EUROPEAN HOSPITAL

THE EUROPEAN FORUM FOR THOSE IN THE BUSINESS OF MAKING HEALTHCARE WORK

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Doctors may be fined for over-doing scans

USA - Doctors who frequently recommend inappropriate medical imaging may be financially penalised. That's one suggestion in a 51-page report presented for debate by the Senate this summer as part of a comprehensive healthcare legislation. If approved, in 2013, a new payments sliding scale would be established, with financial penalties in the form of lower rates for doctors and their facilities if they order an extraordinarily large number of inappropriate procedures.

If the recommendations are accepted, physicians also would be obliged to inform patients of their financial interests in MRI, CT, PET and possibly other services provided in their offices. They would also have to comply with 'appropriateness criteria' for high-tech imaging, including criteria for measuring compliance levels.

Aiming to minimise wasteful scanning and avoidable patient radiation exposure, the document also outlines a new imaging information organisation, created to collect and share imaging utilisation data, with feedback to ordering physicians on their compliance with appropriateness criteria.

Another suggestion is to set up five regional Diagnostic Imaging Exchange Networks to cover the US. Their aim: to help physicians determine the necessity, safety, and appropriateness of imaging and minimise duplicate scanning and patient radiation exposure.

Further, to address the cumulative effects of radiation-based imaging studies, physicians should use IT to access a patient's entire imaging history before ordering new studies.

'Non!' to super-CEO

Opposition emerges to French plan to re-engineer hospital system, but Legislature is expected to bow to the Presidential will, writes John Brosky

'No other country in the world spends more on hospitals than France,' President Nicolas Sarkozy declared as he rallied support for a controversial restructuring of the French hospital system and cut off arguments calling for greater financing to accompany the proposed changes.

The overhaul of hospital administration and regional organisation proposed by Sarkozy through the Minister of Health, Roselyne Bachelot, is on a fast-track for approval and if no significant debate slows its course, the measures described in the act *Hospital, Patient, Health and Regions* (HPST; Hôpital, Patient, Santé et Territoire) will become law by the end of June.

'Do not fear reform,' said President Sarkozy. 'Who would tell me to keep the status quo for hospitals. No one.'

With a majority in both the National Assembly and the Senate, Sarkozy has every chance of pushing through the main points of HPST that would give new decision-making powers to a newly empowered CEO, or super-Boss, for public hospitals that will in turn serve as the hub for re-engineered regional healthcare clusters.

'No human endeavour can function without a leader,' said Sarkozy, 'I call it a "boss". I realise I'm taking a risk saying that.'

The law also spells out a series of rules and incentives for new Regional Health Authorities (ARS; Agences Régionales de Santé) to encourage general practitioners and specialists to move back into rural regions that are currently underserved.

To defuse opposition, the government separated these measures for restructuring France's healthcare administration from financing measures that are addressed in the *Social Security Financing Law* (LFSS 2010; Loi de Financement de la Sécurité Sociale) and for capital investment in the plan Hôpital 2012.

Yet HPST is charged with enough controversial proposals to have provoked a widespread opposition from medical professionals, who say they are being pushed out of decision-making, from regional authorities who see their powers being undermined, and from unions of nurses and caregivers, who are threatened by the spirit of a law calling for a public hospital to be run like a private business.

Introduced in February by Health Minister Bachelot, the fast-track plan calls for just one reading and vote in each house of the French Parliament, to be followed by a revision by a joint commission that will reconcile modifications.

After a long debate, but with no amendment to the major themes proposed by the Presidency, HPST was approved by the National Assembly in March and the Senate

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64% of medical professionals suffer abuse

Spain - 64% of medical professionals are subjected to threats, coercion and insults. 34.4% have suffered threats and coercion on at least one occasion and 23.8% on numerous occasions. Similarly, 36.6% have been subjected to insults on at least one occasion.

Research following a study* by researchers at the University of Zaragoza (UNIZAR), has continued, to detail the type of centre, area, medical profession, age and gender of victims. Santiago Gascón, principal study author, said that a notable amount of less serious – but no less distressing incidents – was not reported. Only eight professionals reported events, because their physical injuries were serious; no one had actually reported threats or insults etc. The new data, he said, shows the true dimension of under-reported violence.

Among 1,845 study participants, averaging 41.8 years, 35.8% were men, 64.2% women, 47.5% nurses, 33.5% doctors, 7.9% administrators, 6.6% technicians and other professionals, 2.8% porters and 1.7% managers.

Psychiatric disorders, alcohol and drugs accounted for many events with offences very high in psychiatric and A&E units. 85% were generated by patients, but in A&E 27.3% of aggressors were people accompanying a patient.

Waiting time caused 58% of aggressive incidents; 15% resulted from disagreements over the issuing of a doctor's certificate, whilst disputes over medication prescriptions provoked 10%.

** Study undertaken during 2005 (pub: 2006); further research published recently in the International Journal of Occupational and Environmental Health*

NHS suffers from lawyers' indefensible greed

CHARGES RUN 10 TIMES HIGHER THAN THOSE WON FOR CLAIMANT PATIENTS

UK - The National Health Service Litigation Authority* (NHSLA), which handles compensation claims for the health service, has described the costs lawyers charge for successful cases for compensation won for medical negligence as 'indefensibly expensive in relation to the compensation awarded or agreed', and is calling for change.

Whilst the patients who have suffered due to medical negligence and/or errors deserve compensation, some unscrupulous lawyers have been charging over £804 an hour when pursuing such claims against the NHS, amounting to over £100 million annually – but the actual amount received by the patients involved is a minute proportion of that sum. For example, one legal firm representing a patient claimed almost £78,000 in costs and fees, but the patient had only been granted compensation of £7,000. The NHSLA contested that bill, as it did in a previous case, when a legal firm presented the NHS with a bill for £4.4 million; this was negotiated to £430,000 – an astonishing difference.

In 1995, 'No-win, no fee' arrangements were introduced to help claimants not entitled to receive legal aid, but could not afford the costs of a court case, to have access to the justice system. However, this resulted in leaflets being circulated in hospitals, with unauthorised NHS logos. Although new laws were implemented to regulate such claims companies, advertisements in the media for 'No-win, no-fee' legal representation still encourages malpractice victims or their families to contact such claims companies, about whom they know nothing more than the advertising link.

The no-win, no-fee lawyers are often on hourly base rates approved by the Courts Service, and they can be double the fees for defence lawyers. Worst, in a successful claim, the fees could become double for the no-win group. However, if there is no-win, there is no fee. This leads to another problem: The NHSLA has accused the legal profession of 'cherry-picking' cases – that is, choosing the most easily substantiated cases – and to be more certain of benefiting from massive rewards for relatively little risk. 'We make no suggestion that there is anything illegal or immoral in their adoption,' the NHSLA said. 'But they are effectively a means of claimant lawyers virtually doubling their fees, having cherry-picked their cases.'

Under the NHSLA's clinical negligence scheme for health trusts – roughly 50p in every £1 is already

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The winner of the *Eee PC 4G*, featured in the European Hospital issue 1/09 competition, is:

Dr Mikko Roine, psychiatrist and head of the Psychiatry Clinic, at Huch Jorvi Hospital, in Espoo, Finland

'Non' to super CEO

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is expected to pass an amended text by the end of May, though the Bachelot law has run into an unexpected opposition.

Seizing upon an uproar among medical professionals, the Senate intends to modify the text saying 'Non' to giving CEO status to hospital directors, and 'Yes' to returning doctors to hospital governance, according to former Prime Minister Jean-Pierre Raffarin, who serves as a Senator from the Vienne region and is a leading member in the party of President Sarkozy, the Union for a Presidential Majority.

In a televised interview, Senator Raffarin clearly was enjoying the new powers of the French Senate, which he played a key role winning in 2008, as he criticised the text approved by the Assembly as 'too complex and not quite clear'.

'We are not here to lie down to any text sent over from the Assembly,' he said. 'This is not a revolution, but it is showing something of a rebellious spirit,' he said.

Despite its fast-track status, a prolonged stay in the Assembly and a detailed study ahead of debate in the Senate has given physicians an opportunity to gather their strength.

Angry that their counterproposals were not taken into consideration, the heads of the medical committees for France's leading hospitals in a press conference greeted the passage of the Bachelot law by the Assembly with a threat to quit their posts and suspend participation in hospital planning

'Contrary to what is being said, the law is not going to expand the role of doctors in the operations of the hospital,' said Alain Destée, a neurologist with the Centre Hopitalière Universitaire (CHU) de Lille and President of the Conference of Presidents of the Medical Committees (CME; commission médicale d'établissement) for the CHUs.

Given a weak role in the selection of the super-CEO, the CME presidents protest that they will be absent from planning objectives and budget with the head of the regional authorities, as well as cut out of internal contracting discussions that are vital to 'spell out and sustain the medical orientation' of the hospital.

Meanwhile French Hospital Federation (FHF) has fallen into line with the government, with Executive Director Gérard Vincent saying, 'There needs to be an orchestra leader, someone who can take decisions, and that is what is missing today.'

Vincent said FHF favours this spirit in the reform law and supports the creation of regional health authorities, saying the challenge today is to 'free up the energies in the departments so that a real wind of change will bring change to the current range of healthcare services and respond to the expectations of both medical professionals and patients'.

Guillaume Sublet, head of Economic Intelligence and Regulatory Affairs with Nextep Consulting & Health Economics in Paris, predicts that despite the rebellious bravado of former Prime Minister Raffarin, the French Senate will ultimately have to vote with President Sarkozy's position in mind. 'The President was very clear,' said Sublet, who manages an online forum of interviews with leading players in the debate over the hospital reform. 'Medical practitioners may win some points about their importance, 'but we can expect that, just as in the National Assembly, the core text will pass without significant modification and French hospitals will walk the President's line with a hospital chief executive leading a management inspired by the private enterprise model.'

RUSSIA: A strange state for state-of-the-art laboratory diagnostics

The last time medical science enriched clinical practice with new advanced technologies ideas about aetiology and the treatment principles of a great number of diseases changed. Now the dilemma of modification of diagnoses and treatments, including laboratory diagnostics, is a very hot issue in Russia.

Russian laboratory diagnostics began in Saint-Petersburg in the 19th century: the first department was organised in Military Medical Academy 115 years ago. But it wasn't until 1997 that the first scientific department of laboratory diagnostics was created within basic medical education, at the Academician I.P. Pavlov State Medical University in Saint-Petersburg. One can say that, in Russia, the development of laboratory diagnostics is at a rather low level, and this type of diagnosis does not play a significant part in the treatment process. On average, patients must wait 10 days for a laboratory check-up. The situation was sad.

Vladimir Amanuel

'Health', the national project, has directed large sums of money to supply Russian laboratories by modern equipment. For the last two years, over 11,000 laboratories gained new facilities – such a number never seen in Russia! Every region sent requests to the Health Ministry stating their needs. Over 5,000 applications were received by the government and, to date, about 3,000 have been met. Every provider has to train two specialists to work with the new system and to supply with reagents for one year.

The results of this process will be verified in two years. The Ministry leaders hope to see a great change in the quality of laboratory diagnostics in medical centres throughout the country. But some specialists have some doubts about successful results. Why?

'The new equipment is a great deal! But we have tremendous organisational problems,' explained **Professor Vladimir Amanuel**, vice-president of Russian Association of Laboratory Medicine. 'Our laboratory assistants cannot use the up-to-date system; they could study, but our physicians don't understand why they need laboratory diagnostics! They became used to their own "feelings"! The contemporary analysis average is only 35%. To change this idea in the doctors' heads will take a long time, I believe.

'It's not right that laboratories in out-patient centres are the only ones with new systems,' he continued. 'The university clinics, big hospitals and diagnostic centres do not receive the modern laboratory equipment. It means the main specialists in Russia will not have the opportunity to use present-day systems and universities can't teach their students about the modern ones. That's why I doubt a quick success.'

Report: Olga Ostrovskaya

NHS suffers from lawyers' indefensible greed

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being spent on legal costs. In the 2007-8 periods the authority paid damages of £264 million and legal costs for the defence team and claimants of about £134m – totalling around £400 million to be paid ultimately by the UK's taxpayers.

Currently, pending negligence claims against the NHS could result in payouts of around £12 billion – about 50% of that going to the claims lawyers, if the claims prove successful. The average time taken to deal with a clinical claim, from its notification to the NHSLA to the date when damages are agreed (or the claim is discontinued), is almost 18 months. A fact that some argue pushes up legal costs, i.e. if the NHS made an offer of settlement, costs would go down. However, 96% of the NHSLA's cases do not reach a court. Over the past ten years, the NHSLA shows that 41% of cases were abandoned by the claimant, 41% settled out of court, 4% settled in court (mainly court approvals of negotiated settlements) and 14% remain outstanding. Less than 50 clinical negligence cases are contested in court annually.

And, surely the NHS also has a right to defend itself?

The NHS is not the only 'loser' in this unacceptable situation: Patients who may have a very legitimate, but far less lucrative claim for lawyers, may be unable to gain legal representation.

Worse, if the NHS defence lawyers win a case, a non-insured claimant (patient) may be liable to pay the costs of the defence. But, to be insured against meeting the NHS legal costs means spending anything from £2,500 up to around £40,000. Few could afford this.

Seeking more control over the fees paid to no-win, no-fee lawyers, the NHSLA has stated: 'The whole costs structure is indefensibly expensive in relation to the compensation awarded or agreed. It is difficult to believe that it would be sustained were it not for the lack of motivation to change it.'

Following presentation of its report, Lord Justice Jackson is reviewing civil litigation costs.

** Established in 1995, the NHSLA is a Special Health Authority (part of the NHS), responsible for handling negligence claims made against NHS bodies in England. In addition to dealing with claims when they arise, it has an active risk management programme to help raise standards of care in the NHS and so reduce the number of incidents leading to claims. The authority also monitors human rights case-law on behalf of the NHS, and more.*

Reimbursement for new medical technologies

Olaf Winkler, Head of Department for Healthcare at BVMed, the German Medical Technology Association, outlines the obstacles that must be overcome to integrate medical technology into the standard hospital reimbursement system after successful studies and CE certification


Olaf Winkler

A current study by the German Federal Ministry of Education and Research (BMBF) concludes that there are no significant obstacles to the introduction of innovative medical technology in Germany. The study presents, for the first time, a comprehensive and systematic analysis of obstacles to innovation for the integration of new medical technology into the German market and healthcare system. The innovation climate is also largely judged to be satisfactory to good by international comparison.

However, there are two phases in medical product development that the experts assessed to be difficult. The first is the clinical research and validation of innovative medical technology, i.e. performance appraisal of the medical use. The next is the integration into the medical reimbursement system by the statutory medical insurers. In effect, this second hurdle is the real challenge for manufacturers and hospitals. Companies assess the entire situation as worse than research institutions and hospitals do. To make matters worse, in Germany the relevant expertise in medical technology and clinical research has limitations. From the companies' and research institutions' viewpoints the identification and cooperation with a suitable clinical partner who knows about the respective, specific competency profile for a certain medical indication – i.e. a hospital – is a major challenge. Improved information presentation of competency profiles is needed.

Secondly, there is a bottleneck during the phase where innovative medical technology is integrated into the reimbursement system of the statutory medical insurers. The majority of the experts consulted judged this process, based on the increasing regulations, as comparatively longwinded, highly complex and not user friendly, or not transparent enough, in both the in-patient and out-patient sector.

There is a significant lack of information regarding the integration of innovations into the standard reimbursement system. There are no actual barriers against access to innovations in the German hospital market. The principle of permission subject to prohibition applies, which means that new procedures can normally be integrated into the hospital supplies system without prior permission by the statutory medical insurers or the Federal Joint Committee. The actual obstacle lies in adequate reimbursement of these procedures. Through retrospective calculation of the DRG flat rate per case system it takes up to four years for the appropriate grouping of a new service/procedure into the flat rate per case system, or to work out the additional recompense, although an annual recalculation of the G-DRG system does take place. As an alternative, hospitals that need to introduce innovations quickly can apply for a new examination and treatment procedure. This application must be made annually by the 31 October. Moreover, the new technology must meet certain conditions, such as actually being confirmed as 'new', it must be confirmed that the costs are not adequately reflected and covered in the existing DRG catalogue. The evaluation system is carried out by the Institute for the Calculation of DRGs (InEK) on behalf of the self-administration partners.

In a case of positive assessment, an innovation reimbursement agreement can then be reached with the medical insurers for the following year. This reimbursement is outside the hospital budget and is paid in addition to the existing budget. However, the procedure has been too bureaucratic, not transparent and inflexible as each individual hospital has to make this application, and the negotiations with the medical insurers depend on their agreement. Based on estimates, the expenditure for these innovations is less than 1% of the entire hospital budgets.

For 2009, there are over 12,000 applications for new examination and treatment procedures, and there are 546 different methods and procedures. Overall, 5,400 applications with 87 procedures, 34 involving medical technologies, have been positively assessed and can now be negotiated for 2009.

With the passing of the Law on the Hospital Financing Reform (KHRG) in February, the legislator paved the way for the first improvements of the innovation clause in the DRG law. The confirmed change relating to new examination and treatment methods gives hospitals the opportunity to apply for reimbursement of innovative services for patients on a flexible basis, rather than to deadlines. It remains to be seen if and how this new rule is utilised. With the end of the regular convergence phase, from 2009 the significance of the new examination and treatment reimbursements fees has certainly increased because of their reimbursement outside the budget. However, it must be considered that spending on new examinations and treatments will be calculated via the base rate in the following year, and revenues for all hospitals will drop.

As an interim conclusion we can sum up that the purchasing decisions for the use of innovative medical technologies should be planned and prepared as early as possible, ideally during the study phase. An appropriate reimbursement is only recommended with a lot of input and a strategic approach. The BVMed Health System Guide – Introduction of Innovative and New Medical Products into the G-DRG system offers information and help with appropriate reimbursement. The guide can be ordered at: http://www.bvmed.de/themen/DRG-System/article/Healthcare_System_Guide.html

EUROPEAN HOSPITAL

OUT AND ABOUT TO DELIVER THE LATEST NEWS – AND HEAR IT

EH@ECR

The Congress of Radiology (ECR), with 18,200 delegates from 97 countries, is one of the most important dates of the year in the *European Hospital* calendar.

The ECR always presents a unique opportunity to discover new concepts for and in radiology as well as to meet up with the medical community. So again, from March 6-10 this year, members of our team joined those presenting the scientific programme, as well as products exhibitors, to provide our readers with first-hand information on the latest scientific and technological innovations and best-practice models in medical imaging.

Our special issue *EH@ECR*, distributed at congress entrances as well as the European Hospital booth, attracted the attention of many who immediately subscribed to our English and Russian publication.

Additionally, our *6th Hospital Management Symposium*, organised in partnership with the ECR, also received high praise from participants.

As seen in this EH issue, we have again attracted contributions from high-profile medical delegates. Various experts and companies will contribute articles for our future publications.

So, be sure to obtain our upcoming editions – it's worth it!

Website: european-hospital.com

EH@CMEF


EH representative Gavin Hua at the CMEF Spring conference

Shenzhen, China – The China International Medicinal Equipment Fair (CMEF), held this April was founded in 1979. In its 30-year existence this bi-annual event (spring/autumn) has become the biggest exhibition of medical equipment, related products and services in the Asia-Pacific region. Thus the exhibition halls present ten thousands of medical and healthcare products, displaying everything for first aid, optics, rehabilitation nursing, all the way through to IT and telemedicine and sophisticated medical imaging.

CMEF attracts some 2,000 exhibitors and over 50,000 visitors from more than 100 countries and regions – and *European Hospital* was among them.

In 2004, the Chinese market for medical equipment and supplies was estimated to be US$2.6 billion. It is still booming, with overseas investments and substantial domestic production. Over 50% of medical care imports have been X-ray and electro-medical equipment.

This year, CMEF launched a parallel trade exhibition: the International Component Manufacturing and Design Show (ICMD).

EH@KIMES


At our Kimes booth: our Korea representative Jane Park

Seoul, S. Korea – This March, *European Hospital* was present at the Korea International Medical and Hospital Equipment Show (Kimes), our fifth time at this special event. Now in its 25th year, the show has become an important venue not only for Korean exhibitors, distributors and buyers, but also for an international audience: 54,328 visitors from 71 countries, including industry representatives from neighbouring China, Japan and Taiwan.

One of the major objectives of Kimes, which is supported by the Korean government, is to showcase Korea as an attractive partner in the international medical market. Exhibited products focused on all aspects of healthcare delivery. Although Korean manufacturers face tough competition, internationally their products are increasingly credited. 'Quality is one of our top priorities to prevail over the low-price foreign competitors, especially from China,' explained one exhibitor. Many firms also expressed interest in European marketing and will be present at MEDICA in Germany this year.

The 2009 global economic crisis did affect Kimes. After years of steady growth, floor space had shrunk by 10.1% after some small companies cancelled participation. 'According to our exhibitors, during and after the show, the results were not as bad as predicted. It turns out that everything remained business as usual,' said the organisers pragmatically. 'Kimes still brings tangible opportunity to the industry,' concluded Choong-jin Kim, President of Korea E & Ex Inc.

Despite being the 26th exhibition, Kimes 2010 will celebrate its 30th anniversary, since the first Kimes was held in 1980.

Cultural-sensitive care and the European Qualification framework

By Stephan von Bandemer and Canan Mavis Richter, Institute for Work and Technology, Gelsenkirchen, Germany

Healthcare services often do not reach the target groups because socio-cultural preferences and values of patients and their relatives are not properly considered. The problem is especially severe in the case of the growing migrant population and results in higher rates of infant mortality, obesity, diabetes prevalence, coronary heart diseases, stroke and others. Increasing problems also emerge in case of geriatric care with the aging of migrant population.

The reasons for the existing under-supply of healthcare are often seen in language barriers, a lack of knowledge about the healthcare system, or lower social and educational status. However, additional and even more relevant reasons occur due to a lack of understanding of individual preferences and values that are based on different lifestyles, milieus, settings, heritage or religious backgrounds.

Approaches to individualised healthcare, based on patients' cultural differences, are now analysed and integrated into education systems for nurses in a European project within the Leonardo programme; this recently had its kick off meeting in Edirne, Turkey. The project team includes members from Germany, Poland, Romania and Turkey and it develops modules for education in cultural-sensitive care in different levels of the European Qualification framework.

The basis for the design of individualised healthcare is a model of the daily physical and psychological needs of individuals under consideration of cultural differences. It combines requirements from the individual and the professional perspective with psychological and physiological needs as dimensions of the appropriateness of healthcare. Especially the dimension of individualisation needs much more emphasis since the demand for and the utilisation of healthcare as well as patients compliance to therapy is to a considerable extent determined by complex systems of socialisation of the patients.

Individualisation of healthcare services is not in contrast but complementary to professionalisation and standardisation. Professional standards should include the differences and preferences of patients. Due to different socialisations of patients concerning lifestyles, milieus and institutional settings, professional standards of healthcare can not only rely on scientifically based medical rationales but must also develop and incorporate science-based social and cultural rationales and attitudes in order to provide an appropriate customised healthcare.

Instruments to achieve these objectives are communicative and reflective planning, and implementation processes of healthcare services that should be integrated into education and further training. To achieve this task the Leonardo project develops education modules based on cultural-sensitive healthcare processes that reflect the different preferences of patients. These modules are aligned with the different levels of the European qualification framework. The levels range from basic knowledge, skills and competencies to the highest expertise and excellence. The different levels are made comparable by credit point systems, according to the ECVET (vocational training) and ECTS (academic education) system.

This concept was first applied in the education of formerly unemployed youth with a Turkish migration background, in a pilot project in Gelsenkirchen, Germany. The evaluation of the project showed that a consequent orientation towards the elementary preferences of the patients, combined with professional standards of geriatric care and the systematic consideration of psychological and physiological dimensions, not only increased the acceptance and compliance by the patients, but also increased the satisfaction of involved healthcare professionals as well as the performance and effectiveness of participating healthcare institutions. The essential difference of the approach to other healthcare concepts has been the systematic consideration and acceptance of different preferences and values of patients in education and health services. The tension between science-based professional standards of healthcare and also the science-based analysis of differences in preferences of the target group cannot be resolved in favour of one side or the other; it has to be systematically integrated into healthcare processes.


Stephan von Bandemer

This approach is not only favourable for the migrant population but also for native patients and healthcare institutions. The differences in social and cultural preferences are not only based on heritage; they result from a complex socialisation of patients as well as healthcare professionals. Institutionally, the integration of differences of elementary preferences into healthcare processes reduces conflicts and frictions and increases staff and customer satisfaction. This also improves the profitability of the healthcare institutions.

In general, this approach is transferable to all levels of healthcare, beginning with prevention programmes, acute care, rehabilitation and geriatric care. It reflects the constitutional principles of personal services, where the provider and customers must cooperate and match the professional standards of the provider, and the individual expectations and preferences of the customer. Therefore, the individualisation of planning and implementation of healthcare processes based on social and cultural differences of preferences and values is an essential element for the effectiveness of healthcare.

RESEARCH

Small yes, but Sweden and Denmark are big in pharma R&D firms

Among 2,552 European R&D projects (clinical phases I-III) conducted by small and mid-size biotechnology firms (under 600 employees), 64 are focused on diabetes, according to a large, detailed study carried out by Novumed Life Science Consulting. If the focus is shifted to entire therapy areas, with a total of 516 compounds under development, oncology holds the highest level of research activity in Europe, followed by compounds under development for infectious disease (262); neurological/psychiatric disease (219), inflammatory disease (199) metabolic disease (128) and cardiovascular disease (104). The result is underlined by portfolios of the world's biggest pharmaceutical companies. In an earlier study, Novumed investigated the global pharma market and identified the 200 biggest selling drugs. In just that one year eleven diabetes drugs produced total revenues of US$21 billion.

For its new study, the Novumed team examined over 4,600 European biotech firms across 30 European countries (including Iceland, Slovakia, etc.). 1,773 fell into the healthcare category (including services, diagnostics etc.) and only 522 focused on drug development. It was found that, of the 2,552 R&D projects associated with those firms, several facts emerged about the status of this industry sector in Europe.

Sweden, Denmark, Norway and Switzerland display a distinct strength in cultivating a productive therapeutic R&D environment, particularly in relation to their total populations. With nine million inhabitants, Sweden has 54 biotech firms working on drug development, all with at least one compound in pre-clinical or clinical development; despite its 5.4 million population, Denmark has 31; in stark contrast, with 82.4 million inhabitants Germany has only 97, which is barely topped by the United Kingdom, with a population of 70 million yet only 98 biotech firms.

As to the maturity of the respective company pipelines, Germany and the UK are again only average. Ireland, with only about 4.2 million inhabitants, and Denmark (as said, 5.4 million pop.) were identified as the biotech regions with the highest number of compounds in clinical development — proportionally about 60%, with the remaining 40% distributed across early-development, pre-clinical and research stages.

2009 International Neuro-rehabilitation Symposium (INRS)

Switzerland — 'My dream is that children with neurological motion disorders will travel through virtual worlds with the help of a robotic gait orthosis. For example, they might explore a farm, smelling the country air and hearing the chickens cluck; while this is happening, the robot would provide them with physiological gait training,' said **Professor Paolo Bonato**, Director of the Motion Analysis Laboratory at the Spaulding Rehabilitation Hospital, Boston, USA, presenting his research at the INRS, in February.

New, virtual computer worlds combine frequent repetition with motivation and feedback, and studies have shown that patients learn better if motivated and are given immediate feedback on their movement performance. They exercise enthusiastically and, supported by the equipment, can repeat the same movement over and over (repetition enables our brains to learn, e.g. playing the piano, walking, and so on). The 350 visiting neuro-biology researchers (from Europe, the USA, Mexico, Thailand, Hong Kong and India) agreed that research findings on technology-assisted neurological rehabilitation, added to the movement disorder therapy currently used, could help patients to practice movement patterns – and perhaps re-learn how to walk or grasp an object.

Professor W Zev Rymer, Director of Research at the Rehabilitation Institute of Chicago, USA, said that the INRS was 'one of the most significant scientific meetings in our field to date' and that such interdisciplinary contact must be maintained, and far more research undertaken to be able to offer patients the best possible treatment.

The event's main organizer was med-tech firm Hocoma AG (*www.hocoma.com*), which is an industrial partner of the MIMICS EU research project (*www.mimics.ethz.ch*) and has links with the EU Spinal Cord Repair research project (*www.spinalcordrepair.eu*).

The MIMICS project aims to improve sensory-motor rehabilitation with the help of virtual reality. Led by Prof. Robert Riener (ETH Zurich and the University of Zurich), project partners include the paraplegic centre at the Balgrist University Hospital (Switzerland), the University of Ljubljana (Slovenia), Barcelona University (Spain), the Neurological Clinic at Bad Aibling (Germany) and Hocoma AG (Switzerland).

Also EU-funded, the Spinal Cord Repair research project aims to identify new information and approaches to functional restoration after injury. Partners in the project: Karolinska Institute (Sweden), Zurich University (Switzerland), Cambridge University (England), Columbia University (USA) and the Friedrich Miescher Institute for Biomedical Research (Switzerland).

E-mail for the INRS Abstract Book: inrs2009@hocoma.com

The TopClinica Congress

Focus: Healthcare globalisation

24-26 June Stuttgart, Germany

Be it telemedicine, patient tourism or international chains of hospitals, the healthcare market, which is accelerating over national borders, and is even more global. 'Medicine without Borders' will be among subjects to be discussed at the TopClinica Congress *Medicine needs a Future*, writes congress manager **Dr Erentraud Hömberg**.

When the German Federal Chancellor made a surprise trip to Afghanistan in February she could not visit the troops in Faizabad because clouds over the mountains made flight too dangerous. 'It's not unusual in this area,' explained Dr Dietrich Doll who, as a former Lieutenant Colonel in the German medical corps, was stationed there for some time. At the congress he will lecture on telemedicine in crisis areas. 'If one of our soldiers is taken ill or wounded in Faizabad during such bad weather, and the medical care available on site is not sufficient, that's when telemedicine comes in. The large German hospital in Mazar-i-Sharif has enough specialists who can assess X-rays or laboratory results via satellite link. When this is not enough, the data are sent to Germany.'

Dr Ulrich Fell, Head of Marketing at GE Healthcare, will report on the setting up of an international network of cancer centres. 'To be able to offer the most modern tumour treatment to more patients, and quicker, with the University of Pittsburgh in the USA, we are planning to set-up at least 25 cancer centres in Europe and the Middle East.'

Dr Claus Biermann, of Philips Germany, who will speak on a developing market at the TopClinica, pointed out that emerging economies that are in the process of developing their healthcare systems particularly offer numerous opportunities for medical technology companies.

The chances of a German University Hospital entering the global market will be discussed by Dr Mathias Goyen, Managing Director of UKE Consult and Management GmbH. As a Hamburg University Hospital spin-off, his firm has succeeded particularly in Arab countries and was involved in the building of hospitals in Dubai and Yemen. Whilst Goyen mainly works abroad, his colleague Leonore Boscher deals with the invoicing for the numerous foreign patients at the International Centre of the University Hospital in Hamburg. Her lecture will focus on 'What and how Arabs, Russians & co. pay?'

Dr Joachim Drevs, Head of the Tumour Clinic SanFontis in Freiburg, which mainly treats international patients; he will describe the frustrations of national regulations that hit the limits of globalisation.

Claus Moldenhauer, of the DAK in Hamburg, will discuss financial obstacles within the European healthcare cross-border traffic.

Dr Uwe Klein from Munich, a specialist in marketing for foreign patients, will focus on the race to attract foreign patients, pointing out the lead taken by Thailand, India and Singapore.

Details: www.topclinica.de

World Congress of Nephrology

22-26 May Milan, Italy

During this truly international event, Congress President, Francesco Locatelli, along with Gérard London, President of the European Renal Association - European Dialysis and Transplant Association, and Eberhard Ritz, President of the International Society of Nephrology expect to welcome around 7,000 specialists, with over 450 speakers from over 35 countries.

The WCN 2009 will present research and an overview of the most relevant fields in the prevention, detection and treatment of kidney disease. Special forums, with electronic voting, will also air potential controversies, e.g. CKD as a public health issue; research partnerships and the need to reconsider the role of academia and industry; clinical practice guidelines in nephrology; ethical issues in kidney disease patients (live kidney donation; the international trade in kidneys, and withdrawal of dialysis, etc.)

Continuous Nephrological Education (CNE) will be available in seven languages.

EUROMEDLAB 2009

7-11 June Innsbruck, Austria

The 18th European Congress of Clinical Chemistry and Laboratory Medicine, focusing on non-communicable diseases associated with western life style and aging, will also present an overview of new research and developments in laboratory diagnostics. 'It's highly alarming that chronic non-communicable diseases, such as heart disease, stroke, and diabetes, are reaching epidemic proportions worldwide,' commented Professor Manfred P Dierich, Vice-Rector of Innsbruck Medical University. 'Identifying priorities is a crucial point in establishing programmes for global disease control to galvanise the health, science and public-policy communities into action on this epidemic. Interdisciplinary research, for example, will be required to explore the interactions of behaviour, environment, and genetics in order to frame risks and determine outcomes.'

The alarming increase of kidney disease as a consequence of diabetes, and its powerful impact on cardio-vascular disease, will also be a central focus, as will rheumatisms and osteoporosis, in which there has been impressive progress in the understanding of the pathomechanisms and treatment. The challenge of neurodegenerative disorders in aging populations, as well as oncology and haematology will also be highlighted, as will discussions on personalised treatment for non-communicable diseases in the future.

Birthday bonanza for Multipette users

Website offers prizes and cash for lab celebrations

Launched by Eppendorf in 1979, the world's first handheld dispenser (repeater) — the Multipette — revolutionised laboratory work. To celebrate its 30th year, the company has created online competitions, a retrospective of the past three decades, and will bring news of a changing selection of Multipette special offers throughout the year. (Check them out at: *eppendorf.com/30years*).

Multipette plus, Multipette stream/Xstream, together with Combitips plus, are essential tools for fast, convenient dispensing of long series, Eppendorf points out. On the website, users are invited to enter the *My Multipette and me* photographic competition by uploading imaginative images, perhaps of a decorated Multipette, or 30th Birthday celebrations in their lab. Each month, from April to October 2009, one winner from the online photo gallery will receive an exclusive Mini-Multipette laser pointer. In mid-November, a jury that will include a professional photographer, will select the 30 best photographs for publication on the website. The 30 winners will each receive a birthday cake and the top three will be able to celebrate with an Eppendorf-sponsored lab party to the value of 600, 500 or 400 euros.

In addition, everyone who contributes their own personal Multipette story, of at least 2,000 characters, will also receive a Mini-Multipette laser pointer.

A changing programme of sales promotions will be announced on the website, including some special packages and a limited edition Multipette. Tapping the 'History' tab will lead you to images illustrating significant Multipette developments, as well as memorable, funny and exciting events of the past three decades.

'Multipette has become synonymous with "handheld dispenser", its reputation assured by unique features, such as Combitip recognition and automatic volume calculation,' said Dr Sabine Kühn, Multipette Product Manager. 'Now Multipette fans worldwide can experience the birthday atmosphere and share their photos and stories.'

NEW

Urine test for kidney disease

Scientists have developed a new test for detecting kidney disease, according to a paper published online in April by Kidney International (www.nature.com/ki/). The technique will allow researchers and clinicians to identify kidney disease or injury within 15 minutes of testing in both rats and humans.

The test, developed by Vishal Vaidya and colleagues at Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA, measures the urinary biomarker of a molecule known as Kim-1, which has been shown to better indicate a range of renal conditions over other conventional biomarkers, such as blood urea nitrogen, serum creatinine, and urinary enzymes. The authors report that the new assay displays visual indicators in minutes, which is a significant improvement from older analyses that require a large analyser and take several hours.

The kidney is highly susceptible to injury due to various disease states, a wide range of drugs, environmental pollutants, and other conditions. The incidence of kidney injury is steadily increasing across the population and contributes to high mortality and increasing numbers of individuals with end-stage kidney disease. This assay has potential to diagnose kidney disease quickly and early enough to provide timely therapeutic intervention, and could also be used in the future to safely screen for agents which are potentially nephrotoxic in preclinical and clinical settings.

Malnourishment in dialysis patients

In the same issue Damien Ashby and colleagues at the Hammersmith Hospital, London, UK, report that daily treatment with the gut hormone ghrelin is effective in sustaining an improved appetite in patients on dialysis.

Malnutrition is a frequent and early feature of chronic kidney disease, and is also associated with increased mortality in dialysis patients. In most cases no cause of malnutrition can be identified, but it may indicate inadequate dialysis or co-morbidity.

The researchers found that daily subcutaneous application of the hormone, which regulates hunger through the hypothalamus, increased patients' appetites without changing energy expenditure. The hormone also had a temporary effect in reducing patients' blood pressure.

They hope that further investigation into long-term application of ghrelin can assist in providing a healthy diet to malnourished dialysis patients.

Private genetic testing for breast cancer risk

UK – A new partnership between BreastHealth UK (BHUK) and Lab21 Ltd aims to offer women predictive genetic testing for breast cancer risk. BHUK, which offers personalised, private breast screening services, has launched a *Breast Health Risk Assessment Service*.

The range of tests used for diagnoses by Lab21 include the deCODE BreastCancer assay and the Myriad assays. 'The deCODE BreastCancer test, which has been validated in more than 100,000 women, will be offered as part of an overall breast cancer risk assessment that takes into account family history and lifestyle factors using the Tyrer-Cuzick model,' the firms report. 'Results will be provided in consultation with an experienced breast surgeon to interpret them and recommend potential follow-up breast screening as required.'

'The Myriad BRCA1 and BRCA2 genetic tests are suitable for women with a strong family history of breast cancer and specialist counselling is provided to support women that require this test. The Myriad BRCA tests are based on extensive clinical research and are currently the only tests available which address predisposition to familial (inherited) breast cancer.'

BHUK is expanding its number of UK clinics via the Spire Healthcare hospital network.

Isolation technology

As processes become more complex, the need for increased laboratory safety is paramount. Protecting operators from hazardous substances, aerosol release or spillages is a critical consideration during processes, whether they are mixing substances or dispensing drugs. Of equal importance is the need to protect the substance, or product, from contamination from the operator. *Mark Nicholls* presents and overview of current and future lab safety measures

The shift in emphasis in recent years has been towards isolation technology. This, according to experts, appears to be continuing. Isolator technology offers enhanced product handling capabilities yet safely separates the operator from the product during processes such as sampling, weighing, liquid decanting or working with a dangerous virus.

Clean room technology and laminar flow hoods and benches have traditionally been relevant in this area and still have an important role to play in creating sterile and particle-free conditions; but it is isolator technologies that are now providing the heightened levels of protection and security required in many laboratories.

James Agalloco is president of Agalloco & Associates, which provides a range of technical services to the pharmaceutical and biotechnology industry, and has particular expertise in aseptic processing, isolation technology and sterilisation. 'Isolation makes the separation near perfect,' he explained. 'The isolator operates so well because the operator isn't in the same environment as the materials.'

Isolation technology has also become the preferred option in the pharmaceutical and health sectors for new installations, particularly where organisations are regularly dealing with potent compounds. 'Operational performance has been extremely good, and is cost effective relative to conventional clean room production,' he pointed out. Operators spend less time gowning and one operator can perform many tasks with an isolator that would require individuals in different places.'

First developed for use in the nuclear industry, isolation technology has found a more recent relevance in pharmaceutical manufacturing and also in hospital laboratories that have found that humans can be the area where the biggest threat of contamination arises in a process. The technology not only allows an item to be placed out of human touch, but it also enables an operator to have a high degree of access and control over a process without having to wear constrictive garments and has clear advantages with aseptic work areas.

For a growing number of processes, biological safety cabinets are no longer believed adequate for the preparation of drugs in hospital pharmacies, sterility testing or preparation of cytotoxics, leading to a shift towards isolation technology to offer the level of protection necessary to the operator and to avoid product contamination.

Brian Alexander, director of regulatory compliance at Tepnel Research Products and Services in Scotland, said that whilst the sterility test is one of the most critical performed by a microbiologist, and has traditionally been conducted with a laminar flow hood, he notes more organisations using isolator technology for sterility testing.

While the shift is not inexpensive, he said, there are advantages. 'Operating costs are lower for isolators due to the smaller workspace footprint, lower utility costs, reduced gowning and reduced training and cleaning costs.'

Options available in isolator technology include Glove Isolators and Half Suit Isolators as well as Flexible Plastic Isolators, Rigid Plastic Isolators, Stainless Steel Isolators and Transfer Isolators with latest developments seeing the introduction of gloveless isolators.

Transfer isolators, equipped with a ventilation and filtration system and various connections for decontamination, allow movement of supplies from the isolator without compromising the process. 'The salient point of all isolator designs is the complete separation of internal and external environments,' Brian Alexander added.

PSA screening cuts deaths by 20%

The ERSPC study, the world's largest of its kind, has gone online

Screening for prostate cancer can reduce deaths by 20%, according to the results of the European Randomised Study of Screening for Prostate Cancer (ERSPC) published on Online First* by the *New England Journal of Medicine*. The findings were also reported at the 24th Annual Congress of the European Association of Urology (EAU) in Stockholm, Sweden, this March.

ERSPC is the world's largest prostate cancer screening study and provides robust, independently- audited evidence, for the first time, of the effect of screening on prostate cancer mortality.

Beginning in the early 90s, the study involved eight countries – Belgium, Finland, France, Italy, Netherlands, Spain, Sweden and Switzerland - with an overall follow-up of up to 12 years. Participants totalled 182,000, but then was dropped to 162,000 men in seven countries, aged 55-69; only those who had not been screened could take part.

By initially screening men aged 55-69 years with the PSA marker and offering regular follow up, this led to an increase in early detection. Deaths due to metastasised disease were then reduced. Exact data showed that, on average, for every 1,408 men screened 48 had cancer diagnosed and received treatment, resulting in saving one life. Screening took place on average every four years with a mean follow-up over nine years. The cut-off value was a PSA level of 3.0 ng/ml or more. Men with this reading were then offered a biopsy.

'The study shows that PSA screening delivers a 20% reduction in mortality from prostate cancer. This provides decision makers on screening policies with important new data on the effectiveness of PSA testing in preventing deaths,' explained **Professor Fritz Schroder**, international coordinator of the ERSPC study. 'However, the ERSPC is also near to completing additional studies on quality of life and cost-effectiveness and these must be assessed before making a decision about the appropriateness of a national prostate screening policy.'

Worldwide, prostate cancer is the second leading cause of cancer death. Separate ERSPC findings already confirm that approximately 30% of detected cancers actually have non-aggressive features and are 'indolent' or slow growing. This over-diagnosis is an unavoidable effect from all cancer screening procedures. With prostate cancer, a new, more conservative form of monitoring, Active Surveillance, might be an important method to help avoid early invasive treatment.

**http://content.nejm.org/cgi/content/full/NEJMoa0810084. Details: www.erspc.org*

A new instrument for mid-to-high volume labs

HIGH-DEFINITION CELLULAR ANALYSIS FOR BLOOD TESTING

At Euromedlab (7-11 June, Austria), Beckman Coulter will demonstrate the new UniCel DxH 800 Coulter Cellular Analysis System. For use in mid-to-high volume laboratories, the instrument features advanced technologies that include high-definition signal processing and multi-angle light scatter; these produce ten times more data than traditional haematology analysers, the company reports. 'Moving parts are minimised to increase instrument reliability and technologist safety. The DxH 800's modular design and small footprint make it the ultimate scalable solution for the LEAN lab.'

Cynthia Collins, group vice president of Cellular Analysis at Beckman Coulter, added: 'The UniCel DxH 800 will transform the haematology lab with unparalleled quality of results, innovative efficiency solutions and revolutionary scalability, reinforcing Beckman Coulter's place at the forefront of cellular analysis.'

The UniCel DxH 800 begins where the LH 700 series left off, Beckman Coulter points out. 'Like the LH series, Decision Rules are a notable factor in the analyser's success, only the UniCel DxH 800 takes decision criteria to the next level by reducing the need for manual review and eliminating the need for manual intervention during repeat or reflex testing. Directed by innovative software, samples are automatically pulled back to the aspirator without operator intervention.'

With its many innovative and proprietary technologies the new instrument also promises to significantly reduce the need for manual intervention. 'For example, the Specimen Transport Module (STM) allows samples to move through the analyser by magnetic force without the need for a track or additional software,' the manufacturer explains. 'It is configured with no exposed moving parts, making the UniCel DxH 800 one of the most reliable and safest haematology instruments available.'

BECKMAN COULTER

A strategic acquisition of the Olympus Laboratory unit

Beckman Coulter Inc, manufacturer of medical test systems, has agreed to acquire the diagnostic systems portion of Olympus Corporation's life sciences business. 'Beckman Coulter is making this acquisition because the combined businesses are better together – the synergies in terms of products, geographic placement and highly capable people make it very compelling,' Beckman Coulter explained. 'We will create a world-leading company in clinical diagnostics with special strength in chemistry and automated laboratory systems. Once the acquisition closes, we expect to have global market share that places us near the top of the chemistry segment.

'This is a very strategic acquisition — Olympus' chemistry systems fill some important gaps in our product line, providing outstanding systems for customers in both the ultra-high throughput and the low-volume segments.

'We've also been very successful at placing our immunoassay systems with our chemistry customers. The access to Olympus' installed base should give us more opportunities to continue the growth of our immunoassay business.

'We think that the combination of Olympus' ultra-high throughput chemistry systems with our UniCel DxI 800 — the highest throughput immuno-assay analyser available today — will be very attractive to customers around the world, especially in Europe and Japan.

'Our automation product lines are also complementary. We're a world leader in connected, total lab automation. Olympus is the leader in pre-analytical automation – we'll be able to offer customers who need automation more choices and better solutions.'

CONGENITAL CARDIAC SURGERY IN RUSSIA

Last year a special cardiac surgery department was opened in the Filatov Children's Hospital in Moscow. Until then, the only one in all of Russia was at the Children's Hospital #1, in Saint-Petersburg, where cardiac surgeon **Vadim Lubomudrov** has led the field in this delicate work. 'Why are there so few children' surgeons Russia?' our correspondent Olga Ostrovskaya asked him. 'After all, statistics reveal infant mortality is about 11 per 1000, and about 3,000 newborns die annually due to congenital heart disease.'

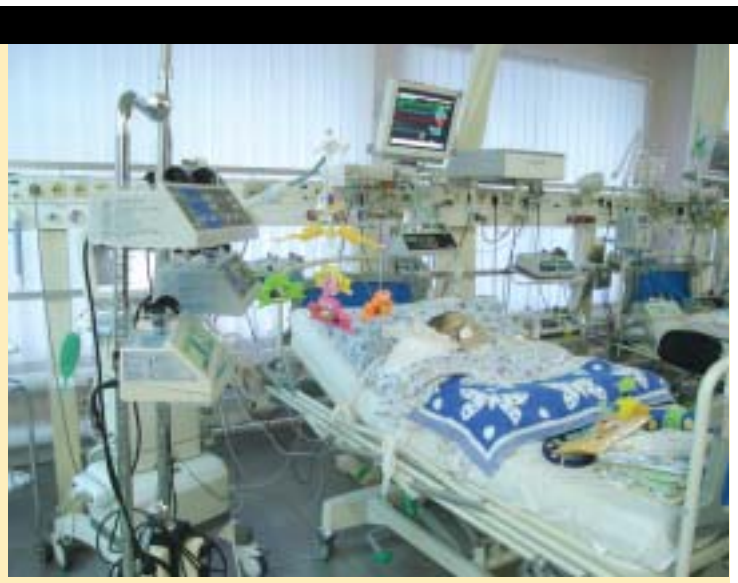
'That's not a simple question,' Dr Lubomudrov replied. 'Russia now has 78 centres that carry out congenital heart surgery, but only 30 centres perform operations on infants. Infants represent 29.2% of all operations and newborns are never counted in our country. It's no wonder that Russian cardiac surgery is at a low level: if country has a Health Development Index of 0.802, it cannot have great surgery.'

About 25 years ago, when Dr Lubomudrov began to work at the Children Hospital #1, the hospital had no cardiac surgery at all. Moscow had the only centre for children with congenital heart diseases (over 5 years only); every city and small town could add the children to the waiting list and send them to Moscow when their turn came, if the child had not died while waiting.

A sad situation indeed, especially remembering that Russian surgeons performed some of the first advanced surgery in the world! Vladimir Demihov (1916-1998) placed the artificial heart in dogs in 1937, carried out a heart transplant in 1946 and an orthotopic heart transplant in 1951 (without CPB). In 1946 he performed a heart-lung transplant and, in '48, a liver transplant. Unfortunately this work remained in the laboratory, never to become possibilities within the country's healthcare system.

Dr Vadim Lubomudrov

'Then, 20 years ago, good fortune arrived,' said Dr Lubomudrov. 'A Russian mother, with a daughter who had a congenital heart problem, worked as an interpreter for the international film festival in Saint-Petersburg, and she told an American woman, Joan MacGovery, the festival's organizer about it. Joan found the money to perform the surgery in the USA, and then thought: *If I could find money for one baby – why not for the others?* From this came the foundation of the charity *From Heart to Heart*. For several years American surgeons and neonatologists came to Saint-Petersburg and Russian surgeons went to American cardiac centres. After several years we, in Saint-Petersburg, developed a really professional team to perform surgery on infants. Up to now, we operate using American equipment and American supplies.'



This March, the project's 20th anniversary was celebrated in California by members of the American cardiac centres and Saint-Petersburg Children's Hospital.

The team at Hospital #1 performs about 300 operations annually (75% for newborns and 80% for infants weighing under 10 kg). All of needs of Saint-Petersburg are met by these surgeons, but they worry about newborns who have congenital heart diseases in other cities, but their only chance is surgery in the Bacoulev Centre for Cardiovascular Surgery in Moscow, but this centre only performs surgery on children over a year old.

'It's a well-known fact,' Dr Lubomudrov reflected, 'if a centre doesn't specialize in infant surgery, and can choose whether to operate on adults or children, the surgeons will decide on adult surgery – because it's not as much a liability as infant surgery. That's why we have a lot of new advanced cardiac centres in Russia but not one for the infants.'

Improved diagnostic accuracy for acute myocardial infarction

The role of magnetic resonance imaging (MRI) to assess the effect of therapy in patients with acute myocardial infarction was demonstrated in a series of papers presented at the 12th Annual Scientific Sessions of the Society for Cardiovascular Magnetic Resonance (SCMR).

Cardiovascular MRI offers the ability to measure after therapy the size a myocardial infarction would have had if no therapy had been performed (Salvage-imaging). This allows physicians to assess the effect of their intervention and thus to perform studies to optimise the benefit to their patients.

Before this new technique became available, this knowledge could only be generated to compare large groups of patients who underwent different treatment regimes to average the differences between the groups. With the new technique, these differences can now be corrected for and thus much faster progress towards individually optimised therapy can be generated.

'Using the new MR technique we have been able to show, in a relatively small trial of 220 patients, that therapy in patients after myocardial infarction can be optimised adding anti-oxidative agents to standard therapy,' said Holger Thiele MD (Leipzig University). 'We had known this from animal data before and could now demonstrate this effect in patients using MRI as an endpoint.'

Magnetic resonance imaging has already been established as an endpoint for cardiac function, size and measuring the size of irreversible myocardial damage after myocardial infarction. It is now expanding to a further endpoint for myocardial salvage in patients with acute myocardial infarction.

The 75th DGK Congress

In April, the 75th annual congress of the German Cardiac Society (DGK) was considered a great success, drawing in some 7,900 specialists. As predicted, the Syntax Study received a significant response. This compared the surgical bypass procedure with percutaneous coronary intervention (PCI) with stent implantation in patients with coronary heart disease. After one year, bypass surgery and PCI fared equally well in terms of mortality rates and heart attack risk. Catheter intervention was superior in terms of stroke occurrence, though significantly inferior in relation to the criterion 'necessity of repeated intervention after one year'. With all comparison criteria amalgamated, the randomised study resulted in an accumulated event frequency of 17.8% for PCI and 12.1% for bypass surgery.

Professor Bruno Scheller

According to **Professor Albert Schömig**, Director of the German Heart Centre in Munich, the Syntax Study results are not suitable for the assessment of the general superiority or inferiority of either procedure. 'The main problem with Syntax is not so much the study data, which are actually outstanding. The problem lies in the concept,' he argued. 'As its primary end point, the study has the combination of death, myocardial infarction, stroke and repeated revascularisation. However, because of the different importance of the individual components of this combined end point, one has to differentiate between complications such as death, myocardial infarction and stroke, which are clinically relevant for patients, and less relevant events, such as repeated revascularisation.'

His colleague **Professor Christian Hamm** (Bad Nauheim) similarly debated: 'It was probably too optimistic to include re-interventions in the statistical calculation because, compared to the surgical procedure, they occur so often that this alone would determine the outcome of the study. The difference between the two modalities lies in the occurrence rate of strokes and the frequency of re-interventions. However, one needs to question whether this can be considered to be of equal importance.'

The DEB SeQuent

The drug-eluting balloon (DEB)

At the congress, **Professor Bruno Scheller**, Head of Interventional Cardiology at the Clinic for Internal Medicine III, University Hospital Saarland, in Homburg/Saar, introduced a new procedure for restenosis. In cooperation with **Professor Ulrich Speck** of the Department for Experimental Radiology at Charité Hospital, in Berlin Mitte, he has developed a drug eluting balloon (DEB), which has now also been licensed in Europe for the treatment of stenosis of the coronary vessels. According to Prof. Scheller the DEB utilises the fact that there is no need for long-term drug elution to prevent restenosis in the long term. This also applies to existing coronary stents, so that no further stents need to be implanted. A further advantage of treatment with the DEB lies in the significantly lower requirement for the use of Clopidogrel

Meike Lerner (European Hospital) asked Professor Scheller about the advantages and current use of this novel dilatation device.

Meike Lerner: ***Drug-eluting stents (DES) have recently lost some allure. Has this driven research on drug-eluting balloons?***

Prof. Scheller: These were, in fact, parallel developments, partly because stents are not suitable for all patients, partly because restenoses are a problem, which also occurs after balloon dilatation without a stent implant. Since the late 90s we have worked intensively on ways to avoid restenosis. The double balloon used by the Tübingen working group was a major step forward, because it enabled us to deliver the drug in the vessel for

Debating the Syntax Study

a few minutes. In 2002, drug-eluting stents (DES) were introduced that made radiation therapy of the vessels superfluous and led to a virtual end of all research activities in this area. If there is something Dr Speck and myself can claim credit for it is that we continued our research – against all odds. In late 2003, we started a clinical study with the new balloon and, in 2006, we published the results in the *New England Journal of Medicine*.

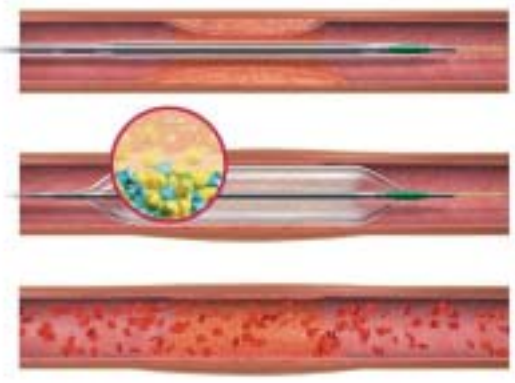


FOTO: SEQUENT®/B. BRAUN

Above: The DEB SeQuent is placed along the stenosis. Middle: The balloon is widened and the vessel re-opens. Below: The growth inhibiting agent (Paclitaxel) from the balloon surface is set free and provided directly to the vessel wall

What prompted cardiologists to look at DES more critically?

One major problem with drug-eluting stents is the fact that the surrounding tissue does not heal well due to sustained drug delivery. Therefore, cardiologists started to take another close look at balloons. Our drug-eluting balloons have been available for three years – but their time had not yet come.

Finding an industry partner to support our work was not so easy. From very early on we presented our concept to all major medical devices companies that are active in cardiology. However, they were not interested, because drug-eluting stents were considered the gold standard. So, B. Braun deserves major praise for placing their trust in us in autumn 2004 and making the coated balloon ready to market.

Have DEBs become part of the daily clinical routine?

As far as clinical indications are concerned, yes. DEBs have been on sale throughout Europe since mid-March. We changed our procedures in Homburg and are now using DEBs for all restenoses as well as smaller vessels — even so-called bifurcations undergo the new balloon technique – in short, all indications where stents failed to deliver convincing results. To what extent the new procedure will be integrated into the existing policies in other hospitals will depend on their planning and financial resources.

What role will DEBs play in the future, particularly compared with other stents?

Obviously, the allure of a new method starts where old methods fail. Thus, at this time, we consider DEB to be a complementary therapy. Nevertheless, we are currently conducting further studies to test drug-eluting balloons as primary therapy with stenoses in larger vessels.

Are there groups of patients for whom DEB is not a suitable option?

No, fortunately not. Quite the contrary: we treated a number of patients where tissue build-up required three or four restenosis and where, according to the surgeons, no suitable location was available for a bypass.

The drug eluting balloon catheter is blown up to widen position in the artery. When the balloon surface is in touch with the vessel wall the drug is freed and enters it and the carrier matrix disintegrates completely, which prevents non-residue cell proliferation

Even with those patients the drug-eluting balloons showed very good outcomes. Moreover, we are collecting data for peripheral DEB applications.

Is it possible to quantify the risk of a delayed restenosis in DEB patients?

Our clinical study covers two years, some interventions happened as far back as five years and as yet we have not had a single patient who presented with a delayed restenosis.

Test for low fingertip temperature detects coronary plaque

Results of five clinical studies evaluating the predictive value of VENDYS, a new FDA-approved cardiovascular test, were presented at the 2009 Annual Scientific Sessions of the American College of Cardiology in Florida. The studies indicate that a simple, inexpensive test that measures temperature changes at the fingertips can help detect hidden coronary artery disease.

Results from hundreds of tests of patients at the Cardiac CT Laboratory at Harbor UCLA, have consistently shown a strong correlation between low fingertip temperature rebound and a high burden of coronary plaques, said **Dr Mathew Budoff** (right), Associate Professor of Medicine and Director of the laboratory. 'The lower the temperature rebound, the more plaque build-up and blockage. This is truly amazing! This test is the only non-invasive, non-imaging, office-based test that I am aware of with such a high predictive value for detection of high risk coronary patients. We are seeing similar results in CT angiography, as well as nuclear, studies.'

The researchers examined patients with the new test before they underwent coronary CT angiography and a thallium nuclear scan. Those with coronary blockage and abnormal scan results often had low fingertip temperature reactivity. The team also studied apparently healthy individuals with a family history of heart disease, or with other cardiovascular risk factors. They discovered that the lower the fingertip thermal reactivity, the higher the chance of having a coronary blockage or calcium score >100 — both of which would place those individuals at a high risk of a future heart attack.

They now hope that, by measuring a dynamic marker of vascular disease, the test can fill the gap in existing cardiovascular risk assessment and complement traditional risk factor measurements as well as advanced, structural imaging tests, such as CAT scan and MRI.

'The technology was originally developed at our laboratory in the Texas Heart Institute while working on vulnerable plaque detection,' explained the VENDYS inventor Dr Morteza Naghavi. 'Despite exciting developments in intracoronary plaque characterisation, it became obvious to me that we needed a non-invasive and inexpensive way to screen and monitor at risk patients, simply because you can't cath asymptomatic people, nor can you put stable patients into CT or MRI machine every three months to evaluate their progress. Frankly, at the time, I didn't expect it to be so surprising in terms of its predictive value compared to risk factors. But now, looking at the data, it makes sense, because it does not measure an individual risk factor, like cholesterol; instead, it reflects vascular function, which is affected by numerous risk and protective factors, much like blood pressure. Furthermore, unlike coronary calcium or carotid IMT, it is a dynamic marker and changes quickly with the progression and regression of the disease.'

Dr Harvey Hecht, Chairman of the Endothelix Scientific Advisory Board and Director of Cardiovascular Computed Tomography at Lenox Hill Heart and Vascular Institute added; 'In terms of sensitivity and specificity for the detection of high risk patients, its area under the ROC curve is well above all traditional risk factors put together. If these findings are corroborated by others, it will be the first non-imaging test that has exhibited a predictive value close to that of imaging tests, which obviously are far more expensive and less suitable for mass screening.'

Protein cocktail directs production of new heart cells

A cocktail of proteins that triggers the production of new heart muscle cells has been discovered by **Benoit G Bruneau** and **Jun Kakeuchi** at the Gladstone Institute of Cardiovascular Disease, in San Francisco. 'The main focus at our lab is to understand how a heart becomes a heart, what cell lineage decisions take place to direct cardiac differentiation, and what morphogenetic and patterning processes occur to assemble all of the heart's components into a functional organ,' explained Dr Bruneau.

The researchers have identified three proteins that, together, direct the differentiation of mouse embryonic cells into beating heart cells. The proteins are a mix of transcription factors, which bind to DNA and influence gene expression and a heart-specific chromatin-remodelling protein. The new research, reported online in April by *Nature (www.nature.com)*, may prove a first step towards making new, therapeutically useful heart cells via cellular reprogramming, Nature points out. 'A damaged heart has little regenerative capability, so knowing the factors needed to produce new heart cells is of high interest. Although the authors used, as their starting point, mesoderm cells (the middle embryonic tissue layer that gives rise to muscle, bone and connective tissue), in theory their study provides a potential "recipe" that could be used to reprogramme other cell types to become heart muscle cells, a major goal of cell therapy.'

EuroPCR 2009

19-22 May Barcelona, Spain

EuroPCR 2009 is focused on minimally invasive cardiac surgery, but narrowing the broad field of cardiology does not make this conference any less complex. The 11,000 interventional cardiologists, cardiac surgeons, vascular surgeons, radiologists, nurses, and technicians expected at the 19th annual EuroPCR may again leave wondering who to believe, for the Late-Breaking Trial session promises to be another 'Powerpoint Marathon' of conflicting findings regarding the performance of a dizzying variety of bare metal, drug-eluting and bio-absorbable coronary stents. Industrial giants such as Johnson & Johnson, Boston Scientific, Abbott and Medtronic compete in what has become an $8 billion worldwide stent market, even though a clear-cut case for the cost benefits of these expensive devices have not yet been established.

The frequency of restenosis is a sensitive and difficult topic that EuroPCR will address in new sessions on secondary revascularisation, organised by Madrid's Hospital Clinico San Carlos. Minimally invasive techniques (MIS) used to place stents are increasingly applied as an alternative to open surgery. Two emerging practice areas singled out as topics in special sessions are coronary bifurcation lesions and transcatheter aortic valve implantation.

This year EuroPCR, organised by the European Association for Percutaneous Cardiovascular Interventions, attracted 564 high-quality abstracts, not counting the myriad clinical trials, with 250 to be presented over the four-day event in 44 themed sessions, such as coronary total occlusion and critical limb ischaemia. New techniques, new devices and new technologies for medical imaging, both external and deep within the arteries will be presented and demonstrated.

Live presentations of surgical procedures are to be transmitted from 12 hospitals in seven European countries, one each from Argentina, South Africa, and the USA. Featuring the surgeon on one screen and the patient's heart on another, these popular sessions attract up to 3,500 surgeons, some debating the demonstrated technique.

Sessions are organised around the organisation of patient care in hospital, involving three groups: cardiologists, nurses/technicians and radiologists.

A multimodal approach strengthens non-invasive diagnostics


Matthias Gutberlet

Matthias Gutberlet, Professor of Cardiac Imaging at Leipzig University and head of the Department for Diagnostic and Interventional Radiology at the Heart Centre in Leipzig, welcomed radiologists, cardiologists and nuclear medicine experts, in March, to the 2nd Non-invasive Cardiovascular Imaging Symposium. Their primary focus was on technological opportunities in cardiac and vessels imaging. Non-invasive procedures such as echocardiography, MRI, CT or myocardial scintigraphy already cover a broad spectrum in cardiovascular diagnostics and these will grow; a trend away from purely diagnostic interventions is clear. In an interview with Meike Lerner (European Hospital), Prof. Gutberlet summarised the most significant advances in imaging modalities, as well as their potential and limitations

Echocardiography is the work horse of non-invasive cardiovascular diagnostics. Has this developed?

Matthias Gutberlet: 3-D-echocardiography in real time has proved a useful tool, particularly in cardiac surgery to assess heart valves before and after reconstruction. 3-D-echocardiography has also shown promising potential for the imaging of the left ventricle. However, ultrasound procedures have their technological limitations, which is why we frequently dependent on other imaging procedures because of insufficient sonographic quality, particularly in the imaging of the right ventricle. To counteract existing weaknesses of individual non-invasive procedures, there is definitely a trend towards multimodal strategies.

Which procedures are included in those multimodal strategies?

This depends largely on the individual indication: MRI certainly delivers the most information, such as on tissue differentiation, vitality, function etc. However, there are also attempts at recording 3-D data sets through higher field strengths and faster imaging, to allow us to carry out reconstructions similar to those done using CT.

CT is currently particularly suitable for coronary diagnostics but, compared with the invasive heart catheter, is currently used relatively infrequently. I'm sure this will change in the future because the development of equipment with a lot more than 64 slices and improved rotation times will significantly increase the time resolution. Whereas achieving an image of the entire heart with the 64-slice CT normally still lasts over several heart beats the latest generation equipment can partly reduce this time down to just one heart beat. This has enormous advantages, both for the diagnosis of patients with higher heart frequency as well as regarding radiation exposure. Combined with perfusion analysis, i.e. an ischaemic indication for the clarification of haemodynamic relevance for the narrowing of a coronary blood vessel via stress-myocardial scintigraphy, stress-MR or stress-echocardiography, the data are already so good that a large part of diagnostics that is currently carried out using the heart catheter could now be carried out via non-invasive procedures.

Will cardiovascular nuclear imaging be overtaken by the rapid progress in radiological procedures?

No, it still plays an important role. PET is still the gold standard for quantification for the indication of ischaemia, i.e. the imaging of circulatory disorders of the heart muscle. At the moment there are also attempts using new tracers to make the perfusion visually analysable in the PET, which would make a complicated post-processing and evaluation of the data, such as currently still required, redundant. A further new possibility would be to combine the SPECT perfusion analysis with coronary imaging via CT. This would not necessarily entail using a dedicated machine, where both procedures run at the same time. It would be possible to start with a CT examination and to locate a coronary stenosis and then carry out the SPECT for the indication of ischaemia, and then to fuse both images afterwards. This would not be a problem from a technological perspective.

Are there new findings regarding the differentiation of plaques?

First, it's important that we achieve good images of the coronary arteries themselves. We have made a lot of progress over the last few years, using MDCT. This procedure alone allows us a good differentiation of the composition of plaques, such as calcified, fatty or fibrous components. Of course this is also possible with MRI, but so far has been predominantly achieved on vessels larger than the coronary vessels, such as the carotids. One important component of plaques is infection, which can basically be visualised well with the PET. A combination of MDCT and/or MRI and PET would therefore be the ideal procedure for plaque differentiation. The limitations here include, among others, the limited spatial resolution of the PET.

How did you convey these findings to participants of your symposium?

Apart from lectures and discussions the accompanying 'hands-on' courses, using CT and MRI, for the first time included live transmissions to the auditorium from the examination room, to give all participants practical experience in dealing with patients with cardiovascular diseases. We hope to continue this at the meeting of the European Society of Cardiac Radiology this October*.

** Leipzig, Germany 8-10 October 2009*

Comprehensive diabetic foot care

NEW CONCEPTS FOR A COMPLEX DISEASE

The Wound Care Unit at the Clinic Pasteur in Toulouse, France, was successfully set up to deliver a multidisciplinary approach to diabetic wound care. This necessitated the formation of a team* of specialists from many fields. Here, **Dr Philippe Leger**, who will lecture on this subject at EuroPCR 2009, discusses the reasons why this is a necessary concept to deal with the vexing problem of diabetic foot care — and how it works.

"Diabetes can damage the nerves in the lower limbs, which can lead to loss of sensation in the feet. Diabetes causes arterial damage, particularly in arteries below the knee. Neurological and arterial disease induce ulcers, and infection increases the problem and can lead to amputation. Diabetes is the leading cause of non-traumatic amputations (eight out of 10). 50% of these could be prevented by improved screening, along with earlier and more coordinated treatment. Indeed, 85% of amputations in diabetic patients are preceded by a foot ulcer. People with diabetes are 15% more likely to have an amputation than those without. We can sum up the problem by saying that 'someone, somewhere, loses a leg because of diabetes every 30 seconds of every day'. This complex and multifactorial disease requires a multidisciplinary approach, which is possible in a wound care unit or diabetic foot clinic. The international consensus on diabetic foot disease promotes the treatment of the diabetic patient by a multidisciplinary team.

Treatment must address all the factors involved in wound healing: We must offload pressure. Many diabetic foot ulcers are neuropathic ulcers and an important part off the treatment is reducing external pressure with different devices or special shoes. With ischaemic ulcers we need to improve blood flow by endovascular revascularisation or bypass. It is also necessary to treat any infection as soon as possible, because this stops, or delays, the normal wound healing process.

The aims of the multidisciplinary approach to the diabetic foot are numerous. They include diagnosis and treatment of the diabetic foot; obtaining optimum glycaemic control to reduce all complications; controlling other cardiovascular risk factors e.g. smoking, dyslipidaemia, hypertension; enabling patients' education and coordinating surveillance of other complications.

The multidisciplinary approach to the diabetic foot is ambulatory care, with a care co-ordinator who is a diabetologist, angiologist or surgeon. In addition to the physician, team members are nurses, podiatrists, orthotist and educators. Access to different specialities is necessary to investigate and treat the disease. We need non-invasive vascular laboratory (duplex-sonography TcpO2), radiology with MRA/MRI, CT scan, biology, interventional radiology, vascular and orthopaedic surgery and cardiology. Sometimes it is necessary to hospitalise patient in a department that specialises in these diseases.

When we created the Wound Care Unit we had to address a variety of problems: We organised patient care with a wound care nurse specialist; we chose the care coordinators and recruited the staff: podiatrists, surgeon, orthotist, and organised their work; from international guidelines we created our own; we formalised multidisciplinary meetings to create the links between different staff involved in wound care, we organised therapeutic education, we informed GPs, diabetologists, angiologists, cardiologists and surgeons of our area. After all this, communication was improved between the different specialist teams and a multidisciplinary clinic was created.

The activity increased very quickly. At present 12-15 patients per day are referred to the Wound Care Unit. The number of arteriographies and interventional endovascular revascularisation has increased by more than 6-fold.

We hope that by this approach we can save feet.

Review of the literature shows that efficient organisation of prevention and care by a multidisciplinary team reduces:

- ulcers and amputations by 50–80%
- significantly the occurrence of ulcers in risk patients
- the time for complete healing
- the recurrence rate
- the incidences of hospitalisations
- length of hospital stays by allowing faster ambulatory care

And, it is cost-effective.

The main problem is that the administration cannot yet understand the importance of the coordinated wound care unit, both for a patient and society. In fact, there are not enough wound care units to give all patients equality of care. "

** The Wound Care Unit team: Dr P Leger, Dr F Branet, Dr A Sauguet, Dr C Jordan, Mme S Zalateu and Mme F Creach.*

ANGIOPLASTY GAINS NEW BALLOON CATHETER

Voyager NC, a new coronary dilation catheter with a high-pressure capability designed to optimise coronary artery treatment during angioplasty procedure, can be used for both pre-dilatation and post-dilatation procedures, the manufacturer Abbott explains, adding: 'Surgeons can use it to navigate tortuous anatomy and open up lesions before a stent is delivered, or expand a stent more precisely against the vessel wall after it is implanted.'

The catheter comes in a several diameters (from 2-5 mm) and lengths (from 6-25 mm) on a rapid exchange delivery system. 'When choosing a dilatation catheter, one of the key attributes interventional cardiologists look for is the ability to accurately deliver the balloon to the target lesion, particularly in challenging coronary anatomy,' said **Dean J Kereiakes MD**, medical director of the Christ Hospital Heart and Vascular Centre in Cincinnati, Ohio. 'Voyager NC delivers on its promise as a high performance balloon dilatation catheter with high-pressure capability, frequently making difficult cases easier, even when treating the most challenging lesions.'

Proprietary technological advances engineered into the new catheter include:

- A specialised tip with a smooth, rounded shape designed to deflect off stent struts and enhance balloon delivery through stents.
- Flexible tungsten markers designed to help surgeons navigate through arteries and properly position the balloon within a treatment area.
- Bi-layer balloon material designed to make the balloon thinner and more flexible, enabling controlled balloon growth.

Voyager NC is the latest among Abbott's vascular products. Others in development include a bio-absorbable drug eluting stent, a peripheral drug eluting stent, and the firm's next-generation drug eluting stent, the Xience Prime Everolimus Eluting Coronary Stent System.

NEW

Data management system automates ECG processing and storage

Agfa HealthCare has released the latest version of its IMPAX HeartStation, a comprehensive management system for electrocardiograms (ECGs). Built on standards-based architecture, the system supports most existing and new ECG devices, integrating easily with the legacy hospital and clinic IT infrastructure and ECG workflow, Agfa reports.

The system also provides expanded compatibility with ECG carts from many manufacturers (e.g. GE, Philips, Mortara, and Schiller), which allows users to continue using their carts, or to have a flexible choice of new carts, the firm points out.

Designed to meet the varied needs, analysis and workflow patterns of large or small institutions, within a single, unified system, IMPAX HeartStation provides a single access point to previous and current ECG examinations in a familiar, easy to read format. Study data from multiple examinations can be rapidly accessed for review, serial comparison, editing, and electronic signing of ECGs throughout a hospital. Data sharing with IMPAX Cardiovascular, or any cardiovascular information system (CVIS) or electronic medical record (EMR), means that ECGs can be accessed within the cardiovascular patient record and reviewed along with other images and reports.

By including ECGs as part of the patient's web-accessible cardiology record, IMPAX HeartStation provides the tools for rapid review of computer-generated reports and easy comparison of ECGs from multiple devices. It provides full integration to CVIS and hospital workflow, and reconciliation of patient demographic data, orders, and billing, Agfa adds.

Source: Agfa Healthcare

Intensity-modulated radiotherapy

IMRT is an evolving method of treatment for complex forms of cancer. Although patients benefit from treatment, a precise evaluation of that benefit and overall cost-effectiveness of the method is still an uncertain science. *Mark Nicholls* reports

Tom Roques

By using computer technology, intensity-modulated radiotherapy (IMRT) provides a precise and targeted dose of radiation to treat the exact size and shape of a tumour whilst sparing adjacent healthy tissue as much as possible. It is proving an innovative tool for treating cancers that have traditionally been difficult to target because of their nature and proximity to crucial structures within the body, such as cancers of the prostate, throat, and those close to the spine.

Because the radiation dose is as targeted as possible, explained consultant oncologist **Dr Tom Roques**, of the Norfolk and Norwich University Hospital (NNUH), England, it reduces the risk of side effects.

As part of the evolution of its IMRT treatment, NNUH is preparing to use *RapidArc*, which allows the IMRT beam to deliver an arc of treatment, thus speeding up radiotherapy delivery and enabling even better treatment plans. Leading university hospitals in Germany and Switzerland (the university hospitals at Gottingen and Zurich) also recently began to use RapidArc IMRT for head and neck cancers.

NNUH also uses portal dosimetry to verify the radiation dose — at one stage one of only two centres in the world to use this.

NNUH remains one of the few UK hospitals to offer IMRT routinely, though Dr Roques explained that, while it appears to have benefits to patients, precisely quantifying that benefit and the overall cost-effectiveness of IMRT is still an uncertain science. However, he added that IMRT offers a high quality dose map and is an effective way of treating unusual or concave tumour shapes. 'With IMRT you can move little bits of lead across the radiation beam while it is turned on, so in effect you turn it into thousands of tiny beams and change the dose of each one. Through the computer software, we can treat a more complex shape. The idea is that you avoid healthy tissue and therefore reduce side effects.' Equally, he added, if you want to keep the level of side effects the same, he said, you can increase the dose offering the prospect of better survival rates.

The key difference with IMRT is that the radiotherapy treatment map is better than a standard treatment map. 'But that does not necessarily mean the patient will be better off or will be more likely to be cured. That is a gap that people have assumed, but is as yet unproven and may be difficult to prove.' Dr Roques pointed out that a lot relies on computer software, which is evolving, though IMRT can be relatively labour intensive. 'The time taken to produce a dose map is quicker than it used to but, but the time was a major barrier to many centres taking IMRT.'

The precision of IMRT has benefits when treating head and neck cancers because IMRT allows better avoidance of the salivary glands and reduces the risk of a dry-mouth for the patient. 'In prostate there is less risk of damage to the rectum, which is a long-term complication of conventional radiotherapy, so in that respect it can actually be better for the patient.'

Dr Roques said the physics of radiotherapy remains far ahead of the biology of cancer with the challenge for the oncologist still in ensuring exactly where you need the dose - avoiding healthy tissue but not missing smaller areas of cancerous tissue in the process. 'The weakest link in the whole chain is the doctor drawing on where the tumour is. We work quite closely with our radiologists who are expert at looking at images to help us define the volume to be treated.'

Dr Roques and his team are undertaking various elements of research to improve and further define the benefits of IMRT: looking at how radiologists can help the oncologist define the treatment volumes; the use of PET scanning after radiotherapy to ensure the tumour has all gone; and about to most accurately draw round the salivary glands they are trying to spare.

From the summer, NNUH is also introducing IGRT (image-guided radiotherapy), which offers a CT scan on the radiotherapy machine to enable more accurate patient positioning and targeting of the radiotherapy dose.

Ultrasound-MRI fusion imaging

Promising research aims for precise, consistent, gentler prostate biopsies

Tissue removal is currently the only way to verify suspicious lesions in the prostate. It is also a key requirement before treating prostate carcinomas. The standard biopsy is performed with transrectal ultrasound (TRUS) to guide the needle in the right direction. However, the ultrasound visualises only general outlines of the prostate and cannot reliably detect the location of the carcinoma. This means that tissue samples are, in effect, taken blindly and randomly in sextant regions of the prostate, leading to varying success rates and often to an increasing number of biopsies.

Philips Research is working on an ultrasound-MRI image fusion system to achieve greater accuracy during biopsies. The new technique superimposes pre-captured MRI scans onto 2-D ultrasound images so that urologists can see both the biopsy needle and potential tumours simultaneously. The technology is currently being clinically evaluated at Radiology and Imaging Sciences Department, at the USA's National Institutes of Health Clinical Centre (NIHCC), where physicist **Dr Jochen Kruecker**, Principal Member of Research Staff with Philips Research, is currently based. *Karoline Laarmann* (European Hospital) asked him how fusion-guided prostate biopsy works and about its future potential.

'We already successfully perform fusion-guided biopsy for the kidney and liver,' he explained. 'The difference is that we use pre-procedural CT scanning in these applications. By contrast, MRI enables precise soft-tissue visualisation in the prostate. Up to now, the difficulty was to hit the MRI findings later on with the ultrasound. So the idea was to combine the best of both worlds: the accurate diagnostic information from pre-acquired MRI and the real-time anatomical information from the ultrasound image. This is done using an experimental multi-modality interventional workstation together with an electromagnetic tracking system. There are miniaturised sensor coils integrated in the biopsy needle, biopsy guide or ultrasound probe, which work like GPS chips. They receive electromagnetic signals that allow the system to determine the actual position of the devices. Then the system generates a fusion view of the live ultrasound image with the pre-acquired MR image and corrects it if necessary, for example, when a patient moves during the procedure.'

In the clinical studies, the primary target group will be patients who had a prior failed biopsy, Dr Kruecker explained. 'In about 20% of cases, the standard sextant biopsy misses the cancer. So there is quite a high number of patients who have reason to believe that they have cancer because of other diagnostic tests, but as long as the biopsy does not supply evidence, therapy cannot be initiated. So the biopsy has to be re-done – and it's not guaranteed that if you repeat a standard biopsy it will find the cancer that was missed the first time, especially when the cancer lesion is small, or located in a difficult area. Certainly, using the fusion-guided procedure may not improve results for all patients. MRI is not the perfect solution for everyone – it might miss certain cancers, or show something suspicious that turns out to be benign. So there will definitely have to be a selection depending on the specific diagnostic picture. Nevertheless, our first results show a high correlation between the suspicion level assigned by radiologists reading the MRI and our positive fusion-guided biopsy rate.'

The research is currently at the single-centre clinical study phase. 'That means, we are doing both: the standard 12-core sextant biopsy with 2-D ultrasound imaging and then the

targeted fusion-guided procedure,' he explained. 'The patient population includes men with elevated PSA and/or abnormal digital rectal examination; men with a history of elevated PSA but one or multiple negative TRUS-guided biopsies, and men with known low-grade prostate cancer who are on "watchful waiting". Next, we are investigating the possibilities for a multicentre study, for example in the USA. Based on the clinical results from such a study, the decision can be made to start the development of a commercialised version of the tracking software. A preview of the results of the technology will be presented at the *2009 Annual Meeting of the American Urological Association* (25-30 April).

Could this technique be applied in other fields? 'We are demonstrating the feasibility of the technique now for prostate biopsy but it may have an even bigger impact on minimally invasive focal therapy like ablation procedures. In recent years, the idea of using focal therapy in the prostate has gained a lot of momentum, but the image guidance has always been the problem. Our technology may open the door to an effective delivery of focal therapy to the cancer lesions that are identified in the MRI. Therefore, at the NIHCC, we are just preparing to begin preclinical and clinical work to translate the technology from a diagnostic application to therapy.

THE FUTURE IS DIGITAL

The DX-D 500

Christian Reinaudo

Agfa HealthCare is ready for a new dimension of digital radiography

At ECR healthcare manufacturers not only introduced the latest products, but also the future technologies and trends that will have an impact on the market in the coming years. Radiology would not be the innovation driver in medical technology without the hard- and software behind it, and as a result, it was no surprise that digitisation was again one of the hottest topics in Vienna.

With the launch of its new, direct radiography family, DX-D, at ECR, and at the German Radiology Congress (DRK) this May, Agfa HealthCare responds to hospitals transformation from traditional film/cassette business into the digital world with Computed Radiography (CR) and Direct Radiography (DR). 'We are expanding our offering beyond CR with the new DX-D line for DR solutions because we feel the time to access direct radiography is now,' says **Christian Reinaudo**, President of Agfa HealthCare.

With over 19,000 CR units installed to date, Agfa HealthCare already enables hospitals and healthcare facilities to switch from analogue to digital, and eventually to fully fledged IT solutions for diagnostic imaging. Thanks to its high image quality and potential for dose reduction, specifically with its DX-S system that delivers DR quality results in a CR unit, Agfa HealthCare observes a growing acceptance for digital radiography solutions. The main advantage of direct radiography – as the name indicates – is its instant visualisation of images without any need of processing. While CR already accelerates the workflow in the radiology department compared with conventional methods, it still includes manual work steps – with DR everything is automated. Because the detectors of the DX-D solutions are delivering almost real-time previews on the workstation and very fast cycle times, productivity is pushed to the maximum.

That's why Christian Reinaudo and his company believe that despite, or even more so because of the financial and economical pressure on hospitals, the demand for DR will increase. 'The global economic downturn may slow down the transition to digital radiography, but it will not stop it', he says, optimistically. 'Our company is present in both the consumable business producing medical film as well as in the investment business with digital radiology and IT projects, and this puts us in a good position. Besides, most people already begin to understand that a targeted optimisation of medical technology and equipment leads to cost savings in the long run. Therefore, to push ahead the progress, affordability of DR solutions is definitely one of our main goals.'

The first member of Agfa's DR family, comprising both single detector and multi detector configurations, will be the DX-D 500, which was specially designed for high-volume departments and imaging centres as well as emergency departments right up to paediatric. It is a direct image system that yields immediate previews on the acquisition workstation. The system configuration is adaptable to almost any facility's specific diagnostic needs. When a specific type of examination is selected, the appropriate X-ray settings are automatically transferred and displayed on the X-ray generator console. For full flexibility it also can be combined with a CR room, as a hybrid solution. The NX touch-screen workstation and the MUSICA^2 gold standard image processing software have been adapted from the company's CR system but have been specifically tuned for DX-D, resulting in the same look and feel of the image and the same workflow on the workstation. The system communicates seamlessly with PACS, HIS and RIS. With the same look-and-feel of the different components an efficient and user-friendly workflow is achieved.

DX-D 500 availability: mid-2009.

'Children are at the other end of physics'

SMALL PATIENTS CHALLENGE TODAY'S IMAGING

As in every medical field, children have special needs in radiology. Increasingly aware of this – and just as they must adapt scanners for increasing numbers of obese patients – manufacturers are sharing lively exchanges with practitioners to develop the most advanced equipment available for very small patients. At the Medical University in Graz, Austria, which has taken a lead in this endeavour, *Meike Lerner* asked **Professor Erich Sorantin** (below), of the Clinical Department for Paediatric Radiology, about the challenges in this field and ways to overcome them

'The main difference is definitely the size: With children we are, in the most extreme cases, talking about a body weight of 400 grams compared with, for example 120 kg in a grown man – this corresponds to a mass factor of 300. Additionally, in paediatric radiology we are familiar with a whole range of indications and cover all areas: orthopaedics, cardiology, oncology but also neurology. We really do see the patient as a whole.

'Up to just a few years ago, imaging in paediatrics was tagged on to adult imaging. For a long time we tried to adapt the possibilities in adult diagnostics to children. However, although there is a common technological development, with children we have to work with very different factors and base our work on very different parameters. For example, for a simple lung X-ray we had to adapt the software for the post-processing of an examination especially to work with children, because we couldn't work with the standard solution. We then developed a solution with the manufacturer. It took us 18 months to adapt the first digital radiography system to the needs of children in 1995. With a further installation in 2003, a flatbed scanner for projection radiography, we also had to do a lot of work to adapt the post-processing software. The company – Siemens at the time – then introduced their own release to the market.

'We should look at it this way: Children are at the other end of physics. Everything we do here will ultimately benefit adults. And the new developments, such as PET/CT or hybrid systems respectively, generally have to be evaluated in a very different way for children. For example, with children we have to work with low contrast resolutions because of the lower proportion of fat. In short, we have to put the cart before the horse and start with the smallest – they need the largest equipment.'

What equipment is suitable for very small patients?

'With X-ray systems there is a relatively simple model: We know that you can "simulate" the abdominal mass of children

fairly well using Plexiglas and we also know how to measure the relevant diameters subject to age. By choosing the appropriate Plexiglas pane (available in panes of 1cm) we can take phantom images for different ages and parameter tests. Then, for example, we fit a stomach tube, endotracheal tube or a strip of gauze to see whether you can actually see these on the X-ray image. This means that, with the help of a simple phantom, we can determine whether the equipment is suitable for children.

'Of course, we also work with more specific procedures, such as the Wellhöfer phantom to carry out differences in the thickness or quantifications, or to vary the dose, and to analyse dependent parameters, such as image noise. In Graz we've already developed a programme specifically for these tests, which we can use to carry out these adjustments.

'In addition, we have to consider physiological changes: a child triples its weight in its first year of life but only doubles its height. Further changes are that the bones calcify based on age – younger children have lower bone density and a higher proportion of cartilage etc. These changes must all be fed into the examination protocols. Therefore we require data from very different medical disciplines to bring them together. From this process the result is certain protocols, which we try to standardise. The CT scans in preparation for funnel chest surgery, for example, in 99% of cases are carried out in the ultra-low dose mode because this is often only about the deformity.

'Thanks to imaging we can carry out many more examinations these days, but now these exams must become even more subtle because we need more precise therapy gradings

'It is decisive that developments – also those in the industry – lead to a point where children are no longer seen as small adults but where specific solutions are developed for this group of patients.'

SuperPACS™ Architecture

A system that integrates legacy systems and multi-sites

A familiar dilemma spans healthcare institutions and services worldwide: the means to access an increasing image and data volume on more workstations at an increasing number of locations. What today's healthcare personnel need is a super communication system and, ideally in terms of hospital budgets, one that will seamlessly integrate existing systems.

This explains the interest in a new offering at the Carestream Health stand at this year's European Congress of Radiology in Vienna. The company was exhibiting its *SuperPACS™ Architecture*, a 'work in progress' that can integrate and match data from different manufacturers' systems and modalities and distribute that information to workstations located within a hospital or beyond – all without incurring additional investment in a new PACS and storage devices. By synchronising disparate PACS, images and reports can be automatically returned to the original PACS or RIS for local storage and distribution. The ability to create a global work list and apply intelligent rules will provide the ability to balance the workload, so that examination captured throughout the institution can be read by radiologists in any on- or off-site location.

The intelligent architecture, which supports multiple patient identification numbers using IHE profiles, also equips radiologists with PowerViewer, which contains a unified set of powerful diagnostic tools. It enables real-time volume matching and automatic registration for CT, MR and PET/CT images. When examining a patient's case, results from different modalities can be matched easily and the images even adjusted to a certain angle to ensure the same perspective in each.

In summary, the PowerViewer:

- Builds a single virtual study with real-time volume matching of all relevant studies (new and previous) to automatically register and synchronise them in one click.
- Provides new native PET/CT reading with tools for image manipulation, including fusion, synchronised views, standard uptake value and volume matching comparison of current and prior cases.
- Offers the ability to save a 3-D view as a bookmark, so that this can be shared easily by several specialists located in different departments or areas.

SuperPACS Architecture from Carestream Health will next be on show at the German Congress of Radiology (Berlin, 20-23 May), and available to order in the second quarter of this year.

Radiologists and patients prefer CO_2 insufflation

Many randomised trials have shown that endoscopic colonoscopies as well as virtual colonoscopies via CT scans are equally efficient in detecting colon polyps and tumours. With an endoscopic examination suspicious mucosal findings can be investigated by biopsy and polyps can be removed. However, causes for argument against this method include the incomplete examination, often severe pain and a higher rate of colonic perforations. Inevitably, patients who have experienced virtual colonoscopy via CT scan prefer this method.

A recent development from ulrich medical has further diminished the appeal of endoscopic colonoscopy. When using the latter, the colon is usually distended by insufflation of room air. In this process no continuous pressure control is provided. 'By using ulrich medical's CO_2 Insufflator for CT colonoscopies, filling the colon with constant pressure by applying medical grade CO_2 gas can be ensured', the company explains. 'Due to the automatic pressure control of the device and the fast re-absorption of CO_2 compared with room air, an examination is more comfortable for the patient. Additionally, with CO_2 insufflation the diagnostic results are improved, because the constant pressure prevents the collapse of sections of the colon.'

ulrich reports that, during a case study to test its CO_2 Insufflator, which carried out with the help of radiologists at Dortmund Teaching Hospital, all the radiologists involved agreed they would choose it in preference to the traditional technique.

Details: www.ulrichmedical.com

AUSTRIA'S GROUND-BREAKING ION-THERAPY AND RESEARCH CENTRE

From 2014, MedAustron expects to treat 1,200 cancer patients annually


Ramona Mayer

Not long after the first earth was moved on a site in Wiener Neustadt (Vienna's Newtown), in the County of Lower Austria, and tests were carried out to ensure the long-term stability of a particle accelerator and weighty equipment in treatment and research facilities, we spoke with **Professor Ramona Mayer**, Medical Director at EBG MedAustron GmbH, about the firm's planning and future operation of the MedAustron Centre for Ion Therapy and Research.

'MedAustron was conceived as a Treatment and Research Centre in cooperation with all Austrian university hospitals and departments for radiation oncology,' Professor Mayer explained. 'The Centre will include a circular accelerator, radiation treatment facilities for medical use, with accompanying biological and physical radiation planning, as well as diagnostics and radiation facilities for non-clinical, fundamental research.'

Clearly a project of this size presents an enormous challenge. Is it supported by other organisations?

We have gained two important, international cooperation partners. On the one hand there is the European Organisation for Nuclear Research (CERN), in Geneva, which shows that fundamental research also plays an important part in the MedAustron project. On the other hand, we also closely cooperate with the Italian Centre for Oncological Hadron Therapy (CNAO). The CNAO together with the Italian Institute for Nuclear Research (INFN) has already planned and built a facility similar to MedAustron in Pavia. We can therefore benefit from their experience in the practical implementation and operation.

How is the project financed?

First we planned a public-private partnership. However, for various reasons this model did not work. Luckily, the politicians in Lower Austria decided to promote the areas of research and development more specifically, which is why the state parliament granted MedAustron a credit guarantee of 120 million euros. Added to this are 46 million euros from the state, i.e. the Republic of Austria, and Vienna's Newtown is also participating financially — it provided the land free of charge. The rest is funded through venture capitalists.

Are the plans on target?

Yes, absolutely. At the end of last year the first soil samples were taken at the future building site to advance the technological planning of the buildings. The next hurdle, at a bureaucratic level, is an environmental impact assessment, which is to be submitted this summer. If everything goes to plan building can start in the autumn of 2010. About three years later we hope to start the test phase of running the centre, with a target to treat the first patients in 2014.

Will it be possible to utilise the accelerator for research as well as patient treatments on a daily basis?

Our objective is to do both, so we will operate a multi-shift operation. From 6:00 am to 10:00 pm the particle accelerator will be at the exclusive disposal of patients. We will build the facility in a way that radiation will either be directed into one of the three treatment rooms or into the research room, where the scientific studies will be carried out after 10:00 pm. Weekends and Bank Holidays will also be reserved for the researchers.

Which illnesses benefit from proton therapy?

Basically proton therapy is suitable for all deep-lying tumours where the surrounding tissue must be spared. The German Society for Radiation Oncology (DEGRO) has compiled a list of indications. Of course you always have to keep an eye on the eligibility for reimbursement of the treatment. Our strongest wish is to be able to offer proton therapy to all patients and to prevent a two-class medical system.

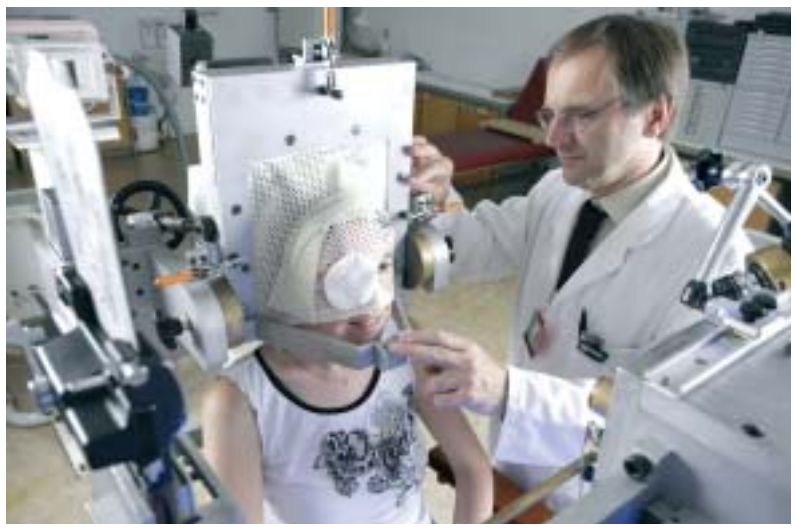
How many will the centre employ?

At full capacity we hope to treat 1,200 patients a year at MedAustron. About 90% of these will be treated as outpatients. Therefore the size of this department will be correspondingly large: around 100 staff, including doctors, medical physicists and nurses and so on, will look after the medical side of the facility.

The University of Applied Sciences, in Vienna's Newtown, is offering a new, English-speaking course on ion-radiation therapy. This training, referred to as Med-Tech, will serve to qualify radiation technologists who already have the Bachelor or Master's degree. Although we have the specific requirements of our centre at the back of our minds the Med-tech course also complies with international standards.

20 years of hospital-based

Although the potential of proton therapy was recognised over half a century ago, and since its development is now known to deliver a radiation beam accurately into a tumour without damaging surrounding tissue, high equipment costs limit its general introduction. *Mark Nicholls* reports on a British hospital with two decades of experience in its use – and value


Dr Andrzej Kacperek, head of the cyclotron centre at the Clatterbridge Centre for Oncology (CCO), with patient undergoing proton therapy

Proton therapy has a number of advantages over conventional radiotherapy techniques, particularly when treating paediatric tumours. However, while the treatment is available in the USA and European countries, e.g. France, Germany, Switzerland, there remain many states where there is no proton therapy or only limited treatment available. Among these is the UK, where the only centre – at the Clatterbridge Centre for Oncology (CCO) in Merseyside – specialises in treating tumours of the eye with proton therapy.

Dr Andrzej Kacperek, head of the cyclotron centre, is a strong advocate of proton therapy and the CCO, with others, is actively campaigning for the establishment of specialist centres in the UK where proton therapy can be offered to treat tumours in children and brain tumours.

Proton therapy is expensive; machinery costs up to 77 million euros, but Dr Kacperek argues the benefits to patients are now clear and cost effective to a health system.

Proton therapy, which uses heavy nuclear particles, is a sophisticated form of radiotherapy that can administer an effective beam of radiation onto a tumour, with the accuracy of a fraction of a millimetre in the case of eye tumours. Due to their relatively large mass, protons do not scatter,

BORDEAUX'S CENTRE OF EXCELLENCE FOR SPORTS MEDICINE

Open MRI not only provides good clinical images for musculoskeletal diagnoses, but also makes it easier to accommodate big-bodied sportsmen

France – Housed in a smart, modern building in beautiful Bordeaux, the Centre D'Imagerie Osteo-Articulaire, at the Clinique du Sport de Bordeaux-Mérignac, is well known for treating musculoskeletal injuries. 'We specialise solely in musculoskeletal examinations and interventions,' confirmed Dr Lionel Pesquer, one of the centre's eight orthopaedic radiologists, all of whom are qualified in subspecialties such as knee, shoulder wrists or joints 'Our patients are professionals, semi-professionals and amateurs athletes, such as soccer and rugby players, ballet dancers, skiers.' Patients travel to the centre from all over Europe.

The centre's approach is truly holistic. It provides a sports medicine and trauma centre, orthopaedic and sports surgery; a radiology centre that provides traditional and interventional bone and joint radiology, arthrography, ultrasound and MR; a cardiology unit that carries out cardiac stress tests and coronary angiographies for example; a Neurology division providing electro-physiology (EMG) and electro-encephalography (EEG), plus departments focused on Podiatry and Orthotics. In addition, the physiotherapy department, with its team of nine physiotherapists, rehabilitates patients undergoing knee replacement, osteotomy, ACL hamstrings reconstruction or surgery for shoulder instability or rotator cuff pathology.

Equipment in the physiotherapy department includes two isokinetics machines (Cybex norms and Cybex 340), 3 kinetechs, several rehabilitation stations and an area for strength, function and endurance recovery.

The centre also has two X-ray rooms with remote control, and facilities for dynamic X-rays for interventional radiology; a digital, high definition development machine with radio luminescent screen, and ultrasound equipments with high definition probe (until 17 MHZ) - Vein and artery colour Doppler. All the examinations are available on the PACS for internal or external clinicians.

About 16 months ago, the centre opened its MR department, which is now equipped with a 0.35 Tesla open MRI system, the *Signa Ovation HD* manufactured by GE Healthcare. The system uses a permanent magnet, high definition applications and high-density coils.

'A kinematic device can be used complementary to the coil so that a scan is made while the patient flexes his knee. For example, it allows better visualisation of the posterior cruciate ligament tears,' said Dr Pesquer. `The scanner performs also accurate images for the extremities – feet, ankles – which are sometimes difficult to scan. The high resolution images obtained with the MR scanner enable the radiologist to better visualise the lesions and therefore provide enough details to the surgeons to operate.`

'The performance of the 0.35T scanner is almost equivalent to 1.5T for ligament lesions but remains limited for partial ligament tears and cartilage lesions for which 3T is the gold standard,' explained Dr Pesquer.

The clinic scans about 23 cases daily. For an open MR 0.35 T, Dr Pesquer explained, the average throughput is about 15 to 17 patients per day. 'The actual examination takes about 20 minutes, but we make appointments for every 30 minutes, because we have to install the patient, which takes time. So we scan two patients an hour.'

When assessing injuries, the Bordeaux team have found that the openness of the magnets is not only easier for patients but also the user. 'It resolves the problem of performing musculoskeletal examinations that can be difficult and/or uncomfortable for the patient on cylindrical MR scanners, due to the traditional tunnel constraints,' Dr Pesquer pointed out.

Laying on the Signa Ovation HD table a patient is surrounded by 210 degrees of open space, which not only makes positioning easier, but helps those who suffer claustrophobia (as well as the elderly and nervous children). However, another vital aspect for the sports medicine centre is that this MRI scanner is far better suited to very large patients, such as rugby players or the bigger athletes.

The centre clearly has a constantly increasing bank of valuable information on injuries and their diagnoses. To ensure such knowledge is shared, it operates a subscription website (*www.image-echographie.net,* languages: French and English) that is fed new case histories every day to further radiologists' medical education. The user can simply type in the name of a piece of equipment to find related musculoskeletal cases on every anatomy.

The centre also organises sports medicine radiology workshops, which are held at the premises in Bordeaux. *Further details: www.clinic-ortho-bordeaux.com*

proton therapy

with the beam conforming to the tumour shape. This leaves other surrounding tissue unaffected and unharmed – unlike conventional radiotherapy - and leads to minimal side effects, which is what makes it suitable for brain tumours or for paediatric tumour treatments.

'With proton therapy we can minimise the dose to the critical tissue so we do not damage otherwise healthy tissue and vital organs,' Dr Kacperek explained. 'Because children are so small, there is the increased risk that healthy tissue could be affected by conventional treatment, whereas proton therapy reaches only the tumour site and little else. Patients tend to live longer and get their treatment at a younger age but more significantly, with proton therapy there is less chance of secondary tumour induction.'

The potential of proton therapy was first realised in the 1950s, he pointed out, but did not develop until the 70s, primarily and crucially due to the ability to precisely identify the tumour site with 3-D imaging and direct the proton therapy beam to it. That precise identification has only been available with the advent of 3-D CT scanners.

Proton therapy has a high success rate. With eye tumour treatment at Clatterbridge, Dr Kacperek said there is a 98% chance that the eye will remain tumour free after five years depending on tumour size.

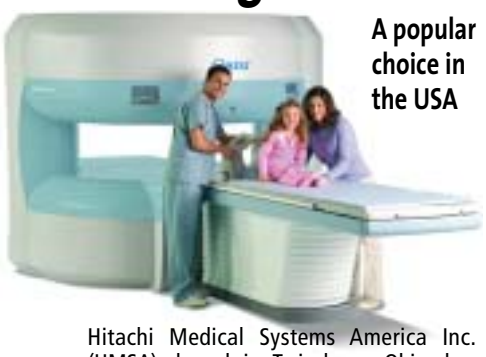
While Clatterbridge offers proton therapy for eye tumours in the UK, children or patients with brain tumours have to travel to the USA or France for treatment.

Dr Kacperek believes proton therapy is not more widely available in the UK due to the cost of the cyclotron equipment necessary to facilitate the treatment (though US scientists are currently developing smaller and cheaper accelerator systems), and a lack of consensus between UK oncologists over whether proton therapy is needed. In this country, the Department of Health (DoH) has formed an expert advisory group to establish a framework for development for proton therapy services. In the meantime, it will make funds available for a number of cancer patients to be referred overseas for high energy proton treatment.

Eventually, Dr Kacperek would expect to see two proton therapy centres established in the UK to meet the demand. He believes that, despite the cost, such centres would benefit the NHS and patients, offsetting the cost of treating patients who sustain side effects from conventional radiotherapy treatments. 'These centres would also mean parents not having to take their children abroad for treatment, with that expense plus the upheaval and trauma of having to go overseas for several weeks. It would also increase the knowledge and skill base of clinicians and clinical scientists in the UK.'

Clatterbridge, the world's first to have hospital-based proton therapy, is about to mark its 20th anniversary of offering proton therapy treatment for eye tumours. With the establishment of the DoH advisory panel, Dr Kacperek is now more hopeful of progress in the development of UK proton therapy services than he has been over the last two decades.

Oasis high-field MRI



A popular choice in the USA

Hitachi Medical Systems America Inc. (HMSA), based in Twinsburg, Ohio, has over 1,500 MRI installations throughout the USA. The company also markets multi-slice computed tomography and digital ultrasound.

Last August, Hitachi completed its first OASIS™ high-field open MRI installation. The system went into clinical use at St Mary Medical Centre in Langhorne, Pennsylvania, in a multi-million dollar MRI expansion of St Mary Imaging 'As technology has continued to progress, the differences in image quality and patient comfort have been minimised,' said Dr Daniel Cohen, Medical Director of MRI at the centre. 'We now can offer patients the security of a spacious design for added comfort during scans while simultaneously providing the most accurate scan results to aid physicians in their diagnoses.'

OASIS™ delivers high speed gradients, multichannel RF technology and the unmatched Zenith RF Coils to the only truly open architecture high performance systems ever installed, Hitachi reports. 'We are very excited about our relationship with St Mary Medical Centre and are proud to see our first installation in a facility dedicated to excellence,' said **Sheldon Schaffer**, HMSA's Vice President and General Manager for MRI.

In September, Metro Imaging, a radiologist-owned and operated group based in St. Louis, Missouri, became the first outpatient imaging centre in the US to have the Hitachi's OASIS™ system. A second OASIS™ MR system was to be installed at another of its centres soon after.

Just one month later, Hitachi installed another OASIS™ system at the Imaging Centre in Baxter Village, Fort Mill, South Carolina, which opened in October 2008, and also provides 32-slice CT, Digital X-ray and Ultrasound. 'We chose the Hitachi OASIS™ because of its open architecture and strength,' explained Dr Geoffrey Gilleland of Rock Hill Radiology Associates. 'Patient satisfaction from a truly open MRI design has obvious value, but to choose a magnet simply because it is 'open' would be a disservice if the magnet could not perform to the highest industry standards. The multichannel coils and gradient performance of the OASIS™ made our decision easy. The OASIS™ 1.2-Tesla high-field open magnet gives us the image quality for the diagnostic confidence expected from our radiologist and needed by our physician community. It is a pleasure to work with this equipment.'

OASIS™ delivers patient comfort while providing high-field image quality and today's advanced clinical capabilities, Schaffer points out. 'Its ultra-wide tablee and asymmetric table magnet alignment ensures the unobstructed patient view for all examinations. The patient can always see out – all around, all the time – instead of staring at the inside of a tube.'

The 90th German Radiology Congress

Berlin 20-23 May

Focus: The role of radiology in oncology

'Radiologists often see cancer patients over a period of years and continuously deliver important information for the treatment process,' says **Claus D. Claussen MD**, Professor of Radiology and Director of the Clinic for Diagnostic and Interventional Radiology at the University Hospital in Tübingen and President of the 90th German Radiology Congress. For the first time in the history of this congress, which is rich in traditions, the programme has been organised jointly with the German Cancer Society. Here, Professor Claussen outlines the importance of radiology in oncology – and what he defines as a change of paradigm in cancer care.

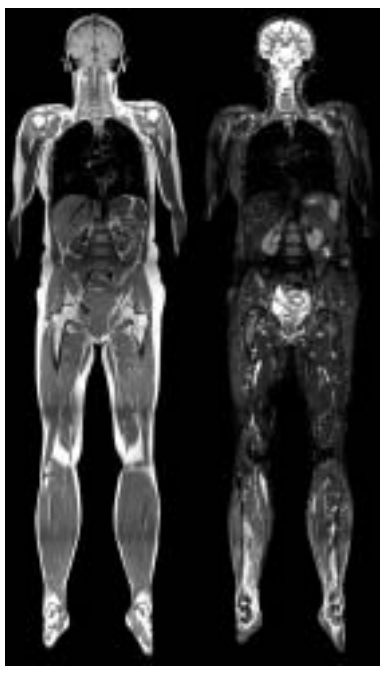
"Cancer has been and will remain a big challenge for medicine. With increasing life expectancy, as well as critical changes in social, environmental and ecological living conditions, the occurrence of cancerous diseases is increasing. Next to the medical problem is the economic problem. On the one hand, innovative treatment concepts must be made available to large sections of the population; on the other, the rising costs for this medical treatment must be met. From a medical as well as an economic perspective, it is essential to achieve interdisciplinary networking of specialist competencies.

Tumour boards

Only the close and trusting co-operation of the oncologist with all surgical and conservative medical disciplines, with radio-oncologists, radiologists and specialists in nuclear medicine, allows an optimum treatment concept, ranging from the initial diagnosis to therapy planning and therapy control. Tumour boards, i.e. regular conferences for representatives of different medical disciplines are outstanding instruments to help combine and align individual treatment plans with the guidelines of the relevant specialist medical associations and to determine the right therapy for the patient.

Individualised medicine – individualised imaging

Cancerous diseases are complex. Consequently, there is a necessity for an individual approach for each individual patient. Imaging plays an essential part in this 'individualised medicine' because the radiologist often sees oncological patients over a period of several years and continuously delivers important information about the individual spread pattern of the disease and changes seen during treatment.



Up-to-date opportunities for the application of MRI: Screening the whole body for metastases

Disease-focused, not organ-focused

Malignant diseases are – apart from a few types of tumour – potentially systemic, i.e. can affect all parts of the body. Therefore we need information about the individual spread pattern of the disease for the entire body. The radiologist plays a key role here. The advances in imaging procedures, such as Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Positron Emission Tomography (PET) and hybrid systems (PET/CT) allow a quick overview of the tumour spread in a diseased body. This represents a great progress and a change of paradigm in medicine: we don't work with a focus on organs but on the disease itself.

Molecular imaging

Onco-diagnostic research puts a lot of emphasis on the development of procedures for the simultaneous imaging of morphological, biological and functional tissue characteristics. The term 'molecular imaging' comprises all those imaging procedures that facilitate the imaging of molecular structures or biological processes with the help of suitable markers and also allow a quantitative evaluation. The objective is to gain information about a tumour, such as tumour biological functions like cell division or the formation of blood vessels which supply the tumour. The technical integration of PET and CET already proved clinically significant for oncology shortly after its introduction in 2001 as it enables us to assign tumour-specific functional changes (PET) to anatomical structures (CIT).

Progress MRI

The development of high resolution whole body MRI has resulted in a further, important progress for onco-diagnostic radiology. Comparative studies of whole body MRI and whole body CT and PET/CT have shown the advantages of MRI, particularly for the detection of distant metastases in the cerebral area, the liver and bones. Moreover, radiologists are currently following and shaping the development of the MR/PET with excitement.

Prof Claus D. Claussen, President of the 90th German Radiology Congress

Interventional radiology

Radiologists can do more than 'just' diagnose. With interventional radiology, a fairly recent development within the field of imaging, they can actively take part in the therapeutic process. Image-guided minimally invasive interventions, such as tissue sampling, and localised therapy procedures, such as radiofrequency ablation or cutting off the blood supply of tumours (embolisation), are gentle and effective procedures of radiological cancer therapy.

Conclusion

Radiology now needs to combine methodical and clinical studies to examine the diagnostic efficiency and therapeutic relevance of modern imaging procedures. At the same time the challenges posed by the large volumes of image data, increasing time pressures and pressure to improve productivity, need to be mastered through more efficient examination procedures and increased competence. However, the most important factor is the specialist medical and personal exchange between radiologists and their clinical colleagues. The Radiology Congress offers an outstanding opportunity for this process. "

The 90th German Radiology Congress – interdisciplinary and realistic

The German Radiological Society, the congress organising body, expects over 7,000 participants from Germany and abroad at this year's event. In the Messe Berlin Exhibition Centre they will be able to evaluate current scientific research in presentations and posters, and be able to further their knowledge of individual subjects and gain new insights through workshops, refresher courses and interdisciplinary case discussions.

Additionally, visitors will be able to assess the latest medical technological trends. About 130 manufacturers will exhibit their latest innovations during this important event.

'Ode' to the liver

'Like the original Ode to the Liver, by Pablo Neruda, I too hope not to be betrayed by my liver. At least, not today!' Thus **Professor Carlo Bartolozzi**, internationally renowned researcher based in Italy's University of Pisa, and section editor for the journal *European Radiology*, opened his *Josef Lissner Honorary Lecture* at this year's ECR. And so began a journey of hepatic exploration, as the professor led the minds of the audience, in the packed lecture theatre in Vienna, through the anatomic structure, to the relationship between modern imaging techniques and effective patient management, and including a 1970s Nobel Prize Winner for Literature along the way.

The liver is not only at the centre of the human body, he noted, but is also at the centre of progress in radiology. The organ is unique and highly complex; it undertakes more than 100 different functions and, thanks to modern radiological tools, we are able to display intricate images of its complicated vascular architecture and highly polarised cellular activity.

Moreover, radiologists can characterise and quantify a wide range of pathologies that may affect the liver, using this information to inform therapeutic planning and optimise patient management.

'In my opinion, the liver is for radiologists what the Matterhorn is for alpinists – a sort of "litmus test" for measuring your skills and for the maturity of any imaging method, as every technique has upgraded its performances to address liver-specific issues,' Professor Bartolozzi pointed out. 'Today, therapeutic management for hepatocarcinoma is strongly dependent on the results of diagnostic imaging,' he added; and surely few people should appreciate more just how valuable radiology is in this regard.

The professor's main interests are oncology and gastrointestinal radiology, fields in which he has developed, from experimental work, a series of innovative tools that include ultrasound microbubbles, multi-slice CT perfusion imaging and magnetic resonance elastography for liver imaging. These and other developments perhaps still in the research lab, will soon be brought into clinical use, if they are not already improving patient care.

During this Honorary Lecture, Professor Bartolozzi discussed in detail the mechanisms and physiological effects on a cellular level of various types of liver damage, describing hepatocarcinogenic as 'the unfortunate natural outcome of liver structure remodelling'.

Providing a comprehensive and engaging analysis of hepatic mechanisms in normal versus pathologic scenarios, including some insights into less well understood cell roles and the effects of vascular changes in response to disease, he concluded that radiology is today a vital link between liver disease and treatment.

'There is no other organ in which interventional procedures play a larger role, using images for treatment guidance and for evaluating the post-treatment response – thus determining an "image-therapy continuum".'

He added: 'Modern imaging can now pick out any number of pathological indicators and changes, building evidence that allows us to make a more confident diagnosis.'

This, he said, puts radiology directly at the centre of a crossroads in patient management.

Report: Rob Skelding

Manipulating parahydrogen promises greater MR sensitivity

NEW

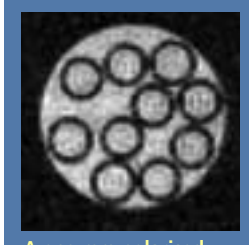
The forecast: More accurate, faster diagnoses of a wider range of medical conditions

A new technology that dramatically improves the sensitivity of Magnetic Resonance techniques including those used in hospital scanners and chemistry laboratories has been developed by scientists at the University of York.

Ultimately, the technique, based on manipulating parahydrogen, the fuel of the space shuttle, is expected to allow doctors to learn far more about a patient's condition from an MRI scan at lower cost, while also increasing the range of medical conditions that can be examined.

Gary Green

Simon Duckett



A one mm polarised single shot image of pyridine

Publishing their work in the journal *Science*, the researchers explain that they have taken parahydrogen and, through a reversible interaction with a specially designed molecular scaffold, transferred its magnetism to a range of molecules. The resulting molecules are much more easily detected than was previously possible. No-one has been able to use parahydrogen in this way before.

Professor Gary Green, of the Department of Psychology and Director of the York Neuro-imaging Centre, predicted: 'Our method has the potential to help doctors make faster and more accurate diagnoses in a wide range of medical conditions. The technique could ultimately replace current clinical imaging technologies that depend on the use of radioactive substances or heavy metals, which themselves create health concerns.'

The new method will also have major implications for scientific research because it radically reduces the time taken to obtain results using Nuclear Magnetic Resonance technology, the most popular method for obtaining analytical and structural information in chemistry.

Professor Simon Duckett, from the University's Department of Chemistry and Director of the Centre for Magnetic Resonance, said: 'We have been able to increase sensitivity in NMR by over 1000 times, so data that once took 90 days to record can now be obtained in just five seconds. Similarly, an MRI image can now be collected in a fraction of a second rather than over 100 hours. This development opens up the possibility of using NMR techniques to better understand the fundamental functions of biological systems.'

'This technology has the potential to revolutionise both NMR and MRI methods in a short space of time,' confirmed **Dr Tonio Gianotti**, Director and International NMR Research and Development Co-ordinator for Bruker BioSpin.

Developed over a number of years, the research has been supported by the University of York, the White-Rose Health Innovation Partnership, the EPSRC, the MRC, the BBSRC, the Spanish MEC (Project Consolider ORFEO (CSD 2007-00006), and Bruker BioSpin. A non-exclusive licensing agreement to develop the technology was signed in November 2008 with Bruker BioSpin.

Dr Mark Mortimer, Director of the University's Research and Enterprise Office, added: 'The rapid development of this research, from the chemistry bench through to measurement, opens up many exciting possibilities to extend this work. The York research team are now seeking partners to help turn this groundbreaking research into commercial and medical applications.'

York Neuro-imaging Centre details: www.ynic.york.ac.uk.
And: www.york.ac.uk/np/research/index.htm

Radiographers share expertise at ECR 2009

Although the majority of the 18,000 participants at ECR 2009 were radiologists, medical writer *Rob Skelding* reports that a specific session for radiographers was well attended. The event also underlined the value of their interpretive skills

During the Extended Role of Radiographers in Europe session, at this year's ECR, expert practitioners showcased their diagnostic capabilities and highlighted the need for standardised 'quality image evaluation' protocols.

Dr Bargy Ween, of the Rikshospitalet University Hospital, Norway, discussed the risk of missed lung cancers on chest radiographs, resulting from a poor radiographic technique and lack of universal image evaluation methods. Most notably, she highlighted the need for a 'radiography lung cancer grading scale', akin to the model used in mammography.

'When it comes to lung cancer – the most common form encountered worldwide – high-quality radiography is a prerequisite to a correct diagnosis,' she told delegates.

Following a Delphi study (focus group discussions and questionnaires) which considered results from 21 radiographers and 13 radiologists working in Norwegian hospitals, Dr Ween spotlighted several key problems hampering chest radiography in Europe:

- Poor technique (variable education and supervision) produces sub-optimal images
- Radiologists do not work closely with their radiographers – communicating only by telephone; not being available for consultation
- No universal standards as to what is 'acceptable or good' chest X-ray analysis
- Less experienced radiographers are often positioned in the 'chest room', but many lung cancer cases require an expert eye.

A significant issue was the lack of formal guidelines on how to use and maximise the advantages of modern digital radiography software – and a need to agree quality control parameters.

'We are not working with film images anymore. Today's radiographers use digital technology producing dynamic data information flows. We need gold standards in this area – and they should focus keenly on cancer detection,' she noted. 'If radiographers are responsible for post-processing, we should agree universally on the appropriate body rotation and arm positioning grades, for example, plus parameters for visualisation of sharpness and noise.'

Dr Ween suggests using the results of her study to create a grading scale for radiographic chest image quality evaluation. This could be implemented as a peer practice model, acting as a link between image evaluation and practical work.

Key radiography skills (trauma image interpretation)

Neil Kinsman and **Lindsay Goswell** from a National Health Service (NHS) hospital in Poole, UK, lectured on the basic methods radiographers should use when evaluating and interpreting trauma images. Because radiographers are frequently called upon to assist junior doctors and nurse practitioners without sufficient experience to make a full, accurate diagnosis from an X-ray, this is a crucial skill. In this light, proficient radiographers should hold a thorough knowledge of 'normal variants' as much as diseases and fractures.

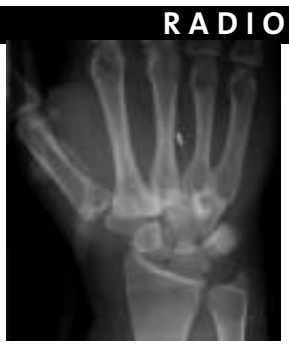
The speakers discussed an effective method of 'image comment' that has been employed at Poole and many other UK hospitals – and shown to improve diagnostic accuracy, and subsequently the patient experience. The method aims to help radiographers to

- Develop a systematic approach to image interpretation
- Recognise injury (particularly X-rays showing multiple injuries)
- Provide an accurate and useful description for radiologists

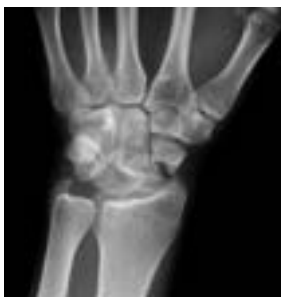
Trauma images (some typical, others not so common) were displayed, accompanied by an explanation and practical advice on good radiographic practice in each case.

They concluded that X-ray is too often overlooked as a valued modality, particularly when compared with ultrasound or CT. However, the sharp skills and detailed knowledge of a good radiographer remain vital to a swift and accurate diagnosis –which, ultimately, has a significant bearing on the patient experience and hospital resources. Listed in the box are some of the most common cases seen in a trauma department.

The Josef Lissner Honorary Lecture



X-ray of a carpometacarpal dislocation



X-ray of a transscaphoid perilunate dislocation

Images courtesy of Neil Kinsman, Poole NHS Foundation Trust, UK

COMMON TRAUMA CASES SEEN IN RADIOGRAPHY

- Salter-Harris injuries
- Bennet's fracture
- Rolando fracture
- Phalangeal fracture
- Metacarpal fracture
- Trapezium fracture
- Scaphoid fracture
- Lunate dislocation
- Keinboch's avascular necrosis
- Perilunate dislocation
- Tri quetral cases
- Collie's fracture
- Paediatric fractures ('Greenstick', Monteggia and Galeazzi)
- Elbow (joint effusions, 'hourglass sign', anterior humeral line and radiocapitellar line)
- Knee (positioning, views, fat/fluid level, infrapatellar measurement, suprapatellar bursa)
- Osteochondral fracture
- Ankle (positioning, views, joint space, syndesmosis, navicular & calcaneum, effusion anterior to tibiotalar joint)
- Weber classifications
- Tillaux fractures
- Talar injuries
- Foot (positioning, alignment, Lisfranc fracture, torsal injuries)

Why low dose really matters in mammography screening

By Dr Jean-Charles Piguet, of ImageRive, Geneva, Switzerland

Although breast cancer, the most common disease affecting women, accounts for over 30% of all the cancers they suffer (far ahead of colon, ovary or lung cancer), breast cancer is responsible for only 1% of cancer related deaths. In countries with effective screening programmes, over 90% of those diagnosed with breast cancer survive. A decade ago, breast cancer mortality was as high as 50% (50 in every 100 affected women died directly from the disease), which shows the huge improvement in how we treat this disease. However, although therapy has improved, the main reason for the mortality decrease is early diagnosis. This not only changes mortality rates, but also their quality of life: lumpectomy and sentinel node biopsy have a very different impact on a woman compared with a radical mastectomy and subsequent lymphoedema resulting from axillary dissection.

Early detection

As a healthcare provider, for me it is important to acknowledge two very different situations: one with a woman in apparent good health, the other with a symptomatic woman who has felt a lump in her breast. For a symptomatic woman, the clinical situation is straightforward, at least in theory: A mammogram will exclude microcalcifications, show any changes compared with a prior examination, and possibly show a mass or architectural distortion that can be identified as the cause of the symptoms.

For an experienced physician, an ultrasound will clearly distinguish between a typical benign lesion (cyst) and a solid mass. In the latter, the next step is to define the type of mass. Either it is stable and benign, or an ultrasound-guided biopsy under anaesthesia – a painless, inexpensive ten-minute procedure - will provide the histological truth.

In summary, we know how to act with symptomatic women. But we want to find cancers as early as possible, when they are still small, i.e. in asymptomatic women. This means examining a population that is still deemed healthy.

Which technologies are here to stay?

Screening is now promoted by health authorities in most European and North American countries. The type of modality used, age group invited and frequency of examinations vary from one region to another, but the medical reality is the same.

The vast majority of all women undergoing mammography will have no suspicious lesions: in 1,000 women there are 30 false positives and six to eight cancers are detected, while more than 990 women have undergone a sometimes unpleasant procedure 'for nothing'. Mammography is costly but, given the benefits, it is very easy to motivate the cost. A more difficult discussion concerns dose. Today, we are exposing a healthy population of women to a lot of unnecessary X-rays to detect a cancer that they, in 99 % of cases, do not have. Again, the benefits clearly outweigh the potential radiation risk, but it is our responsibility to keep the dose as low as possible, which can be achieved in a few ways:

- Reduce the number of exposures
- Increase the interval between examinations
- Reduce the exposure per examination.

Dr Jean-Charles Piguet

The first two methods involve a risk of decreasing cancer detection. The third is the one way to work, provided that exposure reduction does not reduce image quality. Ever since its inception, mammography has been subject to strict government control. Technical limitations of screen film (S/F) mammography produced one set of standards. However, with digital mammography things are no longer that simple. CR tends to further increase dose without improving diagnostic quality, whereas DR significantly reduces the dose. At my clinic, having used all types of technologies and detectors in mammography, the situation for me seems clear: DR will completely replace S/F mammography. CR will also disappear: there is no additional diagnostic benefit compared to S/F and the high dose does not encourage the use of this technology. Also, the poor performance of CR, shown in studies such as DMIST (the Digital Mammographic Imaging Screening Trial), could be widely responsible for the difficulties to demonstrate the obvious superiority of DR. However DR, will be the future.

Three different technologies actually prevail:

1. Indirect conversion with a cesium-silicon sensor and a spatial resolution of 100 microns.
2. Direct conversion with a selenium sensor. There are two suppliers of these sensors, one using 70 microns and the other 80 microns.
3. Photon counting, with a scanning multi-slit detector geometry and pixel size of 50 microns.

Choosing the right system for screening

All vendors obviously argue why their product is superior: from pixel size, DQE, contrast, reliability, workflow, etc. Most radiologists can easily exclude some systems based on image quality. The latter will depend on many factors, including resolution, noise and the algorithms for image processing.

Additional purchasing criteria include ergonomy, workstation features and connectivity/compatibility with different PACS and RIS systems. Additionally, of course, cost is a factor. Although cost is often important, the truth is that, in screening, it should have little bearing on the final decision.

So what about dose?

Too few radiologists think along these lines: if, during the lifetime of my system, I will produce close to half a million exposures of women who are 99% healthy, then is it not my responsibility to truly follow the ALARA* principle? Can I, without reflecting, produce one million mGy (=1'000Gy = 17 full Radiotherapies) when I could, with the same diagnostic quality, reduce this number by 80%? The reason why dose is needed is obvious: a sufficient number of photons must pass through the breast to produce an interpretable image quality.

Additionally, there are at least three factors that allow for a good signal, apart from the dose:

1. DQE: The higher the efficiency of the detector, the lower the dose needed for a good image.
2. Image quality also depends on the scattered radiation. There are two different systems in use to reduce scatter: Anti-scatter bucky grids, and multi-slit collimation of the X-rays before and after the breast, in a scanning system. In terms of scatter rejection, collimation is ten times more efficient, letting through only 3% of scatter compared with 30% by a grid. This obviously translates to a lower dose needed for the same image quality.
3. Also, the higher the S/N (signal-to-noise ratio), the lower the dose needed to obtain the necessary image quality. Thanks to its photon-counting and detector geometry, the Sectra system that we currently use operates at 50% of the dose or less than all other DR systems, and at about 20% of the dose of CR systems – which are still, against all logic, being sold! Hence the question follows: If the image quality is equivalent, can it be justified to double the necessary dose to women who are 99% healthy? To me, at least, the answer is very simple.

To conclude: In screening mammography over 99% of all mammograms will produce no significant findings. That is the price to be paid for an efficient detection in 'healthy' women. The aim is to minimise false negatives and false positives, in other words to have the most sensitive and specific tool possible. DR systems offer good images, in accordance with government regulations, and are obviously better than conventional film mammography. But when one of these DR systems fulfils all the technical and diagnostic requirements, the fact that it uses half the dose compared with any other system should drive towards an unavoidable choice in a screening environment.

** As Low As Reasonably Achievable – a radiation safety principle and regulatory requirement for all radiation safety programmes, for minimising radiation doses*

Post-menopause physical activity reduces breast cancer risk

The breast cancer risk of women who are regularly physically active in the postmenopausal phase is reduced by about one third compared to relatively inactive women, according to a study conducted by the German Cancer Research Centre (Deutsches Krebsforschungszentrum, DKFZ) and the University Hospitals of Hamburg-Eppendorf.

To explore the connections between life style and breast cancer risk, the MARIE* study questioned 3,464 breast cancer patients and 6,657 healthy women, aged between 50 and 74 years.

A comparison between control subjects and breast cancer patients showed that women in the control group had been physically more active than the patients. For this reduced risk, hard work in the gym is unnecessary. The women in the most physically active group, for example, walked for two hours every day and cycled for one hour, while the most inactive study participants walked for only about 30 minutes every day.

The effect of physical activity was independent of weight gain, total energy intake or body mass index (BMI). Therefore, researchers assume that physical exercise reduces the risk of cancer through hormonal mechanisms instead merely by a reduction of body fat or other changes in physical constitution, as it has often been assumed.

A closer look at the types of breast cancer revealed that physically active women are less frequently affected, in particular, by tumours that form receptors for the two female sexual hormones, oestrogen and progesterone. These malignant 'hormone receptor positive tumours' accounted for 62.5% of breast cancers among MARIE participants. Other tumour markers, such as HER2 receptor formation or differentiation stage of cancer cells, were found to be unrelated to physical activity, the researchers report.

**** Martina E. Schmidt, Karen Steindorf, Elke Mutschelknauss, Tracy Slanger, Silke Kropp, Nadia Obi, Dieter Flesch-Janys und Jenny Chang-Claude: Physical Activity and Postmenopausal Breast Cancer: Effect Modification by Breast Cancer Subtypes and Effective Periods in Life. Cancer Epidemiology Biomarkers and Prevention 2008, DOI: 10.1158/1055-9965.EPI-08-0479***

Mammobiles encourage attendance of rural women

Among the most important EU guidelines for efficient breast cancer screening is the assumption that it is a low-threshold offer, which, after an initial start-up period, will include at least 70% of all women aged between 50 and 69. To ensure that this quota is met in areas that lack infrastructure, whilst also keeping personnel expenditure at bay, for the last few years mammobiles have toured Germany to screen women in their own vicinities.

Regions lacking infrastructure in former East Germany present particular challenges.

In the Thuringia area, for example, the geographical spread that needs mobile breast scanning facilities looks daunting. 'We look after more than half of Thuringia. This is an East-West stretch of around 200 km, and a North-South distance of 150 km,' explained radiologist **Dr Susanne Wurdinger** (above). With gynaecologist **Dr Mathias Heiner**, she is responsible for the screening programme in Germany's biggest mammography unit, which has a target group of 180,000 women.

Apart from four stationary mammography units, the doctors and their team have two mobile examination trucks, the mammobiles. Although these are already in use, the doctors plan to expand the fleet; from September a third mammobile, with Hologic's full-field mammography unit Selenia installed, will also tour Thuringia.

Their choice of digital system was pragmatic: Dr Wurdinger explained that the resolution capacity and image presentation were immediately convincing. Additionally, experience has shown that the Selenia systems are functionally very stable – essential for equipment to be used at very high capacity*.

What encourages women to attend mobile screening? 'Based on Dutch studies, we know that the closer the mammobile is to where they are based the more women attend screening,' Dr Wurdinger said. 'The "critical distance" above which the length of the journey gets in the way of potential attendance is a maximum of 12 km – pretty much exactly the maximum distance Dutch women are happy to cover by bicycle.' She believes this is roughly the same as the situation in Germany: Anything accessible within a radius of 10 km is readily accepted. However, longer distances markedly lower willingness to participate in optional screening.

With their six mammography units, the team currently achieves a 54% participation rate — roughly on a par with the German average. The third mammobile should increase attendance towards the EU guideline figures. Apart from large distances, Dr Wurdinger has found that insufficient awareness training also affects attendance: 'In some parts there is an overlap with the so-called "grey screening", i.e. there is a certain group of women aged between 50 and 69 who have regularly been sent, and are still being sent, for mammographies by their gynaecologists. These women are supposedly covered and drop out of the official screening statistics. However, sometimes our invitations for mammographies are also mistakenly perceived as sales promotions and land in the bin. We need to make further efforts to improve the awareness of breast cancer among the general public and to work against any possible reservations about screening. This also includes ensuring that women know that breast cancer screening for the above mentioned target group in Germany is now fully reimbursed by the medical insurers, and that there is no fee – independent of whether they are being screened by a stationary mammography unit or in our mammobiles.'

The time between examination and the disclosure of results is not extended by the use of the mammobiles. The breast cancer specialists in Thuringia meet the EU guidelines, which state that each patient should receive results within a week of examination.

* Service and distribution of all Hologic equipment in Germany, Austria and Switzerland is run by Medicor. Medicor has a widespread service network and more than 20 technicians taking care of the clients. For more information please see *www.medicor.de*

PRODUCTS FROM CHINA

The Shenzhen Comen Medical Instruments Company

Founded in 2001, Shenzhen Comen Medical Instruments Co. Ltd. is one of the few Chinese firms to possess comprehensive core technologies for the manufacturing of monitors and medical diagnostic products. The firm's R&D and manufacturing focuses on multi-parameter patient monitoring, maternal/foetal monitors, and electrocardiograph equipment. Comen markets its medical software and instruments and also delivers module relevant OEM services.

CM1200

Along with its headquarters in Shenzhen, Comen has branches and site offices in Beijing, Shanghai, Guangzhou etc, in total 22 offices in China, and a distribution network covering over 40 countries worldwide. Comen

STAR5000C

reports that it has maintained a sound and rapid development, with an average annual growth rate of 160% for four consecutive years, establishing this as one of leading manufactures in medical sector.

The STAR5000C, the firm's latest maternal/foetal monitoring model, which has a fold-up 12.1" TFT touch screen with nine parameters monitoring functions, can be used for foetal and normal patient monitoring.

Comen also produces the STAR8000H, a multi-parameter patient monitor, with 8.4" colour TFT touchscreen GPRS-based mobile monitor. With streamlined compact design, and multi-functional features, which provides greater convenience for mobile distance monitoring, i.e. for patient home visits, in an ambulance, as well as in clinics and hospitals. The machine is suitable for adult, paedi-

STAR8000H

atric and neonatal patients. For choice, five different monitor models are available.

The company's CM1200, is one of the firm's three 12-channel electrocardiographs. The model has a 12.1" fold-up sensitive colour touchscreen and professional writing pen, provided multi-angle observation. This device has not only been designed for clinical use in various hospital departments but also in various countries — it offers multi-language selection.

Additionally, it can have an automatic measurement and interpretation testing function and 122 kinds of arrhythmia analysis.

Further details: www.szcomen.com

Edan Instruments Incorporated

In the *Forbes China* report this year, Edan is not only listed in the 'Top 200 Chinese Enterprise with the Best Growing Potential' (ranking 17th), but also this unlisted company's rapid rise on the score table made it the Forbes China star, being named as the *Best Mover of Year 2008*.

Located in Shenzhen, Edan employs over 500 people, working in R&D, manufacturing and marketing. Products include foetal monitors, foetal Dopplers, ultrasound scanners, transcranial Dopplers (TCD), patient monitors, and electrocardiographs (ECG).

Edan implements both ISO-9001 and ISO-13485 quality standards throughout the design, manufacture and servicing.

Edan's ECG product SE-12 Express 12-channel electrocardiograph is a high-end and easy-to-operate system that provides both 12-lead resting ECG analysis and stress test, reliably and accurately, the firm reports. 'A complete suite of advanced ECG analysis programmes make it versatile enough to handle a wide range of cardiac screening tests. Alphanumeric keyboard and one touch operation design makes it the perfect choice for you.'

Details: www.edan.com.cn

THE SWITCH FROM ANALOGUE TO DIGITAL

A BOON FOR EUROPE'S MAMMOGRAPHY MARKET

Analogue screening systems are gradually being replaced by digital mammography systems, and breast cancer screening programmes are increasing sales. The majority of European countries have implemented in European countries, but in some others their introduction is slow, but steady. Additionally, Europe has significant geographic diversity, and remote places served by mobile screening units generate greater public awareness of the benefits.

'The implementation of mobile screening units will generate more awareness in distant places,' says research analyst Smruti Munshi, in a new study from business consultancy Frost & Sullivan, which examined the European mammography systems market*. 'In Europe, the trend is that of the mammography system going to the patient and not the patient coming for a mammogram, creating potential for market expansion.

'With an increase in mobile solutions, mobile screening will penetrate rural communities and improve their access to screening,' he adds. 'Telemammography will enable the transmission of digital mammograms from one location to another for expert consultation. Additional tests, if required, can be conducted immediately with mobile digital mammography. Mobile units are also being used in hospitals in emergency rooms and operation theatres. The implementation of widespread screening should lead to increased mobile unit sales in the future.'

Reasons for delayed uptake of digital mammography implementation are mainly budgetary constraints and socio-economic factors, but also include some governments' policies, e.g. they still demand film reading (such as in France).

'Mammography vendors should lobby governments of individual countries, where screening is yet to be implemented,' Munshi suggests. 'Reimbursements are also very vital for market expansion. Lobbying should aim at promoting the reimbursement of the treatment rather than the diagnostic tool. Joint efforts with various advocacy groups such as women's rights groups and cancer therapy groups will be vital for market advancement.'

The study focused on the full-field digital mammography (FFDM), Analogue mammography systems, diagnostic mammography systems and computed radiography markets, and reveals that these earned revenues of US$219 million in 2007 – estimated to reach US$346 million in 2014.

'In the diagnostic market,' Smruti Munshi points out, 'the more advantageous and efficient prone biopsy units are showing more potential for growth, because of their enhanced ability to provide biopsy guidance. Moreover, prone biopsy units offer a cost advantage over add-on upright systems.'

**Report: European Mammography Systems Market M290. Details: www.medicalimaging.frost.com*

E-COMMERCE

Health insurers should take a look at Amazon

German health insurance funds do not use their customer data sufficiently, according to a study by consultancy agency Kienbaum, which also found that health insurers do not 'cultivate a client-oriented culture'. (Clients = the medically insured).

Focused on 2008, the study established that too little effort was put into researching the needs of their clients, 'for example, only 35% of the health insurance funds conducted an annual survey'.

Since the amendment of law in health policy came into effect this January, these facts were considered '… detrimental to competition in the healthcare business. With the introduction of rather equal contribution rates, clients will base their choice of insurance provider not only on fees but, more than before, on service quality, e.g. the most efficient and responsive service offer'.

The study, Customer orientation and competitive orientation within the private and public health insurance funds, recommends '…regular surveys and a systematic use of data about their customers by the health insurance funds. The successful e-commerce company Amazon should serve them as an example. To improve the service, the study suggests offering special information for specific target groups, for example newsletters for young families. Furthermore, health insurance funds should develop special programmes to create an enhanced loyalty to the customer, such as the introduction of special customer benefit programmes. The study strongly sees the need for a more client-orientated culture. To ameliorate the customer culture, the authors suggests the generating of virtual communities within the web as well as the introduction of coherent advisory services according to the principle One face to one customer. Yet, despite enormous investments made in staff training, the investigators found still enormous potential regarding the development of human resources to achieve a more client friendly service culture.'

Magnetic resonance mammography

Many diagnostic advantages and more to come

Evelyn Wenkel MD

Women in families with a history of breast cancer have a significantly higher risk of developing the disease. 'For these patients MRM (magnetic resonance mammography), which is an MRI of the breast, is a very effective procedure to detect malignant tissue changes at an early stage,' said **Evelyn Wenkel MD**, who is using Siemens' *Magnetom Espree* for magnetic resonance mammography (MRM) at the Radiological Institute at Erlangen University. 'These patients require a particularly close-meshed net of early screening measures. MRI is clearly more unerring here than other diagnostic procedures – and compared to conventional mammography it also works without ionising radiation. 'To achieve sufficiently adequate image quality in breast diagnostics we need to work with a field strength of at least 1.5 Tesla. Additionally, we need special, bilateral breast coils or, even better, multichannel coils. With the sequences the examiner needs to ensure that the resolution regarding the recognisability of details is large and that the sequences are fast enough to show the accumulation of the contrast medium in a tumour. A malignant tumour, for instance, would normally absorb the contrast medium quickly, a benign tumour more slowly.'

Dr Wenkel is watching the race for increasingly larger field strengths with reservations – at least in terms of breast cancer diagnostics: 'You can also improve the quality of MRI images through optimised coil and sequencing technology. At the moment, as far as I am aware, there are no randomised studies that prove the superiority of 3.0 or 7 Tesla machines over the 1.5 Tesla MRI scanners used for the diagnosis of breast cancer.'

Compared to sonography, one essential advantage of MRM is the lesser influence of the examining physician on the results, which makes MRM images more objective and easier to reproduce, and also makes it suitable for monitoring and aftercare, she points out. 'In the past the differentiation between scar tissue and new tumours was always a big challenge, even for experienced diagnosticians. This hurdle is now easier to overcome with the help of MRM.'

MRM, she believes, will continue to gain in importance. However, for the early detection of breast cancer it will initially only be used for high risk patients due to the higher costs compared to traditional mammography and the number of available scanners.

A further application for MRM is in CUP (cancer of unknown primary) syndrome, which experts refer to when secondary tumours are found without the location of the primary tumour being detected. For this difficult diagnostic problem radiologists are pinning a lot of hope on MRM. For Dr Wenkel and her colleagues all the advantages of the procedure have not yet been exhausted. 'Apart from purely morphological information about the mammary gland and its changes, MRM can deliver information about the biological characteristics of a tumour, such as cell density or biochemical characteristics. Finally, it has been shown that MRM can also significantly impact on surgery planning. For example, if a further tumour is diagnosed in the breast with the help of MRM this is of crucial importance for the operation. In certain cases an MRI can be important before breast surgery, so that all primary tumours can be detected and then removed during one intervention.'

Promoting

Senology is fast becoming a medical specialty that utilises methods and knowledge from various medical disciplines specifically to treat breast cancer. Based in Dusseldorf, the European Academy of Senology (EAoS) aims to close the gap between theory and practical applications. We asked EAoS founder **Dr Mahdi Rezai** to describe the major barriers on the route to standardised, high-quality senological care and how he and his Academy-partner **Professor Umberto Veronesi**, in Milan, plan to overcome such obstacles

'In 2000, we founded the West-German Breast Centre in partnership with the Dusseldorf University Hospital,' explained Dr Rezai. 'Initially, we had planned to gather therapy data from as many hospitals as possible for benchmarking. We wanted to know what exactly breast cancer therapy looks like in Germany because, at that time, there was no systematic collection and analysis of country-wide data. We have now collected almost 35,000 data sets of breast cancer patients, most of whom underwent surgery. Using 11 indicators we analysed the data and assessed the quality of patient care. Obviously, knowledge on breast cancer is developing at a terrific pace and we wanted to devise ways and means to spread the new knowledge as widely as possible. Therefore, last year we started the European Academy of Senology with the cooperation of Professor Veronesi.'

Discovering their mutual interest after a couple of meetings, the pair

RADIOLOGY

Met at KIMES

MEDISON

During KIMES, Karoline Laarmann (European Hospital) met with Joong-Ho Lee, Senior Executive Vice President of the ultrasound systems manufacturer MEDISON, the Korean firm that entered the ultrasound market in the 1980s and quickly established a global reputation for innovative developments (e.g. the firm produced the first commercial real-time 3-D ultrasound scanner).

Joong-Ho Lee with Karoline Laarmann and Hyun-Jung Kim, Marketing Team Manager at Medison

While Kimes is a home fixture, the show is still very special for the company, which considers it to be major trend barometer. 'Whenever we promote a new solution, we put it to the proof here,' Joong-Ho Lee explained. 'This year, we are presenting our strategic expansion into the new applications, including cardiovascular and musculoskeletal. Our company has superiority of technology for obstetrics and gynaecology, including 3-D technology, and has gained comprehensive expertise over the years. While colour Doppler sonography visualizes blood flow, flow direction and rate as well as state of vessel walls, it seems natural that we now conduct research in the detection of cardiovascular diseases.' Thus the company's R&D centre has been working on technological developments especially for these applications.

The engineers not only achieved exceptional Doppler sensitivity, they also implemented an extensive list of image processing software, such as a speckle reduction filter that reduces and/or eliminates speckle echoes from an ultrasound image. Full Spectrum Imaging incorporates the penetration capabilities associated with lower frequencies, yet maintains the superior image quality known from higher frequencies, Tissue Harmonic Imaging and Pulse Inversion Harmonic Imaging. A further feature the firm has already introduced is ElastoScan, to check to what extent reflectors can be separated from one another under compression. This provides important additional information on tissue conditions in a region of interest that cannot be further differentiated by the B-mode image. For any Medison development, it is important that the diagnostic capabilities of the ultrasound technologies are user-friendly. 'Automation is a main industry trend we address,' he explained. 'Today, accuracy and safety of ultrasound examinations depend a lot on the experience of the user. With automated systems, calculation and analysis of images will partly be performed by the devices and training

international standards for breast cancer therapy

The European Academy of Senology

discussed at length how to shape the future of senology in Europe. In October 2007, contracts were signed with Essen University Hospital and the AOK-Rhineland, a major German regional health insurer. By June 2008, the curriculum draft was ready, teaching staff had been hired and the whole administrative structure organised. 'Our concept was a huge success,' Dr Rezai said. 'Looking at the sheer number of applicants, mainly medical directors and assistant medical directors, we can say that we are booked for the next three years.'

There is, he said regretfully, no comparable institution for senology training anywhere else in Europe. Germany has, for example, 750 facilities where surgery can be performed, but there are only a few surgeons. 'Our aim is to establish an internationally renowned Centre of Excellence built on the three pillars: research, teaching and patient care. Accordingly, we created the Academy and a transnational research network with different European institutes, where physicians have the opportunity to develop their knowledge and skills.'

The EAoS training programme is geared towards preparing medical directors and assistant medical directors who will head breast cancer centres. Currently, he explained, trainees are exclusively German physicians, but applications have come in from Sweden, Belgium and Poland. As a result, EAoS will provide courses in English. Following requests from colleagues, certain modules also will be offered in Austria

Each programme participant will complete seven modules followed by a two-week assistantship, either at the breast centre in Dusseldorf, or with Prof Veronesi in Milan. 'Since we consider it very important to keep in touch with the alumni of the EAoS training programmes, we founded the Kompetenz-Club, for which we will organise further workshops and networking events, for example during the senology congress.

'We have received excellent feedback from the participants. Particularly in this initial phase of the Academy we consider professional evaluation of the training programme to be very important. This obviously included asking participants for their individual opinion – which so far has been positive throughout. Personally, I am particularly happy to see the strong emotional bonds between the participants and us. Whenever a problem occurs, they turn to us, or they present individual cases that we discuss in the group. In fact, we also perform surgeries together, either in our facility or in the participants' hospitals. This development gives me reason to hope that we may, after all, be able to establish top-quality senology care throughout the country — and indeed throughout Europe.

In 1997, senologist Mahdi Rezai MD founded one of Germany's first breast centres. He is also co-founder of the West-German breast centre WBC, and founder of the International Senology Initiative (ISI), as well as the Dusseldorf breast cancer conference, which attracts about 1,300 international specialists.

Dr Rezai, who heads three clinics in Dusseldorf and is scientific director of the German-International Medical Centres (G-IMC), also founded the Rezai Stiftung e. V., which aims to improve medical care for women in his native Afghanistan. In 2008, the first women's hospital to be financed by the foundation was opened in Heart, Dr Rezai's hometown.

time of the medical staff can be reduced.'

Since the available ultrasound systems are quite similar, a small difference can tip the scales when it comes to sales. For example, all Medison systems were optimized to reduce the disturbing noise of the cooling fan inside the devices. Last year, the ACCUVIX V20 won a Good Design Awards 2008 presented by the Ministry of Knowledge Economy in Korea. 'Design is an important factor in creating a product with high value added,' Joong-Ho Lee stressed. 'The technologies behind the systems are getting more and more complex, but it is important to make diagnosis with the systems simpler and faster by intuitive interfaces and a flexible architecture.'

As far as the current global economic turmoil is concerned, Lee looks confidently to the future: 'Ultrasound is one of the most frequently used imaging modalities in clinical daily routine. It has become as indispensable as the stethoscope. So for us, the recession is more like a business opportunity, since many countries have increased their healthcare budgets, while ultrasound is quite affordable compared to other imaging modalities such as MRI and CT.'

29th Annual Congress of the German Society for Senology

Dusseldorf 11-14 June

Competence for the benefit of women

Every year the German Society for Senology congress facilitates interdisciplinary breast cancer discussion between gynaecologists, radiologists, surgeons, pathologists, internists, radio-oncologists and plastic surgeons. In an interview with *Karoline Laarmann*, of *European Hospital*, radiologist **Professor Ingrid Schreer** (right), head of the Breast Centre at the University Women's Hospital in Kiel, and Deputy Chair of the Society, highlighted aspects of its 2009 congress this June

Welcoming the appointment of internist oncologist Professor Ulrich R Kleeberg as this year's congress president, Prof. Schreer explained that he will place particular emphasis on individualised therapy, meaning a holistic, patient-focused treatment concept. 'The responsible use of innovative treatment procedures will therefore be an important topic at the congress. What may technologically or pharmaceutically be possible may not always be the best choice for the patient's well-being. However, the best possible quality of life, particularly for very young patients at high risk, is of enormous importance.'

The *Certified Breast Centres* project, run by the German Society for Senology and the German Cancer Society has met with initial success, and will again come under discussion during the congress. 'They represent big progress for quality assurance,' Prof. Schreer pointed out. 'Through their guideline-orientated therapies, and the pooling of interdisciplinary specialists under one roof, the facilities provide the highest level of care for patients. However, the networking of the breast centres with the national mammography screening programme is not yet ideal. The DGS is hoping to encourage essential structural changes. It doesn't make sense to offer screening — which has a high success rate in the detection of in-situ and small carcinoma – when, if a positive diagnosis has been established, the patient cannot be referred to a clinic with a certified breast centre that ensures appropriate medical care. A further shortcoming that needs to be overcome is the lack of comprehensive information and education for women. Unfortunately, information available about the risks and benefits of an early detection programme is currently only superficial. I feel it is particularly the gynaecologists who actively ought to seek discussion with their patients.

Asked about the promising potential of full-field mammography using tomosynthesis, which is currently being tested, the professor said she believes early screening with the established imaging procedures is 'covered rather well' and that 'whatever new developments are added to these will have to find their niches.'

'Theoretically,' she added, 'tomosynthesis appears promising because 3-D imaging can show the smallest areas of glandular tissue without overlay, but it remains to be seen what use this information about structure and composition of the breast will be in the end. Moreover, we don't yet know whether this technology is as effective for the detection of microcalcifications as for tumour detection. As the use of two-dimensional mammography together with tomosynthesis increases the radiation exposure, I think it is best initially to rely on the standard procedures, i.e. ultrasound, for the examination of dense glandular tissue.'

3-D ultrasound

'One focal point of the congress will be the topics around adjuvant hormone- and chemotherapy. The objective here is to shrink tumours larger than 2cm in size, so that it's easier to operate on them and to preserve the healthy surrounding tissue. If the size of a tumour could be determined accurately with the help of 3-D ultrasound this would be of high prognostic importance. However, we need studies to evaluate how reliable the macroscopic ultrasound measuring procedure really is, by comparing the results with those gained through histopathological analysis. Unfortunately, there has not yet been enough research in this area.

Current trends in ultrasound

'One interesting approach currently being studied in the USA is the rediscovery of scintigraphy. A higher resolution has been achieved through an improved generation of systems, which could become of use to detect breast cancer as well. As scintigraphy not only delivers anatomical information but also functional information it would be conceivable that it could be superior to MRI for breast examinations on dense glandular tissue. However, the basic problem with scintigraphy, i.e. being dependent on radioactive substances, which results in considerable radiation exposure, so far remains, even with the latest generation of detectors.

'Moreover, there is currently a lot of experimentation with high fields in breast MRI to improve image quality. However, the first results show that although 3-Tesla can increase sensitivity, this happens at the expense of specificity. The danger of MRI then is that we get results that point towards a need for further clarification and investigation, which later on proves to have been unnecessary. Ultimately this is not in the interest of the patients.

BREAST SCREENI

Not so long ago this country, of considerable linguistic division, was a split into three regions, referred to as Flemish (with five provinces), Walloon (with five provinces) and the Brussels Capital. Each has its own parliament, with governments responsible for their individual region's affairs; these include health.

***Dr Catherine Breucq**, head of the Breast Imaging Department at Brussels University Hospital, is responsible for breast screening in two of the regions: Brussels Capital and Flemish. The latter has five reference centres (in four universities and the Bruges hospital). Each centre organises its own screenings, but all must follow the Belgian government's guidelines.*

Meike Lerner spoke with Dr Breucq about a new and successful digital mammography project, the Mammobiel (Mammobile), which has begun to scan women in rural areas, who otherwise might not benefit from a screening programme. This unique unit was designed by the hospital with the help of Lamboo, a trailer company, and GE Healthcare, which equipped the truck with the digital mammography system Senographe Essential.

Prior to the launch of Belgium's first digital Mammobiel, the country had two other mobile units. However, last year analogue equipment run by the University of Antwerp was put out of action, leaving one analogue system in service, still involving the procedure of image capture, film development, and so on.

The mobile breast screening project at Brussels University Hospital aimed to produce the most up-to-date Mammobiel, which, being digital, would provide greater performance and higher image quality specifically for dense breasts. This required in-depth planning, not only for scanner choice but also in consideration of the geographical elements of the rural areas to be served. As Dr Catherine Breucq pointed out, this country has many small, cobblestone streets. '

We realised that the requirements to analogue and digital equipments in trailers are different. Because of digital detectors, digital equipment is more sensitive to shocks and also changes in temperature.

The chosen equipment is equipped with a detector that supports a wide range of temperature variation (15°C to 35°C), and the Lamboo trailer with the Senographe essential were tested at temperatures down to about -31°C +43°C-- they put it in a fridge,' she said jokingly, recalling the degree to which the system had been tested. Along with shock resistance and temperature resistance, vibration was also an important element of those tests.

David Caumartin, general manager of GE Healthcare's mammography business confirmed that this is 'not a standard model'. The manufacturer, he explained, has helped produce other breast scanning mobile units, according to the needs of individual countries, and the type of vehicle and its layout. For example, in the Belgian mobile unit the trailer is 15x 3 metres; fitting it out involved input from radiographers, radiologists as well as a GE engineer. Another less critical factor, though nice all the same, was the choice of colour – pink – now so associated with breast cancer care and much accepted by women.

The entire system is built around the detector, the most important part of the image chain, he pointed out. 'We build all the image chain ourselves and the technologies are different from others on the market, and means we can control their robustness for this type of usage. So, we know our detector is more reli-

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able under stress conditions.' 'We also visited two or three Mammobiels last year,' added Dr Breucq. 'So it's a growing process. But I think finally that, as a concept, we are not scoring too badly, and we've had many positive reactions. For us the most important thing was to reach a higher attendance rate. In some little villages, where there is no radiologist, and no private hospital, to get these women to attend mammography screening you must be there, and that's with a nicely designed trailer, and high performance equipment.'

Another reason for the choice of the Senographe Essential was its considerable capacity, Dr Breucq pointed out. 'If all the invited women arrive at the same time you have to do them, but if you have equipment where you lose time between two screenings (and there are a lot of companies that produce mammo-

Dr Catherine Breucq (left) and assistant

graphs where you have a ghosting effect, it means you take a picture, for example, you turn the machine to have the oblique of the same side, then you must wait fifty seconds to a minute before taking another one, because the detector is memorising the previous image). This equipment works very, very quickly, without losing quality. That's very important for us. If the patient is already in a good position, but the nurse has to wait between two screenings, that's not a good system. For compression, this equipment also adapts to the shape of the breast, without pulling it. The less fear the patient has, the better she is positioned, the more relaxed she is and the better image you have, that's the result.'

Women are invited for screening by the service, or can be invited by their general practitioners (GPs) or gynaecologists. 'We started in the Flemish sector in 2001, with an initial attendance rate of less than 30%. The second round saw an increase of almost 12%. Now we have areas where attendance is above 50%. To meet the European guidelines you need 75% attendance. That's very high, and it looks easy, but is not. In the Netherlands, for example, where they have been screening for 20 years, they have rates of 70-75%, but only after so many years. It's a learning curve. Women have to know that there is cancer in life. It's important to write about it because women have to be confronted about breast cancer. Every year in Belgium, October is breast cancer month. Well known people are helping us, for example actresses, and the Belgian singer Axelle Red, and Miss Belgium.'

The Mammobiel is manned by a nurse or radiographer and a secretary, who calculates the numbers in each area who are likely to arrive for scanning, and on that basis how long the unit should stay there.

As for numbers now being screened in the trailer, this much depends on the size of the villages visited. Theoretically, 15-18 women per hour could be scanned. In a small village, their stay may be two days. In the Flemish region, for example, in a village with 3,000 women residents almost 600 arrived in the market place for scans. However, in a city the trailer might stay for several days.

First and second readings are then carried out in the relevant hospitals, along with their own routine diagnostic examinations. If the first and second reading conflict, a third is undertaken. 'If benign, we do nothing, even if you see a well-described cyst, you would not re-call the woman, because we are not searching for benign lesions, we are searching for cancers, malignant pathology.' If malignancy is found, ultrasound follows, then possibly biopsy and MRI. The programme then recalls the women in two ways. The referring doctor is sent a letter giving the results four days before the hospital sends another letter, this time to the patient. The doctor knows the result, but the patient is only told there is a problem, and she should come for a complementary examination. 'We don't talk about probably malignant, or malignant, because then 50% will never come. You have to decrease the fear.'

Dr Breucq then spoke of the need to follow the European guidelines, which '… means there is a level of quality not only in equipment but also in reading experience. If you perform 10 mammographies a month, you don't have enough experience to detect a cancer in a second reading, so you cannot be a second reader.' She also spoke of a significant problem in Brussels, where she is president of the screening organisation: 'We have an attendance rate of 10%, not because the women don't want to come, but because 45% are having diagnostic mammography. This means mammography and a radiologist decide whether -- ultrasound or a biopsy is necessary – making the cost double that of screening. In addition, very often in the 50-69 years group, where the breast is already fatty and you can see through it well, you don't need an ultrasound, yet that is really the tendency of a few, elitist hospitals. In that way we will never increase participation in screening. There are several international studies, randomised trials that conclude that, with the 50-69 years group with a less dense breast, you are scoring perfectly with only mammography screening, for just 58 euros.'

Meike Lerner pointed out the advice of Professor Schulz-Wendtland (Germany) regarding multimodality diagnostics for breast cancer, i.e. first mammography, followed by ultrasound, biopsy, and then maybe MRI. Dr Breucq agreed with this sequence. 'There was a time, two or three years ago, when MRI was really supported by several firms, and there were even patients who refused a mammography and wanted an MRI. I had to say: *Sorry Miss, but with an MRI, I cannot assure you that you don't have a non-invasive tumour. Okay, a big tumour, you will see it on an MRI, but you will also see it on an ultrasound -- for 18 Euros. An MRI scan costs almost 200 euros, so you have to see the cost and the benefit.*

Elastography supports diagnosis and clinical monitoring

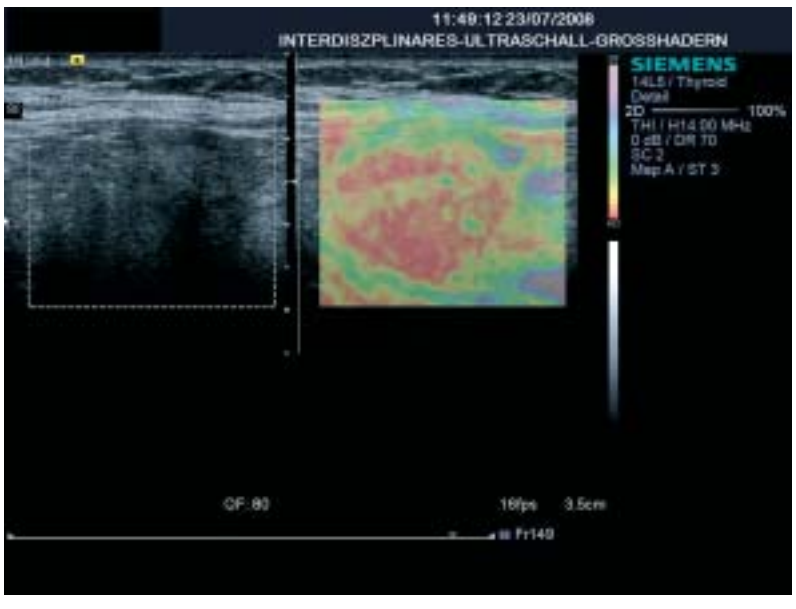
With the possibilities of tissue elasticity measuring the diagnostic use of ultrasound has recently increased enormously; the opportunities and limits of this technology and its areas of application are continuously growing. **Dr Dirk André Clevert** of the Institute for Clinical Radiology at Ludwig Maximilian University, Munich, explains what this means for daily clinical routine

In 2004, the ultrasound activities at the Grosshardern Surgical Clinic and Polyclinic at the Institute for Clinical Radiology, and the Grosshardern II Medical Clinic and Polyclinic were merged and the Interdisciplinary Ultrasound Centre was founded at the University Hospital in Munich-Grosshardern.

Since then, there has been a significant increase in the number of indications and a broader range of applications for ultrasound. Overall, the partner clinics carry out about 18,000 diagnostic examinations annually at the centre, assuring the accumulation of a lot of experience, particularly in imaging diagnostics.

Strain Imaging is a procedure which, for the first time, can assess the stiffness of the tissue alongside the delivery of pure image information. With elastography one generally distinguishes between two procedures – the manual compression of tissue with the transducer to assess superficial lesions, and acoustic radiation force impulse (ARFI) imaging. An acoustically induced pushing pulse produces tissue displacement on a micrometer level. Detection pulses register the displacement along the axis *within the ROI*. The relative displacement is displayed as an elastogram with gray-scale curves.

This allows the doctor to assess the mechanical characteristics of the deep tissue and recognise changes in the tissue. This automatic elastography procedure increasingly works independent of the examiner, Dr Clevert emphasised. Another big advantage for results interpretation is that a numerical value is obtained that reflects the propagation velocity of the shear waves. This value also enhances the objectivity of the diagnosis.



Thyroid carcinoma shown with conventional B-image sonography. Tumour spread towards dorsal can be defined with difficulty, infiltration into surrounding tissue cannot be ruled out. Elastography clearly shows the entire tumour spread with significantly harder tissue (coded red) than surrounding connective tissue

The Siemens system used at the interdisciplinary ultrasound centre has a quality factor that continuously provides the examining doctor with reports about the signal strength in the tissue and therefore with information about elastogram quality. The increasing specificity and sensitivity of elastography has also increased the number of potential indications for this examination. 'We have been gathering experience with this new ultrasound technology for about a year now,' said Dr Clevert. 'Initially, our focus was on liver diagnostics to determine fibrotic and cirrhotic liver changes. Meanwhile, elastography is also now used for other diagnostic indications because of the interdisciplinary character of our centre. It helps us that our system can compare pathologies in the existing B-image with the elastography image due to the dual imaging, and that the automatic B- image recognition (eSie Calcs) can capture these

Dirk André Clevert

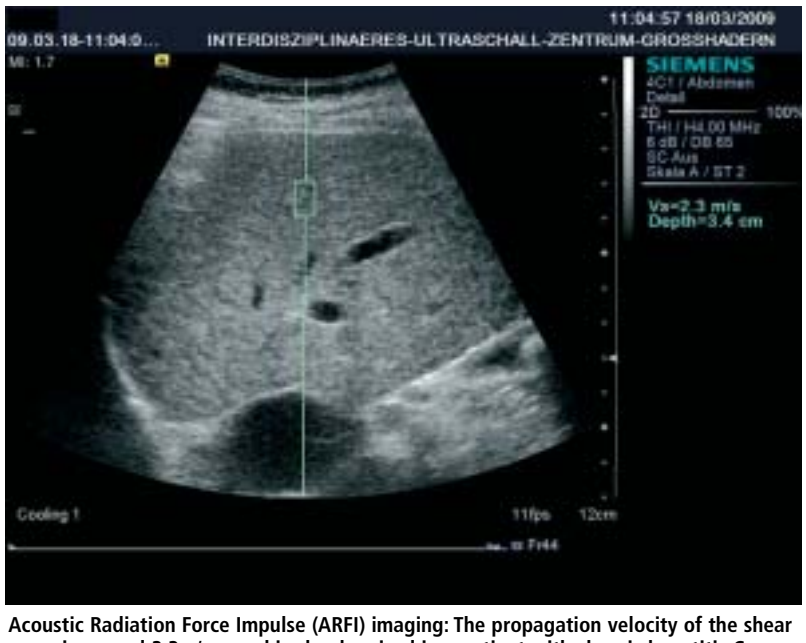
pathological changes and precisely analyse the spread, as well as localisation, in both images.

A new multi-centre study

By the time the elastography system was launched at ECR 2007, Siemens had already published data from the Barr study, which proved that the new ultrasound procedure is particularly suitable to differentiate between normal and malignant breast tissue. At the time, Richard Barr, Professor of Radiology in Ohio/USA, who headed the study, expressed hope that elastography will negate the need for numerous biopsies. Now, Dr Clevert and his colleagues aim to collect further data, along with other universities in a large multi-centre study by examining liver disease with the ARFI method. Initially, to check the reference data, biopsy will be used as the gold standard of tissue analysis.

'As elastography is usually a complementary procedure to other diagnostic ultrasound procedures, it is important for us to know where exactly a suspected tissue change is located. Our system can control the elastography so precisely, based on an existing B-image, that we can examine the characteristics of the tissue at exactly that point,' he explained.

Elastography may have the status of a complementary examination procedure that is used when other ultrasound diagnostic procedures have not delivered sufficient, conclusive results, he pointed out, but, independent of the diagnostic applications, this procedure will be able to support therapy and clinical monitoring in the future. 'A good example is hepatitis; if, six months after the onset of the disease, no normalisation of the transaminases has occurred and HBeAg continues to be detectable, then this disease can be treated with very expensive interferon therapy. However, we know that by far not all patients respond to the administration of interferon. With elastography we can monitor the consistency of the liver tissue and if necessary adjust the therapy scheme at an early stage.'



Acoustic Radiation Force Impulse (ARFI) imaging: The propagation velocity of the shear wave is around 2.3m/sec and is clearly raised in a patient with chronic hepatitis C

BREAST BRACHYTHERAPY

Studies show promise for fast, 5-day therapy for early-stage breast cancer patients

Breast conservation surgery followed by radiation therapy for women with early stage breast cancer has been proven to have the same outcomes as mastectomy. However, conventional radiation therapy requires five daily treatments for 5-7 weeks, a regime that may be logistically difficult for the patient and potentially impossible to undertake if she does not live near a treatment centre.

Accelerated partial breast irradiation (APBI) enables women to complete radiation treatments in just five days. The use of intra-cavity ABPI treatment is increasing in the USA and in Europe. Clinical trial results are proving that the outcomes for low risk breast cancer patients are comparable to traditional treatment and that this is an easier to complete and more acceptable form of radiation therapy for the patients. Radiation oncology departments of hospitals and cancer centres operating at maximum capacity also benefit.

The limitation of ABPI, most commonly delivered by breast brachytherapy, has been the narrow criteria used to select appropriate patients. APBI is not suitable for every woman identified with early stage breast cancer. Eligibility requirements include the criteria that the tumour is no larger than three centimetres, with clear margins of excision, and negative lymph node involvement. Because of the unknown risk of cancer recurrence, the treatment has been limited to women over 45 years. Location of the tumour cavity from the lumpectomy also has been a critical issue, as is the size of the patient's breast, due to concern about radiation to the chest wall and skin toxicity.

Clinical results reported in April and May about clinical outcome findings will enable a broader spectrum of patients to receive this therapy. Age does not appear to be an issue. A group of women who participated in the first clinical trial evaluating the use of MammoSite, the first balloon brachytherapy catheter that received both the USA's Food and Drug Administration 510-K approval and a CE Mark, have been followed since the trial results were first reported in 2003.

This clinical trial was conducted by the American College of Breast Surgeons. It included 1,440 patients being treated between 2002 and 2004 at 97 hospitals. After three years, only 2.5% of the women had a local breast cancer recurrence, and 89% had good to excellent cosmetic results. After five years, the women who were 31 to 50 years of age at the time of treatment have comparable outcomes to women over 50. The effectiveness of APBI treatment appears to be neutral in age. These results were published online in the *Annals of Surgical Oncology*, in March this year,

The MammoSite single-entry catheter consists of a balloon that is inflated to the cavity edges of a tumour, and permits a symmetrical radiation dose distribution to be delivered from inside the cavity to the adjacent tissues surrounding the balloon. An estimated one third of all women who otherwise would be eligible for the treatment cannot be treated because their tumour cavity is either too close to the skin tissue or too adjacent to the chest wall with potential damage to the heart.

The approval of two types of single entry-multi-catheter for use in Europe will change this. The difference is that once the balloon is inflated, different radiation doses may be dispensed in each catheter, sparing a potentially damaging dose to skin or the chest wall in very close proximity to the tumour cavity. The use of the SAVI applicator from Cianna Medical of Aliso Viejo, California and the Contura Multi-Lumen Balloon from SenoRx of Irvine, California, enables radiation oncologists to customise effective treatment of even the smallest breasts.

This spring the results of clinical trials for each product were published. Radiation oncologist Sheree Brown MD, and colleagues at the Wellstar Kennestone Hospital in Marietta, Georgia, published their experiences with 41 patients in Brachytherapy. Patients treated over 12 months between June 2007 and May 2008 had comparable outcomes and mild toxicities similar to MammoSite.

Study results of 63 patients treated with the SAVI applicator at the Moores University of California-San Diego Cancer Centre and the 21st Century Oncology private cancer treatment clinic, in Fort Myers, Florida, were equally positive. The researchers presented their findings in April at the American Society of Breast surgeon's annual meeting.

With such clinical trial results, a much greater percentage of women with early stage breast cancer should be able to have this fast, five-day cancer treatment and get on with their lives.

Report: Dorothy M McSherry, i.t. communications

EUROPEAN HOSPITAL HealthTech Wire®

IT IN EUROPE: the HealthTech Wire update for European Hospital

Towards more efficient cross-border healthcare in Europe

Unlimited digital communication between European healthcare systems – that's the aim of the European Commission's e-health activities. In particular, an electronic version of the European Health Insurance Card is coming closer. However, the road towards a standardised electronic patient summary is somewhat rockier


Gérard Comyn

The electronic version of the European Health Insurance Card (EHIC) is being driven forward by the European Commission's Directorate General for Health and Consumer Affairs (DG SANCO). The introduction of the EHIC some years ago facilitated cross-border reimbursement of healthcare services considerably. But the paper version of the EHIC does have limits: 'Hospitals do not know if a person with an EHIC is really covered by an insurance company, because it might have expired already,' says Noel Nader of GIE Sesam-Vitale in France.

Nader is also one of the coordinators of DG SANCO's EESSI project that aims at establishing an electronic version of the EHIC. This would allow an online insurance verification Europe-wide, so that problems with expired cards could be minimised. EESSI – the bulky acronym for Electronic Exchange of Social Security Information – will be an international IT-network that offers more than 60 standardised electronic documents (SED) relating to health insurance coverage. Health insurance companies that want to take part in the online insurance verification process will do so via national access points that are currently being built up in several European countries.

An online verification will be possible on the base of bilateral or multilateral agreements between European Member States. However, there will be no obligation to take part, neither for a Member State nor for a health insurance company. The idea is that health insurance companies will find the service attractive enough to establish the necessary cooperation with the relevant healthcare providers. This is already happening, in fact: 'EESSI builds on existing pilot installations like for example the NETC@RDS project', says Noel Nader.

The EESSI time schedule is pretty ambitious: The technical specifications for the EESSI service and the necessary access points will probably be finished by the end of the year. The infrastructure could be set up over a period of two years or so, with the system being fully operational in 2012.

While the eEHIC is a purely administrative tool, the European electronic patient summary aims at making personal health information digitally accessible in cross-border healthcare. The electronic patient summary is being developed in the epSOS project (*Smart Open Services for European Patients*) that involves 27 players from twelve European Member States. This project was initiated by the Directorate General for Information Society and Media (DG INFSO). It is backed by € 11 million funding of the European Commission. Industry is expected to contribute at least as much.

The road is a bit rockier here, since a Europe-wide electronic patient summary requires a high degree of interoperability both technically and semantically between the European healthcare systems. 'There are still discussions about how to proceed. But the different actors have figured out how to work together and this is a success', said Gérard Comyn, head of the European Commission's *ICT for Health* unit. To gain more political backing, a Europe-wide governance structure for e-health was brought into discussion recently. 'The topic,' he said, 'was discussed very positively at the ministry of state meeting before the eHealth 2009 conference in Prague. It would certainly give additional impetus.'

Details:
www.healthtechwire.com/ictforhealth

HIGHLY-SECURE LONG-TERM DATA STORAGE SOLUTION

Hard disks are fast replacing tapes and optical media in all phases of data archiving. However, most conventional hard disk systems are generally unsuitable for long-term storage. FAST LTA (long term archiving) reports that its *Silent Cubes* are the first solution designed solely for highly-secure long-term storage of permanent data. 'The storage devices are exceptionally secure against data loss, hardware malfunction and mis-configuration,' the firm adds. 'Silent Cubes are the first and only storage system using hard-disks of three different manufacturers within one storage unit and thereby eliminating the danger arising from faulty batches. Even if four hard disks were to fail at the same time, no data would ever be lost. In addition the storage unit has a redundancy level of four. All data can easily be replicated to a second location or one of FAST LTA`s central data centres if necessary and thereby the level of security can be enhanced further. The software to enable replication is included.'

The company also reports that its WORM (Write Once Read Many) Controller protects all data in the storage units against lost and manipulation at the lowest hardware level. 'All components of the systems are optimised for longevity and the system automatically and regularly checks itself (Internal Digital Audit) and informs the service technicians if anything is wrong.

Silent Cubes are ultra-scalable up to Petabyte level and, because they are small and silent, they can easily be stacked in a 19 inch rack mount.'

Silent Cubes are suited to a wide array of backup and archiving applications exceeding approx. 1 TB in data volume per year. The company adds that the system is specially suited for:

- Long-term storage of medical data (PACS/DICOM)
- Secure archiving of file, email and database servers
- Revision-safe long-term storage of digital documents
- Legally compliant long-term archiving of backup sets.

Hospitals that use electronic medical record systems can improve the process of discharging inpatients by implementing electronic reports instead of dictated ones. More information can be provided in a faster, more reliable manner to the patients' caregivers outside the hospital„

Electronic discharge summaries standardize the format and content of patient records to primary care physicians at the critical time when patients are being transferred from in-patient to out-patient care. Peer-review studies have proven that timely delivery of comprehensive, yet easy to read records, can reduce the number of preventable adverse events that may happen to a patient due to insufficient discharge information. Report: *Kerry Heacox*, of i.t. Communications

Electronic discharge reports

BETTER FOR PATIENTS AND PHYSICIANS

The urban complex that comprises Northwestern Memorial Hospital of Northwestern University covers several city blocks in downtown Chicago. Its medical informatics department is one of the largest and most progressive in the USA. It is regarded as one of the 'most wired' hospitals in the country, and has been on the 'Top 100 Most Wired' list of the American Hospital Association eight times.

Northwestern University Hospital installed a Cerner Millennium electronic medical record and computerized physician order entry system in August 2004. This system recorded patient history and progress notes, but did not provide a method for creating discharge summaries or delivering them automatically to the physicians' offices or clinics. So the hospital informatics team developed its own system.

Physicians were surveyed to identify information they needed the most, and their requests were incorporated with national requirements to maintain accreditation. A patient discharge template was created. It was designed so that portions of the form would be automatically completed by the EMR, including patient demographics, lab results, and allergies and home medications. The electronic discharge system was activated in June 2006.

Elements of the discharge summary included date of admission and discharge, reason for hospitalization, discharge diagnosis, patient's condition at discharge, and medications prescribed at the time of discharge. Patient history, exam summaries, significant findings of laboratory and radiology tests, pathology and stress test reports, and a list of procedures performed are included. The discharge summary also notes what tests do not yet have results, and lists follow-up issues of which the physician must be aware.

Once a discharge report is electronically signed, the system identifies the out-patient physician, or physicians treating the patient, and either electronically faxes a copy or sends it to a different EMR designated by the admitting physician.

In a formal evaluation of Northwestern's patient discharge summaries before and after the hospital went electronic, a research team led by Dr Kevin J O'Leary, Associate Chief of the Division of Hospital Medicine, determined that the quality and clarity of the discharge summaries improved. Both reports were of similar length. With the electronic template, hospital physicians preparing the summaries could easily rank importance of the key results of lab and pathology tests and radiology reports. It was also much easier to indicate what test results were still pending, so that the patient's doctor could follow-up to determine if any test results were abnormal.

One of the goals of implementing an electronic discharge record was to achieve 100% compliance that it would be completed within 72 hours after discharge. Even with electronic reminders to discharging physicians, only 75% initially complied. However, a comparative evaluation of 196 discharge reports showed that, in this sample, 72.6% of the electronic reports were completed within 72 hours, compared to only 59.4% using traditional paper forms.

The format of the electronic form is published in the online version of the April 2009 issue of the *Journal of Hospital Medicine.*

RIS/PACS in practice

Surprising results from coopetition study

A coopetition study carried out by the CKM (Centre for Hospital Management) has shown that RIS/PACS technologies can contribute towards an increase in diagnostic quality, acceleration of processes and a sustainable cost cuts, writes **Professor Wilfried von Eiff**, of the Centre for Hospital Management, Westphalian Wilhelms-University Muenster, Germany. However, these potentials are only released provided that user-orientated workflow optimisation, stable technology/software, effective change management and openness to interfaces for the integration of effective software systems from third party providers are all in place.

Yet, it is precisely those success factors for RIS/PACS projects that are not mobilised in many cases, resulting in avoidable costs, insufficiently integrated workflows, second best diagnostic results and dissatisfied users.

53% of RIS/PACS users could lower costs and increase their productivity by the introduction of the system -- however, only 13% would recommend the RIS/PACS system they use without any reservations. This is particularly being justified by the insufficient consideration of individual, specialist user requirements, the manufacturers' inadequate problem solving ability, as well as a lack of compatibility with other applications systems. Overall, 50% of users evaluated the cooperation with the manufacturers as inadequate.

The users also saw a clear need for improvements in training, product training and helpdesk/user service offered by manufacturers. Bad experiences relate to faulty programmes, inadequate support with the reorganisation of the workflow and ineffective bug management.

Interfaces in the software implementation play a significant role for the success


Professor Wilfried von Eiff

of projects because not every RIS system is compatible with every PACS system. Moreover, users criticised the non-transparent information policies for integration approaches to electronic patient files (EPR). Non-transparent and inflated price policies were also criticised, and users additionally stated that the service and sales staff lack credibility and medical competence. Overall, 44% of users described manufacturers' support as inadequate; a third stated that the technology used is not sufficiently effective.

On the other hand, we need to list positive experiences: Fast data access, high data availability, faster therapeutic turnaround time with radiological diagnoses.

It is interesting that hospitals with clear service structures (five to eight specialist disciplines) prefer cheap RIS/PACS solutions, whilst full service hospitals put strong emphasis on extensive support in the introduction process.

Conclusion: There is no way around the introduction of RIS/PACS systems. More than 50% of users have lowered the costs of the care process and 30% confirm more qualified facilities of diagnosis. The most important criteria in the choice of the 'right' RIS/PACS partner are securing a free interface to effective third party vendors, workflow optimisation before the use of new technology and user-centred change management. A decisive factor for success is that the RIS/PACS project management is oriented around the life cycle of use.

We need greater compatibility!

PACS vendors, image modality manufacturers and storage solution providers must cooperate

As medical images are increasingly digitized, their management, compression and retrieval is increasingly challenged. According to new analysis* from Frost & Sullivan, which examined medical image storage solutions markets in the United Kingdom, France, Spain, Germany, Scandinavia, Benelux and Italy,

the total European storage requirement in 2007 was 106,044 terabytes (TB).

Whilst F&S analyst **Shriram Shanmugham**, mentioned the many known benefits of digital images, the researcher also pointed out the downside: certain images are not DICOM compatible and require a service-oriented approach in order to be archived. 'This is primarily because evolving healthcare standards such as DICOM and HL7 are being updated at a much slower pace than image archiving and image modality technology. 'Other challenges include ensuring interoperability with hospital-based information systems. Another issue is that diagnostic procedures, such as echo and angiogram, generate a high resolution, large file-size images, and their long retrieval times pose a concern for hospitals.'

'Some PACS vendors provide their own unique solution to archiving images that are not DICOM compatible, while others think it is wise to work around the evolving healthcare standards so that, in the future, systems interoperability is streamlined,' Shriram Shanmugham noted, predicting: 'This trend of providing solutions to images that are not DICOM compatible will be prevalent over the next five to seven years.'

The digitised medical imaging archives market requires complete cooperation among the following three major industry participants: PACS vendors, image modality manufacturers and storage solution providers, F&S emphasised. 'Some PACS vendors have indicated that it would be convenient for them if image modality manufacturers provided them with test data before an image modality goes on sale. By having the test data beforehand, PACS vendors affirmed that they could easily establish connectivity (interoperability) of their module with the image modality.'

Hospitals cannot afford to experience an image server downtime, the analyst concludes. 'It is therefore essential that storage solution providers devise innovative technology that obviates the possibility of such server downtime.'

To receive a virtual brochure, e-mail your name, company name, title, telephone number, company e-mail address, company website, city, state and country, to:
katja.feick@frost.com
**http://www.medicalimaging.frost.com. Strategic Outlook into Archive Requirements for Image Management in Medical Imaging M30F*

Robots yes, but let's keep the patient in full focus

Surgeons using technology-supported surgical systems, e.g. lasers and robotics, are challenged not to lose sight of the human element, which influenced the theme *Humanity through technology* for the *126th Annual Congress of the German Society for Surgery* (DGCH) held in Munich this April.

Precise and highly complex medical technology is as much part of the operating theatre as swabs and scalpels. No specialist surgical field could do without it – and this is a good thing, emphasised **Professor Volker Schumpelick MD** (above), DGCH 2009 President of the DGCH and Director of the Clinic and Polyclinic and the Department for Surgery at Aachen, Germany. 'It would be inhuman to deprive patients of the achievements of modern technologies. It increases safety and also often the chances of a cure for patients.'

Young doctors in particular should familiarise themselves with the opportunities of modern technologies for another reason, he added: 'Medical technology is one of the large markets of the future. We need knowledgeable colleagues if we want to develop new products in joint cooperation with the industry.' However, technology is only ever an instrument for the surgeon, never an end in itself, he pointed out.

Details: www.chirurgie2009.de

Laser microdissection technology

COMBINING HIGH LASER POWER AND HIGH REPETITION RATES

The new Leica LMD7000 is a laser microdissection system with a power-adjustable, high precision laser. 'For the first time, high laser power and high repetition rates, are combined within one system,' Leica Microsystems explains. 'The laser's high pulse repetition rates are ideal for the fast excision of single cells, cell clusters, or thin and soft samples. Additionally, high laser power allows the dissection of thick or hard specimens.'

The new Leica LMD6500 and LMD7000 laser microdissection systems both use gravity to collect samples. 'The dissected material, whatever its size or shape, is collected in a contact-free, contamination-free manner. No additional procedures are necessary for collection.'

The laser beam movement of the Leica LMD7000 and LMD6500 is controlled by high precision optics, whereas the microscope stage and the sample are both fixed. 'This allows precise cutting accuracy at high magnifications, as well as high cutting speed at low magnifications. Both are prerequisites to obtain homogeneous material for downstream analysis and reliable results.'

Leica Microsystems' new, intuitive, user interface eases everyday research, the manufacturer reports. 'Additional consumables, such as a non-fluorescent, glass-like membrane for all contrast methods, complete the extensive consumables programme.'

The company also adds that these new systems are ideal for biomarker research, molecular pathology, and many more applications..

Professor warns of despondency among specialist nurses

Surgery generates between 25-40% of hospital revenues, and along with surgeons, specialist nurses are vital to the success of operating theatres. It is thus alarming to find that a survey of 600 theatre nurses has revealed that almost 50% of them would not choose the same profession again.

For the study, **Professor Thomas Busse** (above) and team at Faculty 4 - Social Work and Health, at the University of Applied Sciences in Frankfurt, Germany, distributed their *OP barometer 2008* questionnaire to specialist surgery and anaesthetics nurses working in about 150 general hospitals. The questions, to be answered anonymously, focused on their working conditions and environment.

Prof. Busse noted their unexpectedly great willingness to carry out medical tasks (60%) and that 68.18% of the surgical nurses thought their overtime quota acceptable. However, the professor was alarmed to find the (perceived) strong increase in patient safety: Asked whether endangerment to patients had increased since the introduction of DRGs, almost 60% of respondents answered 'Yes'. They also perceived a massive deterioration in patient care. Only 40.07% of respondents thought they have enough time for patient care.

Although 65% of respondents are currently happy with their jobs, the level of contentment decreases in proportion with the increasing size of surgical departments. Respondents who had worked the longest in surgery were clearly more content than those who were fairly new to the job. Asked whether they would choose the same career again 46.77% of the nurses ticked 'No'.

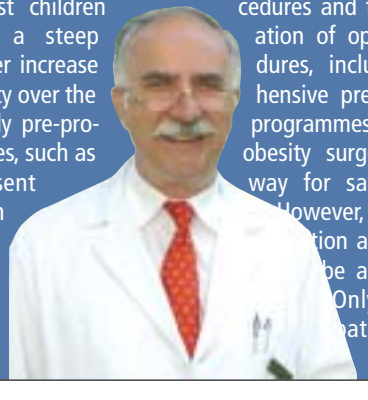
Surgical departments should improve the training and motivation of new staff better Prof. Busse concludes, adding that this should equal the rate at which central surgical units increase in size. 'Without qualified and motivated, functional, surgical care,' he warns, 'even the best surgeons will find their jobs more difficult in the future.' Further OP barometers are planned, he added. 'We intend to make this an annual questionnaire so that we can show developmental trends. 50 new hospitals have already registered for participation in 2009. We also plan to extend the questionnaire to Switzerland and Austria.'

Treating obesity surgically

Promising results and a promising outlook

Professor Rudolf A Weiner, head of the surgical department at Sachsenhausen Hospital, Germany, reports that some developing procedures result not only result in weight loss but also in the systematic elimination of metabolic disorders, and that many new developments in the field promise hope for both the obese and their doctors

"Obesity as a disease is rapidly increasing across all continents, with the exception of Africa. Not only is the average weight of the population in industrialised nations rising, but the problem of obesity has also risen swiftly in emerging nations during the last few decades. The number of morbidly obese, particularly amongst children and adolescents, is on a steep increase. Therefore, a further increase in obesity and morbid obesity over the next few decades is already pre-programmed. Follow-on diseases, such as Diabetes mellitus, present healthcare systems with huge economic problems in the long term. So far, there have not been any comprehensive and satisfactory approaches to obesity prevention. Whereas airlines and the clothing industry are slowly beginning to address the problem, hospitals are completely unprepared. There are currently hardly any hospital beds, operating theatres and toilets that consider the growing weight of patients. The shocking tendency towards rapid weight gain, and the fact that conservative approaches to therapy have largely resulted in no success, mean that for many of those affected surgical intervention is currently the only effective solution. Thanks to the introduction of minimally invasive surgical procedures and the standardisation of operating procedures, including comprehensive pre-and aftercare programmes, the horror of obesity surgery has made way for safer treatment. However, surgical intervention alone is not the be all and end all. Only a selective, patient oriented choice of surgical procedure, as well as an operation prepared, standardised and carried out in the best possible way, with life-long aftercare, will guarantee long term success.



Professor Rudolf A Weiner

With restrictive procedures that limit a patient's capacity to eat solid foods, in the long run the active participation of patients is a prerequisite for successful weight reduction. Malabsorptive procedures, which limit the absorption of fat as the main energy, again require the active participation of the affected patients with lifelong supplementation as a prerequisite for the avoidance of long-term damage, which can arise from a lack of individual trace elements, vitamins and proteins.

The risks and side effects for individual patients are largely outweighed by the advantages through the decrease of co-morbidity. When concomitant diseases and follow-on diseases of obesity, such as Diabetes mellitus, arterial hypertonus, dyslipidaemia and sleep apnoea, independent of the surgical procedure, can be improved or cured in 80% of cases, then the benefit for the individual patient, as

Paediatricians for children in disasters and wars

The battle to establish an international team gains ground

Last year, **Professor Leonid Roshal**, head of the Moscow Research and Clinical Institute of Emergency Children's Surgery and Trauma was one of the main organisers and speakers at a special disaster and emergency medicine conference held in Moscow. Following this conference, a decision was made to organise paediatric teams in every federal region of Russia, with a defined structure of mutual aid.

As previously reported in European Hospital, Leonid Roshal created the world's only paediatric team to tend children caught up in disasters and wars. This team first worked round the clock, without rest. But our options were insufficient. If we already had an international team, I could call "John" in London, and say: *Get your guys and come here quickly!* Our world must have such a network of paediatric teams – I'm sure of it. The task doesn't need a lot of money – huge disasters happen once in two years on average.'

Professor Leonid Roshal

Leonid Roshal: 'We are at the beginning of a long road'

worked in Armenia, after its massive 1988 earthquake. Many disasters followed, despatching the team to all countries, from Algeria to Japan, where there were large earthquakes with many child victims — Egypt, Turkey, India, Chechnya, Pakistan and others. Prof. Roshal knows that paediatricians can help children better than physicians not qualified in this field. However, although he has constantly tried to persuade the international community to organise international paediatrics teams, his efforts proved futile. Why? In conversation with *Olga Ostrovskaya*, our correspondent in Russia, the professor explained and outlined more recent developments.

'At first, it was a hypothesis that paediatricians could help children more efficiently; I devoted my life to prove this in practice. Now I speak with confidence: If paediatricians help children – paediatric surgeons, paediatric traumatologists and so on – we can doubly improve the results. That's why I decided to organise special international teams like ours. We could train the doctors for these teams because we have already had great experience.

'We arrived in India, for example, and saw a tremendous number of child victims. The hospital was overpopulated with patients and had just one traumatologist! Our team

What has prevented the organisation of an international network?

'That's a difficult question. For 20 years I have written different letters - to the Red Cross, the WHO (and I'm a WHO expert!), UNICEF, the UN and so on, asking *Don't you have disasters?* They said Yes — and did nothing. I think they first and foremost healthcare managers and they try to find business facilities; but my problem is not business. Conversely, we need business help. In Moscow this March, we held a charitable concert, *For the Children of Palestine*, to raise money for the team to travel to the East. That's a necessity every time: to find money to send the team to a disaster or war zone.'

The problem must sometimes be political

'Sure. China, for example, had that huge disaster, but we knew nothing about people there and nobody asked for help for children. The same occurred with Pakistan: when I called them and suggested help at first they answered *No*. Later, when we arrived, we received a lot of work and many patients, and then the President awarded me with a special order! Some difficulties always arise between officials in different countries, but that's not the interest in emergency medicine.

'I'm a member of the Board of Directors of WADEM (World Association for Disaster and Emergency Medicine). We hold congresses every two years, and I always organise the session *Children in disasters and wars*, and I know this problem is very important. During the last event, in the Netherlands, we started creating a global system of paediatric teams for work in disaster sites.'

For more information on this, please write to: Mrs Angelina Alekseeva (alexangel17@mail.ru).

well as the economic benefit, can no longer be disputed. All aspects of individual quality of life, ranging from psychological factors to social circumstances and lust for life, have been proven to increase within only the first year after the operation.

However, it must be said that generally obesity surgery offers no solution to the overall problem of developing obesity in the industrialised countries. It remains an individual therapeutic approach that can normalise the affected patient's life and liberate him from concomitant diseases, all with his participation. Obesity surgery or metabolic surgery, respectively offer extremely obese patients who suffer, for example, Diabetes mellitus Type II, and their doctors a perspective, an effective way out of the vicious circle of constantly having to adapt the insulin dose to the increasing weight gain.

Innovations in metabolic therapy through specialised surgical interventions go far beyond obesity surgery. Some of the procedures currently under development result not only in weight loss but also in the systematic elimination of metabolic disorders. We can expect a lot of new developments in this area, which will give hope to patients and doctors alike.

BrainSuite brings Günzburg neurosurgeons new tumour treatment options

Surgeons at the Department of Neurosurgery Ulm University/Günzburg District Hospital have begun to use the newly installed *BrainSuite iMRI*, a digitally integrated neurosurgical operating theatre (OT) that combines image-guided surgery (IGS), high-field intra-operative Magnetic Resonance Imaging (iMRI), visualisation and comprehensive OT data management.

'BrainSuite offers us new treatment options for a broad range of indications including benign and malignant brain tumours and tumours of the pituitary gland,' **Professor Christian Wirtz**, medical director at the Department of Neurosurgery, explained. 'The precise imaging combined with surgical navigation helps to make complicated surgeries safer. Functional and AVM cases also can benefit from the intra-operative

The system is comprised of products from a number of companies: Siemens high-field MRI; BrainLAB's image-guided surgery system; a Zeiss microscope and Trumpf operating table, plus other components. In addition, the surgical team accesses patient data from the hospital's PACS via the digital data management system *BrainSuite Net*.

imaging capabilities. Patients appreciate that we can control tumour resection during surgery faster and with higher security.'

The integrated navigation system links real-time, intra-operative HD images with the spatial position of the surgical instruments, allowing more accurate determination of the tumour location and amount of

37% of surgical outcomes could be improved with an intra-operative MRI, according to a clinical study at Erlangen University

diseased tissue removed.

'In brain surgery, typical risks include injury to critical structures and consequential damages. It is often impossible to differentiate between tumour and healthy tissue with the naked eye. BrainSuite iMRI enables surgeons to reduce these risks by identifying critical functional areas and pathways within the brain during the procedure with MR imaging, allowing them to reach a tumour more efficiently and remove it more completely.,' explained BrainLAB AG. 'The resection of a tumour can also lead to anatomical changes during surgery due to tissue movement (or *brain shift*). Consequently, the accuracy of pre-operative MRT data decreases during the course of a surgery. The combination of surgical navigation and intra-operative MRI provides surgeons with up-to-date information enabling them to remove tumours precisely.'

In Germany, similar neurosurgical operating theatres from BrainLAB are in clinical use in Erlangen and Hanover. Twenty-four BrainSuite iMRIs are currently in neurosurgical use worldwide.

BrainLAB solutions allow expansion from a single system to operating suites to digitally integrated hospitals covering all subspecialties, from neurosurgery, orthopaedics, ENT, CMF to spine & trauma and oncology. The privately-owned firm, which employs 1,000 people in 16 offices across Europe, Asia, Australia, North and South America, has installed 3,300 systems in over 75 countries.
Details: www.brainlab.com

Operating Theatre One

State-of-the-art surgical unit lightens the work of surgeons at Tuttlingen Municipal Clinic

The refurbished theatre at Tuttlingen Clinic; Berchtold's Supersuite combines bright, shadow-free Chromophare lights, Teletom equipment management systems, and Operon surgical tables

Tuttlingen Municipal Clinic occupies two sites, the result of merger in 2002 of two clinics in Tuttlingen and Spaichingen, following a merger of the two clinics in Tuttlingen and Spaichingen in 2002. In April 2008, the hospital managers approached Berchtold to discuss a total re-vamp of an operating theatre (OT). Accustomed to designing operating theatres internationally, a team of consultants at Berchtold's Competence Centre, directed by Florian Stritzel, remodelled the operating theatre to include state-of-the-art technologies at a reasonable price to match the Tuttlingen Clinic's budget.

Today, the newly designed operating room is used equally for gynaecological and neurosurgical surgery; its success is expressed by operating theatre supervisor Martin Hauser. 'It meets all the requirements of efficient operating room procedures. Thanks to the new, decentralised ceiling mount-

Operating theatre director Martin Hauser (left) with Florian Stritzel, director of the Berchtold Competence Centre

ings, we are flexible and can adjust access to equipment as called for by the situation in the operating theatre. Due to enormous structural improvements, criteria for processes and results can be optimised for patients and personnel to a considerable degree.'

Initially, the clinic's technical installations personnel had been invited to Berchtold's showroom to familiarise themselves with the company's *Supersuite* concept, which combines all product lines for custom-tailored, full-package operating theatre solutions.

The Berchtold team then analysed the workflow at the Tuttlingen Municipal Clinic, to evaluate its current space and usage, the activities of the surgical team before, during and after operations, and the need for new medical devices. Based on this, the strengths and weaknesses of space usage were determined. 2-D room planning followed, with subsequent 3-D visualisation from a 360° perspective, to demonstrate the best possible space utilisation and configuration of medical equipment to streamline surgical work.

In October 2008, Berchtold initiated remodelling measures. Two HID gas-discharge lights of the *Chromophare E 655* series, featuring an external camera system and 2 monitor supports, were installed in the ceiling of Operation Theatre One. 'With an excellent light intensity of 160,000 lux, they ensure optimal illumination of the entire operating field,' Berchtold explained. 'Thanks to the low heat development of both surgical lights, which were successfully launched on the market in April 2008, they enable the surgeon to work comfortably by preventing temperatures from rising in the vicinity of his or her head. The newly installed suspension system also allows for flexible adjustment to future technologies. Two additional products from the expansive Berchtold product line now provide greater efficiency and better utilisation of the surgical facilities at the Tuttlingen Clinic in day-to-day clinical practice. The *Teletom TS 520* and *TC 720* equipment management systems, also equipped with two monitor supports, dispense with the need for video cart, cables and hoses on the floor and ensure that monitors, medical devices and connections can be placed at easy reach.'
Details: www.Berchtold.biz

170 years of medical technology innovations

Maquet is possibly Europe's oldest manufacturer of healthcare equipment. Founded in Heidelberg, Germany, in 1838 the firm initially manufactured patient chairs and other healthcare equipment. Today, Maquet operates three business divisions (see box) each focusing on medical technology for operating theatres (OT) and intensive care units (ICU). The firm is a notable subsidiary of Getinge AB, the Swedish medical technology group. This, combined with ArjoHuntleigh Extended Care and Getinge Infection Control, positions the entire Getinge Group among the world's top 25 medical companies.

The *Variop* modular operating theatre, equipped with *Magnus* operating table system, *PowerLED* surgical light and the *Maquet Telemedicine* system

Based on extensive knowledge of hospital and clinic work-flow, as well as OT and ICU requirements, the Maquet brand name enjoys international recognition for providing professional assistance throughout the planning stages of a hospital. 'This naturally includes a consideration of all the relevant medical, clinical and economic aspects,' Maquet points out. 'Coupled with the awareness that only the best products and solutions are acceptable for sensitive OT and ICU areas, Maquet sets a unique standard in medical technology – The Gold Standard.'

The Maquet Surgical Workplaces division concentrates on the design of operating theatres, providing a wide range of procedure-oriented products to enhance workflow. These include operating tables and lights, ceiling service units, and video communication systems. 'Practice oriented, forward looking products are the hallmarks of efficient design, and Maquet's latest operating theatre table system *Magnus* offers an example that surpasses traditional limitations in design and operation. Because of its perfect height adjustment, the Magnus operating table surface helps surgeons to work in a relaxed position, whether they are standing or sitting. Sections that can be adjusted at extreme angles, especially for tipping and tilting, can be summed up in one sentence: *Gravity becomes the surgeon's third hand*,' the company reports.

Undoubtedly, efficient and effective theatre lighting is critical during surgery. Attention to both has produced a completely new approach to surgical lighting in Maquet's *PowerLED* surgical light, which uses light emitting diodes (LEDs) to provide a high quality, pre-focused light source of 120,000 lux, with excellent heat management.

The *PowerLED* surgical light uses LEDs to provide a high quality, pre-focused light source of 120,000 lux with excellent heat management

Given that today's operating theatres must manage a considerable number of units, despite often limited floor space, the firm's ceiling service units are also designed to meet current needs.

Video imaging, now also an integral part of leading operating theatres, involves a high level of communication cables. To meet this need, the company has produced a telemedicine system of suspended conduits for the safe insertion of cabling to convey any type of digital or analogue signal, thus enabling fast access to patient data, a scanner, IRM and radiology or video images. 'The expectations for telemedicine are great. Maquet has developed the first video communications system designed specifically for medical use. It transmits both images and sound live from the operating room to the PC,' the company reports. 'It does so in top-flight digital audio and video quality. It can broadcast through the in-house IT network or to any location on the planet via Internet.'

The *Modutec* ceiling service unit provides ambient light

** In 2008, Getinge AB, which is publicly listed and employs 12,800 people worldwide, achieved revenues of two billion euros. In the same year, Maquet itself generated pro-forma revenues (including the acquisition of the Datascope Corporation) of over one billion euros. Globally, Maquet employs 5,000 people in 34 sales and service organisations, and more than 200 sales representatives.*

Maquet's business divisions

Cardiovascular
Manufacturing products for cardiac assist (intra-aortic balloon counter-pulsation therapy), coronary artery bypass surgery, heart valve repair, aneurysm and vascular repair, peripheral interventions and extracorporeal circulation.

Critical Care
Producing intensive care ventilators and anaesthesia machines

Surgical Workplaces
Products: operating theatre tables, lights and ceiling service units, prefabricated theatre and ICU suites, and telemedicine for theatre integration

The WHO Surgical Safety Checklist

Complications during interventions can be cut by one third

Following the launch of the *Action Alliance on Patient Safety (High 5s)* initiative, launched in 2006 by the World Health Organisation (WHO) Collaborating Centre on Patient Safety (Solutions), the World Alliance for Patient Safety and the Commonwealth Fund, in June 2008 the WHO introduced a Surgical Safety Checklist, as part of the *Safe Surgery Saves Lives* Campaign. Over 300 organisations, worldwide, have already endorsed the WHO campaign.

During a collaborative project involving seven countries (Australia, Canada, New Zealand, United Kingdom, USA, Germany and the Netherlands) the Checklist's five standardised patient safety solutions to prevent avoidable catastrophic events in hospitals was tested. The participants established that implementation by surgeons of the 19 point Surgical Safety Checklist reduced complications during interventions by one third.

Similar to preparation prior to the take-off of an aircraft, a three-part point-by-point check – before the administration of anaesthetic, before the first incision, and before the patient leaves the operating theatre – is carried out, to safeguard against anything that may put the patient at risk.

Among the organisations that took part in the Checklist tests was the German Society for Surgery (DGCH), which has translated the checklist from English for its introduction in the country's hospitals. 'The DGCH drew attention to this checklist at an early stage and has advised its members to use the WHO checklist routinely in their daily clinical work once it has been adapted to the respective local conditions,' said Professor Hartwig Bauer MD, Secretary General of the DGCH in Berlin.

Legionnaires' disease

A hospital outbreak not only causes severe illnesses or death, but also results in ward closures and disruption of care — not to mention potential legal action. What can be done to combat such infections?

EWGLINET collaborator Dr Christian Lueck

Identified only 31 years ago, Legionnaires' disease is a severe form of pneumonia often caused in humans by *Legionella pneumophila* bacteria. Commonly found in water and soil, the bacteria can be inhaled as aerosol particles and cause severe disease. With no clinical features that distinguish it from other types of pneumonia, misdiagnosis and lack of awareness have led to a significant underestimation of the actual prevalence of Legionnaires' disease.

During the years since its identification, the bacteria caught in hospitals have caused severe illnesses and deaths. During subsequent investigations bacterial sources were identified in hospital water coolers, water from taps, water used to wash nebulisers and, in one severe outbreak, contaminated water that had been used to irrigate burns in an emergency department.

Despite increased awareness of potential sources and hygiene efforts, the threat of Legionnaires' disease remains and reported cases have increased. As recently as this January, a 65-year-old resident of a housing association in Denmark died after contracting the disease. That source was reported to be an insufficiently heated water supply. The association faced legal charges.

Clearly surveillance of this disease is vital. By the late 1980's, it had become clear that international collaboration was needed to exchange information and identify problematic sites across Europe. This led to the formation, in 1986, of the European Surveillance Scheme for Travel Associated Legionnaires' disease (EWGLINET), based in London's Health Protection Agency (HPA) centre for infections. We asked **Dr Christian Lueck**, one of the EWGLINET collaborators, about the organisation, and the current methods available for hospitals to test for Legionnaires' disease.

'The European Working Group for *Legionella* Infection (EWGLI) consists of specialist scientists with an interest in improving knowledge on the epidemiological and microbiological aspects of Legionnaires' disease,' Dr Lueck explained. 'We achieved this through international surveillance, as well as developing diagnostic, management and treatment methods. One of the sub-groups of EWGLI — EWGLINET — was implemented to capture the low bacterial manifestation rate of 1% effectively. Supported and funded by the European Union, this scheme monitors the formation of clusters (two or more cases associated with the same accommodation site within two years) to raise awareness of problematic sites.

***Legionella pneumophila* bacteria**

'Over the last 20 years, there has been a significant increase in the number of reported cases. During 1987, EWGLINET received reports of only three cases, whereas 2007 saw 947 reported cases*.

What mainly caused such outbreaks?

'*Legionella* bacteria are common and can be found naturally in environmental water sources. From these sources, the organisms can pass into hot and cold water storage tanks, spa pools or other artificial reservoirs. These water systems often provide conditions favourable to the bacteria, including temperatures between 20 and 45°C, the presence of rust, sediment, sludge or scale,' he pointed out, adding: '*Legionella pneumophilia* can also survive and be transmitted via aerosol particles that, once inhaled, cause infection via the respiratory system. Therefore, poorly maintained aerosol-generating devices act as a source of disease.

'Once a cluster is identified, a report is filed to our London centre to raise awareness of a potential problem. The site in question is then given six weeks to rid their water supply of the bacteria. Health officers then assess the water supply and, if it is still unsafe, the name of the establishment is published on the public EWGLINET website. However, EWGLINET simply raises awareness; the responsibility for shutting-down problematic hospitals (or hotels) lies with the health authority of each country.

How is Legionnaires' disease diagnosed?

'Previously, the diagnosis relied on culturing sputum samples, which can be difficult to obtain as patients often present with a non-productive cough. Invasive sampling procedures are often required, causing discomfort to the patient. Subsequent culturing of the sample is also time-consuming and costly.

Urinary antigen tests are quicker than sputum cultures; the BinaxNOW Legionella test, for example, produces results in 15 minutes

'Now urinary antigen tests, such as the BinaxNOW L*egionella* test (Inverness Medical), are used to diagnose approximately 80% of patients. These detect the presence of the *Legionella pneumophila* serogroup 1 antigen, rather than the live bacteria, from a simple urine sample. The antigens appear one to three days from the onset of symptoms, enabling rapid diagnosis. Therefore, urine samples are generally the favoured testing method. However, sputum samples do provide data on bacterial strains. In cases where a urine test is negative, a sputum sample should still be cultured to check for the presence of other strains,' he advised.'

So, what would be the best method of detection?

'Ideally, using a combination of the high sensitivity achieved from culturing a sputum sample and the rapid, easy-to-use point of care urinary antigen test. So, my gold standard test would be a urinary antigen test that can detect all serogroups.'

What advice would you give to hospitals about testing for the disease as well as its source?

Currently, each country has different guidelines on testing for Legionnaires' disease and how much bacteria is considered dangerous. A proposed scheme is currently under discussion, where water systems are routinely tested for the presence and strain of bacteria. This will enable correct testing methods to be used from the onset. One key piece of advice is to remember that immuno-compromised patients are especially vulnerable to infection, as are patients taking corticosteroids, a major risk factor for contracting Legionella.

** EWGLINET data tables: http://www.ewgli.org/data/data_tables/month_year_onset.asp*

Swine flu and hygiene standards

Flu preparations - Under the UK's National Health Service (NHS) code of practice for nosocomial infections, the hospital Trusts and others are required '… to ensure, so far as is reasonably practicable, that healthcare workers are free of, and protected from, exposure to communicable infections'.

In the Department of Health's *Influenza immunisation programme 2008/09*, various categories of people were to be offered flu 'jabs'. In addition to these groups, it was requested that 'National Health Service (NHS) employers should offer immunisation to employees directly involved in patient care' to help reduce the likelihood of flu transmission to patients.

However, new figures from the Department of Health (DoH) indicate that only 14% of front line NHS staff had received a flu vaccine before the 2008-09 flu season.

The Royal College of General Practitioners called for compulsory immunisation for healthcare staff who have direct patient contact.

The flu outbreak in December and over the New Year was the worst for eight years, with more than 60 cases per 100,000 people – many in hospitals. The Health Protection Agency identified the low levels of staff vaccination as a significant factor in an outbreak.

However, last year a Government study of NHS attitudes found that most staff did not view flu as a serious illness and thought themselves not at risk, so a vaccine was unnecessary.

With the current concern about the Mexican 'swine flu', one wonders how many hospital staff members have followed through with the available flu vaccinations.

Hygiene failings and improvements

UK – The hygiene code governing healthcare Trusts was introduced two years ago.

However, although most Trusts have met the hygiene standards set by the Care Quality Commission (CQC), 22 out of the 388 registered with CQC — 10 acute hospital trusts, six primary care trusts, four mental healthcare trusts and one ambulance trust — have failed to meet the required standards fully.

The CQC is new, having replaced the Healthcare Commission; Commission for Social Care Inspection and the Mental Health Act Commission. Initiated last year to regulate UK health and social care services, CQC came into effect from this April.

The findings do not necessarily mean that the failed trusts have experienced outbreaks of disease due to low standards of hygiene. They simply have not reached the standards set. Some of the 22 trusts have only been issued with a deadline to meet hygiene standards; others have had conditions placed on their registration, e.g. the requirement to keep wards clean. Others that failed have been directed to improve on surgical equipment decontamination, and to tighten their policies to tackle infections such as MRSA, *C. difficile* and *Legionella*.

Legally, the trusts must conform, otherwise they could receive warnings and fines, or even face prosecution or closure.

Scotland

Last autumn Scottish Health Minister Nicola Sturgeon promised to ban further privatisation of hospital cleaning contracts, and that the NHS would employ its own cleaners. Earlier this year the Minister also formed a new inspectorate to police hygiene standards.

This April she announced that 600 cleaners will indeed be recruited by NHS Scotland (a separate body from the UK's National Health Service) aided by government resources to ensure the boards across the country can hire the additional staff.

According to figures released in April, the number of patients who contracted nosocomial infections in this country has indeed fallen. In the last quarter of 2008, the health boards recorded 157 MRSA cases. Although this is 10 more than for the previous quarter, the figure is 24% lower than in the same quarter in 2007.

Additionally, 1,608 patients, aged over 65 years were recorded as having contracted *C. Difficile* during as the last quarter of 2007, while in the same period in 2008 the number of cases was 1,299.

Beyond the hygiene benefits of trained staff cleaners, given today's rising unemployment levels the creation of 600 new jobs within NHS Scotland is also welcomed.

Report: Brenda Marsh

Austria's new training model

The so-called *2 in 1* educational model is an interesting innovation in nurse training; it aims at an efficient synthesis of theory and practice. Following a course of seven semesters, participants achieve the academic baccalaureate qualification, as well as a licence (in the form of a diploma) to practice in general healthcare.

This course was developed in joint cooperation between the Paracelsus Medical Private University Salzburg and the Rudolfinerhaus Vienna, which, with a history stretching back 125 years, is associated with one of the most well regarded schools for nurse training within the German-speaking area.

The curriculum of the *Bachelor of Science in Nursing* is modular and comprises general and special care (four modules), basic medical knowledge (three modules) sociology and psychology (one module), public health and management (1 module), nursing science and nursing research (five modules) a bachelor thesis as well as four obligatory work placements and three placements, which can be chosen. (The equivalent of) A-levels are a prerequisite for being accepted on the course.

This training model accommodates the requirement that the implementation of new concepts on care, advice and prevention, which are constantly being developed for nurses, is being carried out by adequately scientifically trained and practically experienced, competent staff. 'Nurses are increasingly taking on tasks for which scientific training is essential, therefore contributing significantly to the relief and improvement of the entire healthcare system,' said Dr Udo Zifko, Medical Director of the Rudolfinerhaus. The possible employment areas for 2 in 1 graduates are correspondingly diverse and their job prospects are therefore high.

Nurse training in the individual European Union member countries is not regulated in a standardised manner; mostly the prerequisite for admission to study is a general school leaving certificate after 10 or 12 years of school respectively, and in most countries the course ends with an academic qualification, mostly the Bachelor of Nursing.

Further details:
http://www.oegkv.at/uploads/media/Pflege_Erstausbildg_EU_Tab.pdf

The Accreditation Council for Education

NEW

During its 5th international congress (held in Denmark in April), the European Operating Room Nurses Organisation (EORNA) launched the Accreditation Council for Education (ACE) 'Educational and training programmes in the nursing sector need alignment and development on a European level,' explained EORNA President Irini Antoniadou. 'From 1997 to the present, EORNA achieved a curriculum for a minimum of education in operating theatre and anaesthetic nursing and care. ACE represents a major step towards achieving a harmonised high-level peri-operative patient care in Europe.'

ACE is not only the first European accreditation system for operating theatre nurses, but also represents a unique initiative for the professional development of nursing and care in general. Among its aims is the accessibility of continuing education and professional development. To this end, EORNA ACE sets quality standards for distance learning courses and educational events, e.g. scientific meetings, conferences, workshops or symposia. 'Teaching institutes will be able to rely on the ACE quality label and integrate approved courses in their learning plans, thus guaranteeing the latest and accurate information,' the organisers report, adding that it will be available to all European national nursing associations.

When given the stamp *EORNA ACE Approved*, educational courses or events can use the label on all their associated materials. Participants will be able to collect credits points and build their personal continued education programme. The review process by the EORNA ACE Board will assure quality standards of all courses or events.

The system also allows easy exchange of credits between European countries and comparable systems outside Europe, thus improving mobility in healthcare.

Next to evaluating operating theatre related initiatives, ACE will also act as an accreditation committee for other healthcare associations and associations representing expert areas, including emergency, critical, paediatric and neonatal care nursing.

Personnel deficits

Delegate some physicians' tasks to nurses, or watch hospital systems collapse

Healthcare in Germany will suffer if doctors and nurses cannot delegate certain tasks to others. So warned Udo Janssen MD MBA, speaking at the recent Gesundheitsnetzwerker (health network) congress held in Berlin. Blaming the inflexibility of new labour models that make them difficult to implement, Dr Janssen believes they need to be reviewed.

Hospitals not only face insufficient budgets and a huge increase in patients aged over 60 years, but also a shortage of medical staff. Almost 18,000 doctors will probably retire up to 2017, he pointed out, but an equivalent number of young doctors is not expected in the near future. A 'market adjustment' is vital to avoid some clinical departments breaking down due to lack of personnel, and even whole hospital systems collapsing.

Gynaecologist Udo Janssen

Doctors and nurses need to become more flexible about delegation. German doctors, he believes, are mentally conservative about the transference of responsibility to others, or even sharing knowledge and experience they have gained. Conversely, in Great Britain for example, qualified nurses take on tasks that, in Germany, are considered to be solely the jobs of doctors.

During his lecture, Dr Janssen presented a concept for task sharing, in which doctors, to focus on their key-competences, would delegate parts of their work to nurses qualified in those tasks. To do this, it would be necessary to develop new qualification programmes to educate nurses to become medical assistants. The concept was met with some criticism. It was very doubted that nurses would be willing to undertake a doctor's task due to the great responsibility. It was also pointed out that there is neither a pre-existing structure, nor legal cover, that could enable the realisation of his model. Dr Janssen argued that, due to a lack of staff, compromises should be made and more responsibility taken and new methods should be explored.

In addition, because medical personnel levels need to be maintained, but European manpower resources, particularly in Scandinavia and East European countries, are too limited and costly, he suggested 'limited and temporary labour migration' within the EU, which would permit Indian medical professionals, for example, to work here.

Care of elderly and geriatric patients in EU countries

France

The system lacks a coherent structure to deal with its rapidly aging population, Jane McDougall reports

As in all industrialised countries, the population of France is ageing rapidly. Today, 15% (1 in 6) of people are over 65 years old and 4% (>2 million) are older than 85. These figures are set to increase over the next decade. With an older population comes increased morbidity from age-related diseases. However, the hospital environment remains hostile to the older patient, because it is not adapted to an ageing population.

Most general practitioners (GPs) try to avoid the hospitalisation of older patients unless absolutely necessary and alternatives do exist. Specialised day hospitals for the older patient provide capacity for treatment adjustments, diagnostic or exploratory examinations and other short-term care under hospital conditions.

Another important initiative is the creation of a domiciliary care structure (HAD: hospitalisation à domicile). HAD is supported by the public hospital system and reimbursed by the social security. It enables aged patients to receive the equivalent of hospital care in their own homes. It provides an ideal option for the elderly, especially those with chronic illness, medical and paramedical services are obtained without the trauma of hospitalisation. Unfortunately, the network is not fully developed and many departments, especially in semi- or completely rural areas, are not equipped to provide such a service, which requires flexible staffing and time. Figures for Brittany in 2008 show that the nine existing HAD centres treated a total 251 patients, average age: 70 years. Each patient received an average of 0.8 doctor, 1.31 nurse and 1.79 physiotherapist visits a day. The average length of a nursing visit was 34 minutes per patient.

Therefore, for many elderly patients, hospital is the only option. Although many GPs and hospitals try and programme a short period of stay, this often becomes protracted. With elderly patients rapidly losing autonomy, returning to their homes requires planning and coordination. Understanding of this difficulty has led to the creation of support networks for the elderly, the so called 'réseaux gérontologiques'. The idea is that with the GP acting as a coordinator between healthcare in the local hospital and the community, each patient has a personalised project for their return home.

In theory this care starts before hospitalisation, when the reasons for and the possible outcomes of the hospital stay are fully explained. This discussion should also include the patient's family so that they can be aware of future changes in the daily life of their relative. Then the community nursing team and other necessary paramedical staff should be contacted to ensure the correct continuum of care. For a successful return home, which is possible if all works well in almost two-thirds of cases, a fully integrated multidisciplinary team is essential.

Unfortunately, it is at this point that theory is often not translated into reality. One barrier is financial, while some of the cost of medical care comes from the global hospital budgets much of extra care needed has to be financed either from the patient's own health insurance or from family resources. State aid is available from different departments but this requires time and quite lengthy form filling. The burden on the patient's family is high, needing coordination, determination and knowledge of the possible options.

Legally, a patient cannot be discharged unless they have family at home waiting for them, but the quality of attention and family willingness to assist in the return and medical follow-up is not necessarily verified. According to one district nurse in the Parisian region, communication between the hospital and her office is virtually non-existent. Often no one informs them of a patient's potential hospitalisation or return home. On visiting, they find that conditions at home are not suitable for follow-up treatment, with no sufficient provision in place for basic necessities such as cleaning, shopping and cooking. This is due entirely to a lack of communication and coordination between the different players responsible for the patient's care. This nurse fully appreciates the work of individuals in trying to improve the lot of the older patient returning home, but feels that they are working to no avail, in splendid isolation. Her belief is that until French society values the elderly rather than considering them as an inconvenience, the continued care of the chronically, or acutely ill, old will remain piecemeal and erratic. With the majority of the population rapidly becoming 'old' let us hope that their 'value' is realised sooner, rather than later.

Germany

Despite the legal discharge requirement, 50% of hospitals have not implemented it, writes Martin Steinberg

The reduction in hospital length of stays to the necessary minimum is desirable from an individual as well as an economic viewpoint. Patients are allowed to reintegrate into their jobs and social life faster and hospitals are given some financial relief in these days of case-based remuneration systems. However, the individual, medical and psychological needs of patients are at risk of being pushed aside for the sake of economic arguments. Therefore, a well-functioning discharge management system, at the interface between out- and in-patient care, is increasingly important. The German Network for Quality Development in Care (DNQP) published an *Expert Guide to Discharge Management* for the German healthcare system in 2004 as 'disruption of care after discharge (…) bears health risks, exposes patients and their relatives to unnecessary strain and can lead to high consequential costs'. This view was shared by the legislator who, in 2007, passed the GKV-WSG law (statutory health insurance competition reinforcement law), ensuring patients' rights to professional discharge management: 'Insured patients are entitled to adequate care management, particularly for the solution of problems inherent in the transition between different areas of care (§ 11 AGBV V). However, the law leaves room for interpretation regarding which occupational group should carry out which tasks: 'The affected service providers ensure appropriate follow-up care of insured patients … They are to be supported in these efforts by the medical insurers. The care facilities are to be involved in this care management process …'

The Cochrane review supports efforts partly to redistribute the tasks involved in discharge management. On the basis of ten randomised, controlled studies, it examined a concept involving the transfer of responsibility for a unit dealing with discharge preparation within an acute hospital to nursing staff, with doctors only required on an advisory basis. Result: No significant statistical effects regarding mortality in hospital and the three- and six-month mortality rates respectively. Moreover, the functional status of patients looked after by the NLU (nurse-lead unit) was better than that of patients in a normal ward (Anderl-Doliwa, 2008). The Charité Clinic in Berlin considered these findings and was among the first to redistribute tasks among hospital staff in 2006. Last year, the Pfalzklinikum for Psychiatry and Neurology, in Rockenhausen, began its *Ward Manager* project, which plans the use of staff on the ward cross-professionally, coordinates appointments and takes over service controlling. According to Brigitte Anderl-Doliwa, of the clinic's nursing directorate, this redistribution of tasks and responsibilities can only succeed if the discharge processes are actually perceived as management tasks.

However, the reality is currently rather different. According to Anderl-Doliwa, roughly five years after the introduction of the expert DNQP standards, and despite legal requirement, less than 50% of hospitals actually have written standards on discharge management. It is the responsibility of hospital management to create the organisational, legal and structural prerequisites for the redistribution of tasks, he points out.

The claim of a third group, after doctors and nurses, to the right of involvement in discharge management demonstrates the danger of a struggle over competencies in the hospitals. In 2004, the German Association for Social Work in Healthcare (DVSG) also published a policy document on discharge management, defining the objective of the joint efforts. 'The objective is to enable each patient to receive the type of care that best takes his wishes and his requirement for help into consideration, whilst ensuring his right of self-determination, voluntariness and freedom of choice.' Because of the emphasis on the 'freedom of choice care', the DVSG underlines its claim to be a firm point of contact in interface management and not only – as often perceived by the public – a helper in the fight against bureaucratic hurdles. And it is hard to contradict the social workers in their policy document, which points towards their 'broad training spectrum and multidimensional approach'. Social work is classic interface management.

In view of the existing interdisciplinary competence it is surprising that not more hospitals have professionalised and standardised discharge management. This increases the danger of the aspired, comprehensive reduction in the length of individual hospital stays, actually leading to a revolving-door effect with high follow-up costs. German hospitals should quickly define and implement these quality standards in their own interest, but particularly in the interests of patients. The DVSG is right to emphasise that 'discharge management is a multiprofessional task where each occupational group has to abide by quality standards'.

We can only hope that the 'German Patient' has been cured of the symptoms of a sophisticated struggle over competencies linked with a chronic belief in hierarchies.

The Czech Republic

Policies are needed to provide medical education in geriatrics, a restructuring of institutional care, and to change the current critical care/follow-up care beds concept, Rostislav Kuklik reports

Gerontology/geriatrics care is not well organised – best proven by the fact that Tomas Julinek, the last Health Minister, proposed that geriatrics as a specialised medical field should be repealed. If this was to happen (no progress has been noted since the government fell and the minister changed), geriatrics would undoubtedly gradually diminish and die out in the end. Another evidence of poor organisation comes from data published by the Czech Research Institute for Labour and Social Affairs, which states that the present care of elderly citizens is unsatisfactory on both sides. Relatively, there are enough beds in nursing homes; however, admission for many applicants (regardless of social and/or financial status) is simply refused and there is no alternative. For those wanting home care there is a critical lack of professional carers, so the situation is the same - desperate.

In the Republic, the history of the long-term geriatric care settings (LTC) began in the 1980s, when LTC beds emerged as 'a geriatrics bed base' and the position of geriatric nurse was introduced into practitioners' work in town areas. A concept of follow-up care began in 1998. Since then, not much has changed, and LTCs are usually perceived as the 'last resort' for those without relatives, or old, polymorbid, and/or unable to care for themselves. Beds for elderly are very frequently operated by personnel with no proper geriatrics medical training and, unfortunately, these medical professionals do not have an adequate training opportunity to obtain further knowledge to deal with these patients. Postgraduate education in this very medical field is quite tricky and lacks resources on all fronts.

Being retired and over 65 means a lot to anyone, anywhere; in the Republic, it also means (with slight regional differences) that such a person has about 80% probability to be fully independent, 10% probability to need home assistance, 7% probability to need home care, and 3% probability to be fully dependent and needing institutional care. Unfortunately, for some reason we seem unable to meet up with the home care offerings of other European states, despite many efforts made, and even a law on social services applicable since 2007. This country lacks urgent geriatrics beds, and their numbers decrease annually: 611 in 2002, 439 in 2006, and only 393 in 2007. Conversely, as we do not lack follow-up geriatric care beds, there are sufficient opportunities to place an elderly patient in a nursing home, but with the risk of improper care, as discussed.

The future - All over the developed world, the coming of age is an issue seen hand in hand with two general problems: changes need to be implemented in retirement income insurance policy and elderly care. It seems quite advantageous to take the necessary steps as soon as possible, because even politicians in the government feel a strong urge to make unavoidable changes and they have agreed on implementing a national aging programme for the period 2008 to 2012.

Postgraduate medical education for physicians working in geriatrics, restructuring of institutional care and changes to the critical/follow-up care beds concept should be cornerstones of new policies.

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