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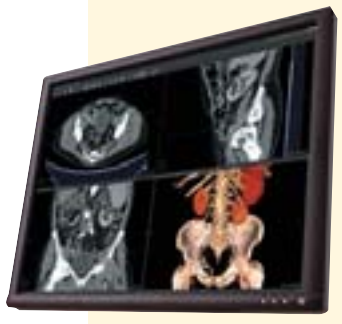

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contents

COURTESY OF SECTRA

France: Breast cancer screening going digital? Lithuania's new programme. See pages 30-31

NICE recommends annual MRI screenings for breast cancer

Guidelines updated for high-risk women

Report: Brenda Marsh

25 October – The National Institute for Health and Clinical Excellence (NICE) – the independent organisation responsible for providing national guidance on the appropriate treatment and care of people with specific diseases and conditions within the National Health Service (NHS) - has updated its familial breast cancer guideline to recommend annual magnetic resonance scanning (MRI) for breast cancer screening of women aged between 20-49 years who are at high risk of breast cancer. These include the country's estimated 1% of young women who carry either of the recently discovered high-risk genes BRCA1 or BRCA2, and therefore face an up to 85% breast cancer risk (the average woman faces an 11% risk).

A country-wide study, by the Institute of Cancer Research (published in the Lancet in May 2005) found that MRI identified 77% of tumours in younger women at high genetic risk - compared with just 40% using X-ray mammography (XRM). A combination of MRI and XRM screening enabled the detection of 94% of tumours. MRI proved particularly effective for women carrying the BRCA1 gene mutation - detecting 92% of tumours, whereas XRM only detected 23%.

About 40% of women at high risk opt to have mastectomies rather than face the risk of developing cancer. This has meant removing healthy breasts. Although about 10 time more expensive than the standard mammograms currently used, an annual MRI scanning programme for women in this high risk category could alter that radical choice of surgery.

Although in the USA, high risk women are routinely offered MRI scans, in the UK, women aged 40+ with high-risk genes are currently only offered mammography, and the arrival of the NICE updated screening guideline does not necessarily herald a change in practice. Health authorities must follow NICE rulings on the use of pharmaceuticals, but NICE guidelines on procedures are not mandatory; they are viewed as 'best practice' standards. Thus the adoption of MRI scanning for the high-risk women will remain a decision of the healthcare authorities, which in turn must consider budgetary restraints.

* In the NICE guideline, all the other recommendations on how health professionals should identify and care for women at risk of developing breast cancer due to familial breast cancer remain the same.

Value of screening questioned

A new major review of studies on breast cancer screening, which involved half a million women, has caused considerable stir in the UK. The review, carried out by the Nordic Cochrane Centre and published by the Cochrane Library, concludes that whilst screening is likely to reduce breast cancer mortality, it is by a fairly low percentage, and it can also lead to over-diagnosis and over-treatment. For every 2,000 women screened over a 10-year period, one would have life prolonged. But, the report adds, 10 healthy women will be treated unnecessarily, because they have slow-growing cancers that might never have affected them if they were not identified during screening.

Dr Peter Goezsche, director of the Centre said that, because the risk for harm is so big, if he was a 50-year-old woman he would decline an offer of screening, '…I would not participate in this lottery'.

The review has led Michael Baum, Professor Emeritus of Surgery, Visiting Professor of Medical Humanities at University College London, and pioneer of the UK's screening programme, to question whether the NHS breast screen programme should be abandoned, and to call for an investigation by NICE.

Solution revolution for bleeding control

A new biodegradable solution has stopped bleeding in animals' wounds within seconds, according to researchers reporting in the journal *Nanomedicine*. Lead researcher Dr Rutledge Ellis-Behnke, at the Massachusetts Institute of Technology, USA, who worked on the development with teams in the USA and the University of Hong Kong, said the nanofibre barrier it forms stops bleeding in under 15 seconds, which could revolutionise bleeding control - and even reduce operation times by 50%.

When the solution, composed of peptide, comes in contact with a wound, they self-assemble into a gel, which does not harm cells it contacts, but forms such an effective seal, that even when excess gel is removed the wound is still sealed. Precisely how this solution works is not clear. Wound sealing is too quick to result from clotting, which take about 1-2 minutes to form. Nor was any platelet aggregation at the interface of the material and wound site observed. The researchers believe the peptides interact with the extra-cellular matrix surrounding the cells. Thus, when an injury heals, the gel gradually breaks down into amino acids, which can help cells to repair tissue.

PHOTO: DONNA COVENEY/MIT

Left: Dr Rutledge Ellis-Behnke with Professor Gerald Schneider, with monitor showing transected liver, sealed by the gel

The new solution has been applied to various kinds of tissue, including skin, brain, liver, intestine, and spinal cord, in almost all cases immediately stopping bleeding.

No immune response was observed in animal tests. The researchers also could find no prion-like substances, or fibril tangles, after the material had been implanted in the brain for up to six months.

Other interesting aspects are that this discovery was accidental; it occurred during their investigation of whether peptide solutions can create a self-assembled scaffold for the re-growth of nerve fibres in animal brains - which has helped to partially restore eyesight in animals with a severed visual tract.

No human trials have been undertaken.

World's first full-face transplant

The ethics committee of the UK' s National Health Service (NHS) has cleared the way for the world's first full face transplant, raising the hopes of around 30 people who are prepared to undergo the procedure.

Plastic surgeon Peter Butler and the transplantation team at London's Royal Free Hospital, have studied the possibility of total face replacement surgery for several years. Now, following the committee's approval, he said the most important part of the process is now beginning: selection of the patients. Many of the candidates have already suffered up to 70 reconstructive surgeries. Only four will be selected for a full-face transplant. Part of their assessment includes their ability to cope psychologically.

Although during surgery on the donor, the skin, underlying fat, eight blood vessels, four arteries and four veins will be removed, for reconnection to the recipient, computer modelling, carried out by Peter Butler, has shown that, due to different facial shape and bone structure, the patient will not look like the donor.

The first operation is expected to take place 'within months', the others at six month intervals.

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EH 5/06

NEWS

Verdict 'soon' in Libya

The five Bulgarian nurses and a Palestinian doctor, accused of intentional mass HIV infection, face their final court sitting on 31 October. A verdict is expected soon afterwards.

44 American scientists, lead by virologist **Rober Gallo**, Director of the Institute of Human Virology in Baltimore, Maryland, and co-discoverer of HIV, have joined organisations petitioning for the plantiffs' release. In a letter published online by *Science*, they accuse the Libyan government of using the medics as scapegoats for the accidental infection with HIV of over 400 children at a hospital in Benghazi.

Analysis by European experts indicated that they were infected before the accused medics' worked there and probably due to poor hygiene in the hospitals. However, during the trial, these reports, from virologist Vittorio Colizzi, were dismissed as evidence, and replaced by 'erroneous' reports from Libyan doctors, protestors said.

In September, the International Council of Nurses (ICN), and its member organisations in 129 countries, also pointed out that the six medical professionals have been imprisoned since 1999. 'We strongly urge all interested parties to reach a speedy and mutually agreeable resolution that will see justice for the imprisoned health professionals, address the pain of the families and mobilise resources for the treatment of the surviving children,' said ICN President, **Dr Hiroko Minami**.

New cancer risk gene found

Carrying a mutated BRIP1 gene doubles the risk of breast cancer – by aged 70 these women's risk rises from 1-in-12 to 1-in-6.

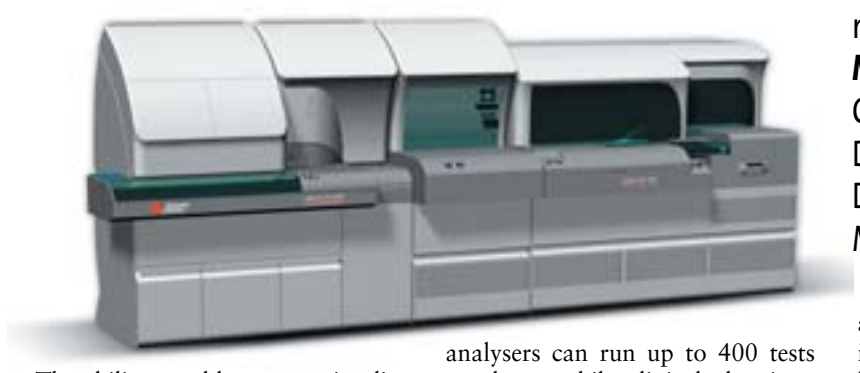
The Institute of Cancer Research study (pub: *Nature Genetics*) focused on the BRIP1 gene in 1,212 women with breast cancer who had a family history of the disease that was not due to the known breast cancer genes, BRCA1 or BRCA2, comparing these with 2,081 healthy people. Nine BRIP1 mutations were found in the cancer group, only two in the healthy. The researchers concluded that carrying a faulty version of BRIP1 doubled women's risk of developing the disease – taking their risk by aged 70 from 1-in-12 to around 1-in-6.

Lead author Nazneen Rahman, Professor of Cancer Genetics at the institute, said there are many more genes to be found '…but with each step we are making progress.'

Quicker lab reports saves costs

The UniCel DxC 880i prototype

Integrated lab systems deliver efficient disease management service, says **Marcel van Kasteel**, Beckman Coulter Europe's Marketing Director responsible for Diagnostics in Europe, the Middle East and Africa



The ability to address an entire disease state in a complete patient report is an emerging trend in diagnostics. It gives the laboratory - not always a valued partner in disease management - a chance to play a more proactive role in developing services for physicians.

Clinicians require a battery of information to accurately diagnose and treat patients. At the same time they are aware of targets and cost control measures imposed by hospital administrators. However, those same administrators appreciate the concept of more efficient disease management because it suggests savings. It can also improve the quality of patient care by earlier diagnoses and therapies.

Unless laboratories start to rethink their testing requirements, these additional demands will place an impossible burden on their workloads. To meet the requirement for robust, reliable testing across a variety of disease states, they must start by pushing for a far broader test menu from their diagnostic partners. They must ensure that the menu includes testing for the growing incidence of blood viruses and infectious diseases alongside cancer, cardiac, anaemia, reproductive and other endocrine tests.

Laboratories should also seek ways of bringing together both their clinical chemistry and immunoassay systems to make full use of their individual resources. But this is not always straightforward. In most cases, it simply means linking two separate analysers together to form one consolidated workstation. But this does not automatically lead to the smooth and parallel processing of samples.

For instance, the total number of tests runs per hour for individual analysers can be misleading and do not readily apply when the systems are integrated in this way. Modern, high performance immunoassay analysers can run up to 400 tests per hour, while clinical chemistry systems perform up to 1,440 tests in the same period. For workstation consolidation to be effective, immunoassay throughput must not hold back overall turnaround time, once the systems are connected. In many cases this is exactly what happens – leading to serious throughput issues, with backlogs and the delayed reporting of even urgent results.

Beckman Coulter has taken a different and more radical approach to workstation consolidation with the provision of our new integrated UniCel laboratory systems. We started from the basis that a single point of entry for both chemistry and immunoassay tests had to significantly maximise workflow. It was essential that the integrated workstation offered parallel processing – running chemistry and immunoassay testing in tandem. Bottlenecks caused by immunoassay throughput would then be reduced and turnaround time significantly improved.

Our experts also wanted to expand on the safety and time saving benefits of closed tube sampling (CTS) technology, already on our chemistry systems, as well as aliquotting. Closed-tube cap-piercing, which is normal practice in haematology laboratories, is not commonplace in clinical chemistry and immunology departments. It removes labour-intensive de-capping and re-capping steps saving hundreds of hours a year. The sample test tubes can be put directly onto the analyser without spillage or contamination, protecting the technician while maintaining sample integrity. Manual de-capping a sample tube can spread potentially biohazard micro-particles as far as six metres. Aliquotting, using a robotic arm to automatically divide the sample into two or more additional tubes, offers similar benefits. Fewer samples need to be taken from patients and it avoids delay when clinicians call for retesting or wish for a fast turnaround of additional tests.

To succeed, a comprehensive disease management strategy requires extensive testing options and robust and reliable throughput from its laboratory. The hospital administrators will appreciate the cost savings this brings, with higher workloads handled more efficiently. But it is the patient who has most to gain, with doctors having faster access to diagnostic test results.

UniCel® CTA** links DxC 800 to DxI 800 to form the new DxC 880i**

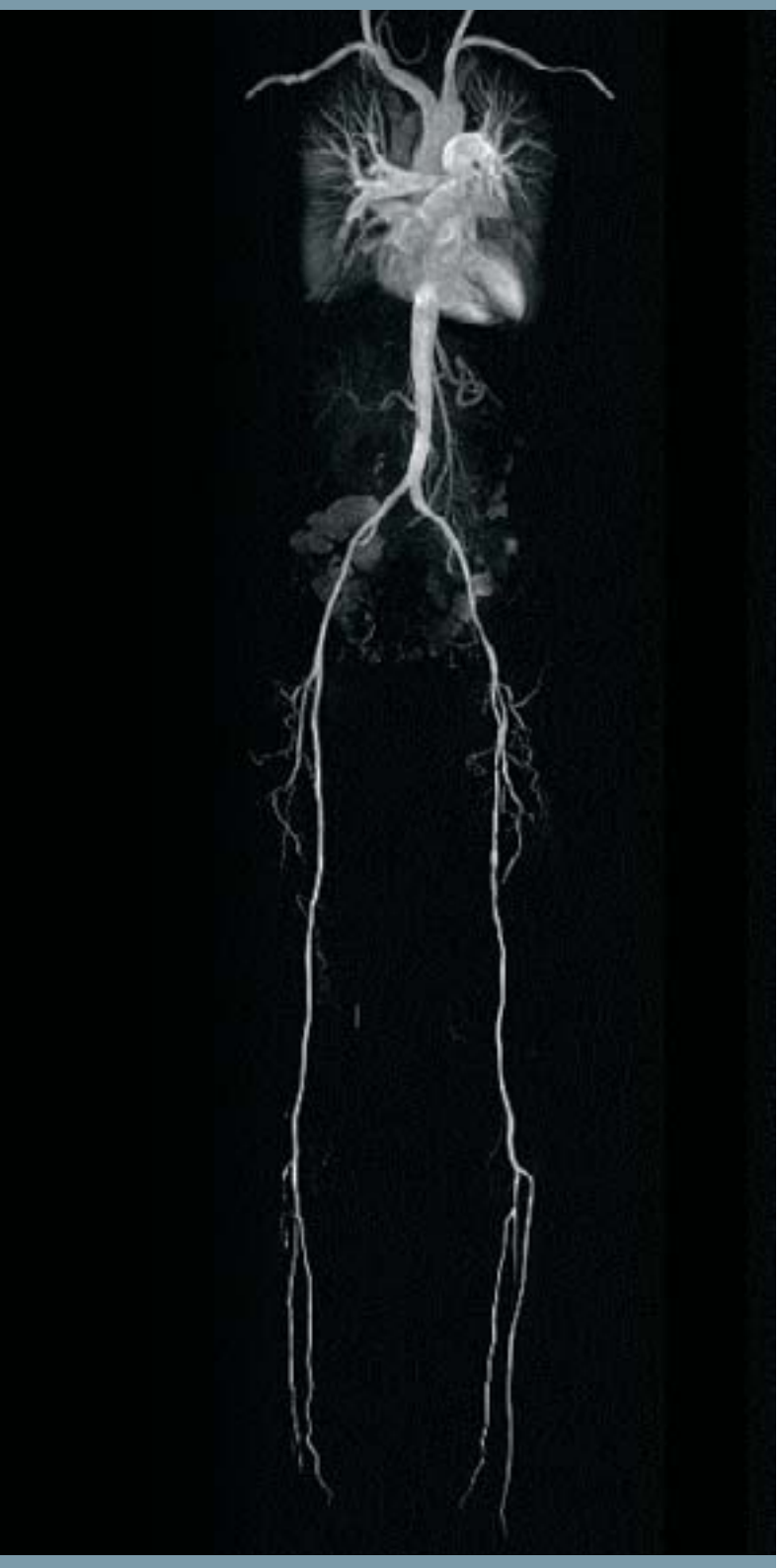
UniCel CTA is a compact module with closed-tube aliquotting technology with a special interlocking interface on either side. It fits between the chemistry analyser (UniCel DxC 800) and the immunoassay system (UniCel DxI 800) to form one integrated unit – the new UniCel® DxC 880i Clincal System.

The DxC 880i offers a combined menu of more than 150 tests and a unique onboard capacity of 120. All reagents from both analysers can be loaded while the system is running, dramatically improving turnaround time (TAT).

A prototype of the DxC 880i will be available at Beckman Coulter's German* offices from 13 November – 1 December 2006 and thereafter in the company's Paris Vision Centre until June 2007. For further details contact your local Beckman Coulter office.

* Beckman Coulter GmbH – Diagnostics, Europark Fichtenhain B13, 47807 Krefeld, Germany. Phone: 49 21 513335 Fax: 49 21 51333633

** In development, pending achievement of CE compliance; not yet available for in vitro diagnostic use.



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Ten years ago, **Professor Maximilian Reiser**, of Munich University Hospital, Germany, caused a stir when he presented his (then) futuristic concepts for teleradiology. Today, this valuable service is not only a reality, but also a fairly widespread practice. By providing external radiological support to other hospitals and private practices, Munich University Hospital's teleradiology service also produces internal financial value. Interview: *Daniela Zimmermann*

BOOSTING HOSPITAL BUDGETS

FROM 'PYJAMA' CONCEPT TO FULL-DRESS TELERADIOLOGY

Prof. Reiser: Over the past six years radiology services in our hospital have increased by about 40%; looking after students has become more expensive from the personnel point of view and competitive research requires a 'critical mass' of scientifically active colleagues. The money generated from teleradiology will help to cover those costs. Although we have set up the teleradiology service as a separate company, the proceeds will mainly go to our institute and the hospital. The revenues will mostly be used to increase our team. The biggest advantage is that we can keep more colleagues here for further training, who will be able to get to know other areas in this way which are not represented at our two sites (Grosshadern & Inner City).

Who owns the company, and how will it operate?

Initially it was a limited company, but it's now a small, public limited company, which has entered into contracts with different hospitals, and we can document that the revenue over the years has been invested into infrastructure, servers, data links and peripheral links. For the teleradiology project we have co-operations with partner hospitals, mostly small or medium-sized clinics, and also with specialist radiology practices outside the hospitals.

So you have set up a small network?

It's not actually that small, because we now also work with the Charité, in Berlin. If a diagnostic centre is overloaded or - extremely rare - if there is a problem with the data link, another diagnostic centre can take over. We normally try to build up and maintain a very close personal relationship with the doctors in the partner clinics and surgeries.

In terms of the business and accounting, who earns the money - Berlin, and then you receive a percentage?

The diagnostic service has a fee per service or within a certain contingent. Whatever is diagnosed at the Charité is reimbursed there and, because it provides the infrastructure, generates the invoices and handles the administration, the public limited company receives a kind of handling charge, which it then retains. Professor Hamm, in Berlin, Professor Claussen in Tübingen, Professor Heller in Kiel and Private Docent Loose, in Nuremberg, are all part of the company. We also have contracts with other registered radiologists.

At the end of the day, any governing body, unless they are thoroughgoing idealists, would like to see a yield of around 15-20%. There is a lot of idealism in our project, almost to the extent of self-exploitation. Over the years, whenever we earned anything we re-invested it into the infrastructure and the hospital to promote research.

This must be a win-win situation for hospital administration?


Maximilian Reiser

Absolutely! Not for nothing are the public and political decision makers calling for better co-operation between healthcare providers, to ensure better quality and limitation of costs. Our model, along with those in other teleradiological networks, contributes towards this. It can only be good for the public image of a hospital to be open towards these innovate projects. Moreover, we not only provide an initial diagnostic radiological service but also remain in touch with these clinics regarding various cases. This results in patients being referred to our hospital, because we can provide specialist knowledge not available in other locations. That's the interesting side effect with our work – the link with other hospitals. It goes without saying that this set-up requires flexibility and fast reaction – otherwise the partner hospitals won't be happy. What this requires is backup and support from a dynamically thinking and acting hospital administrators with the right perspective.

Does this project take work away from other radiologists, for example those in specialist practices outside hospitals? And, doesn't your model contribute to the rationalisation of attractive positions for radiologists in hospitals?

Of course I would love to see Head of Radiology positions being created in as many clinics as possible, but that is not what's happening. To the contrary, more and more hospitals are fighting for survival and simply cannot afford this. At the same time, top quality radiology is an important factor in the hospital popularity ratings. It has not yet been sufficiently acknowledged that radiology plays an increasingly important role in healthcare. However, the number of radiologists has remained the same, which is already leading to significant shortages. Many specialist radiology practices outside hospitals, at least those not based in larger cities, are having problems with recruitment. We work with several of these practices, and help them to overcome shortages arising from staff being away on holiday or due to illnesses. We also offer our diagnostic services at night and over weekends, so our colleagues can occasionally enjoy being off-duty and use this time to recover.

This teleradiological solution is no longer new, is it?

No. I was among the first to start it. As soon as the technology to do it became available, about 10 years ago, I spoke about this at radiological congresses. It created quite a stir and one of your colleagues labelled me a 'pyjama-radiologist' - because during my talk I showed some slides which, at first, showed me dressed in a suit and tie sitting in front of my PC monitor at home diagnosing images. Then I let down the blinds, put on a pair of blue and white striped pyjamas, and there were some slides showing me sitting in front of the PC in my pyjamas. The message was: *The radiologist is available day and night without taking a long time to arrive*. It was quite funny, and a laugh, albeit at my expense, and encouraged me to carry on with this project even more. Meanwhile, this model is not quite so inventive anymore.

Still, the model has to work and obviously does in your case.

Yes. One of our more recent clients is the Max-Planck Institute for Psychiatry, in this case for MR diagnostics! We have been working very closely with some of our partner hospitals for several years. It is important to give teleradiology a 'face', which is why our teleradiologists are often on site at the partner hospitals and discuss examinations and diagnoses with doctors there. Still, this does not rule out technical problems, or problems with communication. The only thing then is for us to react very quickly and to build and rely on our mutual trust.

International Clinical Research Centre in Brno

Czech Republic and USA - The Saint Ann Hospital, in Brno, is about to commence a joint project with the renowned Mayo Clinic, based in Rochester, Minnesota, USA. Under the umbrella name *The International Clinical Research Centre* - ICRC Brno, the project will focus on unique clinical and research education.

Dr William Worrall Mayo, and his two sons, Dr W J Mayo and Dr C H Mayo, founded the Mayo Clinic in 1892. Today it employs around a thousand physicians, tends about 400,000 patients annually and enjoys international prestige.

ICRC Brno, which originated in 2001/2002, will be the first international medical research centre to focus mainly on cardiology, internal medicine, neurology, oncology, acute medicine, and neurovascular diseases. The plans include 170 hospital beds, PET-CT, 3T NMR, CT, nine ultrasound labs, and 420 permanent employees, plus 60 extramural specialists.

Originally, a medical centre was planned to resemble the GCRC (General Clinical Research Centre) concept developed by the Mayo in 1965, and recently adopted by numerous institutions internationally. However, it is now considered outdated, so a 'new-generation research centre' has resulted, employing progressive operating procedures of international scientific cooperation, for example used by the ISS-2 (International Space Station 2).

The project's duration was to be three years (2006-09) with approval from the Czech government already emplaced, the entire project received the green light in March 2006, and the financial budget - up to two billion CZK - in July. One of the founders of the Czech project, Dr Tomas Kara MD PhD, internal medicine specialist and clinical researcher at the Mayo, has been appointed CEO of ICRC Brno.

In October, the ground-breaking ceremony for the first phase of the project took place, coinciding with two events initiated by the ICRC Brno team: BioTec 2006 - the first biotechnology conference in Central Europe (and part of the HOSPIMedica international fair, held in Brno Exhibition Centre), and the first Central European Conference on Biotechnology in Medicine 'Gate2BioTech'.

Source: Czech Press.
http://www.gate2biotech.com/biotec_2006/en/

TOURS COMPANY OPENS A MEDICAL CENTRE WITHIN A CENTRE OF EXCELLENCE

University hospitals have a market value

University hospitals generally have immense medical knowledge, an excellent reputation and ample resources – but not money. This is a situation that cries for cooperation, and third parties, who lack that knowledge and reputation, can provide the latter. The marriage can prove highly successful, as experienced by the Hamburg-Eppendorf University Medical Centre.

Last April, the Medical Prevention Centre Hamburg GmbH & Co.KG (MPCH) opened its doors at the Hamburg-Eppendorf University Medical Centre (UKE). This new facility offers preventive medicine at the highest level, offering state-of-the-art diagnostic services, including whole-body MRI. 'From a medical point of view, the MPCH differs from other so-called anti-aging hospitals in that it provides integrated and holistic prevention. Most other facilities focus on certain areas and cannot cover all prevention possibilities,' said **Professor Christoph Bamberger**, Director of MPCH. Legally, the Centre is a public-private partnership between the UKE (49%)


Christoph Bamberger

and Deutsche Seerederei Rostock (51%), with total funding supplied by the latter.

Why would a shipping company become involved in healthcare? The firm operates Arosa resorts and the Arosa fleet of cruise ships, which promise luxury vacations as well as a broad range of wellness and health-related services for the health conscious - the audience also targeted by MPCH. Information brochures and videos will point the Arosa client to services at the Prevention Centre.

The link with a university hospital is a valuable reference. UKE's knowledge ensures constant top quality, as Professor Bamberger pointed out: 'The scientific council of the Prevention Centre consists exclusively of members of the University Medical Centre, and this council defines and controls the medical programme of the prevention centre. So we ensure that our medical know-how is applied. Paramedical and questionable therapies have no place in the Prevention Centre.'

The concept is proving a success. According to the business plan, optimum utilization equals six clients daily - demand is already much higher. However, no additional appointments are made, so as not to compromise quality.

The Prevention Centre is not the only UKE successful venture. The Martini-Klinik is a private hospital and a 100% subsidiary of the UKE and is based at UKE. It focuses exclusively on diagnosis and therapy of prostate cancer. In its first year, the clinic provided surgery for 200 patients. The turnover - 2.4 million euros – met all expectations. To meet growing demand, in 2006 the number of beds was increased from nine to cover an estimated 17, 350 surgical interventions. Many patients come from the USA, and the Martini-Klinik plans to offer these clients a complete package, to include flight and hotel accommodation.

However, UKE emphasises that there is no danger that it might deviate from its top quality medical path '...just to make a quick buck'. No untested and non-validated therapies will be on offer. 'After all, the reputation – the capital of the institution – is at stake,' UKE concluded.

SURVIVING THE FINANCIAL CLIMATE

Strokes, cancer and heart attacks - the three most common causes of death - also generate enormous treatment costs. The later their diagnoses, the more costly the treatments. Today, medical technology companies are concentrating on developing diagnostic systems to detect these diseases as early as possible. We asked members of General Electric Healthcare for their thoughts on future developments.

Jean Michel Cosséry:*'We strive to see life more clearly. Our purpose is to help predict, diagnose, treat and monitor disease earlier, so people can live life to the fullest'*

Lisa Kennedy: *'Early detection of cancer means reduced progression, increased survival and fewer costs'*

For **Jean-Michel Cosséry**, Chief Marketing Officer for GE Healthcare, the rise in information for patients is one of the big trends in healthcare. The word 'health' is the second most commonly entered on internet search engines. All those involved in healthcare deliveries (doctors, patients as well as insurers) are faced with a multitude of problems. 'Doctors are under time pressure and often cannot give patients what they need.

Earlier disease detection will save healthcare services

Medical insurers only have a specific financial budget and cannot always pay for everything that could be covered, and an increasingly ageing population requires an increasing amount of medical care,' he points out. The way forward, he believes, is to shift away from symptom-based diagnosis to the earlier disease diagnoses.

Current costs

Numerous international studies prove the significant cost increase due to later disease diagnosis. Looking at cardiovascular disease, for example, the continuous monitoring of risk factors (e.g. blood pressure, cholesterol) costs about €850 a year, whereas treatment for heart failure costs €17,000. For stroke, monitoring risk factors (e.g. blood pressure, smoking) costs about €1,200 a year (for regular monitoring of risk factors such as blood pressure and smoking) to €14,000 for a smaller stroke (Rankin Score 1) and even €63,000 for a Rankin Score 5 type stroke. 'Every one of us has a lot of control over a large number of these risk factors – alcohol, high blood pressure, high cholesterol, obesity, diabetes and unhealthy diet, all have a significant impact on health. Everyone should really be aware of this,' said **Dr Lisa Kennedy**, Head of Health Sciences at GE Healthcare.

Prevention is the magic word for the future. The 1-10-100 rule used by technology manufacturers can also be applied to the escalation of costs in healthcare. Solving a quality issue on site, which costs around €10,000 would only have cost around €1,000 if it had already been discovered during a design review at the factory. More careful product development might have cost only around €100. For Dr Kennedy there is no question: Investing in early diagnosis pays off. Earlier intervention means a patient is likely to live longer. Patients with unfavourable

Radioactively marked substances used to diagnose cancer can be traced all over the body, for instance. In cancer diagnosis, this effect is used in that tumour cells have a stronger metabolic behaviour than normal cells, so the substances are able to mark the tumours for imaging purposes. This method enables the detection of cancer at a much earlier stage than possible using CT only. 'GE develops biomarkers not only for oncology but also for neurology and cardiology. We want to show diseased cells clearly so that we can plan and monitor precise therapy,' he explained.

Jean-Michel Cosséry's prophetic summation: In future healthcare systems patients themselves will deal with risk factors in a more responsible way. Earlier and more efficient diagnoses will lead to more effective treatment and, together with finely tuned, highly efficient medication, customised for each patient, will lower treatment costs.

It kills more children than any other illness. According to UNICEF and the World Health Organisation (WHO) that includes AIDS, malaria and measles combined – yet pneumonia remains a forgotten disease. A report published by the two organisations aims to provoke action to reduce child mortality from pneumonia

PNEUMONIA

The UNICEF/WHO report points out that, although effective interventions to reduce pneumonia deaths are available, these reach too few children. Estimates indicate that over 150 million episodes of pneumonia occur annually among children under five in developing countries – accounting for over 95% of all new cases worldwide. Between 11 million and 20 million children with pneumonia will require hospitalisation - more than two million will die from the disease.

Less than 20% of children with pneumonia received the recommended treatment – antibiotics.

The disease

Pneumonia is a severe form of acute lower respiratory infection that specifically affects the lungs. The most common cause of severe pneumonia in children in the developing world is *Streptococcus pneumoniae*, the bacteria that causes pneumococcal pneumonia. *Haemophilus influenzae* type b (Hib) is another leading cause of bacterial pneumonia.

Vulnerability to developing pneumonia

- **Undernourished and malnourished children, particularly those not exclusively breastfed or with inadequate zinc intake, are at higher risk**
- **Children and infants suffering other illnesses, such as AIDS or measles, are more likely to develop pneumonia.**
- **Environmental factors, e.g. crowded homes, exposure to parental smoking, indoor air pollution, may also increase children's susceptibility to pneumonia and its severe consequences.**

Prevention

Efforts include many well-known child survival interventions - expanding vaccine coverage, promoting adequate nutrition and reducing indoor air pollution.

If given in the first year of life, currently available Hib and pneumococcal vaccines can reduce pneumonia cases, and thus save millions of children from dying of pneumonia. *Even better vaccines are in development.*

Conclusion

Scaling up treatment coverage is possible - at relatively low cost. 'The number of lives saved could more than double - to 1.3 million annually - if both prevention via vaccination and treatment interventions to reduce pneumonia deaths were universally delivered'.

Patient's

ÖO: The respiratory centre in our brains manages our respiration, by sending signals via the phrenic nerve to the diaphragm, where the signals are transformed into breathing activities. Conventional mechanical ventilation systems sense a patient's breathing by either a drop in airway pressure or reversal in flow – the last and slowest reaction in the chain of respiratory events. With NAVA a catheter catches signals sent by the brain to the diaphragm and provides the ventilator with an electrical activity of the diaphragm (Edi) signal. This means we are able to detect breathing demands before the breathing action take place and therefore can affect the ventilation in synchrony. So ventilation is based on the patient's neural respiratory output and it also assists the patient's breathing in a proportional way. For clinical practice, this really means a paradigm shift.

Because the body itself gives the signal, the ventilator provides the

MEASUREMENTS TAKEN DIRECTLY WITHIN THE LUNG

GE launches a new monitoring technique

Working in tandem, two new technologies – SpiroDynamics and FRC INview – measure pressure and volume directly from a patient's lung. During this system's launch at this year's Annual Congress of the European Society of Intensive Care Medicine in Barcelona, we asked **Dr Ola Stenqvist**, creator of SpiroDynamics and FRC INview, and Consultant Anaesthesiologist at the Department of Anaesthesia at Sahlgrenska University Hospital, Gothenberg, Sweden, what makes the system unique.

A completely new approach to mechanical ventilation

Since mechanical ventilation arrived over 40 years ago, ventilation therapy has involved adjusting airway pressure, flow and volume. However, when researchers in Toronto, Canada, developed the physiological concept of Neurally Adjusted Ventilatory Assist (NAVA), in which the patient's own respiratory centre in the brain adjusts the ventilation pressure, the way in which patients suffering respiratory diseases can be treated radically changed.

Whereas conventional mechanical ventilators sense a patient's effort to breathe, either by a drop in airway pressure or a reversal in flow – the last and slowest reacting step in the chain of respiratory events - NAVA senses electrical activity in the patient's diaphragm – the *earliest* respiratory signal that can be detected.

Signals from respiratory control centre in the brain are transmitted through the phrenic nerve to the diaphragm, where a catheter captures the electrical activity of the diaphragm (Edi) and feeds it to the ventilator. NAVA responds by providing the requested level of ventilatory support to the patient. As the ventilator and diaphragm work with the same signal, the coupling between the two is virtually instantaneous.

MAQUET Critical Care has added NAVA (Neurally Adjusted Ventilatory Assist) to its SERVO-i ventilator – a combination that presents a completely new approach for mechanical ventilation.

Potential benefits

- **Improved patient/ventilator synchrony**
- **Lung protection by avoiding over or under assistance of a patient**
- **Enhanced patient comfort: improved synchrony helps minimise patient discomfort and agitation while it promotes spontaneous breathing**
- **The Edi signal can be used as decision support for medical staff regarding unloading or extubation**
- **The Edi signal can be used as a monitoring tool, providing data on respiratory drive, volume requirements, effect of ventilatory settings and to gain indication for sedation and weaning.**

The company points out that current SERVO-i users can upgrade their equipment with the NAVA function. For newly purchased SERVO-i, the only extra equipment needed is NAVA software, an Edi Module and an Edi catheter.

OS: SpiroDynamics enables clinicians to measure respiratory pressure directly from the patient instead of measuring it from the ventilator. Measurements are taken continuously in the patient's airways, from where pressure down in the lung (where gas exchange takes place) is calculated. It's like having a telescope in the air pipe to find out what's happening in the lung. This tracheal pressure measurement has several clinical benefits: it is performed regardless of ventilator settings; it creates a dynostatic curve providing estimated alveolar pressure, and it offers enhanced detection of intrinsic PEEP due to ventilator settings or secretions.

FRC stands for Functional Residual Capacity and indicates the volume that is left in the lungs at the end of respiration. Even after respiration, normally there is a lung volume of two or three litres, which functions as a buffer. In acute lung injury (ALI) patients, this volume is decreasing significantly. Up to now, there have only been complicated systems to measure that volume – moreover, those systems were available for research purposes only, but not for every day clinical life. With FRC INview we can offer clinicians a tool to measure this volume at the bedside, with a 90% accuracy.

Since SpiroDynamics and FRC INview work parallel and continuously, and provide results directly at the bedside, we are talking not only about measurements but also about monitoring. This means clinicians receive all these data automatically – without interrupting the ventilation process.

What effect will this have on the treatment of ALI patients?

OS: On the one hand we can permanently examine the respiratory status – which of course means we can react much faster – and, on the other, we can look at changes in ventilator settings in real-time. For example, if a clinician tries to improve the lung volume by increasing pressure, he can see the results of his efforts immediately, without interrupting the ventilation to perform CT examinations.

By generating electronic snapshots in the ventilator, waves can be saved and compared with previous ones. Therefore, the course of the disease and changes caused by intervention can be monitored and analysed.

What have clinicians' reactions been to these techniques?

OS: Interest among clinicians is huge because, although there has been a lot of research in respiratory mechanics, the measurement technology has been lacking. I'd say we rekindled the interest of physicians in this topic.

brain controls mechanical ventilation

Among ventilation advances demonstrated at this year's European Society of Intensive Care Medicine Congress, held in Barcelona, the combination of the SERVO-i ventilator with *Neurally Adjusted Ventilatory Assist (NAVA)* provoked considerable interest because the system allows ventilation to be controlled by the patient's own respiratory centre in the brain. During a discussion with *Daniela Zimmermann*, **Östen Olsson**, the Marketing Director for Ventilation at MAQUET Critical Care, described the development and effects of this ground-breaking technology

patient with exactly the amount of air needed. There is no over or under assistance and therefore the lungs are protected. Moreover, we have improved synchrony between patient and ventilator. The Edi signal, a new parameter in mechanical ventilation, provides important information for diagnostic purposes by monitoring electrical activities. For example, it can be used as a tool for clinicians to interpret the background of the chaotic breathing pattern so often seen in the infants. Direct access to the respiratory centre output gives prompt information on the effect of any intervention relating to ventilation of the lung.

Due to a disease, could the patient's control centre send the wrong signals - perhaps that more oxygen is needed, yet the opposite would be better?

ÖO: The worse the disease is, the higher the signals output, and the ventilator automatically assists more. Most diseases lead to a reduction in a patient's breathing efforts. The signal only influences the ventilatorion, thus keeping the system working to compensate the difference in ventilator support needed. That is the sophisticated point!

The idea of neurally controlled ventilation first arose in the mid-80s. Twenty years later you are presenting the first result in this technology. What happened in the intervening years?

ÖO: The basic research began in the mid-80s at the University of Gothenburg. In the beginning it was not focused on mechanical ventilation of patients; it was only for research purposes on muscle EMG (electromyographic) signals. This idea to involve mechanical ventilation came later on. At that time, the pacemaker industry was also already working on the idea of trying to assist the diaphragm with an electrical signal. But they soon gave in, because they recognised there were really complicated processes involved.

We started our investment at the beginning of the 2000, when we saw progress in technologies. However, as you see, it took a while until the technique was reliable.

If we look at the history of ventilation, NAVA can be a paradigm shift in mechanical ventilation technology. In the 50s, mechanical ventilators were heavy machines, really pumping air into the patients. During the 70s and 80s the spontaneous breathing method began to improve, which was a great progress because patients could interact far better. The focus in the 90s was on protective ventilation, meaning not to harm a patient and cause trauma. Now the body can speak for itself and we may have a self-regulating technology.

What might we see in the future?

ÖO: This new technology gives us a lot of impetus for research because now we can generate information that we never had before.

A new family of ventilators

Two new ventilators – Carina and Carina *home* – were introduced by Dräger Medical at the 26th International Symposium on Intensive Care and Emergency Medicine in Brussels, last March. Carina *home* is already on sale worldwide, and before the end of the year. Carina is expected to become available in Europe (although not yet commercially released in the USA and Canada).

These compact, easy to operate units have been specifically designed for sub-acute care (e.g. high-dependency, step-down unit, LTAC), respiratory wards and home care. They provide the same high-level ventilation performance, tailored to the needs of the respective care environments, so that treatment commenced in a hospital with Carina, during the more acute phase of an illness, can be easily continued in the home with Carina *home*.

Both ventilators include SyncPlus, a technical breakthrough that enables patients to really be 'in sync' with the ventilator – even with mask ventilation, Dräger points out. 'SyncPlus is a convenient, automated technology designed to precisely synchronize ventilation with spontaneous patient breathing. It enhances therapy responsiveness, thereby reducing the need for caregiver intervention.'

The units further expand the company's comprehensive ventilation solutions for all care areas, from emergencies to critical care to the home environment, and support the increasing use and importance of NIV (Non Invasive Ventilation).

The Raphael XTC

The Raphael XTC offers non-invasive positive pressure ventilation (NPPV), full-featured invasive ventilation and easy switching between those two ventilatory modes. Its Swiss manufacturer, Hamilton Medical AG, also points out that the system is fully adapted for use in sub-acute care units, long-term care centres, intensive care departments, recovery rooms and during patient transit.

The unit has a LiteCircuit single-limb breathing circuit for non-invasive ventilation, or double-limb circuit. 'IntelliTrig technology automatically responds to leak changes and adapts the sensitivity thresholds for optimal response to the patient's breath.'

In addition to non-invasive ventilation capabilities, the unit offers cost-effective, high-end invasive ventilatory care covering the full range of clinical requirements for all patient categories, from children to adults. It combines reliability and high performance with advanced lung protective strategies and patient-adaptive modes, the firm points out. 'Key technological features include biphasic ventilation to encourage spontaneous activity from the beginning of mandatory ventilation, and Adaptive Support Ventilation (ASV), an easy-to-use and safe mode of ventilation for the management of intubated patients - from intubation to weaning. ASV employs lung-protective rules and adjusts the ventilatory pattern based on the patient's pulmonary mechanics and spontaneous respiratory activity.'

The Vela Diamond

Another introduction at the European Society of Intensive Care Medicine Congress, in Spain, was the *Vela Diamond* mechanical ventilator platform made by Viasys Healthcare.

Since 2002, the firm's Vela Ventilator has been sold internationally, and is used for patients who need either invasive or non-invasive ventilatory support in intensive care units, sub-acute departments and emergency wards.

'The Vela Diamond features a new, brilliant display screen, further enhancements to the graphical display with colour coded waveforms denoting spontaneous breathing and colour coded icons to denote control advanced settings,' the Viasys Healthcare reports, adding that the ventilator has increased processing power for greater upgrade capability with integrated communication capabilities. The ventilator also has a new expiratory housing to contain and protect the expiratory flow sensor and exhalation assembly.

The 91220 mCare 300

Spacelabs Healthcare is a growing group of companies now operating under one new name. Earlier companies incorporated under this name include Spacelabs Medical, Del Mar Reynolds, Blease, Hertford Cardiology and Spacelabs Medical Data.

The company focuses on products for patient monitoring and connectivity; anaesthesia and ventilation; diagnostic cardiology and clinical trials, with service, supplies and accessories for all products.

Spacelabs Healthcare has launched a new device for the bedside – the mCare 300 Vital Signs Monitor. 'This is intuitive, immediate, portable and flexible for any care environment, the company reports. 'Its clean design makes the mCare 300 easy to use, fast, flexible and lightweight – it weights just 4.1 kgs (9 lbs.), and has one battery. For immediate care assessment, the common functions are controlled by a single button. The new monitor delivers essential parameters – ECG, respiration, $Sp0_2$, NIBP and dual temperature. Higher acuity parameters can be added with optional invasive blood pressure and $EtC0_2$.

The vital signs monitor supports the display of four waveforms and up to seven parameters using a 26.4 cm (10.4 in) touch screen LCD

Fixed value PEEP valves and CPAP systems

A full range of C-PEEP fixed value valves, CPAP breathing systems, twin-port masks and harnesses for use in continuous positive airway pressure, have been launched by Intersurgical, to complement its comprehensive range of respiratory products.

C-PEEP valves – This new range includes seven PEEP valves, ranging from 2.5 to 20cm H2O. Each valve is colour-coded in line with similar products currently on the market. 'Intersurgical valves are 100% tested and individually identified with a code on the valve itself, so that performance data is available for future reference,' the company points out. 'The valve bodies are manufactured from clear material, showing the internal components, allowing monitoring of patient breath rate and for blockage assessment.'

CPAP Breathing systems - Twelve new CPAP breathing systems offer active and passive humidification options, with a mask or T-piece patient connection compatible with the most common types of flow drivers currently found in hospital departments.

The systems are designed for immediate use, straight from the pack, including PEEP valves, masks, harnesses and safety valves, if needed. There are two available types, one for flow drivers requiring an external safety valve, the other for flow drivers with a built in safety valve, reducing unwanted components.

CPAP mask and harness - The Twin-port CPAP mask - sizes: small and medium/large adult - offers a comfortable interface to a patient, Intersurgical points out. 'The soft anatomically shaped cushion will comfortably fit a wide range of patient faces.'

Portable multi-parameter monitors

Fukuda Denshi, manufacturer of advanced patient monitoring and user-configurable clinical information management systems, recently introduced its popular DS-7100 range of portable, multi-parameter monitors to the European market.

'The DS-7100 provides a compact, all-in-one design with amplifier modules and a 3-channel recorder,' the firm reports. 'It incorporates an 8.4" colour LCD and has the capacity to monitor ECG, respiration, dual IBP, temperature, NIBP, pulse oximetry and CO_2. In addition, it has a battery option providing up to three hours operation for transport monitoring.'

The monitors also incorporate OCRG display function, which makes this series useful in the NICU and neonate ward.

The three different models:

- DS-7101L with DS-LAN
- DS-7101LT with DS-LAN and telemetry transmission
- DS-7141 with DS-LAN, telemetry transmission and $EtCO_2$ measurement.

These products will be on show at MEDICA (Hall 11, Stand A59)

The ERS 2006 COPD research awards


Charles Pilette


William Man

Belgium and United Kingdom – Two researchers, **Dr Charles Pilette**, currently at the Pneumology Department, University Hospital of Louvain, St-Luc, Belgium, and **Dr William Man**, who is completing specialist clinical training in Respiratory Medicine and General Internal Medicine, in London, have received this year's awards for research into Chronic Obstructive Pulmonary Disease (COPD), granted by the European Respiratory Society (ERS).

Sponsored by Boehringer Ingelheim, the awards cover two sponsorships for scientific COPD research projects, and total 50,000 euros. Dr Pilette was awarded first prize - 30,000 euros - for his exploration of the regulation of immunoglobulin-A (IgA) transport across airway epithelial cells and its impairment in COPD. This research might help the understanding of the role of IgA in the defence of mucosal surfaces and its impairment in COPD. Mucosal defence mechanisms are critical in preventing colonisation of the respiratory tract by pathogens and impairment in this mechanism appears to be associated with the degree of airflow obstruction and neutophil infiltration - a hallmark of COPD.

Dr Pilette, who graduated from University of Louvain (UCL) and specialised in clinical respiratory medicine at the Cliniques Universitaires St-Luc and Mont-Godinne, Belgium, was awarded a Long-Term ERS Research Fellowship to study Th2 cytokine/chemokine responses in allergen-induced asthma and immunotherapy mechanisms. His current research, at Cliniques UCL St-Luc, focuses on investigating mucosal immune mechanisms relevant to airway diseases.

Dr William Man was awarded 20,000 euros for his investigation into the link between respiratory and skeletal muscle physiology, particularly in relation to dyspnoea and exercise limitation in COPD patients. He is the first author of several recent publications in this area. Dr Man was the first author of a randomised controlled trial of early community pulmonary rehabilitation in patients hospitalised with exacerbations of COPD.

The ERS president, Giovanni Viegi, has reminded all ERS members that its COPD Award is an ongoing initiative and prompted further submissions from young researchers for next year. European ERS members, under 35 years old, are eligible to apply. Details: www.ersnet.org/copd-award. Deadline for applications: 22.2.2007.

Products span respiratory care


The BiPAP Vision Noninvasive Ventilator

Respironics develops and manufactures innovative sleep and respiratory products and programmes, which it distributes internationally: 'Our goal is to provide products and programmes to treat, monitor and manage respiratory-impaired patients throughout the care continuum.' The company's Esprit critical care invasive ventilator and BiPAP Vision non-invasive ventilator, incorporate the unique Auto-TRAK Sensitivity algorithm. 'This technology tracks, detects and responds to breath-by-breath changes in leak rate and flow demand -which may lead to reduced work of breathing. It ensures more natural and comfortable ventilation for patients and improved outcomes for clinicians.' Respironics explains.

Other invasive product solutions include its $NICO_2$ Cardiopulmonary Monitor '... which helps take the guesswork out of ventilation management through breath-by-breath volumetric CO_2 measurements', and respiratory drug delivery products, for example the Sidestream Nebulizer with System 22 Valved T-Piece, Aeroneb Pro Micropump Nebulizer and the OptiVent MDI Spacer.

Non-invasive product solutions include the WhisperFlow 2-60, an integrated high flow CPAP generator and oxygen concentration monitor, and a comprehensive range of patient interfaces designed for Auto-TRAK compatibility.

The European respiratory diseases market

Affordable, effective and innovative products drive sales

The European respiratory market is a challenging environment due to an ongoing lack of innovative drugs, according to a new report from the global growth consultancy firm Frost & Sullivan (http://www.pharma.frost.com). 'Currently, primarily combination drugs drive the market, with top brands facing no real competition from generic alternatives. The emergence of affordable, innovative and effective inhalers and product solutions will provide impetus to market growth,' F&S concludes.

This market in Europe alone earned revenues of $5.84 billion in 2005 and estimates indicate revenues could reach $10.43 billion in 2012.

'Combination drugs are the future of European respiratory therapeutics,

which will gain significant momentum and impel market growth in Europe,' said F&S Research Analyst Sylvia Miriyam Findlay. 'At the same time, market expansion will be driven by the uptake of more efficacious drug delivery techniques that promote improved treatment regimes in asthma/COPD patients.'

However, she added that the lack of new drugs on the horizon will slow down overall growth rates. 'The R&D pipelines of major participants regarding respiratory drugs are not very promising and such a scenario will restrain market expansion.'

Though the European market has limited generic competition, Ms Findlay said it is '...essential to maximise on revenues generated by top selling drugs before their patents expire. Effective life-cycle management, including product line extensions to cover other respiratory illnesses, will be the best way to gain competitive advantage.'

In addition to effective life cycle management, pharmaceutical companies need to increase their investments in R&D and develop more efficient and cost-effective drugs that support improved disease management, she advises.

This market is part of the Pharmaceutical & Clinical Diagnostics Subscription, which also includes research on European Alzheimer's, diabetes and CNS markets. F&S also reports that all research, included in subscriptions, provides detailed market opportunities and industry trends that have been evaluated following extensive interviews with market participants.

For a virtual brochure, which provides manufacturers, end users, and other industry participants with an overview of the latest analysis of the European respiratory diseases market (H043-52), e-mail: rmtheodore@frost.com giving your full name, title, company name, telephone number, e-mail address, city, state, and country.

Details: www.frost.com

TB

TUBERCULOSIS

Discovery of cell receptor CCR5 might help tackle TB

The slow-growing Mycobacterium tuberculosis cause TB. However, when they invade a body, the host cells summon up additional immune cells to kill or limit the damage the bacterium could cause. Just how host cells trigger that response has remained unknown. However, according to research, published in Science (October), a receptor – named CCR5 - on the host cells is responsible.

The researchers, working at Imperial College London; Cambridge and Oxford Universities; the National University of Singapore; Nanyang Technological University, Singapore; University of Basel, Switzerland, and Lionex Diagnostics and Therapeutics GmbH, Germany, have demonstrated that, without the receptor - named CCR5 - mycobacteria thrived within the host cells.

'These results describe a novel mechanism whereby Mycobacterium tuberculosis communicates with the human immune system,' explained Dr Beate Kampmann, of the Wellcome Trust Centre for Clinical Tropical Medicine and the Department of Paediatrics, Imperial College London, and one of the study's authors. 'Another piece of this complex jigsaw has been filled in, which will help us to target TB with very specific drugs or vaccines. We can now test potential vaccines or drug candidates for the desired effect, because we understand better how they should act.'

Because TB is a big problem for HIV patients, because their weakened immune system renders them highly susceptible to this disease, the researchers believe their study will interest scientists working on the development of new drugs to combat HIV, which work by inhibiting the CCR5 receptor that plays an important role in HIV-infection. The new research suggests that such drugs could impair the ability to fight off TB in HIV-infected patients receiving CCR5 receptor antagonists.

Research funding: The Wellcome Trust, London; UK Medical Research Council (MRC) and the Swiss National Science Foundation.

Source: Imperial College London

Mechanism of virulent TB strain discovered

Researchers have identified a mechanism that contributes to the virulence of a particular strain of TB, which possibly makes it more contagious than other strains.

Most people infected with Mycobacterium tuberculosis do not show symptoms, and perhaps a third of a population might carry the bacteria. However, less than one in ten will develop TB. However, about 25% of those infected with the CH strain do contract TB.

Dr Robert Wilkinson and researchers at the Wellcome Trust Centre for Clinical Tropical Medicine, Imperial College London, and Professor Mike Barer at Leicester University, have identified a segment of the CH genome which, if absent, modifies the immune system's response to the strain and makes it more likely to result in TB.

Source: Proceedings of the National Academy of Sciences of the USA

INTENSIVE CARE

Tissue oxygenation

The *InSpectra StO2* Tissue Oxygenation Monitor, produced by the Dutch firm Hutchinson Technology Inc, provides a continuous, non-invasive means of assessing tissue oxygenation and monitoring it during resuscitation. The company reports that the equipment was designed and tested for trauma use, and it provides a direct, absolute measurement of haemoglobin oxygen saturation in tissue (StO_2). In addition, it is

Noninvasive – The adhesive-backed InSpectra StO_2 Sensor attaches easily to the patient's thenar eminence.
Quick – its monitor provides readings 20 seconds after start-up. No calibration is needed.
Continuous – The monitor provides a continuous numeric reading and a trended display.

'The InSpectra StO_2 System is the only tissue oxygenation monitor designed for trauma environments. It uses near-infrared light to illuminate muscle tissue. Light returning to the InSpectra StO_2 Sensor is analysed to produce a direct measurement of oxygen saturation in the microcirculation, where oxygen is exchanged with tissue,' the manufacturer explains.

Preventing hypothermia

A new, compact, fully portable Patient Warming System, is '..the most efficient, non-invasive method of temperature control currently available', according to its maker, Kimberly-Clark: 'Preventing hypothermia, and reducing the amount of time spent by patients in the Intensive Care Unit, the system is suited to a wider range of applications than existing solutions. This makes it particularly beneficial for operations of over three hours, including cardiothoracic, trauma and intensive care surgery.'

The direct application of its disposal hydrogel pads offers the surgical team the best possible access to a patient, the company points out. 'Furthermore, patient temperatures are precisely managed during complex operations by covering less than 20% of the patient's body, versus 80% covered by the conventional warming blankets.' This product also minimises post-operative infection risks.

The Kimberly-Clark Corporation, well-known for its Kleenex tissues, Scott towels and other consumer products, focuses on medical supplies and devices for infection control, surgery, pain management and digestive health.

Continuous renal replacement therapy

The Prismaflex monitor, produced by **Gambro Healthcare** is a platform that provides extra therapy options and features for continuous renal replacement therapy (CRRT)

The monitor's user-friendly interface combines vivid colours and clear graphics on a large 12 inch touch screen, the manufacturer reports: 'Step-by-step instructions on the screen makes installation of the set very easy, as each step is accompanied by an illustration with colour codes matching those of the sets. The Prismaflex monitor will automatically load all pump segments and the circuit will be automatically primed quickly and completely.'

Designed to be more proactive, its safety system offers features such as automatic barcode identification of the set and customised default safe values. 'Fewer manual interventions are required, as the alarm system is more responsive, with the ability to analyse, and in some cases, correct problems on its own without compromising safety,' the firm adds. It also has a unique air management system, including a de-aeration chamber, with automatic blood level adjustment, keeping the extracorporeal volume very low.


Prismaflex

A new 'pre-blood pump infusion port' allows the infusion of supplemental solution for haemodilution or anticoagulation of the set (Citrate). In addition to a new, fifth infusion pump, the monitor comes with two integral 'pinch' valves to manage pre- and post-solution infusion. 'Now, it is possible to change between pre- and post-infusion even during a treatment, using the same set,' the manufacturer explains. 'Therapeutic flexibility is improved, while operator interventions are reduced.'

The monitor has four high-precision scales, ergonomically designed to facilitate bag handling. Three independent infusion scales allow the use of different fluid compositions.

The larger blood pump provides for higher blood flow rates and high flow treatments, and the monitor has wide flow rate capabilities.

** Gambro Healthcare is one of the world's leading providers of dialysis clinic services.*
The business area operates in 14 countries and treats about 11,000 patients in around 150 clinics.

Ci-Ca Therapy

Less bleeding complications due to safe citrate anticoagulation

Ci-Ca Therapy is a continuous renal replacement therapy-method for safe regional anticoagulation. The therapy system, from Fresenius Medical Care, has an integrated citrate and calcium management form. The citrate forms chelate complexes with ionised calcium contained in the blood, hence reducing its concentration, which leads to an effective anticoagulation in the extracorporeal circuit. In addition, the infused citrate is eliminated partly by diffusion and metabolism, which avoids systemic anticoagulation.

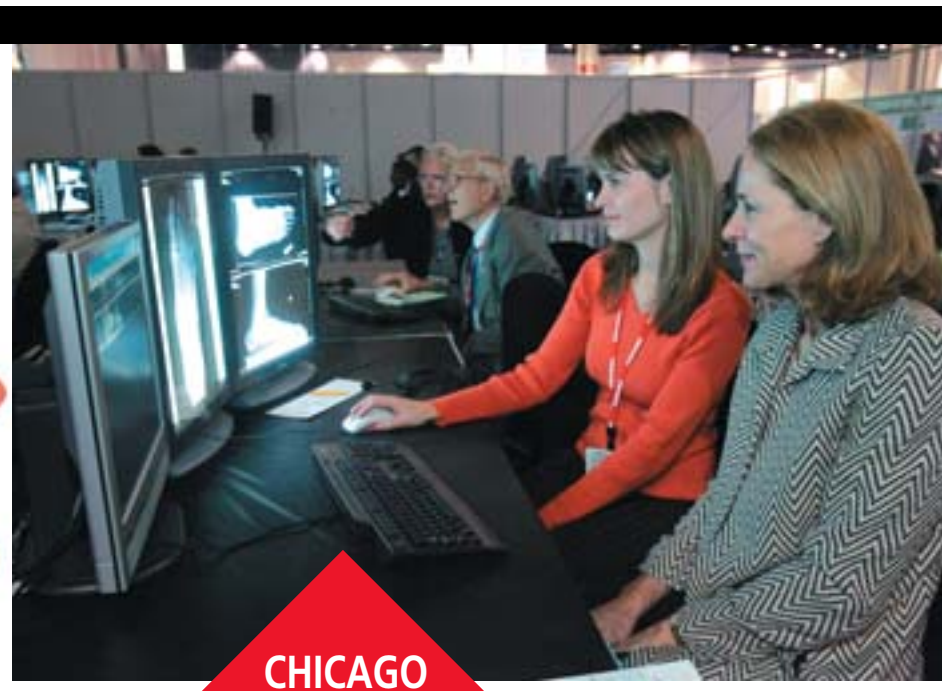
The advantage of citrate compared with other anticoagulants (e.g. Heparin, the most frequently used anticoagulant) is the regional anticoagulation. Heparin, for example, is applied systemically and this results in anticoagulation of the entire organism. This can be dangerous especially with active bleeding or bleeding diathesis patients. With Ci-Ca there is a clearly reduced risk of bleeding complications compared with systemic anticoagulation therapies.

An effective treatment, targeted influencing of the acid-base status, and an easy adjustment of the treatment dose, are some special features of Ci-Ca CVVHD, Fresenius adds.

Management of the acid base balance

The serum bicarbonate concentration can specifically be influenced by the ratio of blood to dialysis solution flow. An increase in the dialysis solution flow facilitates the compensation of a metabolic alkalosis. In case of metabolic acidosis, the acid-base status can be normalised by increasing blood flow.

The multiFiltrate Ci-CA Cassette – This is safe and easy to use due to the integrated citrate and calcium lines, colour-coded components to avoid error, and specific connectors for citrate and calcium.
Details: www.fmc-ag.com



RSNA | 2006

CHICAGO
26 November to
1 December

90TH RSNA SCIENTIFIC ASSEMBLY

As information and communications technology (ICT) makes it way into the everyday practice of medicine, the Radiological Society of North America (RSNA) is integrating ICT with clinical presentations at the world's largest healthcare meeting this year.

This year's meeting will do away with the free-standing info RAD display that has been a part of the congress for two decades. In its place, clinical informatics exhibits will be classified according to subspecialty or body organ, in a redesigned hall. 'If it's a CAD product, it's going into the CAD area,' said Betty Rohr, director of programme services for RSNA. This strategy, she explained, is the result of the RSNA board's decision to change the name of the organisation's Electronic Communications Committee to the Radiology Informatics Committee to reflect the fact that ICT is about so much more than just communications between clinicians.

Hall D, in the Lakeside Centre building at Chicago's McCormick Place, has been dubbed the Lakeside Learning Centre. It will house 1,400 educational exhibits and more than 600 scientific posters, arranged as spokes on two wheels, according to subspecialty. Informatics displays will be interspersed in each 'organ area'.

For the first time, RSNA will treat molecular imaging as a distinct subspecialty of radiology, with its own display area known as the Molecular Imaging Zone, set up around the perimeter of the Lakeside Learning Centre.

Betty Rohr added that the organisation has also noticed greater interest in teleradiology among its members.

Even with all this advanced technology, RSNA President Dr Robert Hatterly has chosen 'Strengthening Professionalism' as the theme of the 2006 assembly. As a practitioner and as current executive director of the American Board of Radiology, Dr Hatterly is a long-time advocate of continuous quality improvement.

One aspect of the professionalism theme is a 21st Century attempt to encourage colleagues to discuss and debate the poster presentations, as they used to congregate in hospitals. However, this time clinicians will be able to post their opinions on plasma displays – to create 'collegiality' Betty Rohr explained.

Cancer care is another area of emphasis. The RSNA is building a bit of a showcase around one of the scheduled speakers, Dr John E Niederhuber, acting director of the US government's National Cancer Institute. RSNA officials said the institute is looking to get more practicing radiologists involved in clinical trials.

Through early October, the RSNA reported that 62,000 people had registered for the event, about 3% ahead of last year's pace, and that hotel rooms were becoming scarce.

The nearly 700 commercial exhibitors will occupy 47,500m² of the massive McCormick Place halls. Both numbers are reported to be about 7% higher than in 2005. Similar to the educational displays, exhibitors will be grouped by type of technology.

Report: Neil Versel

RSNA/US launch for EU healthcare consultancy

Launched in 2005, and introduced to a broader healthcare public at the 2006 European Congress of Radiology (ECR), *Agfa Healthcare Consulting* is now to be introduced to potential customers beyond Europe – at this year's RSNA in Chicago.


Hendrik Wacker

The group aims to provide strategic planning consultations for hospital managers, to help reach their healthcare and business objectives. To date, Agfa reports that the consultants have advised over 35 customers in nine European countries.

Its broad portfolio of services includes the development of strategic direction, situation analyses, return on investment analyses, resource allocations advice, and workflow adaptations, Agfa explained. It also lists among its offerings 'Business Intelligence' and a 'Business Case' service. The latter, Agfa said, aims to analyse the strategic and financial effects of digitisation projects on the whole organisation (including HR, accounting, etc.) and helps create a financial plan (ROI, Net Present Value, Internal Rate of Return, etc.).

Agfa Healthcare's Services business marketing manager, Hendrik Wacker, outlined reasons for starting the group: 'We had customers who knew they had to transform their infrastructure, yet didn't have the means to form a business case for this change. Taking this further than a pre-sales engagement for a PACS/RIS solution sale meant looking beyond a standard radiology installation towards a complete hospital workflow re-engineering case. This includes performing in-depth analyses of management projects, such as strategic justification, financial and human resources. Two years ago we realised that we were doing much more work in actual business consultancy than needed to support a Hospital IT sale, which at the time was Agfa's core business. Indeed our customers began to value having an external expert go into the hospital and analyse their workflow. Based on the experience that Agfa has of the hospital environment, we understood that we should offer structured advice also on areas where we, as a company, do not even provide a technology solution – such as issues based around medical workflow and infrastructural reorganisation across the enterprise. We therefore decided to make this consulting service distinct from the traditional pre-sales engagement by forming a group with dedicated consultants, focusing on the management consulting aspects.'

EIBIR – The European Institute for Biomedical Imaging Research

AIMING FOR EUROPEAN BIOMEDICAL RESEARCH AT THE HIGHEST LEVEL

Professor Gabriel Krestin, Head of Radiology in one of Europe's largest hospitals – the Erasmus Medical Centre, in The Netherlands – is also Chairman of the Research Committee of the European Association of Radiology (EAR) and founder of the EIBIR. 'It was our dream to carry out biomedical research on the very highest level based on the American example,' he told *Daniela Zimmermann*, in an interview for EH


Gabriel Krestin

Prof. Krestin: In the USA, four or five years ago, The National Institute of Biomedical Imaging and Bio-engineering (NIBIB) was founded within the National Institute of Health (NIH). The latter is a huge research organisation, directly subsidised by the US Government, with around $28 billion annually – comparable with the EU budget for research in all areas for the next five years! . Now we are striving for it, too, although we don't have an NIH equivalent in Europe. Very few European institutes organise research in a transnational manner; we organise research mainly nationally. So we want to set up something at an European level.

Early in 2003, Professor Jörg Debatin was asked to develop a strategy for European biomedical imaging research – proposals that were further developed in a second committee. We wanted to see whether there was interest in a network of existing institutes, and their availability for this, etc. Initially we only had a lot of good ideas. In 2004, I followed this up with a very small committee, which initially decided to create a 'virtual institute' – a network of existing, high-quality European institutes already carrying out research – and have them co-operate within the network. Subjects and research institutes were to be freely selectable. We wanted to facilitate the exchange of scientists, particularly between East and West, to jointly write proposals for the EU's Framework Programme for Research.

At first 150 institutes registered, then another 20, all intent on working together – a basis to work on. I knew radiologists were not alone in carrying out the imaging research; I wanted to design it on a broader scale, so other medical disciplines would have the right to co-determination. In 2005, the standing Research Committee was established, and included in the statutes of the EAR. In 2006, the members, elected me as chair of the EAR Research Committee. The Research Committee consists of representatives from all the member countries. So, we have the research committee, which is fully integrated into the EAR, and we have the 170 institutes ready to collaborate.

In 2006, the EIBIR was founded as a limited liability company in Austria. The European Society of Radiology (ESR) is presently the only shareholder of the EIBIR. The ESR raised the start-up capital, but we have also invited other European organizations, like the European Association of Nuclear medicine (EANM), the European Federation of Organisations of Medical Physicists (EFOMP), the European Society of Magnetic Resonance in Medicine and Biology (ESMRMB), and The European Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry (COCIR) to become co-owners.

In a limited company someone owns the majority and other partners own the minority – so the limited company consists of many shareholders, such as the ESR, EANM, EFOMP, and so on. What is the concept here? A limited company should generate money, with all its consequences.

Presently, the ESR is the main shareholder, and probably will want to keep the majority. Of course this raises questions regarding the responsibilities of minority partners. But the issue here is not money, distribution of money, profit; it's about motivating our own ranks and limiting the influence of politics. The EIBIR is to be an organisation largely run by the scientists themselves!

So at the moment the EIBIR is like an empty pot waiting to be filled!

Yes, and everyone should put something into it. We don't research ourselves, but aim to promote research projects, so that ultimately we can act as a consortium to the challenges of the market at a European level.

There are often binding contracts between institutes and industry that are subject to privacy laws. How do you view such partnerships?

We want to be intermediaries between industry and the best possible research institutes in various medical fields. We look for clients, such as the Max-Planck Institute, or others for whom we will undertake research contracts. Another aspect is that research is sometimes a kind of sales strategy for industry. Firms know we don't have enough funds for research, which is why they make them available, but only if combined with the purchase of their equipment. This creates dependency, because the most financially sound institutes are actually not always the best. So what we hope to achieve is not only the research, but perhaps to advance developments with a group of people who purchase similar equipment. We are independent, can monitor quality, so we can promote cooperation without financial interests.

By deciding which institutions best suit certain task, couldn't you create envy between individual institutes and countries?

Research projects tend to be multi-centred, with participation by an inner core of leading institutes and an outer ring of satellites. No single institute leads in all areas. Some institutes specialise in very specific fields, but also can initiate research if interested. There certainly is an element of competition – it's not a bad thing.

How will you develop EIBIR?

This is a service organisation, offering services to its members presently free of charge. More than 170 institutions are already members and, with our success, those numbers will grow.

Initially there was very broad-based discussion within the EAR, ESR and with other organisations, as to whether we should include as many institutes as possible, or whether it was best to limit this to high-quality institutes. . For now, we have decided that it would be more politically advantageous, better for the industry and for our general effect to have as broad a base as possible.

Won't the already better institutes continue to be favoured?

The American NIH hands out research grants based on quality, which is also starting in Europe. Our university has introduced a quality-based reimbursement for research. We receive an annual

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Workflow improvements with thin client PACS

Dr Hartmut Schirmacher, Manager of Life Sciences Applications at Mercury Computer Systems, in Berlin, relates how PACS with tightly integrated thin client technology improves diagnostic workflow throughout a healthcare enterprise

Web-based PACS (left monitor) in conjunction with tightly integrated 3-D thin client technology (right)

High-resolution tomographic scanners and other 3-D technologies provide a number of compelling advantages for diagnostic medical imaging. However, 3-D modalities, such as CT and MR, are creating ever-larger data volumes, increasing the need for faster, bigger servers, higher network bandwidth, workstations with large memory and fast graphics, and advanced diagnostic software. Furthermore, the gap between the amount of information in the original data and 2-D report images sent to clinicians and referring physicians is growing steadily. Radiology departments and 3-D technologists expend significant effort to generate multiple series of reformatted images, cine loops, and standardised 3-D views to document and communicate diagnostic findings. Still, physicians outside the radiology department often want the flexibility to review the original data in addition to the diagnostic report.

Deficiencies of current PAC systems and workstations

Currently, many hospitals have a centralised PACS along with a number of loosely integrated 3-D review and post processing workstations. Data is sent from the modalities to the PACS, then forwarded to (or pre-fetched by) selected workstations. Radiologists and specialised technologists review the images on these workstations, and a multitude of key views or processed images is generated and sent back as snapshots and cine loops to the PACS and selected recipients.

This 'isolated workstation' paradigm has many problems: original data is not always available where needed; significant time is spent sending original and processed data between different workstations and servers; additional quality control is needed to ensure all generated diagnostic images are correctly archived and transferred to all recipients; user preferences are lost when switching to a different workstation; workstation hardware is often too slow or has not enough memory for efficient review of large 3-D studies; software versions and optional application packages are not consistently available across workstations; and referring physicians and clinicians can only review snapshot images, but cannot use these as bookmarks into the original data.

Advantages of the thin client paradigm

The key differentiator of a *thin client* PACS (PACS with tightly integrated 3-D thin client technology) is a true central 3-D processing paradigm, along with efficient streaming technology to enable thin clients to act as fully capable front-ends to all viewing and processing functions of the PACS. All DICOM data remains on the server (no data transfer prior to launching the 3-D viewer), all operations are performed directly on the server, and all functions can be accessed instantly from anywhere in the enterprise via thin clients.

Since data is no longer sent back and forth explicitly, the time required for data transfer and quality control is reduced. Network resources are used more evenly throughout the workflow; peak bandwidth problems are effectively eliminated. Time and expense for maintaining data and software consistency are greatly reduced thanks to central servers and web-based deployment.

Users can work with the same software consistently throughout a hospital, and user-specific settings e.g. hanging protocols, are available everywhere.

Thin client PACS can be accessed anywhere, including off-site locations. The PACS allows gaining full control over (and tracking of) image access and workflow, and a hospital could even become a viewing service provider to off-site users.

Clinical applications on thin clients

Modern PAC systems can provide the ability to plug in specialty and clinical applications, e.g. PET/CT viewing, CT cardiac analysis, virtual endoscopy, etc. If these are truly integrated thin client applications, workflow improves across the borders of different modalities, specialties, and groups.

PET/CT viewing on thin clients, for example, simplifies fusion of data from different modalities in radiology and nuclear medicine, and effectively removes technical barriers for obtaining second opinions from different departments (e.g. oncology, radiology). CT and PET data can be consistently archived and viewed separately or as fused images. Current and prior studies from different modalities can be reviewed conveniently and efficiently in a unified workflow.

CT cardiac analysis is another excellent example in which a thin client-based approach allows radiology and cardiology departments to share image data. Both can review 3-D and 4-D cardiac data in similar fashion and share key images for easy navigation to relevant views. A radiologist can effectively use the 3-D navigational capabilities of volumetric cardiac CT to identify suspected abnormalities, and it provides a cardiologist with vessel analysis tools to detect and quantify coronary artery stenosis, and quantitative analysis of the left ventricle, including wall motion/thickening, and ejection fraction. Even if a cardiologist works between different modalities and labs, all images and analysis results can be reviewed anywhere, and side by side with other data, e.g. angiograms or echocardiograms, whereby proper integration with the cardiovascular image management system is achieved.

Conclusion

From the hospital's point of view, a thin client PACS with clinical applications removes technical barriers between different modalities and departments, creates a much more homogeneous and manageable IT infrastructure, and helps to exploit existing modality and workstation equipment and other IT resources. For medical personnel, the thin client PACS provides a significant increase in productivity and flexibility through instant access to all diagnostic image data anywhere, anytime.

Further details: www.mc.com.
Contact: hschirmacher@mc.com

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research budget, of which 25% is retained for us to actually earn it back through our own output. Of course, this will result in the smaller institutes and departments, that don't deliver good service becoming even smaller, and larger ones growing bigger. I'm convinced the good smaller institutes will thrive in a better environment. If a very talented scientist works somewhere that's not prepared to invest in science and offer him scope, then success will not be obvious..

Will what happens with the EIBIR be determined by its practical work?

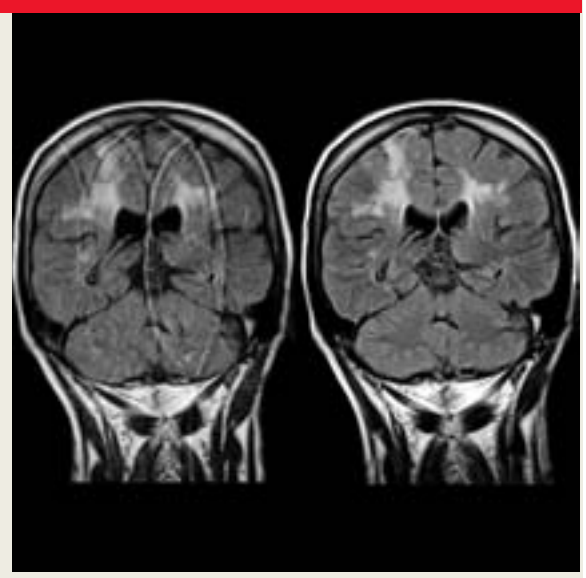
Shareholders and members will decide how they want this organised. The structure we've created will guarantee that it is neither political nor will the ESR dictate alone what will happen in research. Researchers themselves will decide.

Practicality, the EIBIR offers certain services. For example, we'll organise workshops, and facilitate the exchange of scientists: If, say, a French institute is looking for MR physicists, then we could introduce them to MR physicists in the Ukraine. We could also handle the administration to move them to those jobs for one or two years. We'll offer access to advanced training – Master of Science, Master of Research or PhD programms – to young scientists with inadequate opportunities in their own areas; we'll promote doctorates in imaging, which are available at some institutes but not all. That's where we can help, in research education – and not just for radiologists.

In terms of research, to certain extent we will have to implement some ideas in a top down fashion. We'd like to propose topics and encourage participation. Industry might also introduce a topic and our institutes could do the research. But what we'd really like is that researchers themselves will come up with topics that need partnerships. Someone, for example, might want to investigate what the multi-detector CT could do for coronary arteries, but cannot do it alone because they have only 100 patients a year, not the 1,000 needed for a valid study. So the EIBIR could find someone interested in joining and working on that study. We have an organisation set up for this – the European Assessment of Imaging in Medicine – which will run multicentre studies based on the example of ACRIN in the US.

We also look after the image processing area. Lots of our member institutes work on image processing, for example in developing imaging biomarkers – Several groups already work in those areas, and we aim to develop an image-processing platform for them. We actually have the first, very good European image processing groups working together. It doesn't make sense for different groups to individually carry out such developments, with some joining in earlier, others later. Those are a few examples from our networking and research undertakings.

Real-time access to CT scans on laptops and PCs



In July, Siemens Medical Solutions launched syngo WebSpace, a new client-server computed tomography (CT) system that is the first to provide real-time access to patient's CT scans on personal computers (PCs) and laptops, via a simple network connection.

'Traditionally, large volume thin-slice data has been stored for days on the CT scanner and time is lost when retrieving them from some picture archive and communications systems (PACS),' the company explained. Using Siemens syngo InSpace 4D software, hundreds of thin-slice data cases and large thin-slice data sets (up to 5,000 slices) can be instantly available for 2-D, 3-D and 4-D interactive reading. 'All rendering takes place on the server, providing users with advanced processing speed. Ideally suited for short-term storage of thin-slice CT data, syngo WebSpace gives users rapid access to thin-slice data, while freeing up the CT scanner database,' the company adds.

Syngo WebSpace facilitates from 5-20 concurrent sessions, depending on the server configuration, from any number of users throughout the hospital network and via secure access from remote locations. Medical facilities also can access multiple servers to further expand the possible number of concurrent sessions. 'This offers a very cost-effective solution for fast image distribution and high availability, routine clinical post-processing. Once syngo WebSpace is connected to the central server, a PACS workplace or PC can be turned into a processing workplace.'

The first installations of *syngo WebSpace* are expected shortly, for example in University of Erlangen, the University of Munich and Johns Hopkins University, Baltimore.

NEUROLOGY

The value of diffusion-weighted and diffusion tensor imaging techniques


Denis Ducreaux

MRI plays a major role in the diagnosis and follow-up of spinal cord and brain diseases, in order to detect and characterise lesions, to assess feasibility of potential surgical resection and to diagnose recurrences and complications of therapy. Conventional MRI using T1 and T2-weighted sequences (either in spin or gradient echo) lacks sensitivity in early detecting and characterising some lesions, such as multiple sclerosis or acute infarction. In addition, in patients with tumours conventional sequences may not be able to clearly identify the transition between tumour and surrounding oedema. Diffusion-weighted imaging (DWI) is an established and reliable method that helps to detect and characterise such lesions, and diffusion tensor imaging (DTI) is becoming an important technique to identify white matter tracts and the effects of different lesions on them. Unfortunately, DWI and DTI are usually performed using echo planar sequences, which are sensitive to noise, motion and susceptibility artifacts. In addition, the resolution of most currently clinically employed DWI sequences is not optimal to image small structures. Better characterisation of white matter lesions may be achieved using DTI, an MR technique that evaluates the movement of extra-cellular water molecules within white matter fibres and enables reconstruction of 3D images of white matter tracts using specialised fibre tracking (FT) algorithms.

By **Dr Denis Ducreaux**, Assistant Professor of Neuroradiology at CHU de Bicêtre, France

DWI and DTI provide information on the mobility of water molecules in tissue. It is a widely accepted and utilised method for detecting acute ischaemic brain injury: highly mobile extracellular water shifts into the intracellular compartment generating 'cytotoxic oedema' during the early stage of arterial stroke. DTI using FT reconstructions may help visualise early wallerian degeneration in subacute and chronic stage of ischaemic stroke.

A major development has been achieved these past years in imaging spinal cord diseases. Several investigators have assessed the feasibility of performing spinal cord DTI studies. It is known that DTI sequences with computation of fractional anisotropy (FA) are more sensitive than spin echo T2 weighted images in detecting intrinsic abnormalities in acute or chronic spinal cord compression. In lesions that produce involvement of white matter fibres, it has also been reported that DTI with FT may potentially help to define abnormal areas that are undetected on routine T2-weighted imaging. FA and FT maps, derived from DTI computations, may help neurosurgeons to better delineate tumours and might contribute important information before tumour resection.

There are many clinical applications of DTI and FT. Recent ones focused on the spinal cord.

Normal spinal cord anatomy can be studied using FT and shows the main white matter tracts: posterior-lateral cortico-spinal, posterior lemniscal, and spinal-thalamic. On the fibre tracking 3D reconstructions, it is also possible to visualise bunches of fibres in the nerve roots.

In spinal cord tumours, DTI and FT may help to characterise and differentiate tumours (astrocytomas, ependymomas, haemangioblastoma, metastasis) and to delineate their margins.

In spinal cord acute and chronic compressions, conventional T2 weighted images may underestimate the effects of compressive lesions on the cord particularly when no hyperintense signal accompanies cord compression in the hyperacute period (the critical time period to treat these lesions). DTI can detect abnormal areas within a normal appearing spinal cord on T2-weighted imaging, and may also help to predict the patients' outcome.

In myelitis, DTI is more sensitive than regular T2-weighted imaging in detecting spinal cord inflammatory lesions. Additionally, FT shows that inflammatory lesions spread the fibres of the spinal cord in areas that have abnormal T2 signal. This pattern is not seen in invasive tumours.

In metabolic disorders, such as MELAS (mitochondrial encephalopathy, lactic acidosis, and stroke like events) it is a disorder that affects both the brain and spinal cord. On the T2-weighted and FLAIR images multiple abnormal high intensity signal lesions may be seen in the mesencephalon, medulla oblongata, cerebellum and cervical spinal cord. FA values are decreased within the spinal cord of these patients, even when T2 abnormalities are not obvious.

DTI and FA are then more sensitive than other conventional MR imaging techniques to detect, characterise and map the extent of spinal cord lesions. In addition, FT offers the possibility of visualising the integrity of white matter tracts surrounding some lesions and this indirect information might help in formulating a differential diagnosis and in planning biopsies or resection.

GE HEALTHCARE´S VOLUSON E 8

At the congress, the first clinical results, obtained during the use of GE Healthcare's new Voluson E8, were presented.

The Voluson E 8 includes several tools to help improve clinical workflow, such as Volume Computer Aided Diagnosis (VCAD), which considerably facilitates difficult heart examinations and delivers standardised images according to recommendations from leading obstetric and gynaecologic societies.

The system also provides a 4-D transvaginal probe, which gathers more precise data due to ultra-high frequencies and the new generation of probe technology.

Professor Rabih Chaoui MD, is a Board Member of the International Society of Obstetrics and Gynaecology, member of various German Societies, and on the editorial board of several national and international journals. He has authored and co-authored over 200 articles.

His special interest is cardiovascular haemodynamics in the foetus - foetal echocardiography and Doppler ultrasound. He has been using the Voluson since 2002.

2001 Prof. Obstetrics and Gynaecology in Berlin at the Charite Hospital

Since 2004 Private Centre for Prenatal Diagnosis and Human genetics in Berlin

Nick Raine-Fenning MRCOG MBChB PhD, is Associate Professor of Reproductive Medicine and Surgery at Nottingham University. Based at the Queen's Medical Centre, he is involved with the University's IVF unit (NURTURE) and the NHS Fertility Service. With a special interest in ultrasound, he recently established the Academic Imaging Suite, where his team carry out intensive research as well as provide a clinical service and active educational facility.

He was awarded a PhD for his thesis 'The development and application of 3-D power Doppler angiography for the assessment of pelvic organ blood flow'. The majority of his work relates to infertility, but the unit has expanded interest to investigate endometriosis and dysmenorrhoea.

An expert in foetal ultrasound, obstetrician and gynaecologist **Dr Greggory R DeVore** has pioneered the identification of congenital heart defects using 2-D, 3-D, 4-D, and colour Doppler ultrasound. He has published numerous studies describing the use of foetal echocardiography to detect foetuses with Down's Syndrome (in which, using genetic ultrasound, he has the highest detection rate reported in medical literature) and other chromosomal defects.

During medical training and as a Fellow in Maternal-Foetal Medicine at Yale University, he pioneered research on ultrasound evaluation of the foetal heart.

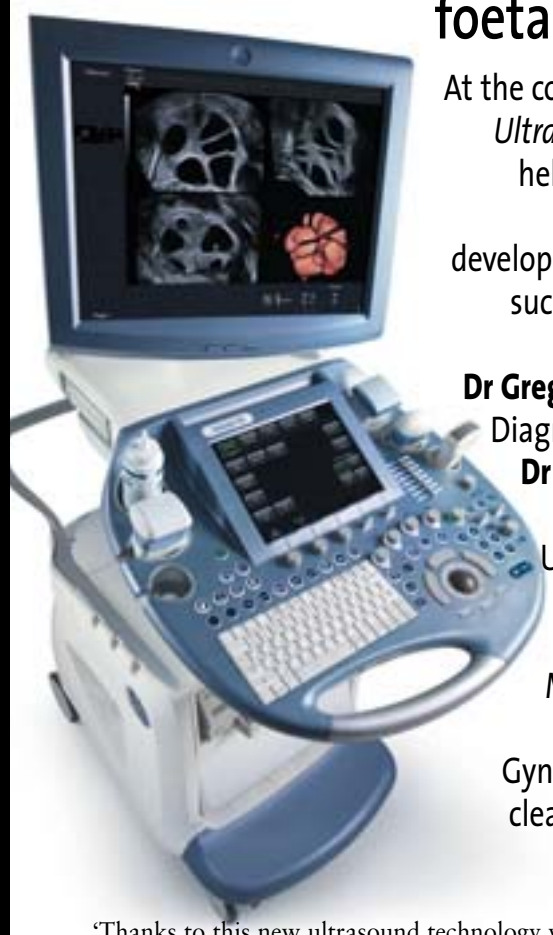
He became Associate Professor at the University of Southern California School of Medicine and is now a full-time consultant assisting community-based obstetricians with difficult foetal cases.

Dr DeVore has personally performed over 100,000 foetal ultrasound examinations. He has served on the editorial boards of medical journals, authored over 100 peer-reviewed papers, and contributed to more than 30 medical textbooks.

He also assists in the development of new ultrasound technologies for major multinational corporations.

New possibilities for the first trimester of pregnancy

New ultrasound technologies detect foetal heart defects earlier



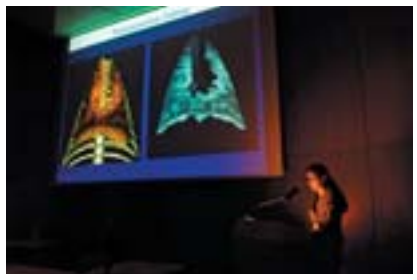
At the congress of the *International Society of Ultrasound in Obstetrics and Gynaecology*, held in London this September), experts discussed the benefits of recent developments in ultrasound (US) technology, such as 4-D used in every-day diagnostic practice. During our interview with **Dr Greggory R DeVore**, director of the Foetal Diagnostic Centre, in Pasadena, California, **Dr Nick Raine-Fenning**, of the Academic Division of Reproductive Medicine, University of Nottingham, where he is Consultant Gynaecologist & Clinical Senior Lecturer in Reproductive Medicine, and **Professor Rabih Chaoui** of the Department of Obstetrics and Gynaecology at the Charité, Berlin, it was clear that, in general, these advances are received with enthusiasm.

'Thanks to this new ultrasound technology we can visualise, in the first trimester, details of the foetus that we have never seen before,' said Professor Chaoui. For example, the high resolution of the new GE Healthcare ultrasound system produces images that enable examination of the foetal heart in the first trimester – when the foetus is just the size of a finger! In terms of size, Dr DeVore added that the US system is also '…small, mobile, easy to handle and provides images that could not be generated previously'.

Prior to this development, heart defects usually could not be diagnosed before week 22 of pregnancy. That progress is one effect of the 4-D technology, the experts agreed. Criticism that 4-D ultrasound is a nice tool for expectant parents, but not for diagnostic purposes, is unfounded, as Dr DeVore pointed out from his own experience with this system: 'From a diagnostic point of view, 4-D is a real step forward, particularly for examining the foetal heart in week 7 or 10 of a pregnancy. With the new 4-D transvaginal probes, we can detect foetal abnormalities earlier than ever before, because they deliver volumetric information on even the smallest anatomic structures. Clinicians who are not specialised in cardiology can now more confidently evaluate the foetal heart, which may improve our overall prenatal detection rate of heart defects'

It is quite normal, says Nick Raine-Fenning, that some experts have a more critical opinion of 4-D ultrasound. After all, almost any medical innovation is initially smiled at. But there are always people, he adds, who recognise the potential of a new method, work with it, develop it and make it a success and thus, in the end, convince the sceptics.

One way to make prenatal exams of the heart more accessible for clinicians is to standardise diagnostic procedures. One of the new technologies is the so-called Volume Computer Aided





Visualising the breathing lung

After previous meetings in the USA (2002) and Japan (2004), this October the 3rd International Workshop of Pulmonary Functional Imaging (IWPFI) took place in the German Cancer Research Centre, based in Heidelberg University, Germany. 'The clinicians' need for earlier and more detailed diagnosis in pulmonary disease demands a joint interdisciplinary effort to push the limits in pulmonary functional imaging even further,' Professor H U Kauczor, head of the research centre's radiology department and President of the Organising Committee, told participants.

"Over 250 scientists attemded a number far exceeding expectation, which turned the original workshop into a real scientific meeting. As most of the research in this field happens at the interface of medicine and technology, participants came from diverse scientific backgrounds, ranging from Pulmology and Radiology to Medical Physics and Digital Image Processing and on to Computational Fluid Dynamics. They faced a packed programme of scientific sessions and poster sessions, and two lunchtime symposia sponsored by Toshiba and Siemens.

With this interdisciplinary audience, emphasis was placed on establishing a common basis and terminology for discussion, through keynote lectures from internationally renowned experts presenting important clinical topics and current research activities from different aspects.

Airway disease and emphysema

In his keynote lecture, H Magnussen (Hamburg, Germany) focused on pulmonary function tests, the reference standard, with which functional imaging must compete. On imaging, P Grenier (Paris, France) said that thin-section CT has already proved a reliable method for diagnosis and follow-up of airway disease, thereby already eliminating the need for bronchography. F M Müller (Heidelberg, Germany) consented that CT and MRI already have a place in lung function tests for assessment of early morphological and functional changes in cystic fibrosis. For emphysema, M Mishima (Kyoto, Japan) emphasised the need for new diagnostic methods to describe the different phenotypes of COPD on the way to tailored therapies in the near future.

For quantification, image processing and navigated bronchoscopy, various software tools and programmes were also shown at the industrial exhibition by larger companies alongside research groups presenting competing near-market solutions that incorporate the latest technological advances.

On this, E Hoffman (Iowa, USA) demonstrated how imaging contributes to understand the pathogenesis of emphysema as well as presenting new insights on the interplay of inflammation and hypoxic pulmonary vasoconstriction in the development of emphysema. Moving from perfusion to ventilation, E van Beek (Iowa, USA) presented data on ventilation MRI using hyperpolarised ^{3}He gas, showing good correlation to pulmonary function tests, opening the perspective for supplementary regional information in the near future.

Another method capable of providing information on regional ventilation is oxygen-enhanced MRI, as was reviewed by Y Ohno (Kobe, Japan).

Pulmonary hypertension, exercise testing and biomechanics were another large focus. Multidisciplinary experts discussed the emerging role of imaging – particularly MRI. The challenging application of MRI for such examinations is driven by its unique qualities, no radiation, assessment of function, comprehensive evaluation, potential for repeated, dynamic and stress imaging. For pulmonary hypertension, S Ley envisioned MRI as the single comprehensive imaging modality providing all necessary diagnostic information as a one stop procedure, which he sees at the threshold, because MDCT and MR already provide excellent information on morphology while functional MRI inches up to the so far gold standard echocardiography in functional assessment. Acute pulmonary embolism is a clinical emergency with acute pulmonary hypertension, where modern imaging regimes can not only establish a diagnosis in cases of inconclusive clinical evaluation but also provide prognostic measures, as with obstruction scores and quantification of impaired cardiac function - as summarised in the lectures by groups from Florence, Italy; Lille, France; Toronto, Canada, and Munich, Germany.

Keynotes on 'Protective Ventilation and Acute Respiratory Distress Syndrome' included dynamic visualisation of ventilation, recruitment and derecruitment - an exciting concept to tailor ventilation regimens by means of quantitative imaging. In addition, segmented geometries from individual imaging data can now be used to simulate inspiratory and expiratory flow pattern, as well as biomechanical 'stress' on the epithelial surface layer.

For oncology, CT now plays a major role for image-guided bronchoscopy, with navigation important to accurately biopsy small nodules, and precisely position brachytherapy probes for endobronchial radiotherapy. To evaluate angiogenesis in lung cancer, imaging was mainly viewed as a possibility to monitor response to therapy with quantitative analysis of tumour perfusion, and to differentiate suspect structures according to their diffusion patterns.

The workshop – The overwhelmingly positive sentiments of participants – and particularly the successful exchange of discussion on highly diverse topics - is a tribute to the organisers wide-ranging vision."

Diagnosis, an automated imaging tool that makes volume imaging of foetal hearts less complicated by automatically generating multi-dimensional images of the right and left outflow tracts, once a standardised four-chamber view has been obtained. This technology provides clinicians with the potential to gather images that fit with the recommended standard screening views of a foetal heart published by the relevant societies.

'Another step in this direction is "off line analysis", because of the 3-D data storage. It allows manipulation of the dataset and images and gives the impression of actual patient examination. Clinicians can reassess the data at any time, using different viewing modalities to enhance the diagnostic ability,' Nick Raine-Fenning added.

At this point, it is difficult to tell where ultrasound for obstetrics and gynaecology is heading. The new technologies generate data that have to be evaluated and interpreted. 'We haven't even grasped he potential of these new technologies. Quite obviously, if we can detect foetal heart diseases in the first weeks of pregnancy, the logical next step would be to treat the diseases as soon as we have diagnosed them. But this will take at least another 15 years,' Professor Chaoui predicted.

WHY STANDARDS MATTER

BY **MICHELLE JEANDRON**, SCIENCE AND TECHNOLOGY REPORTER, INSTITUTE OF PHYSICS PUBLISHING*

There's an urgent need for better measurement standards in the field of high-intensity focused-ultrasound (HIFU) therapy, argue the authors of a report from the UK's National Physical Laboratory (NPL) and the Institute of Cancer Research (ICR). The report highlights numerous areas where the development and clinical application of HIFU are being hampered by inadequate characterisation methods, uncertainties about equipment performance and inconsistent reporting of results.

HIFU therapy is a promising, non-invasive cancer treatment that uses ultrasound to destroy deep-seated tumours with pinpoint accuracy. Basically, powerful ultrasound beams are brought to a focus within an area of malignant tissue, the intensity being sufficient to raise the temperature of the cells and kill them. What's more, the threshold intensity is only reached at the focal point, such that surrounding healthy tissue is left unharmed.

'HIFU will find its niche clinically,' explained Gail ter Haar, head of therapeutic ultrasound at ICR and president of the International Society for Therapeutic Ultrasound. 'It is the only technique that offers trackless tissue destruction, so it is of particular interest in the brain, where it can be carried out under MRI guidance. Other advantages are that it is bloodless, repeatable, has low systemic side-effects compared to chemo- and radiotherapy, and it may not need anaesthetic - although currently anaesthetic is used to suppress patient movement.'

Despite these advantages, HIFU is currently only approved in the UK for the treatment of prostate cancer, with more than 13,000 patients treated worldwide with promising five- and seven-year follow-up. In the USA it has also been approved for the treatment of uterine fibroids. 'In terms of clinical effectiveness, it compares well with other ablative therapies,' added ter Haar. Meanwhile, preliminary trials are taking place for the use of HIFU on other cancers (e.g. liver and kidney), though it is still a long way from being a widely available therapy.

Standard logic

HIFU relies on quite different ultrasound fields to those commonly used for medical imaging. The pressures and intensities involved are much higher, for example, and HIFU involves strong focusing and nonlinear field harmonics.

'There are known limitations with both the measurement devices and procedures, which become particularly important when attempting to deliver the very high energy densities produced by HIFU systems,' explained Adam Shaw, a senior research scientist within the NPL's acoustic team. 'These limitations introduce very substantial uncertainties in attempting to characterise the true acoustic field: for instance, the uncertainty in determining the temporal-average intensity at the focus is typically a factor of two.'

All of which makes life difficult for researchers, clinicians and equipment developers - and makes the case for international standards on HIFU all the more pressing. For starters, standardisation will allow researchers to characterise the exposures in their biological studies with much greater accuracy, and in turn allow proper comparison of results from different groups from around the world.

Standards will also mean that equipment from different manufacturers can be compared fairly and the most appropriate system purchased depending on a hospital's needs. However, the big benefit to the equipment suppliers 'is that there will be a recognised and universally accepted method for demonstrating compliance on safety and essential performance', said Shaw. That should mean reduced time to market for new devices and 'will lead to patients benefiting from the widespread availability of a safe and effective alternative to radiotherapy, chemotherapy and surgery'.

For their part, NPL and ICR are working on a number of fronts to fast-track the introduction of HIFU measurement standards. Key initiatives range from the development of reference techniques for measuring fundamental quantities like pressure and power to the production of test objects for checking the registration between the imaging system used to locate the target tissue and the therapy field. Other priorities are the development of specialised thin-film temperature sensors, tissue-mimicking materials and rapid qualitative methods for pre-treatment system validation.

Shaw concluded: 'The first step towards accepted international standards for HIFU has been taken with an agreement to produce an IEC [International Electrotechnical Commission] technical report in the next 12 months.'

* http://medicalphysicsweb.org

Tomovation means innovation

TOMOVATION®

'A playground for new concepts and ideas'

In 2003, Michael Friebe PhD launched the holding company TOMOVATION (neatly combining tomography and innovation). Back in 1993, Dr Friebe was the founder of Neuromed AG, which at the time was the biggest provider and seller of mobile diagnostic services and refurbished MRI and CT systems in Central Europe. This firm was subsequently bought by UMS AG.

Tomovation has a special focus in all its business activities - medical imaging – and particularly MRI. Currently, the firm holds equity investments in 10 tomography companies. 'The company is difficult to describe, as it is a playground for new concepts and ideas in MRI service operations, niche-market product development, and financing,' Dr Friebe said. 'It has a small sales operation for innovative niche-market products, and owns several MRI and CT imaging centres in Central Europe.'

Refurbished MRI services (and occasionally CT and PET) from de-installation through to re-installation – and everything in between - is provided worldwide via its subsidiary Tomosystems, which is ISO certified and approved by most OEM companies. This company is headed by Stefan Hellwig - an industry veteran - and supported by Bastian Berkel.

The Tomovation group holds over 10 MRI product-related patents and currently is developing devices for image guided surgery (through ITP) and MRI injectors (through Tomoinject), which even work with 7T MRI systems and already have won a prestigious design award.

In coming months, the R&D business will be complemented with dedicated investment activities in tomography start-up firms, to be managed by Oliver Lehmkuehler PhD.

Helped by innovative financing concepts and recently begun shared mobile MRI and PET services, Tomovation itself continues to invest in PET and MRI imaging centres.

Details:
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The electronic health card

'It's a milestone in German healthcare modernisation within a European context,' says ZVEI

"Through its engagement in various initiatives and publications ZVEI (the German Electrical and Electronic Manufacturers' Association) consistently underlines the great potential of IT in the healthcare system – in Germany and Europe.

In the treatment of chronic diseases, where long-term optimum patient care is important, eHealth applications are particularly likely to improve the quality and economic viability of healthcare. But the combination of care given by a hospital, specialist doctors and general practitioners also presents new opportunities. The electronic health card (eGK) will be a centrepiece in the transformed, high-tech infrastructure of German healthcare. This will have far-reaching implications. Initially, the card will replace the current health insurance card for all members of state health insurance schemes, i.e. about 90% of the population. Private medical insurers will also join the project. It is foreseen that, in time, the card will cover the entire population. The pilot phase of this very comprehensive infrastructure project was launched at a regional level last year.

With the introduction of the eGK in 2007, the card will be used to identify patients, verify their insurance status and cover electronic prescriptions. Additionally, patients have the option of storing relevant emergency information, such as allergies, current medication etc. on the chip. These additional services in particular represent significant advantages compared with the current system.

In many European countries chip cards are already being tested or used in e-Government and eHealth services. Depending on the areas of use, card solutions differ greatly in terms of functionality, technology and security infrastructure. Some countries operate entirely without chip cards; instead they have developed network-oriented systems. Currently, about 15 European countries electronically process patients' insurance data via cards or networks - some more intensively than others.

In the medium term, healthcare information such as emergency data or documentation on medication provided voluntarily by patients is to be made available Europe-wide. The European "eHealth Action Plan" is an important step in this direction by the European commission. This plan aims to make electronic healthcare services the norm for medical staff, patients and citizens by the year 2010.

In Germany, the European Health Insurance Card, EHIC, will be on the back of the eGK. It will replace the current system whereby people need separate documentation to prove they have medical insurance when travelling in Europe, and will facilitate non-bureaucratic medical treatment within Europe. Holders of the European Health Insurance Card will be able to receive emergency in- and out-patient treatment in all EU member states, as well as Iceland, Liechtenstein, Norway and Switzerland. Medical services can be used in the same way as they are available to those insured in the relevant countries. The relevant medical insurer refunds any costs incurred.

The optimised accounting system, electronic prescriptions and European validity of the eGK should result in significant cost savings. Particular savings of up to 80% are expected from the comprehensive use of e-prescriptions. However, as yet it is not possible to achieve a meaningful comparison of potential cost savings via the use of the eGK compared with the investment costs for the necessary infrastructure. Currently, the focus in the introduction of the eGK is on improving quality of care rather than on economics.

The project's importance goes beyond introduction of the card, the necessary infrastructure and services. Surveys in Germany have shown that healthcare decision makers also expect significant improvements in organisation and processes. The eGK will be the basis for a comprehensive modernisation of the healthcare system due to the use of innovative technologies. Modern healthcare is a process that comprises screening, diagnosis, therapy, care and homecare. Electromedicine takes a central position in this system. Fast diagnosis with the most up-to-date imaging systems, such as CT with contrast media, and pinpoint therapy procedures, such as the opening and stabilisation of constricted blood vessels, are two examples. Teleradiology, tele-homecare, or the comprehensive care of chronically ill patients, will be implemented nationally and according to standardised quality requirements. Through the networking of existing data, this process will ultimately lead to the development of electronic patient records (EPRs).

At the same time, efficiency and quality of healthcare in Germany will improve: Repeat examinations will be a thing of the past; therapy-decisions will become more individually customised; no complications will result from administration of wrong medication, and the health of chronically ill patients will improve through better care. For example, if allergic reactions or mistakes in medication dosage can be avoided by checks against the EPR, if diagnoses and results of prior examinations are not lost but at hand to speed diagnosis, if an expert second opinion is available electronically to assess diagnostic images, then not only the patient benefits but also the entire care system, due to more efficient use of scarce healthcare resources.

ZVEI and its member organisations work together with medical users on practice-oriented, open solutions for these concepts within the initiative 'Integrating the Healthcare Enterprise'. The implementation of the voluntary use of the eGK will attract additional investments and lead to a dynamic growth market for systems and solutions. In German companies, projects and processes arising from these developments also will help to open up international markets.

Intelligent regulations for new markets are important frameworks for such developments. These include the elimination of the most significant obstacles to investments in the healthcare market: Lack of financing and time-consuming, non-transparent procedures for the licensing of innovative products and methods. The investment backlog in Germany in medical technology is estimated to be around €10-15 billion. One the one hand, this is obvious from the age structure of equipment currently installed. In parts, 40% of equipment in certain product groups is more than 10 years old, which not only means the technical potential remains unused, but also that the pressure to achieve increased economic viability and changes in the way medical services are financed cannot be met in healthcare services.

Without comprehensive modernisation of the medical-technological infrastructure opportunities arising from eHealth cannot be totally utilised. All interested companies will need free access to the infrastructure of the eGK. Interested third parties will need the opportunity to develop and offer their own services, using the eGK. As in other fields, the competition of ideas and developments can increase improvements manifold.

The eGK will be a central part of networking in Germany and will be a basic requirement for significantly improved healthcare. Therefore, its importance for the development of the German healthcare system could be compared with the German motorways as the basis of developments in the German autos industry.

It also allows for a Europe-wide approach for the implementation of eHealth practices.

High performance contrast agent injection systems

Medtron AG is a leading European designer, manufacturer and distributor of contrast agent injectors used for CT, MRI and Angiography.

The company's main aim is to develop high-performance injectors, based on innovative technologies, in terms of recent medical requirements in diagnostics, patient comfort and cost effectiveness. This is particularly the case for simultaneous or sequential injection of a contrast agent and saline solution.

Early on, this company recognised opportunities presented by the innovative CANopen technology. Today it supports an interface based on that standard to control contrast agent injection in the latest multislice CT-scanner generation.

Its *Injektron* line and new, upcoming *Accutron* product line (CT and MRI injector) have been developed to simplify the daily workflow of contrast agent application. Medtron also points out that these wireless, battery operated single or double headed injector systems, with touch screen control panel, choice of languages, wireless touch screen remote control and heatable syringe holder, are comfortable and easy to operate,

The devices and corresponding disposables, such as syringes, automatic filling kits or specially designed customer solutions, are distributed and maintained by qualified international partners.

Founded in 1992, and based in south-west Germany, Medtron AG established itself in the international radiology market via partnership with leading sales and service companies and, Medtron adds, due to 'convincing products'. Full details: www.medtron.com

Digital speech processing from Grundig Business Systems

One of world's leading manufacturers of professional dictation systems, Grundig Business Systems, has launched a new mobile dictation machine – the Digta 415 – providing 64MB internal memory that allows almost 10 hours of talk time. The package also includes DigtaMobile PC software. 'With easy to use slide switch and great editing facilities – it's easy to modify, insert or delete text passages,' Grundig reports, adding: 'Dictations are sent to a transcription service, or speech recognition software, at the push of a button. It's fast, safe, looks good and sounds great – and saves time to spend with patients.'

Additionally, along with battery charging, the USB connection allows the Digta 415 to be used as a PC microphone. This is also one of the first machines in the world to offer password protection.

Diagnosis: Highly efficient, says Grundig, adding: 'These innovative and technically leading voice-processing systems with sophisticated design are distributed through a global partner network.' However, visitors will see them demonstrated at

MEDICA – 15-18 November, Dusseldorf, Germany, booth 15. G39.

RSNA, Chicago, USA, November 26-30, 2006, booth A 3948 C.

Details: www.grundig-gbs.com

Mobile positioning table supports patients up to 230kg

To meet US requirements, Provotec GmbH & Co KG, of Espelkamp – which is entering US and international markets with their *Prognost XPE* tables - has increased the patient load and will have UL and CCC approval.

The bucky table is an inexpensive tool in the X-Ray department, Provotec points out. 'However, due to the increasing use of movable stands, especially combined with digital image receptors, further requirements to the patient positioning table do arise. Along with tabletop movements in XYZ directions, to optimise the advantages of movable stands, table movement is desirable with a patient in the room.'

The Prognost XPE is a mobile patient positioning table with motorized elevating and floating tabletop, which allows variable patient positioning as well as optimal use of modern X-ray tube/image receptor combinations.

'Not having a line cable makes the Prognost XPE - Akku particularly comfortable,' Provotec says. 'A rechargeable battery (accu) supplies sufficient energy to moving patients to the desired working heights. While one accu supplies energy to the table, another is loaded in the loading station. This is very user-friendly, because the accus can be changed simply and quickly and without a tool. Even if charge signals are overlooked and the accu is "suddenly" empty, changing it takes only seconds. The loaded accu can be removed with one hand from the loading station and replaced in the Prognost XPE – Akku, against the empty one. Using a fixed working height, but the advantage of a mobile table with the floating tabletop, Prognost XP is the right choice. Neither line cable nor electricity is necessary.'

Additionally, all versions can be equipped with a moveable Bucky, or cassette holder under the tabletop. Details: www.provotec.com. Or, at RSNA 2006: Hall A – Booth 3948 B – the German Pavilion.

A sublime strategy for holistic diagnoses

Professor Erich Reinhardt (below), President and CEO of Siemens Medical Solutions and member of the Board of Management of Siemens AG, discusses the company's current and future strategies, in an interview with *Daniela Zimmermann*

Prof. Reinhardt: We defined our strategy in the late 1990s; we are currently implementing it, step by step. The strategic orientation is based around the development of products, software and services that help our customers to improve the quality of their healthcare services whilst lowering their costs. We see two big opportunities here: innovations in various medical technologies for diagnosis and therapy, and the optimisation of processes in healthcare systems with the help of information technology. Broadly speaking, this is our strategy. To achieve progress, we will continue to implement it over the next five years.

Why was the strategy developed in the late 1990s?

At that time we undertook an extensive analysis of healthcare requirements, and discovered stable, global trends: The population is growing and becoming increasingly older; awareness of health issues is growing, and the requirement for healthcare services is on the increase. In addition, there is great awareness of the need to increase efficiency and lower costs. Our strategy is based on that.

Are you trying to shift responsibility for healthcare over to the 'end users', so they must undertake these issues themselves?

I don't like the term 'shift'. But I do approve of a healthcare system in which every individual becomes more responsible for his or her own health. Despite all current discussions, I don't actually believe that the system is too expensive for the individual. It all boils down to the question of where to invest one's money. The Germans spend an annual 170 billion euros on cars; spending on statutory medical insurance is around 140 billion euros annually - half of this covered by employers. So it really depends on how, and for what, you can motivate people to spend their money.

Like not going on a holiday and investing the money in one's health instead?

ER: A holiday is not a good example. It is all about the overall attitude towards the importance of health for each individual. How much is somebody prepared to spend if he receives certain services in return? Anyway, we assume that most people – although probably not all of them – will be prepared to spend on healthcare issues which are of particular relevance to them.

What gives you reason for hope?

Demand for, and interest in, healthcare services among the general public is increasing, worldwide. The question is whether we can service this demand within healthcare systems. Do we have the relevant products? My answer is yes! Moreover, health also will become important from an economic point. It is already one of the most important economic factors. You could almost say that, if you want to boost the economy, you must stimulate the healthcare system - and it may not actually be the right approach to simply look at costs. It is just as important to improve quality, to make what's on offer more attractive, whilst at the same time offering services at the best possible costs. As yet, opportunities to lower costs through increases in efficiency have by no means been exhausted.

What effect does this philosophy have on individual products? What do they offer that they didn't offer before?

I've already mentioned this strategy briefly: Increasing quality, lowering costs. So, with new products, the questions we need to ask ourselves are: What can I do to diagnose illnesses earlier and

How do I obtain the specific information required for this? This is important for diagnosis, so that a clearly defined therapy can be developed that works quicker, is more efficient and therefore saves costs, apart from the fact that it will be far more convenient for patients. With regards to therapy, what we need to ask ourselves is how we can monitor the effects of therapy to make sure that, if the desired treatment effect is not achieved, we can change treatment procedures at an early stage. There is a lot of potential here, because healing can be monitored in the long term, and an individually customised monitoring programme can be initiated for risk cases. So, quality in all areas, from early detection and diagnosis, treatment and care needs to be increased through innovations.

Molecular imaging plays a decisive role here.

Yes. Currently a lot is happening in this area, for example in biomarkers. Another important subject is the question of whether biomarkers could be developed to diagnose Alzheimer's. Amyloid plaques are important here. We are currently testing an FDDNP marker that can be used in two different ways: for early detection and as a product for the pharmaceutical industry. For the latter, there are already intensive studies to establish where and how different drugs actually work. Based on the hypothesis that amyloid plaques are relevant, a researcher can then monitor whether a drug is having the desired effect with the help of these markers.

There are further starting points for molecular medicine in terms of the early detection of diseases: It will become possible to carry out a risk analysis at a very early stage in someone's life by looking at an individual's genetic structure and its effects on the development of individual diseases. This, combined with a look at someone's family history, should give us a good idea of how much a person is, for example, at risk of developing cancer. At a later stage in that life, we would then look at what type of preventive medical check-ups are to be recommended.

Yes, it is a risky area, which is why individual patients must be allowed to choose whether they want to undergo these examinations or not.

What happens when medical insurers actually order you to have these check-ups?

This would not be my approach. However, insurers may actually decide to no longer cover treatment for certain illnesses if the at-risk individuals refuse to accept preventive measures that have been proved beneficial for their individual circumstances. Or, put another way, is it right to expect the community to cover treatment if at-risk individuals refuse effective preventive procedures? However, these are issues for society. It is not up to the medical industry to determine the right way forward, although we do play an active role in these discussions. We have to achieve a consensus here, along with detailed and comprehensive information for the public.

Let's return to the medical advantages inherent in the early detection of diseases. Take cancer for example: People known to be at risk can already be screened – at low cost – with certain blood tests. We only have to look for certain proteins associated with certain types of tumours. If we find these proteins we can use the relevant imaging procedures, such as PET, to determine from where these proteins have come. If this is done during the early stage of the cancer developing, chances of a cure are the highest – which, of course, is what we're interested in! However, this must be done on a reliable scientific basis. At the moment there is still a lot of uncertainty around these issues.

Siemens has been on a bit of a 'shopping spree' recently, purchasing DPC, CTI and Bayer Diagnostics. What do 'traditional' Siemens people think about dealing with biologists, pharmacists and laboratory people?

If you look at our strategy, as I've explained, using molecular medicine as an example, it is important to have in-vitro diagnostics in your portfolio. It isn't enough just to produce body images; you also need to analyse blood and other body fluids to obtain a diagnosis. The potential for synergy here is enormous. That's why we acquired DPC and Bayer Diagnostics. These companies cover in-vitro diagnostics, which has now expanded our portfolio. We always say that it is important for our strategy to service areas of prevention, early diagnosis, diagnosis, therapy and care. Those are our fields of activity. So, from a strategic aspect, to make progress, we are looking at what we must do with this chain, this continuum of care.

Now we are no longer limited to the product side, but also cover the chemical side - and we are definitely on new ground here, although we made a first step on to that ground when we acquired CTI last year. When you run PET systems, the contrast media and biomarkers are of great interest – and CTI has a biomarker development project that looks into the diagnosis of various diseases, such as Alzheimer's, which is also a chemical issue. So, again we have synergies here. However, this is still new ground for us, which certainly needs to be handled with care and attention. Our involvement in molecular medicine is exciting, because we are linking processes that others have not yet connected. We are very optimistic in this.

It must be exciting to draw together these very different cultures and encourage chemists, biologists, engineers, MRI and CT specialists to exchange ideas.

Yes. But we have already had a little practice, and have discovered there are interesting ways of bringing together two different worlds with the same objective. There is definitely a lot of interest and curiosity on both sides.

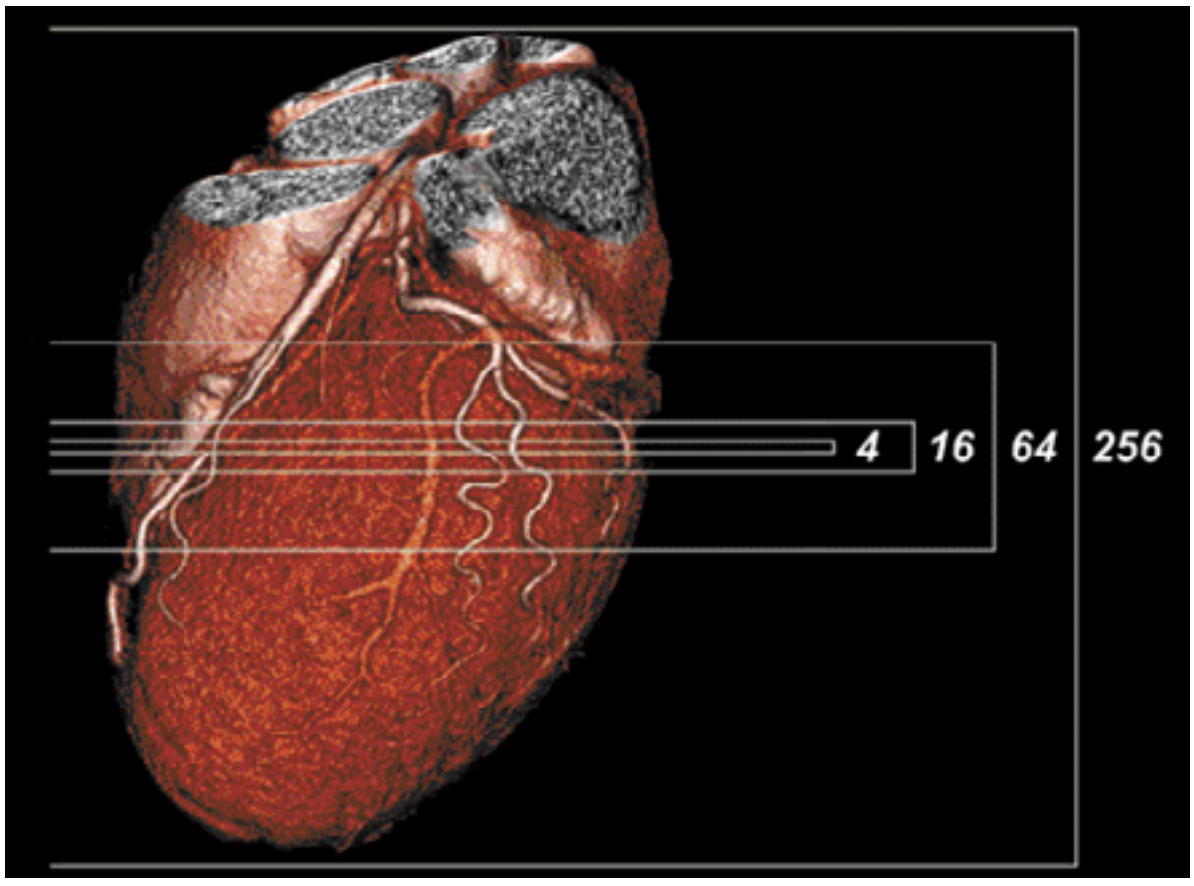
How do you view developments in CT and MR-PET?

From my point of view, the biggest potential lies in computer-assisted diagnostic procedures linked to evaluation programmes that view images and screen them for - and point towards - suspicious areas. This knowledge-driven medicine will play an important role. We have been investing in this for a few years, because we want to support radiologists and enable them to view and read images as quickly and efficiently as possible. Computer-assisted evaluation programmes can compare images, develop correlations and to use databases to achieve objective results. Generally speaking, this means that information and knowledge processing is becoming more important, and research in this area will intensify.

Regarding MR-PET: What I can say is that there is a lot of scientific interest in this project. We know how the technology works and are currently building prototypes. We are doing the right thing with this, and are confident that our work will soon bear fruit.

Toshiba's 256-row CT

Improved diagnostic possibilities and reduced radiation exposure




Patrik Rogalla

With Toshiba's 256-row CT scanner, Multi-Slice Computed Tomography (MSCT) will make a quantum leap. Consequently, expectations were high when the new CT premiered during "New Horizons" on 18-21 October. And the expectations were more than met. In his presentation, **Dr Patrik Rogalla,** radiologist at the Charité Berlin, impressively demonstrated the diagnostic potential of the new 256-row CT scanner.

The 256-MSCT prototype system features a 128 mm broad detector, which translates into a major benefit, because of its wide field of anatomical coverage. In cardiac diagnostics, the entire heart can be scanned in just one single rotation. "Traditional" CT scanners require a helical scan, with multiple rotations, in order to cover the entire heart. This procedure will be no longer necessary with a 256-MSCT scanner. 'The crucial aspect of this new technology is the fact that radiation exposure is considerably reduced. A single rotation cardiac scan with a 256-MSCT requires a dose of just 1 to 2 mSv, compared to 10 –20 mSv in Helical CT scanners,' Dr Rogalla explains. Supposing rotation time of 400 ms, the temporal resolution can be between 200 ms to 67 msec, by just adding 1 or 2 rotations, therefore leaving the dose considerably below a traditional MSCT. Even with erratic heart rates the 256–MSCT can provide a precise diagnostic accuracy in visualising the right and left coronary arterial system.

Dr Rogalla is not only impressed by the enhanced cardiac functionalities, he also expects entirely new possibilities to image organs: 'Up to now, whole-organ imaging has been very limited. With this new technology we hope to be able to visualise not only morphology but also perfusion and maybe also organ function. The combination of morphology, 3D and perfusion imaging has an immense potential, for example we could detect the effects of pathological changes or ventilation.'

In the future, CT may assume a more important role in functional diagnostics, currently the domain of MRI. These two procedures, says Dr Rogalla, have in the past positively influenced each other. And, just like experience gained with CT, are being applied to MRI diagnostics, the new CT technology may well profit from MRI knowledge.

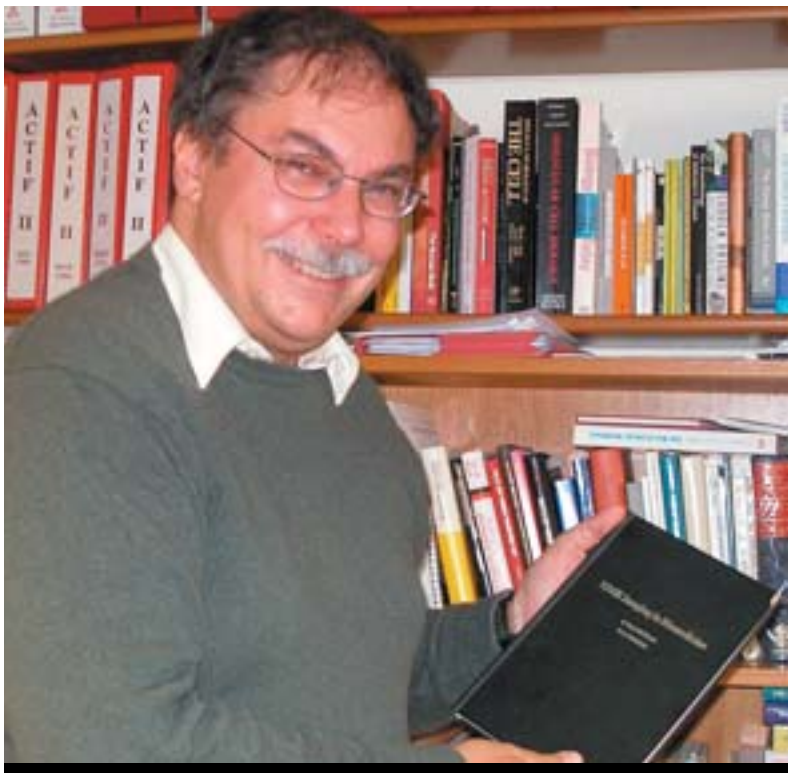
The diagnostic advantages of the 256-row scanner are obvious – even though the real potential of this new technology is not yet known, much less exploited. It goes without saying that all procedures that can be performed with a 64-row scanner may also be performed with the new 256-row scanner. The new system provides identical image quality and identical results with regard to high and low contrast.

'Sensible approach'

New technologies are not always welcomed enthusiastically – particularly not by office-based radiologists. European Hospital asked Dr Patrik Rogalla – CT specialist and daily CT user in a university environment – about the future prospects of the new 256-row technology.

Patrik Rogalla: 'Many physicians are reluctant to take up path-breaking technologies, above all because they require additional training, protocols change and costs increase. As a radiologist, I fully understand this reservation, as many an innovation is being touted as revolutionary and in the end it can't deliver on its promise as it is conceptually flawed. In medical science, real innovations happen about every five years.

As far as the 256-row scanner is concerned, there is a cautious and therefore sensible approach: Initially, one can work with the 256-row scanner just like with any previous equipment – and achieve the same high-quality results. That is extremely important in radiological practice. But this new technology holds immense potential and some of the enhancements and advantages are already visible (see article). We are curious what the future will bring!'



Peter Morris with the book he co-authored with Peter Mansfield: 'NMR Imaging in Biomedicine'

PHOTO: B. MARSH

7-TESLA

Mastering the 'uncontrollable beast'

By **Brenda Marsh**, Editor, European Hospital

The *Sir Peter Mansfield Magnetic Resonance Centre* crowns a slope at the top of the University of Nottingham campus – a fitting position, for it was here, over 30 years ago, that Sir Peter Mansfield, Emeritus Professor of Physics, pioneered his work on MRI, which led to the development of the first MRI scanner, revolutionised diagnoses, and resulted in a Nobel Prize, shared with Paul C Lauterbur (Univ. of Illinois, USA) in 2003.

Today, the centre is still the vanguard of MRI research. It was also the first to install the then most powerful magnet - the 7-Tesla - that is so strong, it needs to be contained within 230 tonnes of iron cladding, to protect people from its field.

Might it present any physical dangers, I asked **Professor Peter Morris**, head of the research centre. 'There is no effect - that's my message. If people move through the magnetic field quickly, some may lose balance, or feel nauseous, particularly if moving from 2-T to 5-T across the face, so they're moved into the scanner very slowly. Once in the middle, the field is uniform and they're fine! Each time the field goes up the same story emerges, but people don't worry about it.' Currently, the platform is manually driven; in the future it will be motor-driven - slowly.

Could 7-Ts enter our hospitals? 'Far from being the uncontrollable beast, the 7-T works as it's delivered – producing really great images, and different ones from those obtained at lower Ts, so what it's giving is new. At first we expected to do as much as five year's work to get decent images but, from day one, our scientists were surprised at the images.' However, there is much to be done - and hurdles to jump.

Of the centre's c. 50 employees, 17 work on Tesla research, under Prof. Morris's guidance. 'We are not on our own,' he says. 'It's a very good team.' About eight Philips researchers - some in Cleveland, Ohio, where the 7-Ts are built - give back-up. During teleconferences once or twice monthly, they work through any problems together, and assess achievements, decide next steps, and discuss timelines for more installations.

As for cost, when quoting someone's formula: *the system's around a million dollars per tesla!* Prof. Morris smiles. That's not just for the magnet, he reminds me. This beast needs *big* housing.

In terms of research, although this is a full-body system, and the team's keener desires might lie in capturing functional activities, as for most research centres with a 7-T, work focuses on static areas such as the brain. Currently they are developing a head-only coil because, to get a better image, it's more efficient to match the coil to the size of the region being examined.

For multiple sclerosis, there is rather poor correlation between the extent of the disease lesions seen in scans and the clinical symptoms. 'We know that quite a lot of these lesions have been missed, and hope the sort of contrast we can get at certain fields may actually reveal these,' Prof. Morris explains. The 7-T brain images have a resolution of .6 of a millimetre, so each image element is .6 x .6 x .6 deep, providing very high resolution. 'MS patients typically have lesions in the white matter, but there are probably some in the grey areas surrounding it, and want enough resolution to see what's happening in the outer cortex. Every region of the brain is covered, in .6mm tubes, so we can pick out any of it we want. We are very very pleased with the kinds of contrast we can get - and we get a little bit of functional work.'

Viewing the centre's images is like exploring deep, mysterious valleys on another planet. A scan, on the sagittal plane, reveals the base of the brain and visual cortex. 'You can actually see some of the fibres in the little fibre bundles leading from the functional areas, and that's just on a regular sequence,' he says. 'The higher field is being perturbed by those fibres in such a way that it makes them visible. You can't see these at lower fields.'

Of another image he says: 'You see grey matter structures that normally you cannot tell apart, but in this lower brain area are different shades of grey; we think it's because you get selective stimulation of iron in those structures. So iron is going to change electrodes and properties and will do it more the higher the field strength. Of course you don't know it's iron, but post mortem studies that indicate these structures accumulate it – in some diseases more so.'

Although none of the images are enhanced, in another scan red nuclei are seen as clear dots, dark due to iron content. They are where damage occurs in Parkinson's disease – one of the neuro-degenerative diseases, including Alzheimer's, that obsess most researchers. At Nottingham, the first Alzheimer's subjects are being investigated.

Images also have been gained through regions of lower and lower intensity; in these the distribution of the veins can be seen.

In another area of research using the head coil, and contrast agent, a hand has been imaged. Turning slowly, the arteries have great 3-D clarity. 'That's probably the highest resolution angiogram that anyone can ever get - doing it at 7-T allows this!' he says. In angiography, it's difficult to get at very small vessels, so until they can, they're always going to use X-ray with contrast medium. This shows we can get the small vessels.'

Other interesting work, using intermittent finger tapping to image brain activity and signals during tasks, imaged in all three scanners - 1.5-T, 3-T and 7-T, proves that 7-T is at least twice as capable of showing the changes than 3-T, and as this might increase to 10%, activity might be realised in real terms.

The challenges

Among problems the team would like to eradicate, is the noise as the coil rotates; but basically, the professor points out, there are two main problems: One, that the static field is particularly bad at tissue interfaces; it is present at lower field, but worse at higher field. However, solutions that work for low field could be applied to high field. A lot of development work has gone into find out which frequencies work and exactly how to treat them, he said: 'It has been done thoroughly well at 1.5-T, reasonably well at 3-T, but not achieved at 7-T,' he says. 'We have three Philips systems that are pretty much a common platform, so we can actually take frequencies developed in 1.5-T and 3-T and transfer that to 7-T, very quickly. But then, due to changes in fields, they will run in certain different ways, so all need adjustment. The frequencies will come from what we've already used at 3-T, and will only need to be modified.'

For this, the centre can fall back on its heritage of building its own MRI equipment. It also utilises its experience in adapting Philips software to specific needs. (Students and researchers alike can have hands-on opportunities back to the earliest scanner at the clinic, with its stacks of hardware and buttons far exceeding today's more automated models, which provides a fuller range of understanding – and that can lead to their later employment in commercial organisations, such as Philips).

Dealing with the problems and getting the best out of the system leads Prof. Morris to foresee the programme running up to five years. However, he concludes: 'The initial signs are extremely good; it has very nice potential and I can see probably a rather larger market for these than perhaps the companies initially thought. I think the problems will be resolved, and the functioning side will truly benefit, so specialist centres will go to 7-T; certainly a lot of clinical research will be done on it. But I doubt we'll reach a point that you should put 7-Ts in your local hospital - but in the 1990s people doubted that 3-Ts would ever go that way, and now that's happening. It will probably take the best part of a decade for that to happen with 7-T. But, research-wise it's clearly going to be a winner.'

** Nottingham's 7-Tesla was purchased through a gift scheme, mainly funded by the Wellcome Trust, together with the Higher Education Funding Council for England. Philips supplied the 7-Tesla. The UK's Medical Research Council mainly supports the running costs, with some funding, for equipment, from the Engineering and Physical Sciences Research Council (EPSRC)*

Peter Morris points out a tribute to Peter Mansfield in the MR centre's reception hall, to Brenda Marsh. In 1997, after gaining his doctorate at Nottingham University, Prof. Morris became heavily involved, with Dr Ian Pykett, in the installation of the centre's first 0.1-T electro-magnet, and subsequent RF and gradient coil designs. When Sir Peter Mansfield entered the scanner – as MRI's first human guinea pig - it was they who 'pushed the button' to start up the system

BOOK REVIEW

Professor Stephen Eustace, of the Institute of Radiological Sciences, Mater Misericordiae Hospital & University College Dublin, reviews a new book on MRI, compiled by **Mathias Goyen**, who also recently received the KlinikAward 2006 in the 'Manager of the year' category

When Lauterbur and Damadian originally described clinical MRI they believed it would become the ultimate whole body imaging tool. Limited by excessive time to acquire such images and associated impact on image resolution, it evolved as a technique to image individual body parts. The development of fast tissue excitation pulse sequences fostered by Hennig, paralleled by the development of fast flexible localising gradients, has lead to renewed interest in its potential use to image the entire body. Although many clinicians and researchers in both North America and Europe have embraced and shaped its development, many recent cutting-edge developments in this field have been driven by researchers in Germany. Therefore, it is appropriate that this book, dedicated to whole body MRI, should be compiled by Mathias Goyen, supported by contributions from a number of co-authors representing many of the major academic centres in Germany.

The book provides an excellent contemporary overview of the field of whole body MRI. It is clearly laid out, well written, illustrated and referenced.

The first two chapters review the technical requirements for successful image acquisition. These are followed by a series of chapters reviewing clinical applications, oncological and non-oncological, including its use as an alternative to scintigraphy in the detection of skeletal metastases, as an alternative to PET CT, and its use in assessing body composition, the vascular tree and, finally, as an alternative to autopsy. The book is completed by reviewing the more contentious role of whole body MR imaging as a method of screening for disease; these chapters are both interesting and provocative.

It provides a practical and complete overview of this exciting new technology and is likely to prompt further research and development in the field, ultimately leading to improved patient diagnosis, care and outcome. I strongly recommend this book to radiologists, particularly those with an interest in clinical MRI, practising in both academic and clinical regional centres.

** Mathias Goyen (Ed.): Real Whole-Body MRI First Edition (July 2006). ABW Wissenschaftsverlag Berlin. 206 pages, 181 illustrations (25 colour). Language: English. ISBN: 3936072493. Euros: 49.95.*

Mechanical cardiac assist devices have become smaller, lighter and safer and therefore their acceptance amongst surgeons and patients has increased. They support organ recovery and bridge the gap while awaiting a heart transplant or, and this is new, remain in the body as a permanent heart support. Blood-saving technologies have made this possible. Now, a new generation of these devices has produced high expectations among manufacturers and their investors, surgeons and their patients. **Holger Zorn** reports

The pulseless life

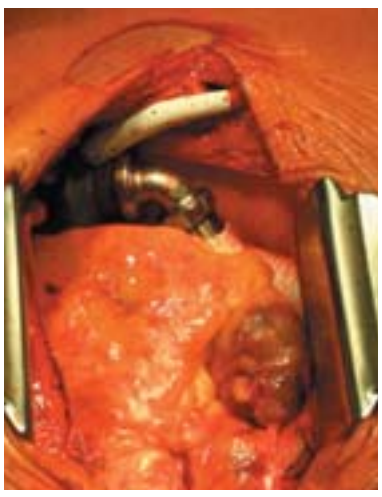
Due to their size, pulsatile heart pumps (ventricular assist devices - VAD) normally must remain outside the body. Tubes the thickness of a thumb transport blood from the heart through the diaphragm, the abdomen and abdominal wall into the artificial pumping chambers - powered by vacuum and compressed air - then back to the lung artery or the aorta. Such paracorporeal systems can support the left, right or even both ventricles. However, life with these systems is not particularly comfortable: Four tubes guided through the abdominal wall mean four entry ports for pathogens; moreover, the compressor and many batteries must be carried along always. Although individual patients have been supported in this way for over three years, and longer, the use is generally limited to a few weeks or a few months – until such a time when a suitable donor heart can be implanted (bridge to transplant - BTT).

However, over the last few years, the number of donor hearts, at least in Europe, has been on a continuous decrease. The Eurotransplant International Foundation, responsible for the mediation and allocation of organ donation procedures in Austria, Belgium, Germany, Luxembourg, The Netherlands, Slovenia and (as a candidate) Croatia, reports a mere 530 heart transplants in 2005; another 864 patients are on the waiting list, 720 of these in Germany. 352 hearts were transplanted between January to August this year - six less than in the same 2005 period. This continuous gap between requirements and availability of donor hearts (see fig. 1), has significantly promoted the development of implantable, mechanical blood pumps.

Real artificial hearts (TAH), which are implanted into the chest cavity, are comparatively rare. First, they also require external power; second, implantation is surgically considerably more complicated; third, a heart that has been supported by a VAD for a period of time can sometimes recover to such an extent that the device can be removed again – obviously not possible with a total heart replacement.

This hope for organ recovery (bridge to recovery - BTR) has increased the acceptance of mechanical heart pumps and promoted the development of smaller, lighter and long-term stable systems. They no longer utilise the principle of displaced volume but that of the Archimedean screw, i.e. they continuously pump blood from ventricle to artery – blood pressure can no longer be measured in the conventional way. One of the pioneers of mechanical heart support use, cardiac surgeon Ernst Wolner, in Vienna, calls this the 'pulseless life'. Such axial pumps are installed in the chest cavity; only a controller cable is guided through the abdominal wall to the outside and connected with the controller and batteries. They have been designed to assist the left heart ventricle (left ventricular assist device - LVAD); this should be left with a certain amount of its own functionality – at least 10%. The right heart works by itself. Contained in a pod in the blood stream, the propellers are practically free from wear, pump between 3-9 litres of blood per minute, at between 8,000-18,000 rotations and do not require more anticoagulation than an artificial heart valve.

This operational performance has



encouraged engineers and convinced investors to develop a new generation of LVADs: Centrifugal pumps that work without any mechanical bearings and are powered by a magnetic field. The centrifuges pump the same amount of blood with a significantly reduced rotational speed and better adapt to differing requirements of the organ – e.g. high physical pressure during sport. There is less pressure on the material, the pumps – it is expected – will remain in a patient for longer and an alternative to heart transplantation is within sight: a so-called 'destination therapy' (DT) that should be more appropriately called 'lifetime therapy'.

At the 14th Congress of the International Society for Rotary Blood Pumps (ISRBP) held in Leuven, Belgium (31/8 to 2/9), six centrifugal pumps were introduced (fig. 2) to facilitate this lifetime therapy. Although all are ready for use, they vary in their developmental stages; this ranges from two (Rotary VAD) and three (EvaHeart) to 65 (VentrAssist) clinical uses. The most advanced, the Ventracor system (pic. 1) is expected to receive its CE mark at the beginning of 2007 – the commencement of its marketing in Europe. During the licensing study (BTT) 30 patients, aged 10-66 years, were involved. 25 patients (83.4%) lasted to the end point of the study (defined as transplant or 154 days supported by the system and still suitable to receive a transplant), four died, one recovered to such an extent that the system could be removed again. The median time of support was 167 days. There were five reported strokes or 0.36 events per patients year. In all 65 patients the accumulated patient experience was 33.3 years; the longest support period: 977 days.

For comparison: Novacor LVAS by WorldHeart, the pulsatile left heart support system was first successfully implanted in 1984 and, to date, has supported more than 1,700 patients. Jack Fawbush of Whitesburg, Tennessee, USA, has lived with the system since July 2001, i.e. over five years. From his 67th year, Peter Houghton of Oxford, UK, has lived with the support of the Jarvik 2000 (Jarvik Heart Inc. New York, NY, USA) for six years, and he has devoted the extra years of life, made possible by the support of this system, to promoting the use of, and information about artificial heart pumps. Encouraging stories, which lead us to hope for more: more patients with more life. Ventracor wants to prove this: 'We recognize wide market acceptance needs more than regulatory approval, so have started the Baseline Results and Cost Effectiveness (BRACE) Study in Europe,' said CEO Peter Crosby during the European Cardiac Surgery Congress, held in Stockholm this September. The study is clearly aimed at patient success – and therefore very simple: Is the patient still alive after two years and if so with what quality of life and what treatment costs?

It will be hard to show this as the bar has been raised. Dr Martin Strüber, cardiac surgeon at the Medical University Hanover, Germany, pointed out: 'There are enough good assist devices for bridge-to-transplant, but what we need is a good device for destination therapy.' He added that progress in pharmacotherapy or biventricular pacing only increase quality of life for limited periods of time, but overall they increase the waiting list for donor hearts – or an LVAD. In Leuven, Dr Strüber presented data on HeartMate II (Thoratec Corp., Pleasanton, CA, USA), a VAD (pic. 2) first implanted on 20 November 2003 at the Texas Heart Institute by Dr Frazier. The pilot study involved 46 patients (22 from Europe; 24 the USA) aged between 14 and 69 years. The longest support period was 863 days; the median 256 days. 16 patients were supported for over a year, ten for over 1.5 years and four patients for over two years. Three strokes and three transient ischaemic attacks (TIA) were observed – an equivalent of 0.11 events per patients year. The CE mark was awarded in November 2005 and, since then, over 470 systems have been implanted (100 in Europe). 'On average we carry out at least one implantation a day,' said Martin Muller, hospital co-ordinator at Thoratec.

Whereas a similar system, manufactured by a German company, has so far only achieved good results when handled by renowned specialists – and axial pumps manufactured by other firms only lead a niche existence – the HeartMate II can be considered a benchmark. All new technologies, all new equipment will have to prove their results are at least as good. That all six manufacturers will survive in this market is unlikely. Just two or three might. This field, particularly in Europe with its ageing population, is on the brink of a breakthrough: If current results can be reproduced, patients with mechanical heart support systems will no longer be considered exotic in a few years time. Soon the whole spectrum of products will be available: The Lifebridge (see European Hospital 3/2005) can be used for several hours for the safe transport of patients in cardiogenic shock. A severely damaged heart that still has sufficient tactile tissue can re relieved with micro-axial pumps of the type Impella (Impella CardioSystems GmbH, Aachen, Germany) for 10 days, or with the centrifugal pump Centrimag (Levitronix AG, Zurich, Switzerland) for 14 days, to an extent that it will either recover or can then be fitted with a long time assist device. This short-term therapy actually could be considered clin-

ically established. For example, Impella pumps have been used in 17 European countries and 140 hospitals 745 times (154 in Italy) since their inaugural implantation on 30 March 1999. This development is fascinating for many: The Cleveland Clinic (Cleveland, Ohio, USA) is currently developing a pump with magnetic bearings for use in paediatrics. Turkish researchers at Yeditepe University, Istanbul, have introduced the prototype of the micro axial pump 'Heart Turcica-1'. CircuLite Inc. (Hackensack, NJ, USA, and Aachen, Germany) has introduced a product of the same name (pic. 3) that can be implanted without the use of a heart lung machine. Inserted into the chest cavity via a small cut between two ribs, it is connected via the superior vena cava trans-septally to the left atrium (inflow side) and to the arteria subclavia (outflow side) and then pumps 2-3 litres per minute. The development's objective is to get the patients earlier and less sick – and finally to achieve catheter-supported implantation by interventional cardiologists, to weaken their scepticism about all forms of mechanical heart support and to send more patients to cardiac surgeons – patients who are currently still kept from them.

OPHTHALMOLOGY

SURGICAL SIMULATORS

Czech Republic – Two unique ophthalmic simulators are in use at the Motol Faculty Hospital, Prague. *PixEyes*, manufactured by the French firm SimEdge, provides tools and software; *Eyesi* - an ophthalmo-surgical simulator developed by Dr Marcus Schill, of Manheim, Germany – provides intra-ocular surgery training.

The simulators cost about five million CZK, and Motol is the only healthcare institution in Central and Eastern Europe (CEE) to have them. 'Both devices, aimed at further ophthalmologic education of our specialists, have been temporarily leased by the hospital for two years. Financing comes wholly through an EU programme,' explained hospital spokesperson Eva Jurinova. 'The computer system is open, offering the prospect of adding one's own patient cases and examples of diagnoses and treatments into the system.'

PixEyes is primarily designed for the correct treatment of retinal disorders; Eyesi provides different features on how to perform 'lege artis' surgical procedures on both the retina and vitreous body.

Dr Odehnal, head of the ophthalmology clinic, added: 'This is a kind of small revolution, because we've never had anything similar here before. Until now, our students had to attend theoretical sessions, see video-projections, and then perform the practical part of the operations on pigs' eyes. Now they can experience the full scope of surgery on a PC, as it was in a real world.'

Both devices are controlled by advanced computer technology that records and assesses all the moves and decisions made by a student when performing surgery on a virtual eye. The courses run in two-week cycles; 20 students have already passed the exams.

Source: Czech Press

Escalating to 1080 high definition

THE SONY PROFESSIONAL DISC RECORDER

Sony has launched the first medical recording device – the Professional Disc-based High Definition (PDW-70MD), which enables the capture of surgical procedures in 1080 high definition (HD). The company reports that this represents the highest quality image possible - far superior to the 525-625 lines offered by standard definition devices.

The equipment enables the acquisition, display and archiving of vibrant video images filmed during operations. The Sony software also allows a patient's record, treatment team details, procedural information and on-the-day notes to be recorded alongside the video images.

As well as proving a valuable device for doctors, the system provides a valuable surgical teaching tool. With its support for HD images, large audiences can view the surgical intricacies as if they were happening live.

The PDW-70MD uses industry-standard MPEG-2 video compression. The recorder can store up to two hours of HD video on a single Professional Disc. Similar to the conventional consumer Blu-ray format, it has been adapted for professional use and delivers faster read/write speed, a robust polycarbonate casing for shock and dust protection and neutral formatting for increased flexibility.

PUBLIC SMOKING BAN: 11% drop in AMI admissions

Italy - Researchers at Turin University have found that hospital admissions for acute heart attack, in people under 60, fell by 11% in the Piedmont region of Italy in the five months following the introduction of a smoking ban in indoor public places, compared with admissions for the same period in the previous year. In addition, they concluded that almost all of this reduction was probably due to reductions in passive smoking.

Their results were published in an online edition of the European Heart Journal (*Short-term effects of Italian smoking regulation on rates of hospital admission for acute myocardial infarction*. EHJ. doi:10.1093/eurheartj/ehl201). An accompanying editorial (Public smoking ban: Europe on the move. European Heart Journal. doi:10.1093/eurheartj/ehl266) said the research adds more evidence to studies supporting the effectiveness of smoking regulations. 'The argument of the "victimless crime" clearly and finally has to leave the discussion based on accumulating data, including this new research,' said editorial co-author Dr Peter Radke, consultant cardiologist at the Department of Cardiology and Angiology, Schleswig-Holstein University Hospital, Lübeck, Germany.

The Italian Government banned smoking in all indoor public places on 10 January 2005. The researchers, led by researcher Dr Francesco Barone-Adesi, of the Cancer Epidemiology Unit at Turin University, analysed all hospital admissions with discharge diagnoses of acute myocardial infarction (AMI), and AMI deaths, between January 2001 and June 2005, for residents throughout the region of Piedmont (population 4.3 million). From February 2005 to June 2005, they found a significant drop in AMI admissions of both men and women under 60 (832 cases compared with 922 for the same months in the previous year). In addition, rates of AMI had been increasing between 2001-2004, leading them to conclude that the reduction seen in the first half of 2005 was not attributable to long-term trends. 'In fact,' said Dr Barone-Adese, as there was evidence that AMI was increasing over time, it's possible that our estimate of an 11% decrease after the introduction of the ban is even an underestimate.'

Active and passive smoking contributed to the fall, he said, but only around 1% was likely to be due to active smoking – a conclusion reached after studying the effects of the ban on active smokers' habits. The observed reduction in active smoking accounted for just a 0.7% decrease in admissions, and about a 10% decrease was due to the sharp reduction of exposure to passive smoking, he pointed out.

The decrease in admissions was confined to under 60s. Dr Barone-Adesi said several studies had found that the relative risk and attributable risk of AMI for smoking decreases with age. Although the reason is still debated, possibly other risk factors become more important with aging. Also, younger people usually spend more time in public places exposed to smoke, so a different effect was not unexpected.

Smoking, he explained, acts on the aggregation of platelets in blood and is most likely to acutely increase the risk of AMI, which '… might explain the 11% decrease in the first five months after the ban began. It suggests that smoking regulations may have important short-term effects on health. The long-term effects on respiratory and cardiovascular diseases and cancer will have to be evaluated over the years to come.'

Professor Heribert Schunkert, Director of the Department of Cardiology and Angiology, Schleswig-Holstein University Hospital, and co-author of the editorial, said that the researchers had produced further evidence from national registries and surveys – an 8.9% fall in cigarette sales, 7.6% reduction in cigarette consumption and a more than 90% reduction in nicotine vapour phase concentration in pubs and discos - suggesting that Italy's smoking ban did reduce overall smoking.

The Yale-method for hip replacements

NEW TWO-STEP PROCEDURE RELIEVES PAIN AND RESTORES MOBILITY SOONER

About 1,600,000 artificial hips are implanted every year, in Germany alone.

On average, after their hip replacement patients cannot walk without crutches before three and a half weeks. Then almost every other patient begins a rehabilitation programme. Mobility, however, could still remain limited because not all implants heal without problems. By 12 years after surgery 95 out of 100 hip implants will have loosened, resulting in another implant – about 25% of all hip endoprosthesis implants are now second implantations - all at considerable financial cost. Clearly it is important to choose the right type of surgical procedure '… to achieve maximum protection for the soft tissues and a low rate of complication,' explains Robert Kipping MD, orthopaedic and emergency surgeon at the Wolfart Clinic in Gräefelfing, near Munich.

John F. Irving MD of the Yale

University School of Medicine, New Haven, USA, explained, at a recent symposium, the advantages of a two-step method he has developed. During the procedure he makes accesses to the hip socket from the front and to the hip shaft from the posterior side of the hip, independent of which implant is to be used. Every method has its advantages and disadvantages, be they minimally invasive and/or robot-assisted, but, according to Dr Kipping, 'The Yale-method combines all the advantages'. Tendon-type structures, which are particularly sensitive and receptive to pain, do not need to be severed and muscles groups that are important for hip function need not be detached from the bone. Moreover, the surgeon works with a direct view and, unlike in some other surgical procedures, is not dependent on the X-ray machine screen and an image transformer.

Statistics appear to confirm the advantages of this new method: The patients can put pressure on the hip joint immediately after surgery and only need crutches for a few days. They do not suffer pain in the upper thigh muscles; most patients can climb stairs unaided just three days after surgery and the pelvis is stabilised within two days. Patients operated on with the previously common, minimally invasive procedures, where one lateral cut is made, were dependent on crutches for 4-6 weeks and the pelvis only stabilised after six weeks. A quarter of those patients still have problems.

As the results achieved in over 600 patients have been consistently successful, for some patients Professor Irving even replaces two hip joints simultaneously in one surgical procedure.

Report: Anja Behringer

FRACTURE RISK PREDICTION OSTEOPOROSIS PATIENTS

SIMPLE CLINICAL MEASUREMENTS RAISE HOPE OF TARGETED TREATMENTS FOR THOSE AT HIGHEST RISK

The future risk of osteoporotic fracture can be predicted with 75% accuracy using a new mathematical formula, according to research published in the October issue of Radiology (RSNA.org). Using the formula physicians to tailor treatment plans for women who have different levels of bone mineral density throughout their bodies e.g. HRT, non-hormonal medicines, vitamin D and calcium supplements, and additional therapies such as calcitriol - an active form of vitamin D).

The study's lead author, Dr Margaret Joy Henry statistician in the Department of Clinical and Biomedical Sciences Department, University of Melbourne, Australia, points out that about 45% of women have different levels of bone mineral density between hip and spine, which causes uncertainty as to how physicians should assess their future fracture risk. She adds that two years after the initial measurements of women with osteoporosis were taken, the equation successfully predicted 75% of the fractures that occurred.

The equation developed by the Melbourne team considers not only bone mineral density, but also various other risk factors. A patient's likelihood of falling, low bone mass, excess or low body weight and additional factors are combined into a single formula that can indicate to a physician level of a woman's fracture risk, and treatment strategies might then be targeted.

The study involved 231 elderly women who had sustained a low-trauma fracture of the hip, spine, humerus or forearm during a two-year period, and 448 randomly selected elderly women who had not sustained a fracture during the same two-year period. Based on measurements obtained from these groups, the equation was developed, and it was then tested in a third group of randomly selected women from the community, who were to be followed for a six-year period to determine the formula's success for fracture prediction.

Along with the 75% success rate, the authors also discovered that heavier body weight seemed to increase the force applied to the skeleton during a fall. Findings of most previous studies indicated that lighter body weight led to increased risk of fracture, due to lower bone mass.

Dr. Henry and colleagues are now assessing risk factors in a large cohort of men.

Ref: Pub: Radiological Society of North America, Inc. (RSNA.org/radiologyjnl)*Fracture Risk (FRISK) Score: Geelong Osteoporosis Study*. MJ Henry BSc(Hons)PhD; J A Pasco BSc(Hons) PhD; K M Sanders M.Nutrition PhD; G C Nicholson MBBS PhD FRACP FRCP, and Mark Anthony Kotowicz MBBS FRACP.

Bone denistometers gain hip structure analysis software

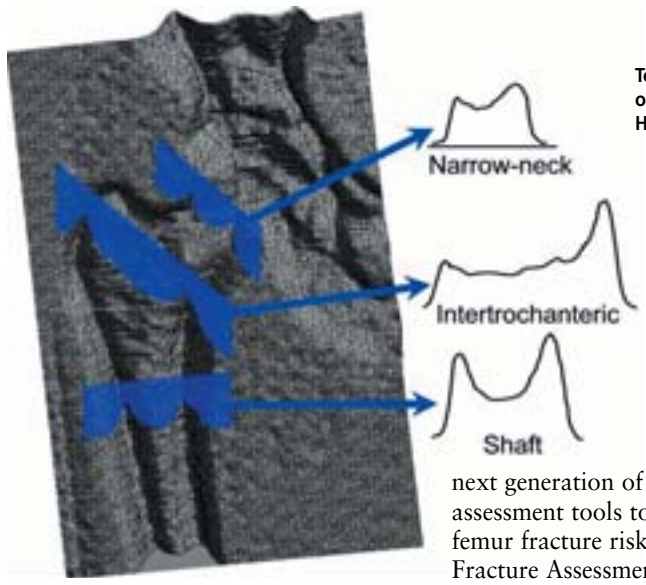

Thomas J Beck

USA – The Food and Drug Administration (FDA) recently cleared the incorporation of Hip Structure Analysis (HSA) software in Hologic dual-energy X-ray (DXA) bone densitometers.

Conventional bone density scanners examine only average bone density. HSA, a hip structure analysis method for DXA scans used in research and pharmaceutical studies, includes specialised software to examine the structural geometry of 2-D DXA scan images, which helps determine whether a patient's bones are weakened, so need treatment or, in the case of a patient already being treated, whether the bones are strengthening.

During his years of work on HSA, Thomas J Beck ScD, Associate Professor of Radiology at The Johns Hopkins University (JHU) School of Medicine, has linked with the National Space Biomedical Research Institute. Describing the value of this development, he compared the HAS/bone density combination with engineers' need to measure the safety of a bridge: they know the density of a bridge's supports significantly influences its safety, but this alone is insufficient to determine whether the bridge is safe enough to cross. The stresses of a bridge (or a bone) under a particular load are largely determined by the amount of material and its distribution within the structure. 'Hip Structure Analysis algorithms allow us to calculate both the bone mineral density as well as the structural geometry that underlies bone strength from DXA measurements,' he said. 'The use of HSA should result in more definitive measures of bone health.'

Dr Beck and colleagues in JHU's School of Medicine are widely recognised for their work in the development of biomechanical parameters of hip structure derived from densitometric information.



Topographic image of hip DXA with HSA cut planes

Hologic has exclusive use of this new JHU development. The company's software builds upon technology developed by APL, which it recently acquired. 'DXA systems have advanced well beyond bone mineral density measurements,' said Brad Herrington, Hologic Vice President of Skeletal Health Imaging. 'Clinicians have long sought the next generation of osteoporosis assessment tools to better predict femur fracture risk. Vertebral Fracture Assessment and Hip Structure Analysis have brought us into that generation.'

Initially HSA will primarily be used in bone research, during which it might help in understanding how the femur weakens with age and how pharmaceutical treatments work to reduce hip fracture risk.

HSA is a trademark of The Johns Hopkins University Applied Physics Laboratory.

Hip revision with bone grafting using inorganic bone mineral matrix

By **Dr Michael Wagner**, head physician at the Bethanien Orthopaedic Clinic, Chemnitz, Germany

The new European Transplantation Regulation makes it very difficult, or even impossible, to run a bone bank from 2007 onwards. In most revision procedures a reconstruction of bone defects is mandatory. Femoral heads harvested from sound donors during total joint replacement have been used worldwide for decades. Since this well-established procedure may be no longer applicable in the future other proven materials are necessary to fill bone defects.

From February to July 2006, at the Orthopaedic and Trauma Department, in Chemnitz, a series of 15 acetabular revisions with major bone defects was conducted, using inorganic bone mineral matrix of bovine origin.1 This mineralised bone matrix is chemically comparable with mineralised human bone. Many earlier animal experimental studies had proved the excellent osteoconductivity.

The average age of the surgical patients was 75 (56 – 84 years). No additional bone grafts where used, no structural allografts were necessary to reconstruct the bone defects in the pelvis.

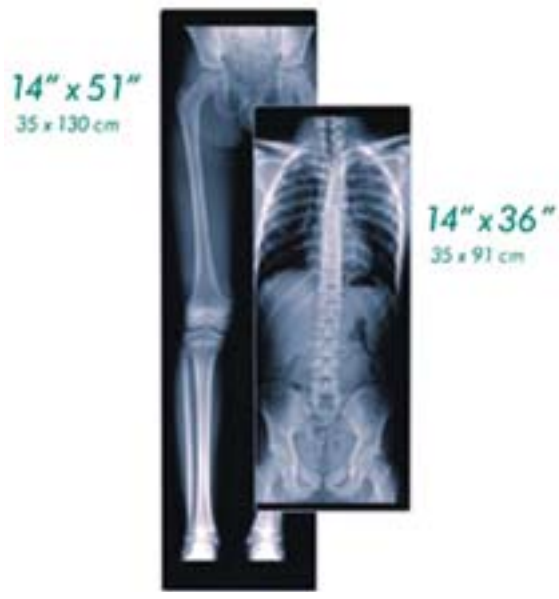
The defects were filled with bone matrix; antiprotrusio cages and acetabular reconstruction rings were used as acetabular prosthetic components.

The postoperative course was uneventful in all 15 cases. No revision was necessary, no infection occurred. In the short-term follow-up, the clinical and radiological examinations showed no changes; there was no resorption of the commercially available bone graft. No implant migration could be defected.

The inorganic bone mineral matrix, of bovine origin, seems to be a good substitute for human bone in total hip revision surgery. It is suitable to fill even major defects, but it is no substitute for structural allografts. The short-term results, in mainly cavitary defects, are promising; the use of this material does not need any difficult preparation because it can be stored on the shelf without needing refrigeration.

1 Orthoss manufacturer: Geistlich Pharma AG, Bahnhofstrasse 40, CH-6110 Wolhusen

Exclusive dry long film for digital CR/DR



XL, an exclusive, dry, long film for use in the *Horizon XL printer* - currently the only digital long film imager on the market – promises to not only to reduce costs, save space, and completely eliminate wet film processing needs, but also to enhance orthopaedic studies of paediatric and adult spines, scoliosis and long bone hip-to-ankle.

Launched by Codonics, the Ohio-based manufacturer of dry diagnostic medical imagers, the long film comes in two sizes: 14"x36" and 14"x51", enabling 'true size' images to be printed on one continuous film (and to be folded to 14"x17").

'The XL offers true-size imaging up to 51" in length, so that an X-ray is exactly what is printed on a single piece of film, ensuring a surgeon's measurements during templating. Yet, Horizon takes up just two feet of counter space and weighs only 66 pounds (29.94 kilograms),' the manufacturer explained. 'Traditional, wet long film capabilities are completely eliminated as the market transitions from analogue to digital,' said Hank Adams MD. 'Codonics provides the only means of printing long film in the digital age of CR/DR.'

Horizon's multiple media printing capabilities bring alternative solutions to printing not only long film, but also large format film and several other film sizes, as well as edge-to-edge colour paper and greyscale paper. 'It's the perfect imaging solution, using Codonics film for true-size, DirectVista Paper for surgical planning, referral copy and patient medical files and for its colour capability for arthroscopy applications plus 3D colour CT,' the firm added.

The XL received FDA approval in March. It is currently in 'Beta testing' at the Mayo Clinic and HSS Hospital, New York.

Fear for the quality of acute care for the injured and victims of accidents was expressed by **Professor Vilmos Vécsei**, traumatology and sports traumatology specialist and Head of the University Clinic for Trauma Surgery in Vienna (VV), as well as President and General Secretary of the European Trauma Society (ETS), and **Professor Otmar Trentz**, Director of the Trauma Surgery Clinic at University Hospital Zurich, and co-Congress President of the 1st joint EATES/ETS congress (see box).

As an umbrella organisation of 10 international associations for trauma surgeons, the ETS works as an interface for the 10 central European countries that acknowledge the specialist medical field of trauma surgery (Austria, The Netherlands, Belgium, Switzerland, Hungary, Slovenia, Slovakia, the Czech Republic, Croatia and Germany). The ETS expresses much criticism regarding the merger between orthopaedics and trauma surgery in Germany. 'At the moment it wouldn't be wrong to state that the German-speaking countries are still at the forefront in the area of care for accident and trauma victims. We can't really foresee what the merging of training for orthopaedics and trauma surgery will bring. However, we think that there will be a negative impact on the quality in both individual areas as the medical field as a whole expands. Orthopaedics and trauma surgery are like two different pairs of shoes – and how are we supposed to teach two different medical specialities in the same time frame that people used to have to learn just one,' said Prof. Trentz. 'The idea behind it is simple: Merging two departments means lower costs and fewer doctors to run that new department. But what has been overlooked is that this will make the number of patients decrease, so the need for doctors is still the same.'

In the past, the problem with trauma surgery was that there weren't actually as many acute traumas to treat as there were departments for trauma surgery, so trauma surgeons increasingly ended up treating orthopaedic cases. This has resulted in the wrong perception - that orthopaedics and trauma surgery are one and the same thing. In some areas, such as surgery for sports trauma and geriatric trauma, it actually makes sense to treat patients with a joint approach, but this does not apply to the treatment of severe, acute injuries. This is where we need the trauma surgeon's specialist skills and knowledge, and there will not be enough time spent teaching these skills in the new type of combined training.'

THE TRAUMA SURGEON IS A DECATHLETE

With about 9,000 participants, the German Orthopaedics and Emergency Surgery Congress (which incorporates the annual meetings of a professional organisation for orthopaedic consultants, as well as two German societies - one for accident surgery, the other for orthopaedics & orthopaedic surgery) has become the biggest congress of its kind in Europe, providing a platform for the international exchange in this medical field. At this year's event (2-6 October, in Berlin) doctors and scientists discussed medical and associated political issues. Among the controversial topics was the introduction of a joint medical specialist field for orthopaedics and trauma surgery in Germany, and issues surrounding how this will affect these individual disciplines.

Vilmos Vécsei

Otmar Trentz

Prof. Vécsei: 'The status of the trauma surgeon is somewhat paradoxical: He is the "specialist generalist". On the one hand, the trend in Europe is that it is just this type of specialisation that's required, because we assume this specialist knows his medical field extremely well. Over past years this has led to a specialisation of doctors around certain individual organs, including in surgery: We have shoulder surgeons, knee surgeons, hand surgeons etc. However, in the care of acute trauma patients, it is important to be able to look at the patient as a whole, so what is needed is a generalist who knows the whole body and can lead and coordinate a team of doctors. So, if you like, a trauma surgeon is a decathlete, not a 100-metre sprinter. However, even this is a type of specialisation, but not recognised as such. Instead this important area is being "de-specialised".'

'One objective for the ETS was to achieve the introduction of the term *European Trauma Surgeon*, which would imply that all European countries would have to establish this speciality, whereas it is currently voluntary. This would be an important step on a way to a harmonisation of European standards. However, to achieve such a resolution requires the agreement of ten European countries, which we don't yet have. A unified, high expectation of quality in trauma surgery is very important because, in the long term, this is also likely to lead to cost savings. A trauma case that has been badly treated and cared for could cause follow-on costs running into millions, something which we tend to overlook in all the health/politics discussions in Europe.'

Harmonising European training standards

Professor Wolfhart Puhl, President of the European Federation of Associations of Orthopaedics and Traumatology (EFORT), who welcomes the merger of orthopaedics with trauma surgery in Germany, also hopes for standardisation in training and treatment across Europe.

EFORT was founded to focus the activities of European orthopaedic surgeons and harmonise medical training standards - a bit of a 'Sisyphus' task because university degree courses and practical training in European countries vary significantly. 'Getting European countries to sing from the same hymn book initially requires information input from the individual countries,' said Professor Puhl. 'This would enable us to draw up an accurate profile of the services and tasks involved, which would satisfy everyone's wishes and needs. These are very long processes and likely to take a few years before we achieve a result. It is right that orthopaedics and trauma surgery are being merged in Germany. Of course, one has to ensure that this will be a merger of very high level. It goes without saying that German trauma surgeons deliver top quality work, and so do orthopaedic surgeons. But both individual disciplines tend to have a wrong image of one another's medical field. This problem will have to be addressed with a new type of training.

'In terms of the concern about acute care in emergencies, I think this kind of care does not have to be provided exclusively by trauma surgeons. They may not like hearing this, but actually there are a number of suitable candidates for trauma patient management. There are clinics where this work is undertaken by an anaesthetist, who is also quite capable in this work. In severe polytrauma everything is about preserving life, something that in which an anaesthetist is well trained, and he can then gauge and direct further diagnostic procedures. Once the initial acute management has been successfully completed individual specialists can then go to work.'

'Know-how is another thing. It must be said that trauma surgery training in Germany is particularly good. This is something that must not be allowed to get lost. But the key point here is the standardisation of requirements that should be harmonised across Europe. Based on a study, we know there are particular problems in training in the muscular-skeletal system. But this is a general problem and one that can be solved by standardising the parameters of medical training at university.'

'In my view we will have come a significant step closer towards our objective of harmonisation in around ten years time and the healthcare systems in the individual countries will also have become more standardised within this period of time. This means stable quality across all Europe, with standardised guidelines and indications. Cost pressures will, of course, increase continuously, another reason to try to harmonise the teaching of knowledge and to digitalise it - another objective EFORT has set itself.'

Report: Meike Lerner/*European Hospital*

DIARY

8th European Federation of Associations of Orthopaedics and Traumatology (EFORT) Congress
11–15 May. Florence, Italy Details: www.efort.org

1st Joint Congress of the European Association for Trauma and Emergency Surgery (EATES) and the European Trauma Society (ETS)
23–26 May. Graz, Austria www.eurotrauma2007.com

International Society for Orthopaedic Surgery and Traumatology (SICOT/SIROT) 5th international conference
29 August – 1 September. Marrakech, Morocco
Details: www.sicot.org

Synchronising drug and gene therapies

Cancer can be tackled with a combination of drug and genetic therapies, so that the effectiveness of individual treatments are enhanced, according to a study by Yi-Yan Yang and colleagues at the Institute of Bio-engineering and Nanotechnology in Singapore, published in the October issue of Nature Materials (http://www.nature.com/naturematerials).

Beyond the promise for a more effective cure, achieving this synergistic effect also means that the dosage of anticancer treatments could be reduced.

The authors used biodegradable nanoparticles made from a polymer that has both a water-loving side and an oil-loving side. When placed in a water solution the polymer spontaneously forms nanoparticles in which the oil-loving part hides in the core, and the water-loving part lines the outside shell. If an oil-loving drug is present in the solution, it will be incorporated in the core. By contrast, the shell can be used to bind DNA or RNA.

The researchers loaded the nanoparticles with a potent anticancer drug and therapeutic gene, injected them in mouse tumours, and observed a significantly slower growth rate in the tumour.

AUTOMATED ANALYSES

Advia LabCell Modular Automation Systems integrate clinical chemistry, immunodiagnostics, haematology, urinalysis, and other hospital and laboratory areas. The menus provide assays across virtually every area of disease management, and are supported by Bayer Diagnostics services, the manufacturer reports.

Advia LabCell is an open automation system that provides a comprehensive menu of automation and pre-analytical components as well as interfaces for recognized, high-volume analytical systems – Advia Centaur Immunoassay Systems, Advia Chemistry Systems, Advia Haematology Systems, Clinitek Atlas Automated Urine Chemistry Analyser, and Diagnostica Stago Star Coagulation Analyser – which can be added on for a customised automation solution that meets laboratories' needs, Bayer adds. 'Advia LabCell handles each sample as an individual, recognising precisely where that sample needs to go, then routing it for optimal efficiency.' In addition, the system reduces the number of steps needed to sort, process, and archive samples, shortening the time to result. 'Potential error is reduced by the minimised physical handling of samples prior to, in between, and following testing.'

The system connects seamlessly with existing IT systems, using plug-and-play to add or change instruments and components.

MOLECULAR DIAGNOSTICS

Human genetic testing centre gains international quality accreditation

IntegraGen, which develops genetic tests for complex diseases, has received accreditation, under ISO Standard 17025, to perform human genetic analyses at its German Competence Centre, in Bonn. The centre was among the first to introduce diagnostic sequencing into human genetics, according to Jorg Leenings, Head of Sales and Marketing.

Screening for genetic predisposition to complex diseases that might lead to future illness could result in more effective personalised prevention programmes and treatments, Dr Jan Mous, President and CEO of IntegraGen, points out, adding that early and accurate genetic diagnosis of chronic conditions, such as diabetes, combined with genetic counselling services can also ensure patients are fully informed about their conditions.

Genes for most monogenic hereditary forms of diabetes have been identified. IntegraGen's tests for these include MODY (maturity onset diabetes of the young); mitochondrial diabetes; neonatal diabetes, and congenital hyperinsulinism. IntegraGen also reports that it is developing a number of additional tests for other genes linked to the development of diabetes.

ISO 17025 is an international standard that assesses the technical competency of laboratories and helps to ensure accurate data generation, controlled test methods and procedures, and properly trained personnel. It covers all aspects of laboratory management, including sample preparation, analytical testing proficiency, report generation and record keeping. The IntegraGen accreditation was awarded by DAP GmbH (Deutsches Akkreditierungssystem Prüfwesen).

With 34 employees, IntegraGen has facilities in Bonn and in the French biotech park Genopole of Evry, near Paris.

Water purity for dialysis patients

UK - Dialysis patients are exposed to 50 times more mains water than well people. The new 33-bed renal dialysis ward at Southmead Hospital, Bristol, uses at least 1,000 litres of water per hour from the mains water supply. To ensure constant flow – and water purity for patients – the ward has installed a water treatment system

Describing the prerequisites in choosing a system, Rob Sims, the hospital's renal technician, said a standby capacity would be essential, in case any system failure put patients at risk, and procedures for routine maintenance and sanitisation would have to automatically and reliably operate during limited time windows. In addition, it should provide an infrastructure able to also provide water to the Day Case, Intensive Care and High Dependency Units, to meet future needs. Finally, the system would have to meet AAMI (1982), Renal Association (1995) and European Pharmacopoeia (1999) quality standards. The ELGA Process Water system was chosen.

Mains water, pre-treated to remove chloramines and hardness salts, feeds two continuously operating ELGA DWA reverse osmosis units in direct recirculation mode to remove 95-98% of all dissolved salts. Unused water recycles through a secondary ultrafiltration (UF) membrane to ensure constant purification and eliminate the need for water storage tanks, usually the main source of system contamination, the manufacturer explains. 'The water then enters an ELGA DWA NephroSafe second membrane ultrafiltration system, which completely removes 99% of all organic molecules to ensure complete quality standards compliance. The purified water is then recirculated through a 500 metre hygienic PEX-A ring main that runs in the roof space above the Day Case, Intensive Care and High Dependency units to the dialysis machines, finally returning to the inflow side of the ultrafiltration unit. Finally, a fully automatic and validated sanitisation procedure heats the circulating water in the ring main to 90∞ C and recirculates it through the ultrafiltration unit inlet for a pre-determined length of time before disposal.'

Rob Sims has reported that the total viable bacteria count (TVC) and endotoxins were undetectable during analyses of monthly water samples by an independent laboratory.

* ELGA Process Water is part of Veolia Water Solutions & Technologies (VWS), a subsidiary of Veolia Water. The group specialises in designing technological solutions and construction of facilities for water treatment, and operates in around 50 countries.

Advancing world hygiene standards

Germany - **Meiko, the Offenburg-based manufacturer of cleaning and disinfection machinery for hospitals and care homes, reports that this market '... has never been in such turmoil', due to 'TopLine', its new range of appliances launched a year ago. 'The absolute latest in bedpan washers/disinfectors is distinguished by a number of innovations which set new standards for cleaning technology and benefit staff, budgets and natural resources alike,' Meiko said. The firm's sales manager, Markus Braun explained that the appliance is '...advancing on all fronts and penetrating markets we scarcely thought about in the past. Countries in the third world are developing a completely new hygiene consciousness. In Germany we have realised that replacement is better (and more economical) than continual refurbishment.'**

Currently, TopLine are the only appliances with a truly sealed wash-chamber, that protects staff against escaping steam (and any unpleasant smell) when they remove utensils after cleaning, Meiko pointed out. 'Steam is removed via a duct system, whereas in some other appliances steam is discharged inside the unit itself - a practise, which can lead to mould and fungus cultures growing on walls and ceilings behind the appliance.'

In addition, during cleaning and disinfection Topline's integrated disinfection management system consumes less water and energy than previously known, due to the development of a novel telescopic rotary jet - this has not only heightened cleaning performance but also achieves it in a very short space of time using minimal energy. 'If a TopLine appliance is not used, it soon switches automatically to stand-by mode and "sleeps" until needed again,' Meiko added.

In appliances fitted with the (optional) technology for automatically opening and closing the wash-chamber door, only a hand movement is needed to open the door, and, after loading utensils into the machine, the door closes; the pre-set cleaning programme begins with a further wave of the hand.

Previously, water was used to cool utensils, which concerned hygienists due to the potential recontamination by water-borne bacteria. In the TopLine system, utensils are dry, cool to touch and ready for immediate re-use as soon as a cycle ends.

To reduce maintenance and service costs Meiko's experts have developed 'M-Commander' particularly for cleaning appliances. M-Commander provides a complete record of the condition of the appliance as well as a log of the quality of the most recent cleaning cycles. If any problems occur tracing the defect is also much easier, and M-Commander can execute any necessary adjustments on the spot.

Meiko's products will be demonstrated at MEDICA (Stand A65, in Hall 12)

A promising outlook for new gentle breast cancer therapies

Targeted medication and gentle surgical procedures are the pillars of modern breast cancer therapy, according to participants at this year's German Congress of Senology.

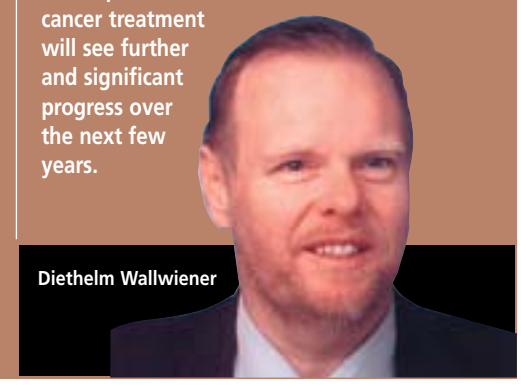
Recent advances in molecular biology and immunology have provided cancer drugs that directly intervene in the molecular processes in a tumour, thus slowing or even entirely stopping disease progress. The first of this new generation of pharmaceuticals, Herceptin, is an antibody that docks on to the HER2neu receptor and blocks it. Consequently, certain factors required for the tumour to grow can no longer dock on to the receptor.

Herceptin is only the harbinger of a new generation of highly targeted and highly efficient drugs, said Professor Diethelm Wallwiener, Chairman of the German Senology Society. 'Many similar products, in different stages of clinical development, are in the pipeline awaiting clinical application.'

During the last decade, experts said, the most important advance is a diagnostic procedure: Sentinel lymph node biopsy (SNB), which allows the examination of individual lymph nodes in the tumour area. If no evidence of cancer is found in the sentinel node, complete removal of the axillary nodes usually is not indicated. Therefore, precise localisation of cancer cells and more selective surgical interventions clearly reduce morbidity in the shoulder/arm area.

Women suffering breast cancer understandably want to receive the appropriate therapy for their individual condition; however, they are also often concerned about aesthetic aspects of surgery or other treatments. New oncoplastic techniques in conservative surgical treatment of breast cancer, and during ablative therapy, offer considerably improved results. 'I'd like to particularly stress thermo-adapted reduction surgery, which has been confirmed by relevant research data. It provides both oncological and long-term cosmetic results for the patient,' Professor Wallwiener explained.

The experts agree that these encouraging developments will continue and that breast cancer treatment will see further and significant progress over the next few years.



Diethelm Wallwiener

Semen can worsen cervical cancer

UK - Cervical cancer could be aggravated by a hormone-like molecule – prostaglandin - found in semen, according to a team of scientists led by Dr Henry Jabbour at the Medical Research Council's Human Reproductive Sciences Unit. The researchers also found that the high concentration of prostaglandin in semen makes other diseases of the female reproductive organs worse - including uterine cancer. The team explained that prostaglandins in semen can influence the progression of cervical and uterine cancers by enhancing tumour growth.

Cells lining the female reproductive organs naturally produce prostaglandin, which helps to regulate cell growth (e.g. messages passed from cell to cell by prostaglandin molecules direct the womb lining to either thicken or shed during a menstrual cycle). However, the concentration of prostaglandin in seminal fluid is 1,000 times higher than that normally found in these cells.

Prostaglandin receptor molecules are present on the surface of cells that make up cervical and uterine cancer tumours. The influx of prostaglandin delivered by semen enhances the normal level of signalling between cells. The high volume starts new cascades of signals that eventually lead to an increase in tumour growth.

Prostaglandins do not cause cervical cancer; it usually is triggered by long-term human papilloma virus infection. However, the MRC research shows that seminal fluid can contribute to tumour growth. 'Sexually active women who are at risk of cervical or uterine cancer should encourage their partners to wear a condom to prevent increased exposure to the prostaglandins that might make their condition worse,' Dr Jabbour cautioned. 'It also highlights the potential for a new therapeutic approach that will tackle both possible sources of prostaglandin, those produced naturally by women and those introduced to the body by sperm.'

BREAST CANCER SCREENING

LITHUANIA One year after implementation

Breast cancer morbidity in Lithuania

20% of all cancers diagnosed annually among Lithuanian women is cancer of the breast. Among its population of just 3.4 million, 1,300 new cases of breast cancer are diagnosed annually and more than 10 women die from this disease each week. The breast cancer mortality rate is therefore comparatively high: in 2004, it reached 33.5/100,000.

The long-term aim of Lithuania's screening mammography programme is to reduce the country's mortality rate from breast cancer. In June 2005, the Ministry of Health approved and began to implement the programme. By the end of the year only 4,500 women had been screened. Nonetheless, the health authorities proudly state that Lithuania is one of the first countries among new EU members (and the only one in the Baltic States) to deal with this problem at national level.

Aimed at women between 50-69 years, the programme includes information about the value of breast cancer mammography and an invitation for screening, then evaluation. Each woman will be offered screening once a year, then once every two years, which intends to cover about 60% of all women in that age group over two years. According to the State Patient Fund (SPF) 29,700 have been screened in 2006, via 11 participating healthcare institutions. Funded from the SPF budget, the programme is estimated to cover screening costs for over 50,000 women in 2006.

According to Dr Birute Aleknaviciene, head of the Cancer Control and Information Centre at Vilnius University Institute of Oncology, progress in diagnosing I and II stages of breast cancer has been dynamic in the last decade. Ten years ago, only 50% of all diagnosed breast cancers were at those stages; this rose to 66% in 2005. As a member of the programme's Coordinating Board, Dr Aleknaviciene predicts it will become 80% in the next decade, and result in a 30% reduction in mortality.

Ruta Grigiene

Birute Aleknaviciene

Support from public and business initiatives

Although the programme includes supplying information to individual women, according to data from the SPF the programme's implementation rate is not optimal. 'I suppose that, as is the case for other preventive programmes, we have to face the fact that overall awareness of the importance of disease prevention in our country is not very high,' Dr Aleknaviciene suggests. She regrets that not only patients, but also physicians, are sometimes baselessly sceptical about prevention; they do not recognise the real aim of screening.

This could be supported by data from representative public opinion research, involving over 1,000 responders – more than 50% of them women – that found only 1-in-3 of the women had been checked at least once in a healthcare setting, for possible breast changes, and 1-in-3 had never heard of mammography. Of all female responders in the at-risk age group, only 1-in-4 had received mammography. The survey was conducted for the public initiative group 'Nedelsk' ('Do not delay'), set up in 2003. The group arranges lectures for medical workers, public discussions, shows and solidarity events, encouraging women to change their approach to health and have regular medicals. Most impressive is its *Pink Ribbon* bus. With crew of medical workers and volunteers, it tours Lithuania, already visiting over 100 towns and villages. Some 24,100 women have been examined within the *Do not Delay* framework; over 270 were diagnosed with breast cancer symptoms.

Among business supporters, Dr Aleknaviciene mentions a cosmetic sales firm that has organised a fund-raising initiative for new mammography equipment. It also informs customers that a percentage of the cosmetics cost will be used for this, and they supply information about the importance of mammography. 'With that modern mammography device our institution will perform about 50 mammograms a day - not, as now, 10-

FRANCE Only a fraction of mammography systems are digital

Report: Keith Halson, our correspondent in France

After successful random trials during the 1980s, an initial breast cancer screening programme was rolled out across the country in 1989. Managed by each *departement*, and based on existing radiological structures, screenings consisted of one image per breast, with two readings, every three years.

In 1999, the screening was modified to include two images per breast and two readings (corrected).

In 2001, this protocol was changed to include a clinical examination by a radiologist, two (or three) images per breast and two readings if the examination was normal (corrected). The second reading is centralised and made by a specialised radiologist (corrected). At the beginning of 2004, the screening programme was effectively made national.

Under it, women aged between 50 and 74 years old are invited to have a mammogram (breast X-ray) every second year. More than eight million women undergo such examinations every year.

Mammograms aim to detect cancers early and can reveal changes in breast tissue before they develop into lumps large enough to be felt with the fingers. They are usually used for women over 35 years old because in younger women the breast tissue is more dense, which can make it difficult to detect any changes.

The low-dose analogue X-ray screening system normally involves taking at least two (sometimes three) images from different angles of each breast. The film is then carefully scrutinised and double-checked for any abnormalities.

However, because the process can be somewhat uncomfortable – the breasts must be firmly compressed by a clear flat plate to hold them still during screening – a number of French GPs have noted reluctance among some of their female patients to attend mammography clinics.

Growing concerns over the dangers to women's health from even the low dosage of X-rays used by the analogue system have led to the development of 'micro-dose' systems that use digital technology.

Although in 2004 the status of ultrasound and digital mammography was left undefined, today only a fraction of the mammography systems used in France are digital, since only film-based systems are approved for screening conditions. However, it is expected that, from the beginning of 2007, digital mammography systems will be approved.

One such system has been developed by Sectra, based in Linköping, Sweden, one of the world's major diagnostic imaging system (PACS) providers.

More than 800 hospitals in Sweden and worldwide use the system daily – amounting to over 40 million radiology examinations a year. In Scandinavia, the company is the market leader with over 50% of all film-free installations. According to Sectra, its MicroDose system is an easy-to-use programme that handles the complete process from examination through to documented diagnosis. It also provides the lowest

15. It is very important for us, because the number and expertise of our specialists far exceeds our screening mammography potential.' Without this support the institution could not buy the device, she adds, because the SPF's appraisement covers the net costs of mammography, but nothing more. Equipment handling, maintenance and repair are not included, so no funds could be set aside for a new machine.

Differences at the periphery

Not all available mammography machines are 'at work'. Of 17, only 11 participate in the screening programme. Dr Ruta Grigiene, head of the radiology department at Vilnius University Institute of Oncology, suggests several reasons. Lithuania is short of radiologists. As a science, radiology is developing so quickly, along with the demand for services, that the number of newly graduated radiologists cannot meet demand. 'The screening mammography programme also demands that each mammogram must be evaluated by two separate radiologists; some smaller healthcare institutions have only one, so must send for evaluation from another healthcare institution. This creates considerable inconvenience for routine work.' Dr Grigiene believes that, in future, better balancing of appraisements for mammography procedure and evaluation could produce different expertise for each institution, so that some will concentrate more on mammography imaging, others more on evaluation.

Problems and future adjustment

Problems emerged in the first year of the programme's implementation. Dr Aleknaviciene believes that, to streamline the programme, it needs responsible coordination. Currently, Coordination Board members are those who established it, and many hold responsible posts in their own institutions, so do not always have time to explain every problem in the process, react quickly and make necessary decisions.

One problems arose with the very first stage of the programme: informing a woman. SPF payment for this service is sent only after the Fund has received a mammogram evaluation. As a result, the primary care institution (usually a general practitioner's surgery) is unsure that its invested resources will be reimbursed. This separation of reimbursement for informing and performing and evaluating mammograms is not well balanced, and could motivate a healthcare institution to concentrate more on one particular stage. This is particularly important, considering our difficult human resources problem, and that medical specialist are increasingly leaving Lithuania to work abroad.

The programme's evaluation and correction is anticipated to meet the 5th edition of European guidelines for quality assurance in breast cancer screening and diagnosis (EC publishing date 2007). There will be, for example, more precise criteria to harmonise radiologists' expertise, to define the number of mammograms evaluated in a certain time period. To improve information, in 2007 the SPF will utilise mass media (radio and TV).

The human factor

A woman's awareness that she is at age-related risk and therefore needs screening can and does cause anxiety. However, screening can eliminate this. Most women usually receive screening results in 10 days to two weeks, depending on the healthcare institution. According to data from SPF, in an average month 3,500 mammograms are evaluated, and about 60 cases show malignant or possible malignant changes. For those women, further decisions follow their visit an oncology unit and other investigative results. Unfortunately, specialised oncology care is increasingly difficult to access; e.g. at the Oncology Institute of Vilnius University the waiting list runs up to three months - not only psychologically difficult for a patient, but also meaningful for biological changes.

This situation might soon change. 'The most important thing is that it is recognised and there is a strong wish to change it,' Dr Aleknaviciene said. 'The implementation of mammography and other preventive programmes is changing cancer prospects. Already we can see the parting of patient tides. Of course, there are shortages in workplaces and specialists. We cannot spin time in the working day up to infinity; but we do anticipate gradual improvement.'

radiation dosage on the market and offers safe, stress-free and rapid examinations to patients.

Recently the system was installed in Le Centre Melunais d'Imagerie Médicale, set up and run by a group of 11 private radiologists based in Melun, south of Paris. This is the first French order for Sectra.

Dr. Fiocconi, radiologist and general manager at the centre, said: 'We chose Sectra MicroDose mammography because of its throughput and ergonomic advantages, but most importantly because we will avoid exposing women to higher radiation than necessary. The system's levels are three times lower than those used by any other product.'

The centre, one of the few private clinics devoted to women's health, has set up a *Maison de la Femme*, which a woman can attend for a total healthcare check. With the installation of the Sectra system, it will develop mammography operations for both clinical and (when approved) screening specialities. Because digital mammography screening is not yet permitted in France, the centre will continue to operate its analogue system.

A French health ministry official recently confirmed that digital mammography systems 'were being studied' but would give no date for their possible authorisation.

The dual-use stethoscope

Emergency care doctors can now use just one stethoscope to tend either paediatric or adult patients.

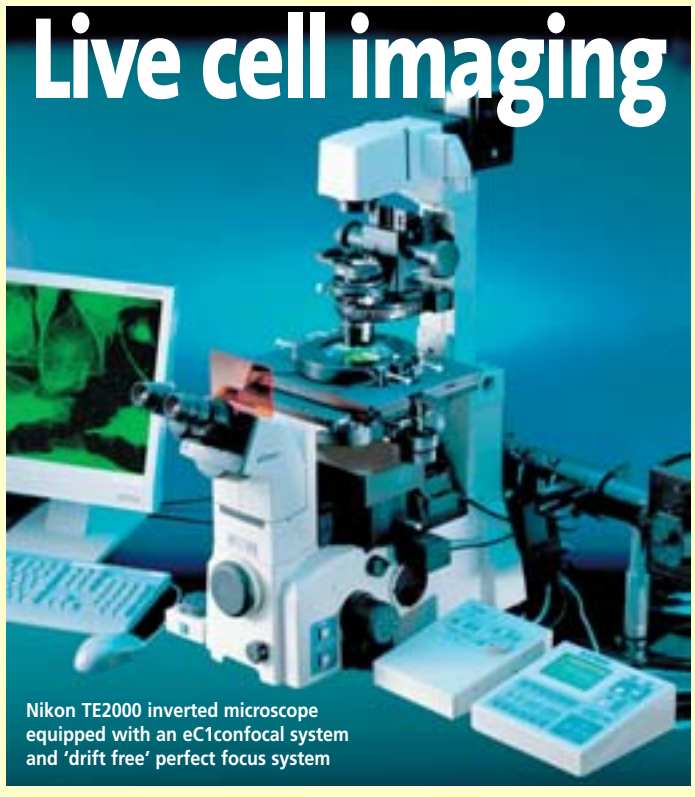
The manufacturer of the *ER Premier* reports that both adult and paediatric sides of the equipment have an ultra-sensitive diaphragm, sealed by a diaphragm retaining ring to optimise amplification and high frequency transmission of heart/lung sounds at 100-1,000 Hz. Combined dual acoustic PVC tubes have an enlarged internal acoustic pathway in the Y configuration to sustain acoustic transmission quality and eliminate internal acoustic leakage and external interference.

The stethoscope, which comes with an ErgonoMax Headset, also has a stainless steel, cardiology-type dual head/chest piece and full-rotational acoustic valve stem.

Additional ComfortSeal Eartips, ultra-sensitive diaphragms, a Cardiology Bell Conversion and an ID tag.Bell Conversion to transform the stethoscope into a Classic Cardiology Stethoscope, are included.

Live cell imaging

Following assessment of the performance and prices of various microscopes and confocal systems for use in the Bio-imaging Facility at the University of Manchester, three new Nikon eC1 confocal microscopes have been ordered. Two of these are to be equipped with EMCCD monochrome digital cameras, offering single photon sensitivity. Nikon reports that one of the confocal systems will be attached to a Nikon *Eclipse 90i* upright microscope, whilst the others will be fitted to TE2000E inverted motorised microscopes, making them ideal for a wide range of advanced live-cell imaging techniques. These inverted microscopes will also be equipped with Nikon's perfect focus system (PFS) to eliminate drift during time-lapse observations. 'The PFS has to represent one of the most useful additions to any live cell imaging microscope,' explained Dr Peter March, Bio-imaging Experimental Officer at the Faculty. 'Contrast-based auto focus is just not an option in rapid live cell imaging. For TIRF, maintaining a stable focal plane is critical - any drift during the experiment will make the data meaningless. With PFS, once you set that focal plane it stays in focus and doesn't move.'



Nikon TE2000 inverted microscope equipped with an eC1confocal system and 'drift free' perfect focus system

BOWA becomes BOWA

It's a new colour - but not a quality change - for new products BOWA-electronic GmbH reports. Describing its choice of orange to re-brand its image, the company said it is: '…a dynamic new look, as fresh as the wind. You'll see this in our products, for example, in a brand new model soon to be launched in our trusted ARC-series; or at our new building project in Gomaringen, Germany, where our entire operation is efficiently pooled at a single site, from planning and development to production and management.'

BOWA products will be on show at MEDICA (Dusseldorf, 15-18 November) in Hall 10, booth G05. Details and company newsletter: www.bowa.de.

MONITORING OUR OWN HEALTH

Health Manager, a new diagnostic system for personal health monitoring, will be launched by Biocomfort at Medica in November. The company reports that this consists of individual measurement devices and metres that transmit measurement data via radio frequency to a PC or a PDA.

Above: Biocomfort gluco-comfort
Left: Biocomfort rhythmo-comfort
Right: Biocomfort scaleo-comfort

Software processes the data and, on the basis of the results, generates the user's personal health profile and returns this by e-mail. 'Currently, devices to measure blood pressure (tenso-comfort), blood sugar levels (gluco-comfort) and weight and body fat (scaleo-comfort) are available. A further device to measure heart rate variability is planned,' the firm says, adding that the system will be marketed in 2007.

Simpler safer pill slicing

Patients with swallowing difficulties could benefit from the new version of the *exakt S Tablet Splitter*. According to 3M Medica, its maker, the extremely sharp blade cuts even the hardest pills more accurately than previously.

The sliding tray guides and reinforced walls of the V pocket, which holds a pill in place, increase stability. In addition, positioning of the enclosed blade has been optimised to improve control.

For safety, the device has closed housing (in which cut pills also can be stored ready for use).

One-step sensor module gives 3-D and 4-D dose verification

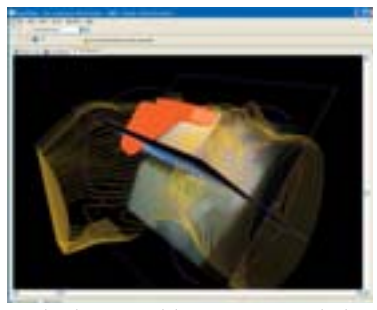
Sweden - ScandiDos AB is marketing a sensor module capable of one-step 3-D and 4-D dose verification. The device, Delta^4 was designed to improve quality assurance (QA) during intensity-modulated radiotherapy (IMRT), which involves using a multileaf collimator with around 80 moving fingers to 'paint' radiation on the region-of-interest.

Görgen Nilsson, president and CEO of ScandiDos, said that, ideally, IMRT regimes should be verified using 3-D volume measurements prior to treatment, but until now the only systems available for IMRT quality control worked in 2-D. 'With 2-D systems, you split the treatment into several parts and verify each separately; with Delta^4 you verify the whole treatment at once. This not only saves time, but it also increases verification accuracy, and hence the QA of the treatment.'

The system has three core elements: a next-generation solid-state detector; new electronics (including a tailor-made application-specific integrated circuit); and sophisticated application software. The Tyndall National Institute (Cork, Ireland) and the Clatterbridge Centre for Oncology (Wirral, UK) helped to develop the detector technology as part of the EU-funded INVORAD project.

Radiation is monitored using 1069 p-Si semiconductor diodes arranged in two orthogonal 2-D arrays. The diodes measure the accelerator pulses individually (typically 300-400 pulses per second). This configuration means that all data required for 3-D treatment evaluation can be acquired in a single detector run, said Aleksandar Jaksic, who led the INVORAD project from the Tyndall Institute. Time-resolved measurements add the fourth dimension to radiotherapy QA. 'The Delta4 design also means speedier problem-solving if deviations from the planned dose are found,' he added. 'The significance of the error can be determined quickly, and the cause identified from analysis of individual beams and sub-beams without the need for repeat measurements.'

The small p-Si detectors, which combine high efficiency and sub-millimetre spatial resolution with dose-per-pulse independence, are ideal for working with the IMRT's steep field gradients, he said. 'The directional and energy response of the detectors are significantly improved over the existing commercial detectors. Recalibration frequency is substantially reduced,



and when recalibration is needed, it can be performed in under 60 minutes.'

Delta^4 has received the European CE Mark, and the USA's FDA clearance (1/06).

Accuvix XQ upgraded

The Accuvix XQ

Accuvix XQ, made by Korean firm Medison (pioneer of the first commercial real-time 3-D US scanner) has been upgraded and re-released as Accuvix XQ Prestige06. Since its launch in 2003, this equipment has been continuously improved and the firm reports it is now considered a 'next-generation ultrasound diagnostic system with future standards'.

Medison adds that, during its debut at ISUOG 2006, Accuvix Prestige 07 attracted keen support among international visitors due to its *Spatial Compound Imaging (SCI)*, which achieves striking enhancement of 2-D image quality; *3-D Compound Imaging (3D CI)*, which dramatically improves image quality of C-plane – a drawback of current ultrasound diagnostic systems, and the *3-D Auto-Contour*, which realises fast 3-D, thereby setting new standards for premium ultrasound system and helping to produce more precise and convenient diagnosis.

Accuvix XQ Prestige 07 has various advanced probe functionalities, such as 129,024 channels, Clip Cine Store and easy-to-handle User Interface.

GLOBAL EVENTS

2006

OCTOBER

25-26 Brussels, Belgium
Emergency Communications and Consequence Management
www.smi-online.co.uk/ECCM.asp

26-29 Cape Town, S. Africa
World Stroke Congress
www.kenes.com/stroke2006/gen.asp

29-2 Nov Cairo, Egypt
Forum 10: Combating Disease and Promoting Health
Organiser. Global Forum for Health Research. www.globalforumhealth.org

31-2 Nov Washington DC, USA
2nd National Medicare Prescription Drug Congress
www.medicarecongress.com

NOVEMBER

4-7 Chicago, USA
Healthcare Design 2006
www.healthcaredesignmagazine.com

14-15 London, UK
Military Medical Logistics Conference
www.dem-ltd.com

15-17 Genoa, Italy
Aniarti 25th National Conference
Focus: critical care nursing. www.aniarti.it

15-19 November New York, USA
The 33rd Annual VEITH symposium
This leading international event for vascular surgeons, interventional radiologists, interventional cardiologists and other vascular specialists, will be hosted by Frank J Veith, MD, Professor of Surgery, Cleveland Clinic Lerner College of Medicine of Case Western Reserve University, and The William J. von Liebig Chair in Vascular Surgery at the Cleveland Clinic Foundation (Cleveland, OH). It will feature 300 presentations from world-renowned vascular specialists. www.veithsymposium.org

15-18 Dusseldorf, Germany
MEDICA 2006
www.medica.de E-mail: info@medicacongress.de

21-24 Barcelona, Spain
CEO Health Leadership
IESE Business School. sawebdev.ca/leaderhealth/

26-1 Dec. Chicago, Illinois
RSNA 92
92nd Annual Assembly and Meeting of the Radiological Society of North America (RSNA). www.rsna.org

DECEMBER

3-7 Brussels, Belgium
Image-Guided Radiotherapy (IGRT)
A European Society for Therapeutic Radiology and Oncology (ESTRO) teaching course. www.estroweb.org

6-9 Prague, Czech Republic
EUROECHO 10
Annual Meeting of the European Association of Echocardiography (a Registered Branch of the ESC). Organised with the Working Group on Echocardiography of the Czech Society of Cardiology. Focus: education and research in cardiovascular ultrasound. www.escardio.org

7-10 Toulouse, France
14th European Congress of Andrology (EAA) www.eaacongress2006.cict.fr

10-13 Jerusalem, Israel
3rd International Jerusalem Conference on Health Policy
Organised by the Israel National Institute for Health Policy Research. www.israelhpr.org.il

2007

JANUARY

17-19 Washington DC, USA
Health & Human Capital Management Congress www.worldcongress.com

FEBRUARY

26-28 Phoenix, Arizona, USA
Radiological Society of North America (RSNA) highlights: Clinical Issues for 2007
www.rsna.org

MARCH

9-13 Vienna, Austria
The European Congress of Radiology - ECR 2007 www.ecr.org

26-28 Barcelona, Spain
3rd Annual World Health Care Congress Europe 2007
Organised under EC patronage, the event will be attended by over 500 executives from key organisations that are advancing healthcare in Europe, as well as ministers, government officials, hospital directors, healthcare industry suppliers. www.worldcongress.com

22-23 Geneva, Switzerland
International Health Workforce Migration Conference
Organised by the International Hospital Federation & Health Research & Education Trust
www.hret.org/hret/publications/ihwm.html

27-30 Cairo, Egypt
Egyptian E-medicine International Conference
Organiser: Egyptian Diabetes Centre. www.onlinediabetes.net/emedicine

APRIL

19-22 Prague, Czech Republic
IHOF Technology www.ihofforum.com

22-24 Beijing, China
China Med 07
19th International Medical Instruments and Equipment Exhibition. www.chinamed.net.cn
E-mail: chinamed@mdc.com.cn

13-14 Lisbon, Portugal
The Annual European Forum of Medical Associations (EFMA)
The Portuguese Medical Association will be host to visiting observers and representatives from the World Medical Association (WMA); Standing Committee of Doctors in the European Union (CPME); Permanent Working Group of European Junior Doctors (PWG); European Union of General Practitioners (UEMO); European Medical Students' Association (EMSA); European Working Group of Practitioners and Specialists in Free Practice (EANA.); European Federation of Salaried Doctors (FEMS); European Association of Senior Hospital Physicians (AEMH), etc.

29 - 2 May Prague , Czech Republic
ICNC 8 - international scientific nuclear cardiology meeting, with additional focus on PET and cardiac CT imaging.

JUNE

9-12 Hamburg, Germany
Heart Failure 2007 Hfsecretariat@escardio.org

24-27 Lisbon, Portugal
Europace 2007 - The European Heart Rhythm Association (EHRA), a registered branch of the European Society of Cardiology. Focus: arrhythmias and cardiac pacing in Europe. europace@escardio.org

Dear Readers
European Hospital continues to expand and so does our list of correspondents and representatives in Europe. We are pleased to introduce three newcomers.

LITHUANIA
Scientist **Andrius Vagoras** MD PhD lectures on dermatovenereology at Vilnius University, where he also researches the epidemiology of sexually transmitted infections.

His span of medical and healthcare knowledge is broad, having obtained, at Vilnius, his degree in medicine in 1997, certifications as a primary healthcare physician in 1999 and general practitioner in 2000. Two years later he gained certificates as an internal diseases physician and his PhD in dermatovenerology (*Male urethral N. gonorrhoeae and C. trachomatis infections: epidemiology, risk factors and selection for infection-specific investigation*).

His fellowships and projects participation include work on the Lithuanian-Swedish project '*Improving of diagnosing and management of STIs*'; at the clinical bacteriology institute of Uppsala University, Sweden, and in the Department of Dermatology, Charité, Humboldt-University Berlin, Germany.

He is lead and joint author of many scientific research papers and publications, which include a students book on the microscopy of genital smears, written with colleagues in Uppsala and Vilnius, and published in Lithuanian, Russian and Bulgarian.

If you have medical/healthcare/products news from **Lithuania**, please e-mail: av@european-hospital.com

FRANCE
A British resident in France, journalist **Keith Halson** BA (Hons) graduated in modern languages and is a member of the Institute of Linguists and of the UK's National Union of Journalists.

Keith has a keen interest in politics and economics, and as a journalist his experience is broad - reporting on news, motoring, finance/business and domestic issues for leading British newspapers and magazines. He has also edited and reviewed books and taken part in broadcasts for the BBC.

Along with his new appointment as *European Hospital's* Correspondent in France, Keith is also the owner/director of Madcap Media Ltd, specialising in press and public relations.

Please e-mail Keith regarding medical/healthcare/products news relating to France: kh@european-hospital.com

ITALY
Danilo Camisasca is a freelance marketing and business management consultant for medical products manufacturers.

Following graduation in biology, marketing and clinical chemistry technology, Danilo began his career in a Milan-based medical analysis laboratory. Following this, he became a products specialist for Chemetron Chimica, focusing on diagnostic products and instruments; Marketing Manager (Diagnostic Systems) at Beckman Analytica, the Italian subsidiary of Beckman Instruments, USA; Sales and Marketing Manager of Dako S.p.A (now DakoCytomation) the Italian subsidiary of the in vitro diagnostics company Dako A/S Denmark, and Business Director of the Italian firm Wimed, specialising in products for home healthcare, diagnostics, therapy and rehabilitation.

If you have medical/healthcare/products news from Italy, please e-mail: dc@european-hospital.com

We appreciate all input and comments from our specialist readers, which further enhance European Hospital's ever-increasing presence in the EU and greater Europe.

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