories, and advanced training institutions. This is achieved with the aid of a patented “virtual microscope” that gives all necessary actors access to a digital cross-section archive. This saves time, as diagnostic findings can be examined by different doctors within the shortest possible time, and is simultaneously cost-effective.

VMscope’s general manager, Mr. Kai Saeger, explains how virtual microscopy works:
“Virtual microscopy is a digital process that provides an alternative to the expert evaluation of glass microscope slides through an optical microscope. Histological cross-sections are digitalized by a scanner and stored as a virtual cross-section in an image archive. The scan is processed in extremely high resolution to enable all relevant growths to be displayed on the monitor. This means that virtual cross-sections are large-scale data and require special programs for their visualization. The virtual microscope utilizes special streaming technologies for a time-lag-free representation. Similarly to digital radiology, virtual microscopy opens up new opportunities for treatment and research. For example, parallel viewing of several differently stained images is possible. Images can also be viewed simultaneously at several workplaces, and users can have immediate access to multiple images from an archive.”
Conclusion

Health is our most precious possession. For this reason, it is necessary to create new innovative services that resolve conflict between increasing progress in the field of medicine, and increasing costs of healthcare delivery. Telemedicine and hybrid value creation constitute two of these innovative approaches. However, they show that within the healthcare sector, as in other areas of life, it takes time not only to develop valued services, but to assure their acceptance. Both steps require time and energy. The forerunners in telemedicine services, for example, have learned to deal with prejudices directed at virtual forms of diagnostics, consultancy, monitoring, and therapy supervision. They are overcoming these prejudices with the help of top performances within the area of telemedicine. Projects such as StrokeNet and telemedicine support, during air flights are well chosen to convince a variety of actors of the promise of this new form of health care. They also provide evidence of Germany’s central role in the development of innovative telemedicine services.

Implications for practical utilization
Telemedicine is a discontinuous innovation with a wide range of potential. Research findings at the TU Berlin show that three requirements must be fulfilled for the successful implementation of telemedicine services:

- innovative ability of organizations and individual actors,
- involvement in an open and cooperative relationship with involved partners – scientists, providers, and users, and
- acceptance on the part of all interest groups.

To achieve the successful interaction of all persons and institutions involved in telemedicine services – i.e. patients, doctors and other care givers, hospitals and other providers, as well as medical insurance companies – deficits in information must be remedied, and the value of telemedicine for the user must be communicated. This can be undertaken during direct consultation between doctor and patient, and also in large-scale advertising campaigns in which the advantages of telemedicine are illustrated.

Implications for research
Further research is necessary for the continuing development and propagation of telemedicine services. Two immediate actions are particularly important. First, it is necessary for groups involved in telemedicine to achieve better connection between the innovative ability of organizations and the individual acceptance of telemedicine services. Second, on a technical level, currently available technologies must be further simplified before they are made universally available. For example, simplification of monitoring technologies would substantially increase their acceptance by professionals and also their consistent utilization by patients.

Political implications
Early competence with technical services, such as telemedicine, provides a foundation for the further development of our service-oriented society. The establishment of a service competence center in Germany, could be decisive if Germany is to continue setting standards within the area of telemedicine. Telemedicine research findings, provide excellent examples of the outstanding service research. They also demonstrate the impressive opportunities within the healthcare sector for implementation of innovative service concepts.
Hot Spots of Service Innovation in the Healthcare Sector
Society for the support of the healthcare management sector for the region of Leipzig

Regional healthcare competence: Med-in-Leipzig

The establishment of a society for the support of healthcare management in Leipzig grew from the desire to increase Leipzig’s national and international reputation as a leading center for medicinal teaching, research, and practice. It was intended as an ambassador for medical services in the region, and a platform for bundling the great variety of available competences into an efficient internal and external exchange of experiences.

“Verein zur Förderung der Gesundheitswirtschaft in der Region Leipzig (VFG) e.V” was established on September 7, 2004 in the BIO CITY LEIPZIG, a biotechnological-biomedical centre where industry, science, and research live and work together. Leading actors from hospitals, research institutions, companies, and entrepreneurs within the healthcare management sector, came together with representatives from the city of Leipzig as initiators and founding members. Their aim was to encourage communication between business, scholarship, research, politics, administrators, social insurance agencies, and the media within healthcare.

The main focus of the VFG is on cooperation and knowledge transfer between university and non-university institutions within the region. All actors within the “Leipzig health cluster” have formed successful networks via the VFG in which the exchange of information fuels more effective delivery of medical services. One of the future focal points of activity is the analysis of medical supply chains, in particular from the patient perspective, in order to develop and implement new services within the medical market.
**XP Sport GmbH**

**fit4business – commercial health management**

Fit4business is a modular, systematically structured concept for comprehensive commercial health management in small and medium-sized businesses within the region of Aachen/ Cologne in Germany. The company focuses on the development and/or optimization of medical service quality, coaching of managerial staff, and preventative health measures.

XP Sport views commercial health management as a value creation process within a company that optimizes the potential and performance of employees. This includes gathering information, analysis, and planning. An up-to-date profile is compiled, intervention designed and implemented, target agreements monitored, and a concluding evaluation performed.

**Contact**

XP Sport GmbH
Im Erdbeerfeld 20
D-52078 Aachen
www.xp-sport.de

**Vitaphone GmbH**

Telemedicine Service Center – from early diagnosis to modern therapy management

Vitaphone, based in Mannheim, is a leading international company that integrates services within the field of telemedicine. It supports a spectrum of services from functional diagnostics, to modern therapy management for the chronically ill. With the patient as the central focus, all efforts are targeted towards the improvement of diagnostics and therapy with a simultaneous increase in economic effectiveness.

Vitaphone provides support for service providers and their financial backers to ensure optimal provision of patient care. They offer future-oriented concepts for recording and transferring biosignals that are integrated into telemedicine monitoring and care systems. The lynchpin of the system is the Telemedicine Service Center, which is open 24/7 and staffed by doctors and qualified medical assistants. An experienced, coordinated team undertakes telemedicine monitoring, supervises patients, processes electronic patient files, documents diagnostic findings, evaluates ECGs and other medical data, and transfers these to attending doctors in hospitals and practices. In an emergency, the Telemedicine Service Center will also undertake the entire emergency management process.

Vitaphone offers a unique portfolio ranging from hardware and software development and system integration, to the complete service spectrum of the 24/7 Telemedicine Service Center for the monitoring of chronically ill patients. To date, the company has distributed this portfolio in 16 countries and is evaluating the results.

**Contact**

Vitaphone GmbH
Markircher Straße 22
D-68229 Mannheim
www.vitaphone.de
Onko-Kids-online

By kids for kids

The opportunities for young cancer patients to interact with others are greatly restricted. Relationships with friends and family suffer, as a consequence, and can lead to a wide range of difficulties, even after the culmination of therapy. Via internet, Onko-Kids-online makes it possible for young patients and their families to keep in contact, even during periods in the hospital. The children are provided with laptops with internet access in oncological wards.

The Onko-Kids web site, provides a forum for patients to exchange information. Contact with the patients’ schools and participation in school lessons, is made possible via internet and webcam through live broadcasting. Special multimedia material providing information on the disease and its therapy suitable for children, has been developed for children and young adults. Part of this information is directly available on the web site.

Two innovative achievements of this company have been recognized by others. Onko-Kids-online has received the “Oskar Kuhn Prize” for health communication and the “Wolfgang Heilmann Prize” for the humane utilization of IT technology.

VMscope GmbH

Web hosting of virtual cross-sections

The VMscope GmbH was founded in December 2004, following the award of the main prize in the national “Start-up Competition Multimedia” organized by the BMWA as a spin-off from the Charité Berlin. The company partners originate from the “Digital Pathology & IT” department in the Institute for Pathology.

The purpose of pathology is the examination and evaluation of microscopic tissue specimens for conditions such as tumors. The previously customary dependence on microscopes and the original tissue makes a telemedicine diagnosis (for example for consultation) and the simultaneous examination by numerous users (e.g. medical students) practically impossible. The VMscope GmbH has a solution for these limitations, which is the virtual microscopy.

In this process, histological cross-section specimens are scanned in their entirety in high resolution form, stored as data (up to 30 GB), and made accessible on the internet. The major technical challenge was the realization of the real-time visualization of the large image data via internet. The service includes preparation and digitalization of data up to hosting. The customer merely has to provide VMscope with a microscope slide, and receives in return, a link and access code for access to the virtual microscope via the internet.

The company’s customers include the IAP (specialist advanced training for pathologists), the Charité Berlin (teleconsultation), a number of universities (digital histology course), and research groups (digital archiving of tissue specimens).
Everyday life without the computer is now (almost) unthinkable. Medical surgery, for example, is increasingly making use of computer-controlled “navigation systems”. These developments permit a shift from the purely manual, to assisted activity for surgery (automation).

In a computer-based operation, the surgeon no longer stands at the operating table, but sits in front of a control panel that provides him or her with a three-dimensional view of the operation area via a sight visor. The surgeon's hands direct control instruments; the information is transferred to the arms of a robot equipped with the actual operating instruments. Together with the camera, these instruments are positioned in the area of surgery. They are precisely guided by the movements of the operator at the control panel.

Further developments and tests are required before this technology can be employed in daily surgical operations, but work at the Innovation Center for Computer-Assisted Surgery (ICCAS) means that operative processes in certain sensitive regions of the body could be carried out with a higher degree of safety accompanied by lower risks. Thus, the Center’s work would benefit patients and surgeons to an equal degree.

ICCAS is analyzing operation procedures with the aid of modern IT tools. It compiles surgical workflows and integration profiles for the conception, specification, and simulation of medical-technical prototypes within the field of computer-assisted surgery. Major areas of work include, the integration of all surgically relevant information in a standardized model of the patient stored in the computer, along with the visual processing, representation, and interaction of these data.

The center aims to occupy a key position in the development of surgery in the future. Currently, 30 young scientists from Europe, Asia, and America are carrying out research and development at the ICCAS. The unit receives support from the Federal Ministry of Education and Research, the free state of Saxony, and the German Research foundation.
Institution for Statutory Accident Insurance and Prevention in the Health and Welfare Services (BGW)

Innovative methods for the prevention of occupational accidents and diseases

The central task of the BGW is the prevention of occupational accidents, diseases, and occupationally-related health hazards. In the event of illness or damage, BGW organizes the best possible medical, professional, and social rehabilitation and guarantees appropriate compensation.

In addition, seminars and information are offered on workplace safety, accident insurance, accident prevention, health protection, and legal regulations. While these services provide practical tips for health in the workplace, BGW also carries out research on the causes of occupational accidents and diseases, work-related health hazards, and measures for their prevention. In the area of inpatient geriatrics, for example, innovative concepts are visualized and tested with the aid of the ServLab in Stuttgart, where a virtual home for the elderly was created as a research platform for the design of innovative services.

The Institution for Statutory Accident Insurance and Prevention in the Health and Welfare Services is the statutory insurance association for non-state institutions in the German medical service and welfare care sectors. It performs its statutory tasks under its own authority with government supervision.

Contact

Berufsgenossenschaft für Gesundheitsdienst und Wohlfahrtspflege (BGW)
Pappelallee 35/37
D-22089 Hamburg

www.bgw-online.de
German Foundation for the Chronically Ill

Paths are formed by walking on them – support for scientific research within the area of chronic diseases

The German Foundation for the Chronically Ill is a non-profit foundation that supports the public healthcare sector, and scientific research. The fields of cardiology and pneumology are the current focus of activity at the foundation. Services are provided to organize and carry out integrated research projects by doctors, hospitals, and other medical institutions. The foundation supports the management of integrated care, through the involvement of competent service providers and the appointment of board members with extensive experience. The goal is an efficient network to achieve the statutory purposes of the foundation. A further focus is on healthcare economics: researchers can compare the effectiveness and efficiency of various forms of health services affecting the human heart and respiratory systems.

Contact

Deutsche Stiftung für chronisch Kranke
Alexanderstraße 26
D-90762 Fürth

www.stiftung-telemedizin.de