Russia: New cardiology centre signals better healthcare

One of the most painful problems of modern Russia is the high death rate, especially among able-bodied people. In 2005, the average life expectancy for men was 65.8 years. In 2008, there was a significant decrease in the population death rate. Cautious estimates show that, for the first time for last eight years, the increase of 1.5 years in life expectancy for men exceeded the permissible level. A reduction in deaths was observed in all the basic categories, including cardiovascular diseases at 67.3 thousand (6%). Could this improvement signal the beginning of a long-term positive tendency?

About a year ago, the leaders of the Russian Federation’s government emphasised that it is expedient to include in the priority national project on public health services measures to decrease the death rate from preventable causes. It is no secret that many Russians die young from chronic diseases that simply are not diagnosed in time and, even when a correct diagnosis is made, the patient does not receive the necessary help, because of the absence of advanced equipment, and doctors’ cannot provide qualified help.

In 2007, in the national ‘Health!’ project, top medical technologies were given a new priority. Over 30 billion rubles of the federal budget were allocated to construct 14 hi-tech medical centres in Russian regions. Eight of these have been chosen – based on population healthcare needs, as well as the presence in these localities of variously qualified personnel.

As a result, cardiovascular surgery has been sited in Penza, Astrakhan, Khabarovsk, Kramovo-
arsk and Kalmnograds. traumatology and orthopaedics in Cheboksary and Kramnodar, and neurosurgery in Tyumen.

The emphasis on cardiology is clear: cardiovascular diseases kill about a million Russians annually. ‘We lag behind Europe and the USA in a number of medical technologies, particularly for cardiovascular surgery,’ according to Yuri Nounychn, deputy head of the Federal agency for high technologies.

The first centre – At the end of January the first cardiology centre opened in Penza – a city not chosen accidentally, for it is well-located geographically, with highways and railways enabling patients to travel to the centre from different corners of the region.

President Vladimir Putin and the members of the State Security

By Olga Ostrovskaya

Google enters EPR pilot project

Cleveland, Ohio – Cleveland Clinic, a non-profit, multipa-

ciality, academic medical cen-
tre, is working with Google on

a pilot project to test the secure exchange of electronic patient records (EPR – or, known in the US as the elec-

tronic personal health record –

PHR).

Marissa Mayer, Vice President, Search Products and User Experience, Google said: ‘We chose Cleveland Clinic as one of the first part-
ers to pilot our new health offering because, as a provider, they already empow-
er their patients by giving them online tools that help them manage their medical records online and co-ordinate care with their doctors.

The clinic has over 100,000 patients entered in its PHR system – the eCleveland Clinic MyChart. The pilot, an invita-
tion-only opportunity offered to a group of Cleveland Clinic PHR users, plans to enroll

between 1,500 and 10,000 patients. The clinic reports that the pilot project will test the secure exchange of the PHR data, e.g. prescriptions, condi-
tions and allergies, etc. between their Cleveland Clinic PHR to a secure Google profile in a live clinical delivery set-
ing.

Patients participating in the pilot project authorise the secure importation into a Google account, via Google’s GData protocol (already offered in many of the company’s products) and supporting standards-based medical infor-
mation formats, e.g. the Continuity of Care Record (CCR).

By integrating with the Google platform, Cleveland Clinic says that, at no cost to the user or provider, this will help to provide ‘national access, consumer empowerment and 24/7 access/ portability’.

Google enters EPR pilot project

Cleveland, Ohio – Cleveland Clinic, a non-profit, multi-

paelity, academic medical cen-
tre, is working with Google on

a pilot project to test the secure exchange of electronic patient records (EPR – or, known in the US as the elec-

tronic personal health record –

PHR).

Marissa Mayer, Vice President, Search Products and User Experience, Google said: ‘We chose Cleveland Clinic as one of the first part-
ers to pilot our new health offering because, as a provider, they already empow-
er their patients by giving them online tools that help them manage their medical records online and co-ordinate care with their doctors.

The clinic has over 100,000 patients entered in its PHR system – the eCleveland Clinic MyChart. The pilot, an invita-
tion-only opportunity offered to a group of Cleveland Clinic PHR users, plans to enroll

between 1,500 and 10,000 patients. The clinic reports that the pilot project will test the secure exchange of the PHR data, e.g. prescriptions, condi-
tions and allergies, etc. between their Cleveland Clinic PHR to a secure Google profile in a live clinical delivery set-
ing.

Patients participating in the pilot project authorise the secure importation into a Google account, via Google’s GData protocol (already offered in many of the company’s products) and supporting standards-based medical infor-
mation formats, e.g. the Continuity of Care Record (CCR).

By integrating with the Google platform, Cleveland Clinic says that, at no cost to the user or provider, this will help to provide ‘national access, consumer empowerment and 24/7 access/portability’.
EUROPEAN HOSPITAL Reader Survey

YOU may qualify for a FREE subscription to EUROPEAN HOSPITAL, the bi-monthly journal serving hospitals throughout the EU.

If selected, you will be sent a copy of EUROPEAN HOSPITAL every two months.

To participate, simply fill in this coupon and fax to: +49 201 87 126 864

No fax? No problem. Please post your coupon to: European Hospital Publishers, Theodor-Althoff-Str. 39, 45133 Essen, Germany

Please inform me about the Hospital Administrator Forum at the FES 2008.

ENTRY COUPON

Fax to EUROPEAN HOSPITAL, +49 201 87 126 864
DO YOU WANT TO RECEIVE OR CONTINUE TO RECEIVE EUROPEAN HOSPITAL

Yes No

Signature Date

Patient Number

Name

Job title

Hospital/Clinic

Address

town/city

Please phone

Fax

New, tell us more about your work, so that we can plan future publications with your needs in mind.

Please put a check in the relevant boxes.

1. SPECIFY THE TYPE OF INSTITUTION IN WHICH YOU WORK

□ General hospital

□ Outpatient clinic

□ University hospital

□ Specialised hospital/type

□ Other institutions (eg medical school)

2. A YOUR JOB

□ Director of administration

□ Chief medical director

□ Technical director

□ Chief of medical department/type

□ Medical practitioner/type

□ Other/department

3. HOW MANY BEDS DOES YOUR HOSPITAL PROVIDE

□ Up to 150

□ 151 to 500

□ 501 to 1000

□ More than 1000

□ None (not a hospital/clinic)

4. WHAT SUBJECTS INTEREST YOU IN YOUR WORK?

□ Surgical innovations/surgical equipment

□ Clinical research/mammals/equipment

□ Ambulance and rescue equipment

□ Physiotherapy updates/equipment

□ Nursing: new aids/techniques

□ Hospital furnishing: beds, lights, etc.

□ Infection/sterilisation

□ Linens & laundry

□ Information technology & digital communications

□ Personnel/hospital administration/management

□ Material/Management

□ Diet political updates

□ Other/Information requirements - please list

ESPECIALLY FOR DOCTORS: Please complete the above questions and we would like you to answer the following additional questions by ticking yes or no in the lines as appropriate.

What is your specialty?

□ in which department do you work?

□ Are you head of the department?

□ Are you in charge of your department’s budget?

□ How much influence do you have on purchasing decisions?

□ Can only present an opinion

□ I tell the purchasing department what we need

□ I can purchase from manufacturers directly

□ Do you consider that your equipment is up-dated

□ relatively modern

□ state-of-the-art

□ Do you use/own second-hand equipment?

□ if so, what do you use this for?

□ is your department linked to an internal computer network?

□ is your department linked to an external computer network?

□ is your department involved with telemedicine in the community?

□ Do you consider your department is under-staffed?

□ Does your department have any support from other departments?

□ Do you have any office space which you consider to be insufficient?

□ Do you attend congresses or similar meetings for your specialty?

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ No

□ Yes

□ No

□ Yes

□ No

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No

□ Yes

□ No
Council attended the opening. After their tour (buildings are under construction with special units using German technology) government members and many of the country's top physicians held a meeting to focus on problems in the development of high-tech medical equipment.

One problem is financing such devices; another is training doctors to use them. For the new and well-equipped centres to provide appropriate patient care, preparation is necessary, in the short term training over 1,000 doctors and about 1,000 nurses are needed. In essence, this will demand the creation of a new system of retraining for medical personnel.

If all the envisaged premises can be executed, public health service leaders hope for a significant expansion in high-tech healthcare delivery — from 20% to 45-50%. Thus the level of medical care would rise throughout the country, not just in its capitals, Moscow and Petersburg.

Russia: New cardiology centre signals better healthcare

99.9% of our DNA is shared with all other humans. Only about 0.1% of our DNA makes us individual.

DNA Art UK was established last year to supply these highly original artworks* to the public. What makes this firm’s DNA portraits unique is that they display only the 0.1% of DNA that makes someone an individual — which makes a truly personal image. Finding that 0.1% inevitably involves a number of time-consuming procedures; these take six to eight hours per person.

For those wanting an even more individual self-portrait, the firm’s laboratory can also identify several characteristics. For example, following further painstaking procedures, such a bespoke DNA canvas could show up the alcohol gene and the male/female chromosome. Frank Scolaro, director of DNA Art UK, also points out that there are some limitations as to which can be illuminated. ‘Most characteristics are not located on a single gene but on multiple genes. Only the traits showing up on a single gene can make a coherent picture.’ Nonetheless, work is continuing to identify over 20 other personal traits.

In effect, this company has introduced a very new kind of art form to the market, as the giclee printing technique used to produce dnaPortraits was originally developed to meet the critical demands of collectors of limited edition prints. ‘Giclee productions remain colourfast for at least a century, and DNA Art UK’s high resolution imaging produces a vibrancy that makes such longevity meaningful,’ Frank Scolaro explains.

‘DNA Art is at the cutting edge of art and science. A tiny slice of the human genome is highlighted as bands that show the presence and intensity of your DNA. This is transformed in the laboratory into a remarkable image, which is then printed as a photograph or inscribed onto a high quality canvas. Your DNA is your grand design — it’s your blueprint — so you couldn’t have a more real portrait of yourself or loved one.’

With Breast Care Solutions: A comprehensive approach – covering every step of the way.

About every 10th woman will be diagnosed with breast cancer in her life. That’s why we have bundled our strengths to help fight breast cancer worldwide: You receive everything you need from one source, so you can offer outstanding quality of care. For women. For health. For life. www.siemens.com/breastcare; +49 69 797 6420

Answers for life.
Better research opportunities, defined career paths, greater job security and higher salaries: these attractions inevitably lure young, talented scientists away from their own countries to work in the USA. Among them is German biotechnologist Jens Meiler. PhD. Four years ago he became Assistant Professor for Protein Structures in the Departments of Chemistry, Pharmacology and Biomedical Informatics at the Mayo Clinic, University, Nashville, where opportunities for research into computer-assisted determination of protein structures have proved worlds apart from those on offer in his homeland.

After having studied theology at Johann Wolfgang Goethe-University, Frankfurt, I really wanted to go to the Mayo Clinic and its affiliated hospitals. Here, computer-assisted protein determination is now designed to forecast the spectrum of medications used in living organisms (simulated environment). This is the challenge that I’m focusing on, and carries considerable potential. It is the field of research in which Jens Meiler and I have been able to tailor a treatment for a specific patient after the data describing a patient’s own genetic information is entered in the programme interface. The computer then should be able to determine how the patient’s unique polypeptides will react to the administration of a wide spectrum of medications used to treat the given condition, disorder, or disease.

The programme’s core function is now designed to forecast the interaction of proteins, which becomes a real computer simulation of the interactions of proteins, their structure and interactions; their aim is to determine the underlying causes of certain diseases then develop appropriate therapies. Due to technical computer capabilities in recent years, it is now possible to carry out protein simulations for a specific patient and examine their structure and function. Once the functions are known, they can be manipulated through changes to their structures and proteins can be turned into therapeutic drugs. In addition, it is possible to determine the interactions between a drug and a protein or vice versa, to select a drug that will bind with the protein in the best possible way, based on detailed knowledge of its structure. One of the best known examples of this is the structure simulation of the HIV-1 protease protein, which led to therapeutics that are part of the drug cocktail now widely used to treat patients.

Opportunities to design a protein, or find the right drug for a certain protein, are almost unlimited, currently it is difficult to determine at exactly what stage science is at. In principle, research in this field is always as good as the computer scientists develop and the computer used to perform the research. Further developments are therefore strongly dependent on the enhancement of computing power and the development of new algorithms. Research is now at a stage in which it is possible to design a protein can be tried. However, with computing power at its current level, proteins can be listed only to a certain size. Larger proteins require higher computing power. Associated with this is a new, powerful scientific age; in hand, the interdisciplinary approach of the research team is important. Dr Meiler’s team includes computer scientists, chemists, physicists, biologists and colleagues – those who know what problems need to be solved and those that can programme the computer to do so.

On the whole, the approach to protein research provides a significant opportunity for a new approach to drug development that, in turn, may solve problems such as multi-resistance to antibiotics.

**Computer-programme aims to personalise medicine**

Rostrislav Kuklik reports from the Czech Republic

A computer programme under development at the Masaryk University Centre for Biomolecular Research at Masaryk University, in Brno, a postdoc and a team of scientists, could become the first step towards personalised medicine.

Although working for two years with a team at the Mayo Clinic in the USA, the Brno researchers have been developing their programme in a slightly different format. Currently, it can design proteins and forecast their biological behaviour in living organisms (simulated in vivo environment). The Mayo specialists concept was that the programme should be able to “tailor” a treatment for a specific patient after the data describing a patient’s own genetic information is entered in the programme interface. The computer then should be able to determine how the patient’s unique polypeptides will react to the administration of a wide spectrum of medications used to treat the given condition, disorder, or disease.

The programme’s core function is now designed to forecast the interaction of proteins, which becomes a real computer simulation of the interactions of proteins, their structure and interactions; their aim is to determine the underlying causes of certain diseases then develop appropriate therapies. Due to technical computer capabilities in recent years, it is now possible to carry out protein simulations for a specific patient and examine their structure and function. Once the functions are known, they can be manipulated through changes to their structures and proteins can be turned into therapeutic drugs. In addition, it is possible to determine the interactions between a drug and a protein or vice versa, to select a drug that will bind with the protein in the best possible way, based on detailed knowledge of its structure. One of the best known examples of this is the structure simulation of the HIV-1 protease protein, which led to therapeutics that are part of the drug cocktail now widely used to treat patients.

Opportunities to design a protein, or find the right drug for a certain protein, are almost unlimited, currently it is difficult to determine a patient’s own protein structure and function. Once the functions are known, they can be manipulated through changes to their structures and proteins can be turned into therapeutic drugs. In addition, it is possible to determine the interactions between a drug and a protein or vice versa, to select a drug that will bind with the protein in the best possible way, based on detailed knowledge of its structure. One of the best known examples of this is the structure simulation of the HIV-1 protease protein, which led to therapeutics that are part of the drug cocktail now widely used to treat patients.

Opportunities to design a protein, or find the right drug for a certain protein, are almost unlimited, currently it is difficult to determine a patient’s own protein structure and function. Once the functions are known, they can be manipulated through changes to their structures and proteins can be turned into therapeutic drugs. In addition, it is possible to determine the interactions between a drug and a protein or vice versa, to select a drug that will bind with the protein in the best possible way, based on detailed knowledge of its structure. One of the best known examples of this is the structure simulation of the HIV-1 protease protein, which led to therapeutics that are part of the drug cocktail now widely used to treat patients.

Opportunities to design a protein, or find the right drug for a certain protein, are almost unlimited, currently it is difficult to determine a patient’s own protein structure and function. Once the functions are known, they can be manipulated through changes to their structures and proteins can be turned into therapeutic drugs. In addition, it is possible to determine the interactions between a drug and a protein or vice versa, to select a drug that will bind with the protein in the best possible way, based on detailed knowledge of its structure. One of the best known examples of this is the structure simulation of the HIV-1 protease protein, which led to therapeutics that are part of the drug cocktail now widely used to treat patients.

Opportunities to design a protein, or find the right drug for a certain protein, are almost unlimited, currently it is difficult to determine a patient’s own protein structure and function. Once the functions are known, they can be manipulated through changes to their structures and proteins can be turned into therapeutic drugs. In addition, it is possible to determine the interactions between a drug and a protein or vice versa, to select a drug that will bind with the protein in the best possible way, based on detailed knowledge of its structure. One of the best known examples of this is the structure simulation of the HIV-1 protease protein, which led to therapeutics that are part of the drug cocktail now widely used to treat patients.

Opportunities to design a protein, or find the right drug for a certain protein, are almost unlimited, currently it is difficult to determine a patient’s own protein structure and function. Once the functions are known, they can be manipulated through changes to their structures and proteins can be turned into therapeutic drugs. In addition, it is possible to determine the interactions between a drug and a protein or vice versa, to select a drug that will bind with the protein in the best possible way, based on detailed knowledge of its structure. One of the best known examples of this is the structure simulation of the HIV-1 protease protein, which led to therapeutics that are part of the drug cocktail now widely used to treat patients.
Fundraising

Health service budgets often cannot be stretched to buy a vital piece of equipment or new state-of-the-art department. However, by stimulating social consciousness money from the public can flood in – even enough to build an entire new hospital. Sounds too good to be true? Not according to Peter Fletcher, Director of Philanthropy at the University Hospital Birmingham (UHB) Foundation Trust. ‘You will get what you ask for,’ he told an intrigued audience of at the Hospital Management Forum in 2007 (see ECR supplement in this issue for this year’s event). Although frequently used in the USA and UK, the hospital fundraising approaches he described are less known in Europe.

‘For hundreds of years people supported their local hospitals out of philanthropy or generosity, not because they expected a reward.

Today, many people think of hospitals as an unpleasant place, a place they go to when they are sick. In fact hospitals are a place to get well and we should be proud of them. This misconception has to be broken if we want to motivate people and capitalise on their generosity,’ he explained.

Fundraising is no miracle, he emphasises, when training people in fundraising techniques. ‘There’s just a significant need to make it a professionally organised activity.’

The first and foremost step in establishing a hospital’s fundraising project is to gain management commitment to support and invest in it. ‘Although it’s the people who donate to the hospital, fundraising is not a bottom-up concept. Fundraising has to become an attitude of the organisation, not just a department – this is only possible in a regulated top-down process.’

Additionally, fundraising needs good public relations. ‘The best thing to do is to involve a specific person to co-ordinate the activities and contact people,’ he points out.

Raising money is no miracle; it must be a professionally organised activity

‘In a world where motivated people are sometimes difficult to find, I have a theory to always go back to basics. Everyone has a story to tell and also likes to hear a good story – we have to listen and tell good stories about our hospital as well.’

This year, Fletcher’s team plan to organise monthly fundraising events for the hospital in various restaurants in and around Birmingham. ‘We will inform people about our hospital, tell them how proud we are of it and thank them for their support. We will possibly ask why they are supporting us and we will appeal to the community to support the hospital’s development, to become a part of it as its advocate.’

From the expert’s point of view, healthcare fundraising is not meant to solve the problem of cost explosion. ‘Hospital fundraising is not about raising money just to pay the bills and it will take a very long time before fundraising for healthcare has an impact on its overall finances.’ It is, however, a brilliant method to show authorities that when they cut costs they not only affect a hospital, but people. ‘Fundraising is more about involvement of the people in their hospital - a way for patients to influence the development of their chosen clinic according to their needs,’ Fletcher says. Nevertheless, fundraising is still interesting for healthcare facilities because people donate for a special reason. ‘You are not accountable to the hospital’s financier why these donations were spent for that particular reason. For smaller clinics it could be even more worthwhile as they are closer to the community.’

Unlike in the UK and North America, healthcare fundraising is not well established in continental Europe. ‘What it needs on the continent is just one hospital to be serious about making a difference; one hospital that believes in what it does, and decides to ask its community for support, and then, I believe, many others will follow.’

I was contacted by Dr Sven Ploem from the Universitair Medisch Centrum Groningen (UMCG), The Netherlands, who is keen to start a fundraising project for his radiology department. There is also a clinic in France that contacted by Dr Sven Ploem from the Universitair Medisch Centrum Groningen (UMCG), The Netherlands, who is keen to start a fundraising project for his radiology department. There is also a clinic in France that believes in what they are doing, and decides to ask their community for support, and then, I believe, many others will follow.

For details and guidance e-mail: hospitalfletch@btinternet.com

(How one hospital raised millions: page 6)
**ARCHITECTURE & FUNDRAISING**

**High-tech ‘dacha in the woods’ to treat Ukrainian children**

The All Ukrainian Health Protection Centre for Mothers and Children will cover 10 hectares and contain departments for general paediatrics and surgery (in five surgery blocks), urology, oncology, oncohaematology, and a perinatal centre. A research and training centre is also planned for paediatric doctors, to help integrate Ukraine into the world medical community.

**UK, France & the Ukraine – In the spring of 2006, Kateryna Yushchenko, Head of the Supervisory Board for the Ukraine 3000 International Charitable Foundation, and wife of the president of Ukraine, laid a capsule at the site of a future hospital — The All-Ukrainian Mother and Child Healthcare Centre. 'Today,' she said, 'we make our first step on the way to our greatest dream — building a modern hospital for Ukrainian children, the best of its kind in Europe.'**

Following a competition that involved seven architectural companies – based in Germany, Netherlands, Italy, the United Kingdom, USA, and the Ukraine itself – the selected architects for the new 250-bed children’s hospital are BDPgroupe6. The objective is to build a children’s hospital with the most modern medical equipment and to organise a clinic facility that provides specialised, high tech medical care, explained Neil Cadenhead, Director of BDPgroupe6. As architects and engineers, we have the ability to design it very sustainably. This appointment confirms that there is a demand for the very best of European hospital design in the international arena.’

The architectural firm BDP, with Group6, its associate practice in France, are regularly listed in the BD World Architecture top 10 healthcare architects. ‘We currently have healthcare buildings in design and construction of a value in excess US $4.572 million in addition to a large international commercial portfolio. The firms are growing and ambitious and have 12 offices in France, the UK and overseas,’ the company reports. ‘Our formalised association as bdgroups is to undertake international healthcare commissions and we are actively pursuing opportunities throughout the world, often using local practitioners.’

As the first floor hospital opened last year and will end in 2009. The buildings are created around the architects and structural and environmental engineers. The group is supported by EC Harris as health planners, quantity surveyors and equipment advisors, and by Budova Centre in Kiev - architects engineers and quantity surveyors.

**Parents and individuals**

The parents of a 4-year-old who died in 2004, set up a charity to raise money by 2007, to provide vital equipment and name an oncology ward after their son. By December 2006, they had raised £560,000. In 2007, a dinner dance and special lottery, which offered spectacular prizes, raised around £250,000.

A young mother and friends organised a Memorial Fun Day, in memory of her 36-year-old husband, who had died in an accident. They raised £1,200.

**Local newspapers**

**Newspaper Oxford Times: OX5RUN (an annual five-mile sponsored run in the grounds of Blenheim Palace), was a major factor in helping to raise £3 million.**

**Children**

12-year-old singer, Zoe Mace, recorded an album inspired by her four-year-old Down’s Syndrome sister, who died. In just five weeks, that folk and opera CD, *Little Boy of Light* sold 5,000 copies nationwide. Zoe and her family have raised over £25,000 for CHOx.

Schoolchildren produced the opera ‘Amahl and the Night Visitors’ at which a 13-year-old child, suffering Crohn’s disease, sang in the choir. That event raised £29,000 from ticket sales and donations. In addition, inspired by this effort, an anonymous donor donated £25,000 to CHOx.

Two teenagers, Ilyly Henson and Leandra Cadbury, climbed the summit of Mont Blanc — 4,807 metres. Their efforts raised over £24,000 for the TORCH Appeal, a charity set up by the family of their friend Tom Waley-Cohen, who died of cancer when aged 20. Aiming to raise £1,000,000 to name a surgical ward at the children’s hospital, Torch has already exceeded that target.

One teenager’s personal campaign — Sophie’s Campaign for the Children’s Ward for Interesting Things to Do (SCCWI) was set up in 1997, by 14-year-old Sophie Watson, a cancer patient in the John Radcliffe Hospital. After Sophie died, in 2000, the charity pledged £250,000 (which exceeded) to the new Children’s Hospital. Their fundraising continues, largely through successful sales of SCCWI clothes, which are sold by youngsters across Britain.

Teengear Andrew Baker, a former patient who survived major brain surgery and, by way of thanks, for his treatment, began fundraising, with a target of £20,000. He has enlisted the help of his school and a nearby girls’ school, and recently organised a football tournament.

**The power of people**

When the Oxford Radcliffe Hospitals NHS Trust invested £250 million in its new Oxford Children’s Hospital, funding for certain special embellishments could not be contemplated. Thus a £15 million Campaign was launched to enable the hospital to be built and equipped far beyond the NHS standard. £15.8 million of that target has so far been received. Who raised that astonishing sum? Its benefactors are ordinary people, the young, old, healthy, sick, and all kinds in between. How? Seeking answers from the Trust, Brenda Marsh (European Hospital) discovered inspirational as well as heart-rending tales,

The new Oxford Children’s Hospital has taken the majority of children’s services from the Radcliffe Infirmary (now closed), Churchill Hospital, and the Royal Oxford Radcliffe Hospital in Oxford under one roof, creating a centre of excellence for sick children. Treating about 5,000 children annually, this hospital is certainly child-friendly: everything has been designed specifically for tots to teenagers, as well as their families.

A major feature, for example, is the parent bed and storage area that has been included beside most of the children’s beds. In addition, there are classrooms, play terraces, sensory rooms, colourful sporting animal direction signs, adolescent facilities and parent/patient kitchen and lounge facilities, all designed to help minimise distress, provide distraction make life as normal as possible for children and their families during the stressful times.

The way in which dedicated child, adult and business fundraisers have raised and continue to raise cash for the Campaign for the Children’s Hospital, Oxford (CHOx) is inspiring. In addition, their ideas have provided considerable fun for those taking part. Here are but a few examples of what they did, and achieved. Clearly so much can be gained to raise the standards of hospital facilities simply by asking the public to help – for it is to them that a hospital also gives.

When the Oxford Radcliffe Hospitals NHS Trust invested £250 million in its new Oxford Children’s Hospital, funding for certain special embellishments could not be contemplated. Thus a £15 million Campaign was launched to enable the hospital to be built and equipped far beyond the NHS standard. £15.8 million of that target has so far been received. Who raised that astonishing sum? Its benefactors are ordinary people, the young, old, healthy, sick, and all kinds in between. How? Seeking answers from the Trust, Brenda Marsh (European Hospital) discovered inspirational as well as heart-rending tales.

**The new Oxford Children’s Hospital**

The new Oxford Children’s Hospital has taken the majority of children’s services from the Radcliffe Infirmary (now closed), Churchill Hospital, and the Royal Oxford Radcliffe Hospital in Oxford under one roof, creating a centre of excellence for sick children. Treating about 5,000 children annually, this hospital is certainly child-friendly: everything has been designed specifically for tots to teenagers, as well as their families.

A major feature, for example, is the parent bed and storage area that has been included beside most of the children’s beds. In addition, there are classrooms, play terraces, sensory rooms, colourful sporting animal direction signs, adolescent facilities and parent/patient kitchen and lounge facilities, all designed to help minimise distress, provide distraction make life as normal as possible for children and their families during the stressful times.

The way in which dedicated child, adult and business fundraisers have raised and continue to raise cash for the Campaign for the Children’s Hospital, Oxford (CHOx) is inspiring. In addition, their ideas have provided considerable fun for those taking part. Here are but a few examples of what they did, and achieved. Clearly so much can be gained to raise the standards of hospital facilities simply by asking the public to help – for it is to them that a hospital also gives.

Parents and individuals

The parents of a 4-year-old who died in 2004, set up a charity to raise money by 2007, to provide vital equipment and name an oncology ward after their son. By December 2006, they had raised £560,000. In 2007, a dinner dance and special lottery, which offered spectacular prizes, raised around £250,000.

A young mother and friends organised a Memorial Fun Day, in memory of her 36-year-old husband, who had died in an accident. They raised £1,200.

Local newspapers

**Newspaper Oxford Times**: OX5RUN (an annual five-mile sponsored run in the grounds of Blenheim Palace), was a major factor in helping to raise £3 million.
**Organisations and commerce**

**Renault F1 Team** gave a £150,000 gift to the Children's Hospital Campaign in 2005 to name the Renault F1 Team Play Terrace, between Tom's Ward and Robin's Ward. They continue their support with gifts of auction items, toys for the children and pedal electric cars.

Formula 1 cars, and recently driver Lucas di Grassi (pictured) visited the patients. All their involvement has resulted in positive media coverage and the gift has resulted in a long-term relationship that benefits not only child patients, but also the Renault F1 community profile.

**Shops** The Midcounties Co-operative Society made a commitment to raise £150,000 to name the Children’s Radiology Waiting Area. In addition to a creative array of events, activities as well as its team participation in the OX5RUN, the Co-op asked every customer that went through their 130 stores in August 2006 to add 50p to their bill for the Children’s Hospital. Over 120,000 customers said ‘Yes’.

**Siemens Magnet Technology** has taken part in many events to raise funds for the children’s hospital. For example, eight of its engineers cycled 100km off-road, which raised £17,100. This Siemens division makes magnets for hospital MRI scanners.

**A computer company** aims to raise another £45,000 for CHOx to help develop a Resource Room on the surgical floor. This firm, CSW, specialises in products for electronic health records management, and integration with web-based knowledge resources.

**Builders** The management team at Oxford builders merchant Johnsons Buildbase unanimously pledged £55,000 for the CHOx appeal — and their staff happily joined in. As a result, they have beaten their target, by participation in a huge number of events, e.g. a 50-kilometre walk, golf days, a car raffle, sponsored runs, T-shirt sales and counter collections.

**Other charities**

A £14,000 mobile cardiac monitor was purchased for the Children’s Hospital thanks to funding from ECHO, a leisure industry charity.

The Baronets Trust donated £12,000 for a specially designed bath and ceiling-mounted hoist for the hospital. (In Britain, the title baronet is an ancient hereditary honour; its standing lies between a baron and knight).

And so donations have arrived, raised by everyone, from the poor to nobility, the young and old, the week and the strong.

*With special thanks for help and co-operation to Claire Hooper, Communications & Stewardship Manager, Oxford Radcliffe Hospitals NHS Trust.*

---

**What’s one way to dramatically impact Critical Care?**

Reduce length of stay by up to 3 days*

Dräger’s non-invasive ventilation (NIV) technology holds the key. By offering NIV across our complete line of ventilators and integrating SyncPlus® advanced leakage compensation technology, we can support your efforts to both avoid intubation whenever possible, and facilitate rapid weaning and extubation. As a result, the use of NIV for acute respiratory failure has the potential of reducing hospital morbidity, shortening patient length of stay and reducing the cost of care; while at the same time improving patient comfort.

Yet this is just one aspect of our integrated CareArea™ Solutions, to impact your entire patient care process. To discover how all our innovative solutions can impact your care process, visit www.draeger.com

*Ram FSF et al, The Cochrane Library 2005, Issue 4*
The theatre is spectacular. Its immane catacomb blue glass walls surround space age technology — the EndoALPHA system. Even that name suggests something that surpasses what existed before; it’s ‘the be all and end all’.

Mounted like futuristic works of art, HD TV monitors display digitised X-ray images of endoscopy procedures transmitted by the surgeon from cameras that explore the body’s depth. The clarity achieved is significant. The use of high resolution HD TV camera systems together with NBI (Narrow Band Imaging) allows even the smallest of changes in the stomach or breast to be detected with precision.


The beneficial effect of the surroundings is palpable. Patients enter the theatre visibly more relaxed, he said: ‘Patient comfort definitely increased, and the positive atmosphere has a subliminal feeling of well-being among the surgeons and theatre staff. There’s a genuine three-way separation: The maximum freedom of movement was achieved due to the lack of cabling lying around, as well as the easy, quick movement of devices, as needed.

‘At the moment the theatre is lying around, as well as the easy, quick movement of devices, as needed. Maximum freedom of movement is achieved due to the lack of cabling lying around, as well as the easy, quick movement of devices, as needed.

‘At the moment the theatre is empty, there is more than enough space for the operating table to be set. The theatre can be set up in the optimal position for each procedure. It is not only well lit, but also has a very comfortable atmosphere for the surgeon and the patients.

‘The system also can be set up to provide live links to other hospitals, practices or to national and international congresses. As Heima Jacqui, Managing Director of Olympos Wunder & the Group pointed out, it is video and audio links to other departments in the hospital can be created in the future. For example to the gastrointestinal and radiotherapy departments.

Dr Langwieler added: ‘Our aim is to further enhance the competence and quality of our work. This not only means the treatment of patients across borders, or the close co-operation with Ronald Marvix at Trondheim (Norway) and Antonio Lacy in Barcelona; it also means finding new ways forward in research and development. Real innovations come from smaller hospitals. We are much more innovative than bigger hospitals – when it comes to cooperation with Olympus in the development of a new instrument, or in modifications for a surgical procedure, we can test this method in a relatively short space of time.’

‘The idea for the reconstruction was conceived at a congress,’ Dr Langwieler explained. ‘For reference, we chose the operating theatre in Barcelona. We flew to Barcelona in June and Prof. Koop (Gastroenterology) is the points of contact for the development of this new concept for gastroenterology. The future area of integration is not only in the theatre but also in gastroenterology and the networking of both technologies.’

‘Despite being a small hospital, we have been working on our strategy of becoming a technological leader’, said Raif Pfitzner, Manager of the Ev. Amalie Sieveking-Krankenhaus. ‘Following the successful integration of cardiology and cardiac intervention care with one of North Germany’s most modern catheter laboratories, with Olympus we are now embarking to further develop a centre for MIS and MIS gynaecology. Without a doubt, the hospital has become one of the most interesting places to work in the field of minimally invasive surgery which, in the long term, makes us even more attractive to potential employees and consultants.’

Funding, planning, construction and realisation:

‘The idea for the reconstruction was conceived at a congress,’ Dr Langwieler explained. ‘For reference, we chose the operating theatre in Barcelona. We flew to Barcelona in June and Prof. Koop (Gastroenterology) is the points of contact for the development of this new concept for gastroenterology. The future area of integration is not only in the theatre but also in gastroenterology and the networking of both technologies.’

‘Despite being a small hospital, we have been working on our strategy of becoming a technological leader’, said Raif Pfitzner, Manager of the Ev. Amalie Sieveking-Krankenhaus. ‘Following the successful integration of cardiology and cardiac intervention care with one of North Germany’s most modern catheter laboratories, with Olympus we are now embarking to further develop a centre for MIS and MIS gynaecology. Without a doubt, the hospital has become one of the most interesting places to work in the field of minimally invasive surgery which, in the long term, makes us even more attractive to potential employees and consultants.’

Funding, planning, construction and realisation:

‘The idea for the reconstruction was conceived at a congress,’ Dr Langwieler explained. ‘For reference, we chose the operating theatre in Barcelona. We flew to Barcelona in June and Prof. Koop (Gastroenterology) is the points of contact for the development of this new concept for gastroenterology. The future area of integration is not only in the theatre but also in gastroenterology and the networking of both technologies.’

‘Despite being a small hospital, we have been working on our strategy of becoming a technological leader’, said Raif Pfitzner, Manager of the Ev. Amalie Sieveking-Krankenhaus. ‘Following the successful integration of cardiology and cardiac intervention care with one of North Germany’s most modern catheter laboratories, with Olympus we are now embarking to further develop a centre for MIS and MIS gynaecology. Without a doubt, the hospital has become one of the most interesting places to work in the field of minimally invasive surgery which, in the long term, makes us even more attractive to potential employees and consultants.’

Funding, planning, construction and realisation:

‘The idea for the reconstruction was conceived at a congress,’ Dr Langwieler explained. ‘For reference, we chose the operating theatre in Barcelona. We flew to Barcelona in June and Prof. Koop (Gastroenterology) is the points of contact for the development of this new concept for gastroenterology. The future area of integration is not only in the theatre but also in gastroenterology and the networking of both technologies.’

‘Despite being a small hospital, we have been working on our strategy of becoming a technological leader’, said Raif Pfitzner, Manager of the Ev. Amalie Sieveking-Krankenhaus. ‘Following the successful integration of cardiology and cardiac intervention care with one of North Germany’s most modern catheter laboratories, with Olympus we are now embarking to further develop a centre for MIS and MIS gynaecology. Without a doubt, the hospital has become one of the most interesting places to work in the field of minimally invasive surgery which, in the long term, makes us even more attractive to potential employees and consultants.’
2006 to get a better picture and we realised that our operating theatre should be designed differently. Some design ideas developed during the planning phase, but we needed funding for their implementation, which we requested from the city council for the entire operating theatre refurbishment. Within the Albertinen Group, we also had funds of €2.7 million. As soon as the finance was in place there was a lively exchange between everyone involved in the project, including the architects, because not every idea could actually be implemented as planned. The blue walls, for example, were only developed during refurbishment. The project, which involved relocating a central sterilisation unit, new construction, and the refurbishment of four existing operating theatres, took 16 months to accomplish from planning to the official opening. During the five critical months there were times when the operating theatre could not actually be used, Dr Langwieler pointed out. 'The modifications did have an impact, but it was not as extensive as we had assumed. We also did a good job in terms of logistics. We extended our working hours during the week, then didn’t operate some weekends. A further limitation of our work was that we had to relocate the recovery room and changing rooms to the third floor. We operated on the second floor, which meant that we could only reach the operating theatre via sealed off stairways. Hygienists took daily swabs to ensure that we adhered to the hygiene guidelines. Transportation across two floors, along with those daily checks, were quite complex, but at least we did not have a total outage.\textsuperscript{7}

Thomas Lütke-Kappenberg believes past experience helped during the Hamburg project. 'We could fall back on experiences gathered in Barcelona over three years ago. However, other aspects, developments and new functionalities were added in Hamburg, such as digital video screens, the architecture of the operating theatre, ergonomics and the extension of functionalities by a few PACS systems. Luckily, we didn’t have to develop a new IT infrastructure: the existing network was completely sufficient, but we did need to programme the interfaces, which is not always easy. However, the Albertinen Group’s IT department was most co-operative.\textsuperscript{7}

And so to the future... Since the successful hand-over of the first integrated Olympus operating room in the Hospital Clinic Barcelona in 2004, the company has completed over 70 reference projects in Europe, and reports that the number will increase at an even greater pace in future. Today, the European Olympus Medical Organisation employs about 2,000 members of staff, who work on the development and sales of endoscopic systems in over 30 national companies. ‘For Olympus this highly modern operating theatre (in Hamburg) serves as a global reference centre for customers from all over the world, and the opening of a new global Olympus Training Centre with an operating theatre showroom in Jenfeld will complement this overall concept,’ Thomas Lütke-Kappenberg explained. The training centre offers an exclusive training programme and through the link with the reference centre online training can be carried out at any time. The geographical proximity of the hospital to Olympus also promotes this form of co-operation. Moreover, the rebuilding of the operating theatre was certified by the Technical Inspection Authority for the first time, i.e. we are the first organisation which supplies and fits operating theatres certified by the Technical Inspection Authority. For such advanced operating theatre, Olympus works closely with Europe’s leading surgeons and endoscopists and, according to Frank Drewalowski, General Manager of Olympus Medical Systems, Europa, the company is investing in specialist teams of project engineers and service experts right across Europe – all who are, he said, ‘committed to turning all the visions of operating room users into reality.’
Uniting the lab and radiology

Healthcare is in a dynamic state of change — and so is the healthcare industry, in which there is an increasing trend towards integrating scientific disciplines.

The Siemens Healthcare acquisition of DPC, Bayer Diagnostics and Dade Behring is a good example of this. 

Merle Lerner (EH) asked Jacqueline McDowell (JMcD), Head of Integrated Diagnostics and Market Development at Siemens, why the company chose this route, and how following such practice could also benefit hospitals.

This concept translates into greater efficiency for our customers. With Siemens’ capability for full integration, we can look beyond disciplines and focus on disease states and organisational challenges. We can view the entire picture and as a result develop tools and products that will help our laboratory customers to work along the continuum within their own hospitals.

Whether it is research and development, the use of new technology or biomarkers, strategies, we believe we can help customers to expand their scientific disciplines beyond the laboratory and incorporate more than one discipline. We can also be proactive in terms of helping the laboratory, imaging departments and hospital management to realise the improvement potential in the workflow of diagnostic medicine.

There is a lot of value and power in looking at it this way—many of today’s thought leaders believe it will become increasingly valuable for laboratories to consider their silos and collaborate closely with imaging to provide comprehensive patient care.

Additionally, one of our goals is to support laboratory professionals in creating more awareness and visibility for themselves within the healthcare environment through the positioning of integrated diagnostics. Of course that requires a mutual understanding between laboratories and their imaging counterpart — the radiologists.

Today there is often a sense of the unknown across the two departments. And our opportunity as a company is to help our customers take down those walls through education and knowledge and broadcast the message that integrated diagnostic data, both imaging and laboratory, is the most powerful information in the hospital.

This sounds like hard work for laboratories and radiology departments. It may see one another as a kind of competitor.

JMcD: Well, on the one hand, while pathologists are different from radiologists, we are seeing interesting synergies, around the world, where both work together to provide integrated diagnostics that create advances in healthcare never seen before. I think, in many ways, radiology is not so different from the lab. The biggest difference is that in radiology you move the patient, whereas in the lab you move a sample from the patient.

To harness the potential of integrated diagnostics, organisations will have to empower and encourage people to work with other disciplines. When leadership encourages people to look at the disease state, people recognise that there are many synergies. It’s not about relinquishing control of a department; it’s about exponentially increasing the power of diagnostics — laboratory and imaging combined.

At a recent conference focused on integrated diagnostics, a radiologist noted that he had learned more pathology in the last two days than on his own in the last five years. Today, he believes that the combination of pathology and radiology places both disciplines in a stronger position with hospital administration, by demonstrating the value of diagnostic medicine as a whole.

At Siemens we have torn down our silos by integrating in vivo and in vitro diagnostics and focusing on the care continuum and patient pathways, and we believe we can provide value by travelling a parallel pathway of courses because, in many ways, we are experiencing exactly the same things. When we work with our lab and imaging partners, we find both are very excited about what Siemens is doing. It’s an opportunity for us to work together, not just from a technology perspective, but from an overall workflow and solutions perspective. This is our vision of how healthcare in general can be improved. We are convinced that laboratories and radiology departments will come together to build diagnostic services that take medicine to a whole new level. We’re excited to be part of it.

Automating a clinical laboratory is complicated and expensive. The Amsterdam Clinical Automation Conference aims to provide access to major clinical laboratory automation manufacturers and providers to help laboratory managers to select and implement those technologies.

Presiding over the programme will be AACC® president, Larry Broussard PhD (Louisiana Health Science Centre, New Orleans, La). Moderators are Robin Felder PhD (University of Virginia, Charlottesville, VA) and Henk Goldschmit MD (Region Diagnostics Services, Tilburg, The Netherlands).

The keynote presentation by Ed Bos of KLM Airlines, will demonstrate how KLM Airlines and Schiphol Airport successfully used RFID technology to improve luggage management. Jan Doels PhD will then describe how his Hospital Laboratory has used RFID technologies to improve tracking.

Other key topics: automation, Lean management principles, automated QC, and calculating ROI using procurement models.

As a finale, Jackie McDowell of Siemens Medical Solutions (see article on this page) will present a new diagnostic paradigm — merging digital, imaging and laboratory data.

During the conference, clinical automation companies will present products and be available for individual discussions.

**Also in 2008**

- 10-11 September, Cambridge, UK: Evidence-based medicine and patient focused testing, jointly sponsored by the AACC and ACSB.

- 13-14 November, Honolulu, HI: ‘Laboratories into the future’ co-sponsored by the AACC and the Australian Association for Clinical Biochemistry.

- Jointly sponsored for the fourth time by the American Association for Clinical Chemistry (AACC), the Association of Clinical Biochemistry (ACB – US based) and the Netherlands Society for Clinical Chemistry and Laboratory Medicine (NVVK).

- Conference sponsors: Beckman Coulter, Ortho-Clinical Diagnostics, Radiometer and Siemens Healthcare Diagnostics.

Details: www.aacc.org. Email: jhm@aacc.org

**Is lean right for your organisation?**

By Maria Foster, Managing Director, Whitebridge Associates, Pittstown, NJ

I have been involved in bringing Lean (and Six Sigma) methodologies to laboratory organisations over the last 10 years. In the early years, I was confident that Lean, with its proven results in manufacturing, was highly relevant to improvements in healthcare delivery worldwide. However, I have found that the Healthcare industry is actually an amazing approach, it does not work in all hospitals. Not because some hospitals do not need Lean, but because some hospitals do not successfully implement and sustain a Lean culture.

What does it take to implement Lean?

The most important components for a successful Lean implementation are strong leadership and breaking down the boundaries between departments.

The leadership of the hospital must be ready for the resource and time commitment needed to support a Lean implementation. Lean is not about tools or methods; it is about management philosophy and about creating a culture of continuous improvement. Organizations that are effective in implementing and sustaining Lean have leaders that:

- Create a vision
- Have an implementation plan
- Invest in people and processes
- Embrace change management
- Commit to staff education and coaching
- Monitor, quantify, and post results
- Motivate and reward employees for their contributions

Within each hospital there are a number of departments with different technologies, staff, and information flow. Often, these departments operate without knowledge of their impact on the rest of the organisation. Establishing a cross-functional team across departments is key to gaining the movement of the patient as a continuous flow versus a series of individual steps.

It is often said that people change when they see the light or feel the fire. Hospitals that have successfully implemented Lean throughout their facility have created a Lean implementation in a high risk area (e.g., medication delivery and management) or an area that incurs high costs or patient dissatisfaction (e.g., patient flow in an Emergency Department). These are areas where most employees agree that change is necessary, where small changes can generate results quickly. Success in one area encourages employees to bring about change throughout the facility.

What does it take to sustain Lean? Essentially, Lean implementation generates a lot of excitement, many facilities have found that after an initial spurt, the momentum begins to wane, or to remain isolated to a small area of the hospital system.

When Lean is implemented, it takes strong leadership and cross-functional teams committed to Lean to keep the momentum going. Without vigilance, people will go back to what they have always done. If Lean is a cultural and continuous improvement journey that never ends, are you ready to start that journey? Perhaps there are a few steps to take to ensure Lean is not a fad. First, hiring an outside consultant to begin and then build your own competency. Be sure to plan and communicate with your organisation. Work with someone who has had experience in hospitals. Learn from the Japanese concepts of Lean so that they are meaningful to your staff.

Once Lean is implemented, it is submitted for the long term to ensure an effective implementation and sustainable gains.

**The Amsterdam Clinical Automation Conference**

13-14 March 2008

**The future hold for hospital laboratories?**

By Marika Mayer, Consultant with Master’s degree in business administration, Department of Services, Tilburg University

The complete takeover of hospital laboratories through private laboratory service providers is rapidly changing the nature of German laboratories. Taking a closer look at these developments, it becomes apparent that several trends are developing.

On the one hand there are massive efforts towards the automation of laboratory diagnostic services in hospitals. This can be on a legal and spatial basis, i.e. in the shape of a complete closure of the in-house laboratory. An external laboratory then supplies the entire laboratory with the necessary laboratory diagnostic services; however, at the same time this necessitates the installation of POCT (point of care testing) on site to ensure that emergency laboratory testing facilities are always available in the hospital.

However, laboratory outsourcing does not necessarily mean that external outsourcing of the production of laboratory results, as the 24hr availability of a laboratory is a must-criterion for continued high quality patient care in medium-size and large hospitals. The external laboratory service providers take on legal, organisational and
Outsourcing, co-operation or centralisation

financial responsibility and acts as the operator of the in-house laboratory. The existing staff can be taken over or supplied by the hospital. At the same time the strategic laboratory partner is guaranteed the exclusiveness of outsourcing - laboratory tests that the hospital did not process for economic or technical reasons and that were sent on to other, specialised laboratories, are now exclusively processed by the new laboratory partner. Along with outsourcing there are also increasing efforts towards co-operation and centralisation of laboratory diagnostics in hospitals, especially against the backdrop of the recent waves of mergers among public hospitals. We often see the formation of one main laboratory and one or more basic laboratories, whereby the range of services offered by the basic laboratories is limited to easily mechanised, routine parameters, and service hours are often limited. The main laboratory, on the other hand, not only offers routine diagnostics but also specialised services in hormone diagnostics or microbiology.

In the course of centralisation it is also possible that smaller laboratory units are closed and one central laboratory takes on the round-the-clock care for several hospitals. As a result of the 2004 Law on the Modernisation of Healthcare, hospitals are increasingly making use of a further type of laboratory care. So-called medical centres, run jointly by hospitals and/or private laboratories, concentrate laboratory diagnostics of at least two specialised areas (such as laboratory medicine, microbiology) and additionally act as providers for outpatient clinics and other users. This structure is particularly common for large hospitals or university hospitals where the range of services offered exceeds the capacities of conventional, medium-size hospital laboratories. These types of solutions are also similar to the outsourcing principle.

For private providers (laboratory specialists in private practice) who have to survive in a strongly competitive market characterised by crowding out, loss of profits and stagnation resulting from health politics, the wave of outsourcing of laboratory diagnostic hospital services offers an enormous growth potential. Hospital laboratories are currently much sought-after objects, with the competition offering them opportunities to obtain laboratory provision at around 20-30% cheaper compared with own-run laboratories. The winners of this development are often large laboratory services providers with supra-regional structures. They are able to use (and pass on the benefits of) their advantageous conditions of purchase and know-how within the industry to the hospital laboratories. Laboratory doctors in private practice have already had to learn to deliver economical, rational but nonetheless high quality work, often associated with painful losses.

The changing structures only very rarely lead to losses in quality, because the laboratories have comprehensive quality management in the shape of special accreditations and certifications. The developments explained above account for the increasingly growing proportion of privatised hospital laboratories. At the same time, the trend in the private laboratory sector is towards concentration of the labour market, not only on a German but also on a European level. International chains of laboratory services providers are rushing on to the German market as the local laboratory companies are sought-after objects for potential take-overs or stakes, because they are mostly tightly organised and work efficiently. Sonic Healthcare made the headlines in 2007 when they took out a stake in Labor Schottendorf in Augsburg, and so did the takeover of Bioscientia GmbH. Patenlab, a laboratory services provider predominantly operating hospital laboratories and currently expanding across Austria, Switzerland and Eastern Europe, has acquired a major stake in the Münchener Labor Dr. Tiller. It seems that none of the large German laboratory companies is currently safe from rumours of takeover, but then, there is a little truth in every rumour.

It would not be speculative to say that the European labour market will increasingly be characterised by convergence and internationalisation. It remains to be seen to what extent further, internationally represented companies – from other industries as well – will break into this market, which is still attractive, with returns of up to 20%.

www.1K-die-krankenhausberater.de

Answer for life.

Siemens Healthcare Diagnostics and Dade Behring have joined together to help you take diagnostic testing to new heights.

Siemens is the industry’s first fully integrated diagnostics company. By combining the strengths of Diagnostic Products Corporation, Bayer HealthCare Diagnostics and now Dade Behring, Siemens can offer you the broadest and most capable portfolio of clinical diagnostic solutions available. Today, more than ever, you can count on one partner to streamline your workflow and help you deliver enhanced patient care. It’s an extraordinary opportunity, and we’re ready: www.siemens.com/lab-efficiencies; contact center: +1-800-255-3232.

Siemens Healthcare Diagnostics

Answers for life.

Siemens

Ready for greater workflow efficiency?

Ready to hit the ground running?

Ready to improve patient care?
Labs are Vital is a global initiative managed in the United Kingdom by a steering group that includes the Royal College of Pathologists, Association of Clinical Pathologists, Association for Clinical Biochemistry, Institute of Biomedical Science, British In Vitro Diagnostics Association and Abbott Diagnostics. ‘Laboratory medicine is at the heart of patient care. It is important that we raise the profile of laboratories and highlight the quality, safe and cost effective service they deliver,’ explained Dr Graham Beastall, Labs are Vital executive member and Consultant Clinical Scientist at the Glasgow Royal Infirmary.

HIV infection is transmitted from mother to fetus, and 25-35% of babies, born to (untreated) HIV positive mothers, are infected with HIV. Since the risk of transmission to the foetus is directly proportional to the viral levels in the mother’s blood, any reduction in viral load could improve the chance of the baby to start life without that deadly infection. This reduction can be achieved by antiretroviral drugs (ARV). However, these could have adverse effects on the foetus, especially during the first trimester.

Due to the very high exposure to the mother’s blood during labour and birth, these are the most critical stages to reduce the risk of exposure.

The key to implementing any ARV protocol is detecting HIV infected mothers. In some countries and states all pregnant women are tested for HIV (unless they opt not to). However, detection of antibodies is an additional five who were in the seronegative women, there were no positive women, are infected with HIV infection. Today, the SMARTube technology, Stimmunology, has been developed, which enables detection of antibodies during the WP (Fig 1). This is achieved by pre-incubation of the blood sample, in a SMARTube for stimulation of antibody production. In a study in Kenya, pregnant women were tested for HIV with and without the SMARTube step. Eight were seropositive, yet, among the seronegative women, there were an additional five who were in the WP, and their HIV infection was detected only after pre-treatment of sample with SMARTube. These

Fig 1: Clinical trial summary

Based on all the above, antiretroviral (ARV) treatment protocols for HIV infected pregnant women (who are not on ARV treatment prior to pregnancy) have been developed. When possible, ARV (usually AZT) is taken from weeks 14-34, and during labour. Since the exposure of the foetus is the greatest during labour and delivery, a preventive/prophylactic ARV treatment is given to the baby for the first 1-6 weeks of life. The combined mother and child ARV regime can reduce mother-to-child transmission of HIV to as low as 1-2%. Even where resources are limited, a single dose of medicine given to mother and baby can halve the risk. The fact that the ARV regime is a short one and its effect in saving lives is so dramatic, lead to broad implementation of ARV-protocol globally, including the poorest and most afflicted areas, because the treatment is manageable, cost effective, and of limited duration, and, most importantly, because we are responsible for the well-being of newborns.

The challenge of implementing any ARV (particularly during the WP problem) is detecting HIV infected pregnant women. In some countries and states all pregnant women are tested for HIV (unless they opt not to). However, detection of antibodies is too late for the “window period” (WP = the time between infection and possible diagnosis). Women who were infected recently might test negative, in spite of the infection that is risking their fortunes, and thus not be offered any ARV. This WP, which usually lasts up to three months, could be even longer in pregnant women, because the pregnancy itself is somewhat immuno-suppressive (to protect the foetus).

Overcoming the WP problem has been a major diagnostic concern. It has been found that specific immune suppression causes the window period. A

Fig 2: Detecting HIV infected pregnant women missed by current serology due to the window period

Women sero-converted within 3-4 months (4%) too late for ARV to protect the babies form HIV infection. Today, the SMARTube technology, Stimmunology, has been developed, which enables detection of antibodies during the WP. Misdiagnosis of HIV infection due to the WP contributes daily to the spread of the epidemic in the adult population. Misdiagnosis of HIV infection in a pregnant mother is a missed chance to save a baby. Bridging the gap of the HIV WP population should be of top priority. Early and complete detection of HIV infections among future mothers is a critical key to curtailing the epidemic and saving future lives.
The 2008 ECR promises to be international, controversial, inspiring, as well as a meeting in which new insights for inter-professional relationships and working practices are sought. The programme is impressive indeed. We asked Professor Maximilian F Reiser, this year's Congress President, about the highlights, newly introduced themes and other pressing issues that impact on radiologists throughout Europe and beyond.

The high profile agenda of Europe’s biggest radiology congress

‘RADIOLOGISTS MUST STEP OUT OF THE SHADOW OF THEIR MACHINES’

This year the guest countries at ECR are Germany, Israel and India. Why were they chosen?

Maximilian Reiser: ECR’s primary task is to present advances in radiology, and the selected guest countries are interesting for several reasons. Israel is an important location that generates many exciting developments and drives. India has established itself at an international level and we would like to draw attention to the country’s medical and radiological developments. We will focus on India’s diagnostics and therapy for tuberculosis, a disease of global significance that increasingly re-appears in the West. The German contributions highlight the potential of computer-aided diagnosis (CAD) in clinical applications. CAD will play an increasingly important role in radiology and we look forward to many interesting presentations that will show not only its advantages but also the drawbacks.

The ECR Meets Partner Disciplines is a new event on the agenda.

What is this?

MR: It’s an entirely new and exciting format that aims to strengthen interdisciplinary cooperation. We invited colleagues from different countries, this year general practitioners (GPs) with whom we will discuss coronary heart diseases and peripheral arterial obstructive diseases in the context of atherosclerosis, for example: Where do these two areas converge? What does the GP have to know about diagnosis and treatment? How can radiology help?

We want to overcome communication barriers in order to improve exchange and cooperation. After all, as a radiologist, you have two types of customers: patients and referring physicians. This issue also has a certain professional-political dimension because, in my opinion, in many countries the profession ‘radiologist’ is misunderstood. They are perceived as people who sit somewhere behind huge machines, whereas, in reality, radiologists are clinical physicians. Therefore, no matter how different European healthcare systems may be, radiologists have to step out of the shadow of their machines and present themselves as clinical physicians who play a crucial role in patient care.

We do not want to start a discussion on international healthcare systems, but ECR prides itself in being a particularly innovative congress – our programme bears testimony to that. Which criteria do you apply when selecting a paper for the congress?

The ECR offers a wide range of scientific sessions and professional seminars that deal with issues central to our work: How can we ensure that a diagnosis is as precise as possible? How do we most effectively control the success of the therapy? Here we do not only choose presentations that provide the most knowledge, but we also aim at optimising the learning process by using interactive elements. A case in point: our ‘audience response system’, which is becoming increasingly popular. This system allows the speaker to integrate the audience in his or her presentation, for example by soliciting opinions on radiation exposure. On a pad, the participant can choose between several alternative answers. This kind of interaction significantly increases motivation. The system can also be applied to check whether participants understood and retained the material under discussion. This is something particularly appreciated by our younger colleagues.

Unfortunately, we must decline many submitted abstracts — this year almost twothirds of all entries. However, this is by no means negative, because it shows that we have high scientific expectations and that we follow through on those expectations. A ‘no’ may be frustrating for the researcher, but we strive for utmost objectivity in our selection.

What are this year’s ECR highlights?

There are many highly differentiated presentations on radiation exposure. Frequently this issue is being dealt with in quite a biased manner, that is, the focus lies on the risks and how to minimise them. But when we talk about radiation exposure we must always talk about the risks and benefits of a radiological examination. That’s what we want to emphasise in our events.

In the context of one of our Special Focus Sessions we will also address the issue of the ageing society – the ‘demographical tsunami’. We must find answers to questions such as ‘What does a sustainable healthcare system look like and how will this impact radiology?’ There are some highly interesting cross-disciplinary approaches, such as the use of telemedicine for stroke diagnostics. A further example is mobile diagnostic systems, because they are already used in Norway, where

contined on page 2

When Sterility is Indicated...
The high profile agenda of Europe’s biggest radiology congress
continues from page 1

A patient does not go to a radiologist for X-rays, but the X-ray equipment goes to the patient. This is particularly beneficial for older patients because they no longer have to leave their familiar environment.

A second interdisciplinary session will deal with myoma, focusing on myoma embolisation with presentations by a gynaecologist, radiologist and a patient. It is very exciting, because the patient will describe her hospital experience in detail. She will present her records and show, very impressively, how her quality of life was improved by the myoma and how much it improved after embolisation. The patient had learnt about this organ-saving therapy only after long research - and after four gynaecologists had recommended hysterectomy. Myoma embolisation is an acute problem, since this radiological intervention is not widely accepted, particularly in Germany. Myomas can be treated with focused ultrasound – another option that will be discussed.

*Why has the Women in Radiology theme been introduced?*

Women are still discriminated against in radiology. It is unacceptable that the females earn less and in general have worse working conditions. It is unacceptable that the careers of women suffer because they have children. Nevertheless, that’s the reality and it’s a reality that women will discuss at this event.

The presentations emphasise the social responsibility of radiology and they suggest solutions to these problems. We will also address possible political steps – for example the fact that we need to make-day-care for children.

In some countries, such as France, childcare outside the family is well organised. In other countries this is still a huge problem.

However, there are solutions to all these problems and ECR, as the biggest European radiology congress, will contribute its share. I’m confident that all participants will welcome this year’s high-profile agenda and that, once again, ECR will be a huge success.

**Professor Moshe Graif MD**

Over the last three decades CT has become a premier diagnostic tool for the evaluation of the acute patient. Over the past ten years in Israel, we have seen an overwhelming increase in the volume of CT examinations in the emergency department (ED). Data from the USA and Germany appear to yield similar results. A comparison of the number of CT studies performed per 1000 ED visits showed a five-fold increase over one decade! Particularly dramatic was the increased use of CT studies during the night shift. A particular increase in body CT studies in the ED (Renal Colic, appendicitis, acute abdomen, bowel obstruction) over neurological CT was also noted. Surprisingly, the massive CT utilisation patterns had no significant impact on the consumption of other imaging services (such as X-rays).

Expectations that examinations — such as abdominal series (AAS) which have limited clinical value in patients in whom CT or ultrasound is considered — will decrease, were not met. The five views skull radiograms so far appear to be the only example of an ‘extinct species’.

The ‘Golden Hour’ (Dg & treatment within 60 minutes) rule, which nowadays dictates the management of the trauma patient, favours CT, as a ‘one stop shop’, over the combination of several modalities. It also appears that clinicians may still feel more comfortable with CT images than with ultrasound. Emergency doctors prefer to use CT as the gold standard for imaging abdominal trauma and to reserve FAST (focused abdominal sonography for trauma) for unstable patients.

These trends boost healthcare costs. They also affect patients due to increased radiation exposure and more incidental findings that lead to further investigation (not always justified). They create queues of patients waiting for a CT examination (prolonging the average investigation time for each patient, particularly the clinically

CT: Overuse in emergencies, but top value for trauma cases

By Professor Moshe Graif MD

Involving smaller and less experienced teams. Those teams are also subjected to the effect of prolonged, continuous working hours and accumulated fatigue.

While the technical time per CT examination has decreased (Spiral CT exam time is shorter by 2.3-10 factor) which induces increased throughput, the radiologist reading time is prolonged because there are more images to read (65% more images per MDCT study on average), more reconstructions to perform, and change in procedure mix (more complicated studies such as CT, abdominal studies, CT guided interventions).

A particular aspect of Emergency CT is related to its role in mass casualty events (MCE). It appears that hospitals

The clinical nature of the cases that involve blast and/or shrapnel injuries requires special CT protocols. This includes whole body scans to identify foreign bodies missed on a radiography and triple contrast regime (via naso-gastric tube, intravenous injection and rectal contrast administration). There is also a routine use of CT angiography and 3-D reconstructions in every case of a penetrating object and/or suspicion of vascular involvement.

In those situations, CT now offers a quick mode to evaluate the extent of injury, shrapnel localisation and the detection of unsuspected injuries. The rapidity of the modality makes patient cooperation less necessary. The availability of PACS, and heavy duty workstations, enables

Objective is to provide optimal care, which involves more skeletal X-Rays, CT work up and angiographies.

Ultrasound is one of the modalities located in the spine (arrow) more radiologists and technicians will be needed, and residency programme planning measures should be taken at national level to ensure the proper future availability of a professional workforce.

* I would like to thank Dr. Ahuva Engel, Dr. Dorith Shaham, Dr. Ofer Benyaminov, Dr. Jacob Sosna, Dr. Osnat Luxenburg, Dr. Arie Blachar, Dr. Eli Konen, Dr. Arnon Makori, Prof. Pinhas Halpern, Ms. Sharona Vaknin and Mabli Zelikovitz Mirc for their help in providing scientific data for this report.

**Simultaneous evaluation of a complex injury by several specialist teams.** The velocity of execution and accuracy make CT an ideal tool for emergency use, and is

Replacing traditional radiological studies. Utilisation is likely to increase. The development of techniques designed to reduce radiation are constantly under intensive consideration.

Careful use of the guidelines may help to reduce the unnecessary studies. In the future,
4,000,000 paediatric CT scans were performed in 2006 in the USA, a number that has tripled since 2001. Concerns about the adverse effects of cumulative radiation dose in a generation of children where CT imaging and other radiation-intensive procedures will be the norm has led to the launch of a national campaign to establish low-dose radiation protocols designed specifically for variously aged children. The ‘Image Gently’ campaign was launched in January 2008 by the founding members of the Alliance for Radiation Safety in Paediatric Imaging (ARSPI). The Society of Paediatric Imaging proposed this campaign in 2006, and formed the Alliance in 2007 with the American College of Radiology, the American Society of Paediatric Radiology, as well as the American Association of Physicists in Medicine. An additional six major professional organisations have become affiliate members, representing a total of more than 500,000 medical professionals working in Canada and the United States. GE Healthcare provided a large unrestricted educational grant to fund the project.

The campaign aims to significantly reduce the amount of radiation used when performing paediatric CT scans. It emphasises that children who are scanned only when absolutely necessary, that radiation dose should be reduced using protocols and scanning techniques created specifically for paediatric imaging, and that alternative imaging procedures with less or no radiation should be used when possible. (As an example, the newly published results [Radiology online January 14, 2008] of a study performed at the University Hospital in Bologna reported that contrast-enhanced ultrasound is almost as accurate as contrast-enhanced CT for diagnosing solid organ injuries in children following blunt abdominal trauma.) Medical physicists are also encouraged to become more involved and actively monitor paediatric CT techniques.

The www.imagegently.org website includes a library of protocols for imaging children. In its first week of operation, over 2,600 providers downloaded protocols. The website also contains research and educational materials. Marilyn Goske MD, chair of ARSPI and a leading paediatric radiologist at the Cincinnati Children’s Hospital Medical Centre in Ohio, said, ‘We hope to change the way all children are imaged, using kid-size, not adult-size radiation doses.’ In an interview with European Hospital, she said that it will take decades to learn if paediatric CT scans are detrimental to the long term health of children who receive them. With the exception of paediatric cancer patients receiving radiation therapy, no records are being kept of the cumulative radiation doses that children receive, which, Dr Goske said, is an issue of discussion by the Society of Paediatric Radiology, as an electronic registry interacting with electronic patient records is technologically achievable.

The fourth bi-annual ALARA (as low as reasonably achievable) Concept in Paediatric Imaging conference was held in February in Orlando, Florida, and was attended by paediatric radiologists, emergency physicians, medical physicists and hospital administrators. Its theme was building bridges between radiologists and emergency medical providers and focused on improving imaging safety and quality for children presenting in an emergency department. The conference objectives were to discuss the challenges that emergency physicians and radiologists face in overcrowded hospital emergency departments and to identify methods of improving communication, as well as establish better protocols for procedure ordering and imaging of children with the least amount of radiation.

The combination of the threat of litigation with malpractice lawsuits and the fact that many uninsured families use emergency departments as sources for primary care has created an environment in which many US hospitals in which an excessive number of inappropriate diagnostic imaging procedures are ordered. This is done to make rapid accurate diagnosis, provide treatment quickly, and deal effective with a higher volume of patients than an emergency department can support.

The 2008 ALARA conference will be initiated. ‘The majority of children receive emergency treatment at hospitals that primarily treat adults. We think that recommendations for protocols of treatment developed jointly by paediatric emergency specialists and paediatric imaging specialists can provide a safer and better quality of care.’ Dr Goske added that European hospitals have developed impressive initiatives in keeping paediatric radiation dose to a minimum.

In 1895, the discovery of x-rays revolutionized medicine. Since then, diagnostic imaging has developed into a highly specialized field; thanks to technological innovations, doctors can now make precise diagnoses early on, and with less risk to patients’ health.

The name Bayer Schering Pharma is strongly associated with the development of innovative contrast media for diagnostic imaging. The focus of the company’s research today concentrates on new approaches in the area of magnetic resonance and computer tomography as well as optical and molecular imaging – allowing illnesses to be discovered earlier and therefore treated more effectively.
WOMEN IN RADIOLOGY

Professor Remy-Jardin MD PhD heads the Department of Radiology and is Chairman of the Department of Thoracic Imaging at the Calmette Hospital, University Centre of Lille. She is also Professor of Radiology in Lille University’s Medical Faculty.

The Calmette Hospital specialises in thoracic and respiratory medicine. In her department, Prof. Remy-Jardin oversees five senior doctors and seven interns. Her international reputation and the quality of the department’s research attract radiologists from all over the world – the present senior staff includes doctors from South Africa, Canada, Italy and all at Lille to improve their knowledge in high-resolution computer tomography of diffuse infiltrative and vascular lung diseases; interventional vascular procedures; cardiac and pulmonary functional imaging; and reduction in radiation dose – the professor’s area of expertise. Additionally, much of her published research is in spiral CT imaging, especially technical developments; post-processing; CT angiography and multidetector CT, including dual energy.

Her university thoracic imagers and scanning research programme is based on a longstanding collaboration with Siemens: the centre serves as a reference site for the company, providing it with access to clinical activities through which clinical research can be undertaken. This research is then channelled into publication in international journals and/or presented at major conferences. It also used for Siemens’ technological investigations. In return, the radiology department can propose the use of the latest scanners and Siemens’ technological developments; post-processing; CT angiography and multi-detector CT, including dual energy.

What do you consider your major professional achievements among the many we can only briefly outline here?

RJ: To have become the Head of a Radiology Department in which it is possible to combine high-quality diagnostic activities, teaching and clinical research activities. This has been possible through the constant collaboration with the previous head of this department, Professor Remy. Because I was hearing retirement age, he handed over the Radiology Department to concentrate on university research interests. Perhaps, due to my close personal involvement with him, I feel very keenly the challenge of keeping not only the same level of quality but also the overall vision for the department.

How do you manage family time?

As a radiologist, I have to say that you have to choose. Because my profession is my life. I have to say that when my daughter was born, I was still a medical student. I’ve been extraordinarily lucky in my professional life, because my husband is in the same profession, the same specialty and the same department – very lucky! There is probably only one thing I might have done differently if I’d been a man, or not had a family, and that is to have been more involved in the organisation and politics of our profession — another important aspect of radiology. Unfortunately, this isn’t something one can do without full-time commitment and it would involve a lot of time and travel. So my choice has been my son rather than professional politics. I don’t really have any regrets. I sometimes think about it, but I can’t do something with and, because I’m Head of Department, I can organise my working day without having to ask my boss’s permission. That’s not something someone 10 years more junior could do. I can arrange to leave early and work at home, so that when my son comes home from school, I can be there for him. However, I’m often at the hospital at weekends, much to my son’s chagrin. I guess I needed to look after him, so I could organise my day differently but that’s not what I choose to do.

The same goes for choosing radiology; if you love it you should do it. There is a plenty of options. The hospital career path is probably the most challenging to balance work and family, but in a private radiology centre, a woman can happily work part time, fitting her professional career and family.

What advice would you offer women in medicine or, specifically, radiology?

Women, particularly those in senior positions, have to impose some rules. Although we are just as efficient as men (if not more so) our time is more limited. So, if a half-hour meeting is scheduled for mid-day, it still takes too long. Also, when you are at 12.15, it becomes a 15 minute meeting. Obviously, over time, I’ve become more efficient, but I say this, but it is important. The time we have for work has to be used efficiently, but the time with the patient decisions can be made directly and manage everything. How can they work part time, fitting their professional career and family?

First, I really like my job – that’s very important. Second, I am ambitious — to succeed, you need to be. Third, you also need to be feminine. Also, you should not work with conventional imaging — the patients are now less and less, but it was hard work and women may benefit from this. You must always combine the job with your private life. I’m not married and have no children.

PET/CT AND CHILDREN

PET/CT imaging exhibits significantly higher sensitivity, specificity and accuracy than conventional imaging when it comes to detecting malignant tumours in children. This was first published in the Journal of Nuclear Medicine (132, 772-779, 2001). According to the European Society of Paediatric Radiology, he points out. The investment in new imaging techniques is an absolute necessity for the society. Using contrast media and molecular imaging, PET/CT can better visualise various tissues and organs. PET/CT enables the identification of early changes in tumours. This early detection can improve the patient’s chances of survival. PET/CT is a safe imaging technique for children. It is well tolerated and has minimal side effects. Children do not have to fast before the examination, and they can receive general anaesthesia if necessary. The examination time is short and the patient is comfortable during the procedure. PET/CT imaging is especially useful in children with solid tumours, such as brain tumours, bone tumours, and soft tissue tumours. PET/CT can help detect small lymph node lesions in children, which is not possible with conventional imaging. The use of the latest scanners and Siemens’ technological developments; post-processing; CT angiography and multi-detector CT, including dual energy.

Professor Maria Cova is one of the two women to hold the post of Board Member of the Italian Society of Radiology (SIRM), of which she was Vice President from 2004-2006. Apart from spending a year at Johns Hopkins University Hospital, Baltimore, USA, the professor has never worked anywhere else. There are three radiology departments in Italy: the University Department at the Hospital of Cattinara Hospital, Trieste, of which she is Chairman.

Daniela Zimmermann asked her about what women can achieve in this field, as well as the importance of research, multicultural roles and research activities.

DZ: What does your role as a Board Member of the Italian Society of Radiology entail?

MC: The Society is subdivided into seven internists. Her international oversees five senior doctors and respiratory medicine. In her also Professor of Radiology in Lille Radiology and is Chairman of the Radiology Department in which it is possible to combine high-quality diagnostic activities, teaching and clinical research activities. This has been possible through the constant collaboration with the previous head of this department, Professor Remy. Because I was hearing retirement age, he handed over the Radiology Department to concentrate on university research interests. Perhaps, due to my close personal involvement with him, I feel very keenly the challenge of keeping not only the same level of quality but also the overall vision for the department.

What advice would you offer women in medicine or, specifically, radiology?

Women, particularly those in senior positions, have to impose some rules. Although we are just as efficient as men (if not more so) our time is more limited. So, if a half-hour meeting is scheduled for mid-day, it still takes too long. Also, when you are at 12.15, it becomes a 15 minute meeting. Obviously, over time, I’ve become more efficient, but I say this, but it is important. The time we have for work has to be used efficiently, but the time with the patient decisions can be made directly and manage everything. Women must be efficient and flexible with the time at their disposal. No, they stay in the profession, but, in a private life – which naturally I don’t work part time, fitting her professional career and family.

First, I really like my job – that’s very important. Second, I am ambitious — to succeed, you need to be. Third, you also need to be feminine. Also, you should not work with conventional imaging — the patients are now less and less, but it was hard work and women may benefit from this. You must always combine the job with your private life. I’m not married and have no children.

But do I have a very active private life? No, I think medicine is a pretty demanding profession, so I don’t want to miss. So I’ve always done my best for work, but what I’ve been in private life – which naturally I don’t work part time, fitting her professional career and family.

Professor Maria Cova is one of the two women to hold the post of Board Member of the Italian Society of Radiology (SIRM), of which she was Vice President from 2004-2006. Apart from spending a year at Johns Hopkins University Hospital, Baltimore, USA, the professor has never worked anywhere else. There are three radiology departments in Italy: the University Department at the Hospital of Cattinara Hospital, Trieste, of which she is Chairman.

Daniela Zimmermann asked her about what women can achieve in this field, as well as the importance of research, multicultural roles and research activities.

DZ: What does your role as a Board Member of the Italian Society of Radiology entail?

MC: The Society is subdivided into seven internists. Her international oversees five senior doctors and respiratory medicine. In her also Professor of Radiology in Lille Radiology and is Chairman of the Radiology Department in which it is possible to combine high-quality diagnostic activities, teaching and clinical research activities. This has been possible through the constant collaboration with the previous head of this department, Professor Remy. Because I was hearing retirement age, he handed over the Radiology Department to concentrate on university research interests. Perhaps, due to my close personal involvement with him, I feel very keenly the challenge of keeping not only the same level of quality but also the overall vision for the department.

What advice would you offer women in medicine or, specifically, radiology?

Women, particularly those in senior positions, have to impose some rules. Although we are just as efficient as men (if not more so) our time is more limited. So, if a half-hour meeting is scheduled for mid-day, it still takes too long. Also, when you are at 12.15, it becomes a 15 minute meeting. Obviously, over time, I’ve become more efficient, but I say this, but it is important. The time we have for work has to be used efficiently, but the time with the patient decisions can be made directly and manage everything. Women must be efficient and flexible with the time at their disposal. No, they stay in the profession, but, in a private life – which naturally I don’t work part time, fitting her professional career and family.

First, I really like my job – that’s very important. Second, I am ambitious — to succeed, you need to be. Third, you also need to be feminine. Also, you should not work with conventional imaging — the patients are now less and less, but it was hard work and women may benefit from this. You must always combine the job with your private life. I’m not married and have no children.

But do I have a very active private life? No, I think medicine is a pretty demanding profession, so I don’t want to miss. So I’ve always done my best for work, but what I’ve been in private life – which naturally I don’t work part time, fitting her professional career and family.
The new IMPAX Solution Suite

Agfa Healthcare’s new IMPAX solution suites offer PACS and RIS to cover hospital data handling and cardiovascular, cardiology, orthopaedics, mammography and radiology data. The firm’s Enterprise Suite, for example, was designed for the multi-site hospital and integrated Healthcare Delivery Networks operating in multi-patient ID domains. The system is driven by Agfa’s Data Centre, a multi-media archive for medical images and diagnostic results. Other applications in the new IMPAX series include:

Virtual Colonoscopy: This non-invasive CT colonoscopy clinical application produces a complete (supine and prone) CT colonoscopy data set in about 20 seconds. No user interaction is needed before diagnosis begins. Lesion detection takes place in a clinically relevant, user dependent, pre-defined layout. Automation ensures maximum productivity and streamlines results sharing.

Registration and Fusion: Easy-to-use automated tools and single mouse click make the comparison of high-res images effortless. The application supports the comparison of images from the same image types (for example CT to CT and / or MR to MR for follow-up studies) as well as in multi modality cases (e.g. CT to MR). Besides supporting X-ray images, the software also supports nuclear medicine by means of the registration and fusion of PET with CT and/or PET with MR.

OrthoGen: Agfa reports that this advanced measurement tool, for orthopaedic (Orthopaedic) and paediatric (paediatric) specialists, eliminates the need to perform manual measurements because it has an intelligent wizard. This guides the physician through complex measurement schemes and compares results with normative values. Results can be saved as images and proprietary records in PACS, printed as reports, or exported for further processing.

X-ray Angio Analysis: Diagnosing peripheral arteries and angiograms requires dedicated image processing and analyses. The application provides a comprehensive package for reviewing vendor independent DICOM X-ray Angio (XA) CR and RF diagnostic images in the radiology domain. The application key functionalities are Digital Subtraction Angio (DSA) and quantitative analysis of lesions and morphologies. The package offers three types of analyses: Straight, Bifurcation and Ostial. The creation of reports for hospital-wide distribution is supported.

IMPAX RDS: Agfa reports that the application enables radiologists, and other specialists, to access the world’s most comprehensive radiology database of diagnoses, case examples and images. Integration with the IMPAX system allows automatic results filtering based on anatomical region, improving both speed and diagnostic confidence.

Sectra launches a new PACS system

Sectra’s wide portfolio on show at the ECR this year includes a new PACS workstation, a photon-counting MicroDose Mammography system, pre-operative solutions for orthopaedic surgery and the company’s full range of Enterprise Control solutions.

PACS: The IDS7/tx, the latest model in Sectra’s PACS workstations, is being launched in Europe for the first time. This comprehensive, high-end diagnostic workstation features a patent pending technology that solves the problem of data explosion, Sectra explains: ‘The system enables radiologists to retrieve, display and process image data of extreme sizes with ease – problems encountered in working with large datasets do no longer occur.’ The PACS can distribute images for readings in multiple clinics. Even over high-latency networks, the streaming technology distributes datasets in network quality, regardless of size and variations.

Photon-counting: Sectra reports that its MicroDose Mammography LBD is currently the only commercial- ly available photon-counting mammography system on the market. ‘The unique photon-counting full-field digital mammography system maximises image quality and increases throughput at the lowest radiation dose on the market. At our booth, we demonstrate a totally integrated solution for mammography screening, including Sectra Screening RIS, Sectra MicroDose Mammography, and Sectra Breast Imaging PACS, all designed to effi- ciently streamline mammography workflow.’

Orthopaedics: Sectra offers a solution to optimise productivity through advanced image processing capabilities. A comprehensive set of guides for pre-operative planning of hip and knee surgery includes approximately 33,000 views of digital templates, from 18 implant manufacturers, bringing full functionality to plan and template even complex trauma cases.

The company will also showcase PACS-Guard. Control Tower software generates reports, monitors the daily status of a radiology department, reveals long-term production trends in RIS and PACS and identifies potential bottlenecks early.

New name. New colours. Same great workflow.

Kodak’s Health Group is now Carestream Health, Inc. We’re the same team with the same drive to make your work flow with our innovative KODAK CARESTREAM RIS, PACS, and Information Management Solutions, plus a full digital portfolio that includes CR, DR, and laser imaging systems.

We can help automate your workflow from patient administration to results distribution. You can count on the same collaborative support from professionals who truly understand your demands, challenges, and goals.

www.carestreamhealth.com

The innovation in Kodak health products
How to inspire creativity while assuming productivity exactly match the market’s needs. Yet, at the same time competitive advantage requires innovations that develop creative strategies will stay on top – or make it to the top. Establishing and maintaining strategic partnerships is a crucial component of any viable strategy for future business. Although the healthcare market may not be a loud and noisy one, it nonetheless deserves close attention as more and more information about medical services is available on the internet or in quality reports. Patients have an increasingly clear set of priorities and know how to look after their own interests. They spend a lot of time and energy on finding the right partner for their particular health issues. Oversupply leads to competition for the client – the patient. Hence, the market needs creative strategies to differentiate themselves from the competition. It’s worth the effort!

Britta Fünfstück graduated in engineering physics in Linz, Austria. For the past ten years she has worked in management consulting and healthcare, in Germany and the USA, where she worked with the Boston Consulting Group from 1998-2000. She then joined Siemens Healthcare, where she has managed business development projects, led product definition teams in high-tech and, has been responsible for product planning, global marketing and sales of MR systems. At the beginning of 2008 she was appointed to lead the team as Head of Business Development/Strategy.

The importance of strategic partnerships

Harald W Bachleitner studied law at Ludwig-Maximilians University, Munich, and for the bar at the Munich Staatsprüfung. Further training included Public Management as well as studies to qualify as an assessor, at the European Foundation for Quality. After a period as a civil servant for the city of Munich, he joined the München-Schwabing Hospital, first as Deputy Administrative Director and Head of Finances, then rising to become the hospital’s Administrative Director. In 2005 he was appointed Managing Director of SRH Zentralklinikum Suhl gGmbH and, in 2007, became a healthcare consultant and Managing Director of bachleitner contract GmbH & Bachleitner Beteiligung GmbH. In January this year, he was appointed Managing Director of Initiative Gesundheitswirtschaft, Berlin.

Medical management in the Russian healthcare system

Professor Shlyakhto Eugen Vladimirovich MD studied medicine at the Pavlov Medical State University, St Petersburg; he also gained a doctorate in science, and worked as Vice Rector for research at the university from 1994-2001.

In 1993 he was appointed Professor in the Department of Internal Medicine, where he has been head since 1997, when he also became Director of the Pavlov Medical Institute in the university.

Prof. Vladimirovich also has been Director of Almazov Federal, Heart, Blood and Endocrinology Centre since 2001. In 2004, he was a corresponding member of the Russian Academy of Medical Sciences, and is a member of various Russian medical societies and associations; among these he is Vice President of the St Petersburg Branch of the Russian Medical Association.

The professor is Editor in Chief of Arterial Hypertension (Russ.) and Vice Editor in Chief of Scientific notes (Russ.) publications. Since 1992, his monographs/books and scientific manuscripts have been many, covering his fields of interest: Arterial hypertension, heart failure, unstable angina, clinical pharmacology of antihypertensive drugs, cardiotrhythmics and molecular cardiology.

In addition, he has participated in numerous clinical trials

The Management of Innovation and Efficiency

How to inspire creativity while assuming productivity globally, many healthcare providers face a dilemma: They not only need to be innovative to provide high quality care but also must reduce the costs of that care. Is this really a contradiction? No, in fact one effort can be directly connected to the other – by increasing workflow efficiency. How increased efficiency leads to high productivity, as well as to exceeding quality, can be demonstrated by looking at high-tech industry – e.g. the medical engineering industry. Strong process orientation is a common and important factor in reaching and maintaining excellence and best-in-class quality. This is reflected by not only measuring criteria, incentive structures, and productivity programmes, but also by the motivation of the people involved. Yet, at the same time competitive advantage requires innovations that exactly match the market’s needs.

healthcare IT, and has been responsible for product planning, global marketing and sales of MR systems. At the beginning of 2008 she was appointed to lead the team as Head of Business Development/Strategy.

Such innovations in products and solutions are the key to success. Innovation management has therefore developed as a discipline and core competence. These management experiences and insights of driving innovation and at the same time cost efficiency can and often need to be transferred to different markets and businesses – and also to healthcare providers.

During the symposium, examples of innovation and efficiency in healthcare will be demonstrated as well as examples of how industry experience could be applied to hospital management or the management of radiology departments. We will also see how a close collaboration between healthcare providers and the industry can drive innovations in technology and workflow – to shape the future of medicine together.

In many countries, healthcare is the biggest industry – as well as among the few that are growing! This means healthcare is a highly dynamic market. The current situation nevertheless has enormous potential for service providers that manage to sharpen their profiles on this dynamic market by offering products with unique selling points or at least points that differentiate their products from those of other companies. Strategic partnerships are long-term co-operations between owners of complementary know-how and joint corporate objectives – both factors ensure a level of quality that cannot be reached by one of the partners alone and they offer optimised cost efficiency. Moreover, strategic partnerships enable the parties to enter into large projects and they open perspectives and create visions. In the high-tech medical technology sector strategic partnerships help to secure funding to cover increasing investment costs. For example, manufacturers of CT or MRI equipment offer their customers – i.e. the users – provision of the required know-how to operate their equipment, implement and operating costs remain affordable. Consequently, the use of the equipment is efficient in the long run.

Furthermore, the manufacturers’ corporate co-responsibility ensures product development that is based on actual need in the field. The result is a win-win situation for all players: the patient receives verifiable quality and prices from the realisation of technological potential. The user also realises his potential and at the same time minimises risks; he incurs less implementation and operating costs, increases customer loyalty, number of cases, efficiency and employee satisfaction. Additionally, the manufacturer has satisfied customers and generates demand by offering his customers an added-value.

In short: A strategic partnership gives you an edge over the competition. It’s worth the effort!
Radiology process redesign, the theory of constraints and the twenty-nine million dollar revenue opportunity

After gaining a degree in Nursing and a qualification as Nurse Practitioner, Martin Bledsoe MSPH worked in Kentucky, USA, for 11 years. He then attended the University of North Carolina, gaining an MSc in Public Health, and joined Johns Hopkins Medicine. His roles there included various top administrative roles prior to his current appointment as Chief Administrator for the Russell H Morgan Department of Radiology and Radiological Science at Johns Hopkins Medicine. In this role he manages about 1,000 employees.

He has been actively involved in the leadership and programme development for the Association of Administrators of Academic Radiology, of which he is currently President-elect. He is a consultant and published author of articles on imaging business operations.

In almost all US hospitals, in-patient radiology examinations are not scheduled. Instead, they are performed when equipment and patients are simultaneously and serendipitously available. While this flexibility may optimise patient flow for radiology under current conditions, it introduces variability and inefficiency into broader hospital operations, which may result in increased length of stay in an environment with fixed reimbursement per admission, a decrease in length of stay of even a few hours over an entire hospitalisation can create tens of millions of dollars of revenue opportunity if the newly created capacity can be utilised.

This presentation shows how the Johns Hopkins Department of Radiology analyzed its in-patient workflows with the intention of redesigning them before moving into its portion of a new 1.6 million square foot in-patient facility. The presentation includes a brief review of a management concept concerning throughput known as the theory of constraints. Some of this concept’s principles are then applied to the process of an in-patient hospitalisation, which leads to the conclusion that to maximise throughput, hospitals must deploy new systems for patient tracking, universal scheduling, and real time systems performance monitoring. These systems have been widely deployed in other industries but for the most part specific applications for healthcare have not been developed.

One key principle of the theory of constraints is that maximising the throughput of a microsystem often slows throughput of the macrosystem. In the context of an in-patient hospitalisation, radiology can be regarded as a microsystem and given hospitalisation itself the macrosystem. Because throughput has always been important in radiology due to large capital investment in equipment, it is a logical place for early proof of concept work in designing the new healthcare applications. However, as a next step in developing and testing these new applications it will be necessary to perform simultaneous pilot work across all hospital microsystems, including other diagnostic areas, treatment areas, and in-patient nursing care, in order to capture throughput efficiencies at the macrosystem level. Only then can hospital management create the revenue opportunity provided by a length of stay shortened by a few hours.

The sooner the better. Never did that phrase ring more true than when treating illness. From predicting and diagnosing to monitoring, treating and informing, GE Healthcare dedicates its resources to helping healthcare providers stay as many steps ahead of illness as possible. Because the earlier the detection, the sooner we might bring disease to an end. Healthcare Re-imagined.

GE Healthcare

The end of disease starts at the beginning.

To learn more visit www.gehealthcare.com/re-imagine

© 2006 General Electric Company. All Medical Systems by GE Healthcare.
Dr Peeter Ross studied medicine in Tartu University, Estonia, and in Helsinki University, Finland, and undertook further studies in radiology at Oulu University, Finland. After residency in radiology at Tartu University, he joined StorageTek – a company which was a part of Agfa Healthcare. He then joined a specialist-team to build up the international rollout of the Agfa HIS/CIS business, with a focus on market evaluation and strategy. After being head of medical management at GWI in Bonn, he moved to the Estonian eHealth Foundation, as its executive director and the CEO of Estonian eHealth Foundation. In 2004, Dr Ross was appointed to his current position as Director of Research and Development in East-Tallinn Central Hospital, Estonia. He is also acting president of Estonian Society of Radiology and a member of the supervisory board of Estonian Health Insurance Fund and Estonian eHealth Foundation.

Using a single HIS/PACS platform for patient medical data sharing between healthcare providers

The presentation will provide an overview of patient medical data sharing and distribution between the hospital, general practitioners (GP) and patient, using recent developments in Hospital Information System (HIS) and Picture Archiving and Communication System (PACS). The effective use of medical data requires workflow re-engineering and use of modern data transfer technology. Using the latest HIS/PACS technology, the radiology department at the East Tallinn Central Hospital has completely re-engineered radiology workflow management during the last four years. The hospital started to use PACS with limited diagnostic workstations and web user licenses. By the end of 2007 the hospital became ‘filmless’, with an annual volume of 170,000 radiology examinations.

The case mix includes all imaging modalities and radiologists also provide reporting services for external facilities. Our web-based PACS with streaming technology allows archiving of all kinds of images, including non-DICOM and non-radiology images. The PACS is integrated with the web-based HIS, so the radiologist or referring physician can open images using the HIS and simultaneously view other patient data. The same possibility is available for general practitioners (GPs) outside ETCH. This kind of holistic patient approach achieved by HIS-PACS integration minimizes the risk of having inadequate patient history or referral letters before imaging or during reporting.

Inspired by successful digital image sharing with other health care providers, ETHC has opened the entire electronic patient record for authorised GPs and even more – a patient can access his/her medical data in HIS. The security of individual patient data is guaranteed by using a personal ID-card. Classic hospital or department workflow is linear, meaning that almost all patient data resides with the individual patient or physician and can’t be accessed from different locations. Digital processing of patient data opens new dimensions for patient care management. Now, if needed, patient data can be used at any time and any place.

From this point of view, the implementation of PACS is allowing radiologists to achieve workflow optimisation. The radiologist can report not only the images made in the department or radiologist’s location, but also the images that have been taken in other locations. Reporting can be done on the basis of the anatomic region, modality, urgency, department, etc. The successful and secure radiology data sharing can be taken as a good example for implementing similar solutions for other medical information distribution.

From the outset of HIS/PACS planning, it is essential that HIS/PACS and PACS should be integrated.

Managing services in patient data archiving

The impact on IT, finance and physicians

Session 2 IT & Telemedicine

Outsourcing as part of hospital IT optimisation. Doing it the right way

Medical doctor Thomas Geisinger studied hospital business administration (VWA) at Mainz University, Germany. Today, he is Global Manager for E-Health integration with Agfa Healthcare. After being head of medical management at Frankfurt/Main University Hospital for three years, in 2003 he became a hospital business advisor and director for DRG Product Management at GMI in Bonn – which was acquired by Agfa Healthcare. He then joined a specialist-team to build up the international rollout of the Agfa HIS/CIS business, with a focus on market evaluation and strategy.

The presentation will begin with a classification of all Diagnostic activities (such as DRGs). It includes the procedures for medical documentation and the cost measurements based on the activities performed. The available DRG models will be shown that could be used to perform such activity/cost calculations.

The second part will focus on the execution. What the parameters are to manage the vendor and what available definitions there are for the service levels.

Better Images
Higher Diagnostic Quality
Improved Patient Safety

VISIT US AT THE ECR
EXPO HALL A, BOOTH 120
ENTRANCE LEVEL
Dr Tech Hanna Kaarina Pohjonen gained her MSC in Engineering at the Helsinki University of Technology (thesis: 3-D analysis and visualisation of medical images), then her Licentiate of Technology (thesis: Registration and visualisation of multimodal medical images). In 1997 she gained her doctorate (thesis: Image fusion in open-architecture quality-oriented nuclear medicine and radiology departments), and in 2002 became Associate Professor at the same Institute (doctorate in healthcare informatics, post-doctoral merit). In 2008 Dr. Pohjonen became Associate professor at the Tallinn University of Technology.

She has carried out research at the Clinical Perfusion Laboratory of the Papworth Hospital, UK; the Department of Human Anatomy and Cell Biology; the Muscular Research Group, University of Liverpool, UK and at the Dept. of Technical Physics in the Laboratory of Biomedical Engineering, Helsinki University of Technology.

As a clinical engineer she was employed at the Medical Engineering Centre of Helsinki University Central Hospital, working on the registration of multimodal images for neurological cases (computer algorithms & clinical marker designs); 3-D-modelling of medical objects, segmentation, and quality assurance concepts in radiology. At the same centre, she was a network engineer working on healthcare IT procurement; telecommunication networks and had responsibility for RIS/PACS pilots and teleradiology.

In 1997, Dr Pohjonen was an evaluator of the European Union Telemedicine Programme. In that year she also became Project Manager at the National Technology Agency (Tekes) under the Ministry of Trade and Industry, until 2000, when she began full-time consultancy in healthcare Information systems and networks, founding her own company Rosalinea Oy, which has held consultations in 20 countries.

About 90% of our turnover is from abroad,” Dr Pohjonen points out. The company has specialised in large national and regional eHealth programmes throughout Europe (e.g. consultation for almost all the largest PACS installations in Europe, including the NHS Connecting for Health). Consultation also includes the NHS Connecting for Health. Consultation also includes large national and regional eHealth programmes throughout Europe (e.g. consultation for almost all the largest PACS installations in Europe, including the NHS Connecting for Health).

In 2008 Dr. Pohjonen became Associate professor at the Tallinn University of Technology. She has carried out research at the Clinical Perfusion Laboratory of the Papworth Hospital, UK; the Department of Human Anatomy and Cell Biology; the Muscular Research Group, University of Liverpool, UK and at the Dept. of Technical Physics in the Laboratory of Biomedical Engineering, Helsinki University of Technology.

As a clinical engineer she was employed at the Medical Engineering Centre of Helsinki University Central Hospital, working on the registration of multimodal images for neurological cases (computer algorithms & clinical marker designs); 3-D-modelling of medical objects, segmentation, and quality assurance concepts in radiology. At the same centre, she was a network engineer working on healthcare IT procurement; telecommunication networks and had responsibility for RIS/PACS pilots and teleradiology.

In 1997, Dr Pohjonen was an evaluator of the European Union Telemedicine Programme. In that year she also became Project Manager at the National Technology Agency (Tekes) under the Ministry of Trade and Industry, until 2000, when she began full-time consultancy in healthcare Information systems and networks, founding her own company Rosalinea Oy, which has held consultations in 20 countries.

‘About 90% of our turnover is from abroad,’ Dr Pohjonen points out. The company has specialised in large national and regional eHealth programmes throughout Europe (e.g. consultation for almost all the largest PACS installations in Europe, including the NHS Connecting for Health). Consultation also includes healthcare information systems, networks, data privacy and security issues as well as eHealth applications. Typical customers: governments, hospital districts, private healthcare chains, EU global IT companies, small innovative eHealth companies, investors, big consultancy companies.

Dr Pohjonen is also a reviewer in European Radiology and Consultant for Imaging Management.
Hospitals must be governed by business rules

Jürgen Abshoff

Chair of the CO-OP for Quality Management in Hamburg Hospitals (EUS). Last year he became President of the advisory council (Betreit) for the German health industry congress. "Which partnership models can help hospitals obtain any state-of-the-art medical technology quickly? This is entirely unrealistic - at least in the current system of statutory health insurance. Today, the performance levels of the system are so uncertain that we often don't even attempt to get quality under control. In this case, the public pension funds will continue to rise and cover the needs of pensioners - a challenge which is presented by a 'health lie'. The DRG system, introduced in Germany as a pricing system, is used as a budget system. Combined with strict budget cap-tals, this has deepened the health environment. Recent political decisions, such as the newest health law in the Netherlands, have exacerbated this trend in the entire hospital sector. Above all, this reform ran the danger of perpetuating the well-tried and successful administrative autonomy of the healthcare system. Health insurers were deprived of their inde-pendence and control over their income. If the planned health fund becomes reality, politicians will control the income of health insurers and will - more than in any case tactics - tighten the health insurers' financial flexibility even more. Additionally, to add insult to injury, they will hold the insurers and health providers respon-sible for their disastrous policies.

In 2000, when Philips was making the so-called convergence, Germany will very likely further develop in hospital financing. This reform aims at abil-ity, or at least entirely change, the principles of German hospital financing eliminating since 1971: planning, dual-source financing, pricing system.

Most importantly, the dual-source funding system, which means that capital investments are being funded by the state while operating costs are being funded by the statutory health insurers, is to be replaced by overall financing schemes based on fixed, maximum or recommended (DRG) prices.

In Germany, the dual-source funding system, which means that the state funding, called "pension lie" – the often repeated, is planning a new wing or modernization, instead of upgrading the hospital's equipment. The average time for a patient to be admitted to a hospital ward is 12 months, 15,000 surgical interventions are performed; the average costs of an intervention are Euro 40 billion, and the Japanese DRG system, introduced in 1984, to 2007, he was Manager of the Hamburg Hospital Federation, and was founder and member of the steering committee of the Co-operative for Quality Management in Hamburg Hospitals (EUS). Last year he became President.

Philips can also provide a managed service solution: As well as providing financing, Philips can also offer a new lease or managed service solution: as well as providing financing. Philips can also include a commitment to keep the technology up-to-date for a fixed period. Philips also offers the user a choice of outsourcing, to include upgrade, or for prede-vided budgets. On a larger scale, Philips can also provide a managed service for longer terms when the company provides multiple systems, as technology progresses it will upgrade and replace the systems in the long-term agreement. In this way Philips ensures the customer is always working with state-of-the-art technology over a defined period, for a pre-agreed budget. In such part-nerships we typically also agree on the performance levels of the sys-tems, such as uptime and response times.

In addition to these financing and service approaches it is important for Philips to present partners with a ‘full scope’ of technology solutions. That’s why we established Philips’ turn-key solutions. The company acts as a main contractor and integrator for all technologies when a hospital is planning a new wing or moderni-sation of an existing facility. As an integrator, the company plans and evaluates the purchase of all medical devices, from beds to lamps. The company takes care of the programme management, specifications, procure-ment, project management, installa-tion, testing, and point-of-care man-agement. Again, for a fixed price. Responding to these new demands requires flexibility. Approaches as well as technologies and partnerships are restricted for six years, therefore, we also have to design our solutions with the utmost flexibility and on a project-by-project basis - for the benefit of Philips customers and our partners.

The new approach is built on the idea that collaborative approach - from a performance and financial point of view. This is what Philips provides. In doing so, the idea is to develop the right partnerships, customer and reliable solutions.

Hospitals were deprived of their inde-pendence and control over their income. If the planned health fund becomes reality, politicians will control the income of health insurers and will - more than in any case tactics - tighten the health insurers' financial flexibility even more. Additionally, to add insult to injury, they will hold the insurers and health providers respon-sible for their disastrous policies.

In 2000, when Philips was making the so-called convergence, Germany will very likely further develop in hospital financing. This reform aims at abil-ity, or at least entirely change, the principles of German hospital financing eliminating since 1971: planning, dual-source financing, pricing system.

Philips can also provide a managed service solution: As well as providing financing, Philips can also offer a new lease or managed service solution: as well as providing financing. Philips can also include a commitment to keep the technology up-to-date for a fixed period. Philips also offers the user a choice of outsourcing, to include upgrade, or for prede-vided budgets. On a larger scale, Philips can also provide a managed service for longer terms when the company provides multiple systems, as technology progresses it will upgrade and replace the systems in the long-term agreement. In this way Philips ensures the customer is always working with state-of-the-art technology over a defined period, for a pre-agreed budget. In such part-nerships we typically also agree on the performance levels of the sys-tems, such as uptime and response times.

In addition to these financing and service approaches it is important for Philips to present partners with a ‘full scope’ of technology solutions. That’s why we established Philips’ turn-key solutions. The company acts as a main contractor and integrator for all technologies when a hospital is planning a new wing or moderni-sation of an existing facility. As an integrator, the company plans and evaluates the purchase of all medical devices, from beds to lamps. The company takes care of the programme management, specifications, procure-ment, project management, installa-tion, testing, and point-of-care man-agement. Again, for a fixed price. Responding to these new demands requires flexibility. Approaches as well as technologies and partnerships are restricted for six years, therefore, we also have to design our solutions with the utmost flexibility and on a project-by-project basis - for the benefit of Philips customers and our partners.

The new approach is built on the idea that collaborative approach - from a performance and financial point of view. This is what Philips provides. In doing so, the idea is to develop the right partnerships, customer and reliable solutions.

Hospitals were deprived of their inde-pendence and control over their income. If the planned health fund becomes reality, politicians will control the income of health insurers and will - more than in any case tactics - tighten the health insurers' financial flexibility even more. Additionally, to add insult to injury, they will hold the insurers and health providers respon-sible for their disastrous policies.

In 2000, when Philips was making the so-called convergence, Germany will very likely further develop in hospital financing. This reform aims at abil-ity, or at least entirely change, the principles of German hospital financing eliminating since 1971: planning, dual-source financing, pricing system.

Philips can also provide a managed service solution: As well as providing financing, Philips can also offer a new lease or managed service solution: as well as providing financing. Philips can also include a commitment to keep the technology up-to-date for a fixed period. Philips also offers the user a choice of outsourcing, to include upgrade, or for prede-vided budgets. On a larger scale, Philips can also provide a managed service for longer terms when the company provides multiple systems, as technology progresses it will upgrade and replace the systems in the long-term agreement. In this way Philips ensures the customer is always working with state-of-the-art technology over a defined period, for a pre-agreed budget. In such part-nerships we typically also agree on the performance levels of the sys-tems, such as uptime and response times.

In addition to these financing and service approaches it is important for Philips to present partners with a ‘full scope’ of technology solutions. That’s why we established Philips’ turn-key solutions. The company acts as a main contractor and integrator for all technologies when a hospital is planning a new wing or moderni-sation of an existing facility. As an integrator, the company plans and evaluates the purchase of all medical devices, from beds to lamps. The company takes care of the programme management, specifications, procure-ment, project management, installa-tion, testing, and point-of-care man-agement. Again, for a fixed price. Responding to these new demands requires flexibility. Approaches as well as technologies and partnerships are restricted for six years, therefore, we also have to design our solutions with the utmost flexibility and on a project-by-project basis - for the benefit of Philips customers and our partners.

The new approach is built on the idea that collaborative approach - from a performance and financial point of view. This is what Philips provides. In doing so, the idea is to develop the right partnerships, customer and reliable solutions.
New technique enables transfer of X-ray phase contrast imaging to clinical practice

X-ray phase contrast imaging (XPCi) is a novel imaging technique with the potential to revolutionise the field of diagnostic radiology. It can do this because it is based on a different physical effect, namely refraction/interference instead of absorption. Studies carried out with synchrotron radiation have demonstrated that the exploitation of such effects leads to a substantial increase of the contrast of all details in an image, as well as to the detection of details classically considered invisible. These studies have shown that the potential of XPCi is especially remarkable in those fields where small absorption differences are the main limiting image quality, such as mammography – where most tumours are invisible. These studies have demonstrated by means of ex-vivo or animal studies. These include:

- lung imaging, in which the technique showed the potential to spot small lesions with conventional planar imaging without having to rely on expensive (both in terms of cost and patient dose) CT scans
- vascular imaging/ coronary angiography, in which the potential to image blood vessels without contrast agents was demonstrated
- bone imaging, where minimal details on the bone trabecular structure are easily and effectively depicted due to the substantially increased sensitivity
- and many others, to include improved resolution and lesion detectability in liver imaging, kidney imaging, etc. Moreover, refraction/interference effects are less subject to decreasing with increasing X-ray energy that absorption effects as a consequence, images could be acquired at higher X-ray energies, which could translate into improvements also of one order of magnitude.

Despite being probably the ideal X-ray imaging technique, the problem so far with XPCi was that its use seemed to be restricted to synchrotron radiation environments. All early implementations of the technique seemed in fact to require levels of spatial coherence (i.e. small focal spot plus large source-to-sample distance) and monochromaticity not available with state-of-the-art clinical sources. Although pilot experiments with synchrotron radiation like the one on mammography currently underway in Trieste have a high scientific significance, a real world-scale impact would be achieved only by developing a relatively small-sized, cost effective prototype. This clearly requires taking XPCi out of synchrotron environments and into laboratory practice.

Researchers at University College London, after having demonstrated that polychromatic radiation can provide the same level of phase contrast imaging (PC) as its monoenergetic counterpart, have developed a new technique based on the use of coded apertures, which makes all advantages of XPCi achievable with conventional sources.

Unlike other techniques based on perfect crystals, grating interferometers, etc., the coded apertures approach allows for the first time the use of divergent, polychromatic X-ray beams, like those produced by conventional

By Professor Robert D Speller
Head of the Radiation Physics Group, University College London, and
Dr Alessandro Olivo, of the Medical Physics & Bioengineering Dept.
University College London
Today, biomedical research faces many challenges for which the traditional approach, based on the subdivision of biological systems, is inadequate. These artificial subdivisions are generally along dimensional scales (body, organ, tissue, cell, molecule), scientific disciplines (biology, physiology, medicine, bioengineering), or topographic anatomy (cardiovascular, musculoskeletal, gastrointestinal, etc.). They make it impossible to unravel the systemic nature that governs physical disease manifestations.

Thus, it is necessary to complement this traditional approach with an integrative approach to combine observations, theories and predictions across the temporal and dimensional scales, the scientific disciplines, and anatomy. This realisation, shared by the vast majority of experts in biomedical research, has given rise to a number of initiatives such as integrative biology, system biology, physiome, etc.

What is the role of Radiology? Radiology should play a major role in this integrative approach of the VPH, as imaging provides non-invasive insights into structure and function of human tissues and organs. With revolutionary technological developments during the last decade, radiology has grown far beyond visualisation of 2-D structures. Multi-slice CT and MRI, especially when using parallel imaging and higher field strength, record volumetric data at isotropic submillimetre spatial and subsecond temporal resolution. Together with the assessment of function, such as molecular imaging, e.g. by PET, diffusion-weighted MRI or dual energy CT, multidimensional, so-called 4-D imaging has become reality. With 4-D imaging dynamic processes are observed and analysed, e.g. dynamic cine imaging of the beating heart or the breathing lung and also the moving liver during respiration and the subsequent deformation. When using contrast agents and imaging with high temporal resolution, tissue and organ perfusion are easily addressed. Another major advantage of radiology is its capability to provide all these data of individual patients looking at different scales: cells (molecular imaging), tissue, organ and whole body.

Bio-System-Radiology

As such, radiology is entering a new field – bio-system-radiology. Image-based geometries and functional assessments are used as bio-conditions for modelling and simulation of human systems. This allows, for example, to model their physiological processes and pathological changes using computational fluid dynamics or other methodologies. From the non-medical arena, modelling has been widely used in research and development in the car or aerospace industry. Towards this, radiology should seize this opportunity to contribute to bio-systems, including medical and non-medical applications.

What will the future look like? A number of initiatives are already working on creating a new field – bio-systems, bio-systems biology (Bio-System Biology) and bio-systems medicine (Bio-System-Medicine). The Virtual Physiological Human (VPH) and the framework of the VPH, as imaging provides non-invasive insights into structure and function of human tissues and organs, are leading the way. The VPH can be defined as a new domain in biomedical research and the framework of the VPH to serve these needs. The VPH might be a way to share observations (‘description’), to derive predictive hypotheses from them (‘prediction’), and to integrate them into a constantly improving understanding of human physiology/pathology (‘integration’), by regarding it as a single system.

MSCT of the aorta, segmentation of individual geometry and 3-D print generated by rapid prototyping technology

By Hans-Ulrich Kauczor MD PhD, (left) Director and Chairman of Radiology at Heidelberg University Clinic, and radiologists Frederik Giesel MD MBA and Hendrik von Tengg-Kobligk MD of the German Cancer Research Centre in Heidelberg, Germany

Bio-System-Radiology

Aiming at improvements of drug and device design, modelling is currently entering the medical arena, e.g. system-biology in oncology or simulation of blood flow in cardiovascular disease. The great advantage of system modelling is its capability to provide all these data of individual patients looking at different scales: cells (molecular imaging), tissue, organ and whole body. Thus the appropriate therapy, e.g. endograft and its size, can be selected and accurately targeted. This knowledge will also foster the development of new, dedicated stent designs. Radiology has even more to offer: We can use image data together with rapid prototyping technology to produce reproductions of living structures or organs representing the actual structure in 3-D, the so-called ‘3-D print’. Novel integrative approaches in biomedical research and their translation into the clinical arena will profit substantially from multidimensional radiological imaging. Radiology should seize the chance to expand into the new field of ‘Bio-System-Radiology’ so that patients can benefit from innovations driven by bioengineering and systems biology.
Clinical trial validates CT virtual colonoscopy

Presenting those results, C Daniel Johnson MD, Professor of Radiology at the Mayo Medical School, Rochester, MN, emphasised that rigorous reader training was an important component for the results. All interpreting physicians had to read 500 cases, or attend a 1.5 day training course, and also pass a certified examination consisting of 50 cases of mixed levels of difficulty.

The results of the Munich Colorectal Cancer Prevention Trial, continued on page 14

When the International Agency for Research in Cancer (IARC) 2007 statistics report, showed that 429,000 new cases were reported in Europe in 2006, Director Peter Boyle recommended that colorectal cancer screening programmes be implemented throughout Europe. This disease is not fatal – it is diagnosed in its earliest stages. Adults should have a colorectal screening examination from aged 50 and then every three to 10 years, based on their level of cancer risk. The barium enema and optical colonoscopy — traditional tests to identify polyps — are resource-intensive and time consuming. Traditional optical colonoscopy is invasive, usually requiring sedation and incurring a 1-in-1,500 risk of colon perforation.

Patients find both processes unpleasant, and many avoid screening. In the USA, for example, although there were over 112,300 new cases of colon cancer and over 52,000 deaths from this disease in 2007, the US Centers for Disease Control and Prevention reports that only 44% of individuals eligible for screening (about 70,000,000 people) had a screening examination.

From a hospital resource perspective, non-invasive CT colonoscopy, or virtual colonoscopy (VC), is a far more efficient alternative, as long as there are physicians qualified to interpret the procedure. With the proliferation of multi-detector CT scanners in hospitals and clinics, the ability to offer this procedure, by medical facilities throughout Europe, has increased significantly.

Two barriers have prevented widespread implementation: procedure cost and validation to show that VC has equivalent detection sensitivity. The publication in 2007 results from major clinical trials conducted in Europe and the USA have validated VC’s accuracy and effectiveness. In September last year, the preliminary results were announced from the National CT Colonography Trial, sponsored by the American College of Radiology Imaging Network (ACRIN) and funded by the US National Institutes of Health. ACRIN reported that VC procedures performed on 2,531 asymptomatic patients in 15 US academic hospitals and private practice imaging centres yielded a 90% per patient sensitivity for adenomatous colorectal lesions 1 cm or larger in diameter. This level of sensitivity was comparable with that of optical colonoscopy.

When the International Agency for Research in Cancer (IARC) 2007 statistics report, showed that 429,000 new cases were reported in Europe in 2006, Director Peter Boyle recommended that colorectal cancer screening programmes be implemented throughout Europe. This disease is not fatal – it is diagnosed in its earliest stages. Adults should have a colorectal screening examination from aged 50 and then every three to 10 years, based on their level of cancer risk. The barium enema and optical colonoscopy — traditional tests to identify polyps — are resource-intensive and time consuming. Traditional optical colonoscopy is invasive, usually requiring sedation and incurring a 1-in-1,500 risk of colon perforation.

Patients find both processes unpleasant, and many avoid screening. In the USA, for example, although there were over 112,300 new cases of colon cancer and over 52,000 deaths from this disease in 2007, the US Centers for Disease Control and Prevention reports that only 44% of individuals eligible for screening (about 70,000,000 people) had a screening examination.

From a hospital resource perspective, non-invasive CT colonoscopy, or virtual colonoscopy (VC), is a far more efficient alternative, as long as there are physicians qualified to interpret the procedure. With the proliferation of multi-detector CT scanners in hospitals and clinics, the ability to offer this procedure, by medical facilities throughout Europe, has increased significantly.

Two barriers have prevented widespread implementation: procedure cost and validation to show that VC has equivalent detection sensitivity. The publication in 2007 results from major clinical trials conducted in Europe and the USA have validated VC’s accuracy and effectiveness. In September last year, the preliminary results were announced from the National CT Colonography Trial, sponsored by the American College of Radiology Imaging Network (ACRIN) and funded by the US National Institutes of Health. ACRIN reported that VC procedures performed on 2,531 asymptomatic patients in 15 US academic hospitals and private practice imaging centres yielded a 90% per patient sensitivity for adenomatous colorectal lesions 1 cm or larger in diameter. This level of sensitivity was comparable with that of optical colonoscopy.

Delivering IT solutions for your unique healthcare needs really hits the “Suite” spot.

Agfa’s IMPAX™ Suites are comprehensive and fully integrated digital imaging and information solutions for your healthcare enterprise. IMPAX Suites are ideal for facilities big, small, or in between because they are customized to your specific needs. Whether it’s the IMPAX Enterprise Suite for your multi-site facility or a dedicated IMPAX Suite, designed specifically for radiology, orthopaedics, cardiology or mammography, you can be confident your requirements will be met. A modular solution built to your specific needs today, with the flexibility to meet your needs of tomorrow – all the while allowing you to work faster, better, and with greater efficiency. Now that hits the “Suite” spot.

Learn more about our Impax Suites. Visit us at ECR, EXPO B #212-213.
Computed tomography versus magnetic resonance imaging: competitive or complementary?

The rapid pace of technological developments both in cardiac Magnetic Resonance Imaging (MRI) and cardiac Multi Detector-Row Computed Tomography (MDCT) keeps revolutionising the field of cardiac imaging. In this contribution, we intend to give a brief overview over the specific imaging capabilities of cardiac MDCT versus cardiac MRI and highlight some typical differential indications.

### Multidetector computed tomography of the heart

In the last decade, the majority of clinical studies on cardiac MDCT have focused on coronary artery disease (CAD), both in the acute and preventive setting.

Traditionally, the first approach in the evaluation of CAD with MDCT is the quantification of coronary artery calcification. The correlation between the extent of coronary artery disease and coronary calcification is supported by substantial clinical evidence. Various ways of reporting the calcium burden have been established (Agatston-Score, Calcium Mass, Calcium Volume). It has been shown that the extent of calcification has a high predictive value for subsequent coronary events when calcium scoring has been established as a tool for risk stratification in a population.

As there is no one-on-one relationship between coronary artery disease and coronary artery stenosis, the detection of obstructive coronary artery disease requires assessment of the arterial lumen. This analysis has already been traditionally performed invasively with coronary artery catheterisation. Recently, however, the value of CT Coronary Angiography (CTA) has been recognised, particularly in terms of its high predictive value for non-invasively ruling out significant stenosis in patients with atypical chest pain or prior equivocal or non-diagnostic test results. Compared with conventional coronary artery catheterisation, recent clinical trials of CTA with 64-slice CT or later generation scanners report sensitivities approaching 100% and specificities of over 95% in the diagnosis of obstructive coronary artery disease. It has also been shown that CTA is a valuable tool for the assessment of coronary artery anomalies and coronary bypass patency.

With the advent of faster scanner generations, CTA is increasingly extending to coronary artery disease. Contrast enhanced cardiac MRI scan in a representative short axis plane of a 57-year-old patient with history of myocardial infarct. Delayed enhancement pattern can be seen in the phase sensitive inversion recovery (PSIR) sequence (left) as well as in the corresponding magnitude image (right). Hyperenhanced endocardial region (hypertension endocardium) shows the location of non-viable, infarcted area with myocardial thinning (arrows).

### Table: Typical Indications for CT versus MRI of the Heart

<table>
<thead>
<tr>
<th>Cardiac MDCT</th>
<th>Cardiac MRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elective evaluation of coronary arteries</td>
<td>Detection of myocardial scar and viability</td>
</tr>
<tr>
<td>- atypical chest pain - intermediate pre-test probability of CAD AND - ECG uninterpretable or unable to exercise or prior stress test equivocal</td>
<td>- post myocardial infarction - prior to revascularisation</td>
</tr>
<tr>
<td>Evaluation of acute chest pain: - intermediate pre-test probability of CAD AND - no ECG changes, serial enzymes negative</td>
<td>Evaluation of LV function: - following myocardial infarction or in heart failure</td>
</tr>
<tr>
<td>Prior to invasive procedures: - before placement of biventricular pacemaker - prior to repeat cardiac surgical revascularisation</td>
<td>Characterisation of native and prothetic cardiac valves</td>
</tr>
<tr>
<td>Evaluation of suspected coronary anomaly</td>
<td>Quantification of flow volumes</td>
</tr>
<tr>
<td>Evaluation of specific cardiomyopathies</td>
<td>Evaluation of myocarditis or myocardial infarction with normal coronary arteries</td>
</tr>
<tr>
<td>Evaluation of suspected aortic dissection</td>
<td>Evaluation of cardiac masses (tumour or thrombus)</td>
</tr>
<tr>
<td>Evaluation of pericardial conditions</td>
<td>Prior to radiofrequency ablation</td>
</tr>
<tr>
<td>Assessment of complex congenital heart disease</td>
<td></td>
</tr>
</tbody>
</table>

### Clinical trial validates CT virtual colonoscopy

Clinical trial validating CT virtual colonoscopy continued from page 13

First reported at the 2007 International Symposium on Virtual Colonoscopy (ISVC) held in Boston, Mass. in October, yielded 100% sensitivity in identifying lesions 10 mm and larger. Sensitivity for polyps between 6-10 mm was 93.4% and 76.9% for lesions smaller than 6 mm. The 300 asymptomatic populations studied to date.

The study was conducted at the Pitié-Salpêtrière Hospital, Paris, used simulation modelling over a 10-year period to assess the cost of faecal occult blood tests, optical colonoscopy, and VC for a virtual asymptomatic French population aged over 50.

Dr Medihi Cadi, who presented the results at RSNA 2007, said the team had presumed that 50% of the eligible population would present for screening. Assumptions were made that the optical/VC procedures would be repeated over 10-year intervals if negative, and after 3-5 years if positive with adenomas. The faecal occult blood tests would be repeated every two years.

Medical costs were based on 2007 French rates. The cost per individual over a 10-year period averaged €885 for an optical colonoscopy, €543 for a CT VC, and €439 for faecal occult blood tests.

A cost-effectiveness study on...
Resonance imaging of the heart

Functional information is obtained with every retrospectively ECG-gated CTA scan, this ancillary information is ordinarily exploited to assess cardiac function and segmental wall motion. For the latter applications, however, CTA is in strong competition with other imaging modalities, primarily nuclear medicine techniques, which have been traditionally used for the assessment of cardiac perfusion, echocardiography as the most commonly used tool for the evaluation of cardiac function, and MRI, which currently still exceeds the temporal resolution of CT for the assessment of cardiac function, enables the spatially resolved evaluation of myocardial perfusion and does not expose the patient to ionizing radiation.

**Cardiac MRI**

Because of the limitations of other clinical methods (e.g. poor acoustic windows at echocardiography, limited spatial resolution and specificity of nuclear medicine myocardial perfusion scans), cardiac MRI is shaping up as the new reference standard for the assessment of myocardial function, perfusion and viability. Compared to MDCT, MRI has significantly better contrast resolution and, seen in isolation, in theory has better temporal and spatial resolution. Currently available cardiac MRI scanners and sequences, however, are unable to combine spatial and temporal resolution to match cardiac MDCT for the detailed assessment of the coronary artery lumen.

Our routine cardiac MRI protocol is designed to yield comprehensive information on cardiac morphology, function, perfusion and viability within a 40 min time-frame. For the routine MRI workup of the heart, contrast agent is administered to study two phenomena: First-pass kinetics (perfusion imaging) and delayed enhancement of the myocardium. The perfusion scan is typically performed twice, after application of pharmacologic stress and at rest.

In 4-5 representative sections of the heart the wash-in of the contrast agent is recorded in real-time. This allows for the reconstruction of a detailed perfusion map. Thus, rather than evaluating for obstructive coronary artery disease directly, such as with MDCT, the presence of significant coronary artery stenosis is indirectly deduced from the presence of perfusion deficits within the dependent myocardium. A milestone in the field of cardiac-MRI in the ‘90s has been the discovery of the effect of delayed enhancement (DE). DE imaging makes use of the fact that hyper-enhancement on DE images (performed 10-12 minutes after contrast administration) represents irreversibly injured myocardium (due to any kind of heart disease). This way, important information on the likely success of revascularisation (e.g. via bypass grafts) can be objectively established.

**Conclusion**

For the responsible clinician it is important to recognise that both tomographic imaging modalities of the heart have their unique strengths and weaknesses which are currently intrinsic to the physical underlying principles and limitations, which will not be overcome in the near future. The primary strength of MDCT clearly is the morphological assessment of the coronary arteries, whereas ischemic sequelae and their effect on cardiac function, perfusion and viability are preferably evaluated with cardiac MRI. Therefore, pending future developments, we have come to discourage the notion of the often proposed “one-stop-shop” in cardiac imaging with a single modality. Both techniques are important, evaluate different manifestations of coronary artery disease and thus complement each other. It is our responsibility as physicians to judiciously choose the appropriate imaging modality for each patient and for each clinical scenario.

Contact: shassan@umuc.edu
Tomosynthesis is an imaging technique used in medical diagnostics, particularly in mammography, to visualize structures within the breast that are obscured by superimposed tissue in standard 2-D images. This method involves taking multiple images at various angles, which are then combined to produce a 3-D image. The key advantages of tomosynthesis include the ability to visualize small, dense masses or microcalcifications that might not be apparent on standard 2-D mammograms. It also reduces the impact of breast density, which is a significant factor in the detection of early-stage breast cancer.

**Potential clinical benefits**

- **Increased detection rate**: Tomosynthesis can help detect lesions that are not visible on 2-D mammograms, especially in dense breast tissues where tumors are more difficult to identify.
- **Improved specificity**: By providing a more detailed view, tomosynthesis reduces the number of false positives, decreasing the number of unnecessary biopsies and follow-up exams.
- **Better visualization of microcalcifications**: This is crucial in identifying early-stage cancers.
- **Support for decision-making**: Tomosynthesis images can help radiologists make more informed decisions about the need for further diagnostic procedures.

**Technological aspects**

- **Angular range and number of exposures**: An optimal angular range and number of exposures are crucial to achieve high-quality images. Too few angular steps can lead to poor image quality, while too many can increase the radiation dose.
- **Radiation dose**: The dose in tomosynthesis is usually lower than in standard 2-D mammography, although it is not the sole factor in radiation protection. The industry is working to minimize the dose further while maintaining image quality.
- **Resolution and contrast**: High-resolution images are necessary to identify small lesions. Tomosynthesis can achieve resolutions of 200 microns or better, which is critical for detecting early-stage cancers.

In summary, tomosynthesis offers significant clinical benefits by improving the diagnostic accuracy of mammography, particularly in dense breast tissues. However, the technology continues to evolve, with ongoing research aimed at optimizing performance and reducing radiation exposure.
Mammography in Russia

Breast cancer morbidity has been the leading oncology disease (21.8%) in Russia since 1996 - and since 1981 in St. Petersburg. In Moscow, the morbidity has increased 52.4% in last 14 years. Almost 13% of all diagnosed cases are neglected. The low success of treatments is due to unsatisfactory early diagnoses - even though worldwide experience has confirmed the high effectiveness of diagnosis from experience has confirmed the high effectiveness of diagnosis.

The Moscow screening programme began in 2004, after 85 mammography machines were installed in Moscow’s out-patient clinics. This year, St. Petersburg oncologists asked the City Government to reach concrete decisions to realise a screening programme, and the modernisation of existing city mammography machines was decided. In the next four years, we plan to digitize mammography equipment and connect the mammograms to the shared city computer network.

We have found a similar programme in Tartu, Estonia, but Tartu is, of course, a small town compared with the megalopolis of St. Petersburg. Professor Vladimir Semiglavzov, Director of Petrov’s Federal Cancer Research Institute, adds: ‘The key concept behind screening is very early stage cancer discovery, so that treatment can change the prognosis and the natural clinical course of the disease. However, breast cancer is a heterogeneous, multi-faceted disease that may influence screening efficacy. To screen the healthy population, test specificity is vital because it means a minimum amount of false-positive results that lead to unjustified biopsies and sometimes to surgery. Cancer progression is a long process and not all stages are irreversible. Possibly, in the future, screening methods will lead to recognition of early molecular-genetic changes, and then more complete screening techniques will be needed. For now, mammography serves as the main element of screening.’

Reduced compression pressure

In conventional mammography, breasts are highly compressed so as to reduce tissue overlap. High compression pressure is not needed for tomosynthesis imaging. Just enough breast compression to pull tissues out of the chest wall and keep motion at a minimum is adequate. Therefore, there is the possibility of less painful compression using tomosynthesis. If reduced breast compression is used, the X-ray energies may need to be raised so as to penetrate the thickest breasts more efficiently. In this case, it is important that the image receptor maintains its high quantum efficiency at the higher energies.

Contrast-enhanced imaging

Researchers have studied mammography using IV administered iodinated contrast agents. Using either dual energy or pre- and post-contrast imaging, they have observed enhancement of otherwise occult cancers and differentiation of benign from malignant tumours. While this research is still in its infancy, contrast-enhanced tomosynthesis images might allow for even greater malignant tumour to background contrast and visibility over that observed with 2-D contrast imaging, and could conceivably supplant MRI gadolinium breast imaging.
PET-CT for radiation therapy planning: A step towards personalised radiation medicine

For individualised radiotherapy, high-precision planning and treatment of the target volumes is critical. If highest radiation doses are delivered in a target volume, the chance of tumour cell kill increases and tumour control probability is enhanced. Precise delineation of the target in its anatomical and functional state has long been a dilemma for radiation oncologists. Traditionally, large margins were added to the tumour volume to account for uncertainties of tumour visualisation and target delineation. This results in a high risk of ‘collateral damage’ to healthy tissues - and in return the radiation dose to the tumour must be lowered, compromising the chance of tumour control.

Technological progress has enabled advances in cross-sectional imaging, molecular imaging, and 3-D reconstruction. Introduction of CT was the first key development towards modern 3-D radiotherapy planning. Additional information from other imaging modalities such as magnetic resonance (MR) imaging, MR spectroscopy, or PET, has further improved the target volume definition process by providing better soft tissue contrast or physiologic information. Parallel innovations in radiation therapy technologies enable millimetre-precision with the introduction of stereotactic techniques and online 3-D image-guided radiation therapy (IGRT) based on linac-mounted Cone Beam CT systems. These parallel innovations have brought the fields of radiological oncology and radiology, which had drifted apart in the past decades, together on a novel level. Today, radiation oncologists are able not only to see anatomical imaging alone by radiation planning CT (left, arrow) shows indirect contours of the lung tumour. The PET fusion in treatment position shows the metabolically active tumour and lymph nodes (yellow/purple). The target volume (shown in red) for the radiation therapy plan is based on the combined anatomical (CT) and molecular (biological) PET (information) source. In addition to tumour targeting for initial radiation therapy planning, molecular imaging is being explored for outcomes prediction. Repeat imaging during or after radiation therapy can be used for image-guided therapy adjustment, and to guide further therapy (right).

In contrast-enhanced CT (A, C) and F18-FDG-PET/CT (B, D) of a male patient with anal carcinoma vividly demonstrating the added value of PET-CT for target delineation. Conventional CT shows a questionable mass in the anal canal; however the exact extent of the tumour cannot be differentiated from the adjacent nodes (A, arrow). PET-CT (B) clearly identifies the tumour by visualising the increased glucose metabolism. Similarly, a right inguinal lymph node, which appears within normal shape and size ranges in contrast enhanced CT (C), can be identified as malignant node by increased glucose metabolism in PET/CT (D) and can be differentiated from a normal contralateral inguinal node (dashed arrow).

For the first article in his series, Prof. Schönberg invited colleagues at Mannheim and partners at Ohio State University, USA, for a roundtable discussion on PET/CT as a hypoxia tracer. Now that PET/CT planning is becoming established in lung, head and neck cancer, other tumours, such as gastrointestinal, anal carcinoma, prostate carcinoma, lymphoma and gynaecologic tumours are also being studied. For example, at initial diagnosis of anal carcinoma, 15-39% of the inguinal lymph nodes are involved. In the future, PET may be used as a decision tool whether to include the inguinal nodes to the target volume or not. However, the use of this new paradigm is not without challenges. Not all metabolically active areas within malignant lesions represent tumour.


dose-limiting normal tissues (lung, spinal cord, oesophagus), and provides the opportunity to escalate the radiation dose for better tumour control. Conversely, an increase in the target volume based on PET/CT occurs in about one fourth of cases, where PET/CT identifies tumour involvement that is not evident by CT alone. Integrating PET/CT into the radiation therapy planning process has the potential to reduce risk for inadequate coverage of the tumour within the radiation ports ("geographic misper"), and reduces inter-user variability in target definition. The higher precision in delineating tumour extent, and excluding non-cancerous tissues, opens the door to dose escalation to the tumour while omitting large margins or ‘elective’ target volumes. Radiobiological modelling studies of such dose escalation in stage N2-3 lung cancer have estimated an increase in tumour control probability by 13-18% by surpassing the gains achievable by many adjuvant therapies.

Similarly, in head and neck cancer, target delineation through PET/CT fusion has shown benefit. Initially used to assess tumour response and guide management of involved cervical lymph nodes after radiation therapy, the technique of co-registration has evolved to PET/CT-guided intensity-modulated radiation (IMRT). This enables selective intensification of the radiation dose ("dose painting") in tumour sub-regions that are most metabolically active or in hypoxic areas using 18F-MISO PET/CT as a hypoxia tracer.

For more details on this topic see our upcoming Symposium: www.mr-pet-ct.com

Meet the experts

<table>
<thead>
<tr>
<th>N.A. Mayr</th>
<th>F. Wiese</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Department of Radiation Medicine, University of Heidelberg, Germany</td>
<td></td>
</tr>
<tr>
<td>2 Department of Radiation Oncology, University Medical Center Mannheim, Medical Faculty Mannheim, University of Heidelberg, Germany</td>
<td></td>
</tr>
<tr>
<td>3 Department of Clinical Radiology and Nuclear Medicine, University Medical Center Mannheim, Medical Faculty Mannheim, University of Heidelberg, Germany</td>
<td></td>
</tr>
<tr>
<td>4 Department of Radiation, Ohio State University, Columbus, USA</td>
<td></td>
</tr>
</tbody>
</table>

www.mr-pet-ct.com
MR contrast agents: A step up from compartmental to targeted imaging

The issue of image contrast is inherent to MRI. The natural desire to differentiate structures and reflect function has previously been explored in Roentgen applications. However, owing to the particulars of ionising radiation physics, k-edge characteristics of only a few agents could be exploited, namely iodinated, Barium sulphate-, Gadolinium- and other heavy metal-based compounds as well as gases. These have been applied to what are essentially compartment-based approaches that may be used to image the vascular system, gastrointestinal tract or other body cavities. However, in MRI, contrast agent development has been more diverse and can only be considered as a market issue today. With current use quoted for between 20 and 40% of MRI scans, depending on body area, the development of Gadolinium compounds in the 1980s was a particular success story and the largely intravascular use of Gd-based agents will primarily increase the contrast between normal and pathological tissues when there is an increased vascular permeability, such as in breakdown of the blood-brain-barrier, the site of iron-induced order of magnitude [Jensen]. Gd-compounds are available as soluble agents while the ferumoxides come in colloidal solutions (superparamagnetic iron oxide, SPIO).

While Gd-based agents will primarily increase the contrast between normal and pathological tissues, the site of iron-induced images. Compounds based on these materials have therefore been called positive agents. In contrast, very small particles of iron are too small to be ferromagnetic but they may be magnetised, a state that renders them superparamagnetic. The resulting susceptibility leads to a signal intensity decrease on T₂*-weighted images and a negative image contrast, an effect that can exceed that of Gd by well over an order of magnitude.

MR relaxation depends on particle size: Larger SPIO will accumulate in the reticuloendothelial system and permit detection and characterisation of focal hepatic or splenic lesions, while smaller particles have a much prolonged intravascular residence and can be used as blood pool agents. New approaches focus on even smaller, ultra-small USPIOs, enabling cell tracking and the labelling of macromolecules, specifically, antibodies. In addition, there has been renewed interest in manganese as a cofactor in several critical biological functions where it may serve as a surrogate marker of calcium influx in cerebral or continued on page 20

Andrea Martini and Joerg Larsen, of the Institute for Roentgendiagnostics, Braunschweig Teaching Hospitals, Germany, discuss nanotechnology, hybrid imaging and the quest for a personalised medicine

Gadolinium is dominating current clinical applications for contrast media in MRI. Nonetheless, recent developments somehow follow the evolution of approaches in Nuclear Medicine over two decades: Specifically, the attempt to image a physiological environment and pathological processes in vivo is what unites new approaches to modulate image contrast and with the additional advantage of ever increasing spatial resolution. This article aims briefly to review current MRI contrast media usage, the variety of creative approaches to new exogenous media and the state of their development, highlighting particularly interesting or promising concepts.

MRI contrast media were originally used to make unspecific lesion detection easier, i.e. to contrast focal pathological processes, such as inflammation or tumours, against normal tissue background. Lesion characterisation also became possible through repeated scanning following contrast medium administration and was advanced with the introduction of hepatic agents. As hard- and software capabilities improved, fast imaging became a reality and today we routinely image and analyse the first pass of a contrast agent in perfusion studies. Beyond a need for acceptable tolerability, there are no set requirements new agents must fulfil. Quite the contrary, with developments in image acquisition, more specific clinical questions allow for more specific contrast media. Para- and superparamagnetic properties have traditionally been exploited in MRI contrast agents: Unpaired extranuclear electrons act as strong magnetic dipoles and affect hydrogen nuclei in their vicinity. Gadolinium (Gd) with seven, manganese (Mn) with five and iron with three such unpaired electrons, all shorten both the T₁- and T₂-values respectively. However, the T₁-effect is greater and results in a rise in signal intensity in areas of contrast media uptake on T₁-weighted images. Compounds based on these materials have therefore been called positive agents. In contrast, very small particles of iron are too small to be ferromagnetic but they may be magnetised, a state that renders them superparamagnetic. The resulting susceptibility leads to a signal intensity decrease on T₁*-weighted images and a negative image contrast, an effect that can exceed that of Gd by well over an order of magnitude [Jensen]. Gd-compounds are available as soluble agents while the ferumoxides come in colloidal solutions (superparamagnetic iron oxide, SPIO). While Gd-based agents will primarily increase the contrast between normal and pathological tissues when there is an increased vascular permeability, such as in breakdown of the blood-brain-barrier, the site of iron-induced

microdose mammography is here.

from now on every woman will expect less.

Once the word is out, there is no turning back. Your patients will never accept any other kind of breast screening. Photon counting lies at the heart of microdose mammography. As the name implies, the radiation dose is far lower than any other mammography system. And with a resolution of 24.96 megapixels, image quality leaves our competitors blurred.

How is this possible? Our patented detector counts X-rays one by one (believe us, it's a very fast detector).

That means no electronic noise in the image and no information lost in conversion. Because the image is acquired by multi-slit scanning, scattered radiation is eliminated. The result? Dependable images without ‘dead’ pixels that might obscure micro-calculifications.

Sectra’s mammography solution includes not only the stand-alone but also breast imaging PACS, screening RIS and full support. Together these systems form a complete digital workflow solution that takes better care of both you and your patients.

For a significantly bigger information dose, go to www.sectra.com/medical. (If you’re going to ECR in Vienna, March 7-10, be sure to stop by booth 407, Hall D. For details see www.sectra.com/eeur.)
functions in the cell mass and functionality in cell culture may thus be visualised in cell culture perhaps allowing a small but detectable enhancement, beta-cell activation could be visualised in cell culture experiments. While there is considerable experience with issues surrounding the selective binding to target epitopes, the development of agents that provide a sufficient contrast-to-noise ratio to visualise even a single cell constitutes the actual challenge. Nonetheless, this has been realised for some applications in standard clinical MRI settings although mechanisms explored and potential clinical applications are too diverse to attempt to describe the current state of the art and try to evaluate their future roles.

Nonetheless, a few specific agents from cardiovascular, rheumatologic, neurological, oncological and endocrine research shall be referred to below, indicating a variety of possibilities: Tang has used USPIO particles to detect and characterise degrees of inflammation in arteriosclerotic carotid artery plaque, which is thought to be present in plaque instability and subsequent stroke. Manganese has been equally assessed in an experimental arthritis model to consider Mn labelled monoclonal antibody against endothelial cell adhesion molecule ECAM 1 on 4.7 Tesla. This could thus serve as a memory agent for ischemic events. Spuentrup has shown that fibrin clots implicated in acute pulmonary and cardiac thromboembolic events can be visualised in swine models at 1.5 T using a probe which specifically binds to fibrin. A very high accuracy in focal solid pancreatic lesions detection has been reported for the commercially available Mn compound Mangafodipir.

The basic fact that soft tissue contrast and the physical properties of USPIO agents change and change independent of one another with rising field strength is already known. Invest Radiol 2005;40:715-16) is the most obvious reason why the career of a novel contrast drug may be unpredictable. Given current bureaucratic obligations in the licensing of drug agents for patent-related legal implications, it can take years before a new compound reaches the market and, even before software development comes along and renders the new agent obsolete. We note, for example, that the first work-in-progress PET-MRI System was presented last year, using next-generation detector technology and featuring acceptable scan parameters such as a spatial resolution of 3mm, currently sufficient for brain imaging. While the developers and many others primarily see the introduction of further hybrid-modality technology for a commercial development, it will allow new ways to study cerebrovascular and neurodegenerative diseases and brain diseases in particular.

Mechanisms: Nanotechnology in targetted or molecular imaging aims at properties of molecules especially sensitive detection of molecular targets that are far too small to be detected with conventional MRI techniques. This approach is analogous to immunohistochemistry, in situ hybridisation, and some scintigraphic methods and positron-emission tomography (Wickline and Lanza). While there is considerable experience with issues surrounding the selective binding to target epitopes, the development of agents that provide a sufficient contrast-to-noise ratio to visualise even a single cell constitutes the actual challenge. Nonetheless, this has been realised for some applications in standard clinical MRI settings although mechanisms explored and potential clinical applications are too diverse to attempt to describe the current state of the art and try to evaluate their future roles.

Nonetheless, a few specific agents from cardiovascular, rheumatologic, neurological, oncological and endocrine research shall be referred to below, indicating a variety of possibilities: Tang has used USPIO particles to detect and characterise degrees of inflammation in arteriosclerotic carotid artery plaque, which is thought to be present in plaque instability and subsequent stroke. Manganese has been equally assessed in an experimental arthritis model to consider Mn labelled monoclonal antibody against endothelial cell adhesion molecule ECAM 1 on 4.7 Tesla. This could thus serve as a memory agent for ischemic events. Spuentrup has shown that fibrin clots implicated in acute pulmonary and cardiac thromboembolic events can be visualised in swine models at 1.5 T using a probe which specifically binds to fibrin. A very high accuracy in focal solid pancreatic lesions detection has been reported for the commercially available Mn compound Mangafodipir.

The basic fact that soft tissue contrast and the physical properties of USPIO agents change and change independent of one another with rising field strength is already known. Invest Radiol 2005;40:715-16) is the most obvious reason why the career of a novel contrast drug may be unpredictable. Given current bureaucratic obligations in the licensing of drug agents for patent-related legal implications, it can take years before a new compound reaches the market and, even before software development comes along and renders the new agent obsolete. We note, for example, that the first work-in-progress PET-MRI System was presented last year, using next-generation detector technology and featuring acceptable scan parameters such as a spatial resolution of 3mm, currently sufficient for brain imaging. While the developers and many others primarily see the introduction of further hybrid-modality technology for a commercial development, it will allow new ways to study cerebrovascular and neurodegenerative diseases and brain diseases in particular.
Personalised medicine? It's on the move!

Integration has become a keyword when discussing present and future challenges in healthcare worldwide. Companies such as Siemens have already begun to change business concepts by offering services that cross departmental boundaries. However, the basis of full integration is a good IT network and compatible technologies. Daniela Zimmermann, of European Hospital, asked Tom Miller, CEO of Workflow and Solutions, Siemens Healthcare, and Dr Bernd Montag, CEO of the Imaging and IT Division of Siemens Healthcare, about the huge challenge they face.

In addition, in the article ‘Diagnosis: Uniting the lab and radiology’ (Laboratory section of European Hospital — page 10) Jackie Donoghue, Head of Integrated Diagnostics and Market Development at Siemens, gives further reasons behind the Siemens Healthcare acquisitions of DPC, Bayer Diagnostics and Dade Behring.

DZ: How will integration benefit healthcare?
Dr Bernd Montag: Progress in medical imaging — working closely with laboratory diagnostics by using sophisticated information technology — will lead to an earlier and more reliable diagnosis and localisation of diseases, for example cancer or cardiovascular diseases. Already many examples, such as the diagnosis of breast cancer, show that the combination of in vitro and in vivo diagnostics increases the quality of care significantly. If, for example, the existence of a tumour can be verified using a lab test, then it can be localised and typed by using innovative imaging methods, such as mammography, ultrasound or magnetic resonance tomography.

On the other hand, medical imaging plays an important role in the field of acute care, e.g., when trauma patients must be examined quickly. The University Hospital Erlangen recently installed our brand new CT system, the SOMATOM Definition AS, directly in their trauma centre. Now, patients can be examined from head to toe within seconds.

We should also note the enormous potential of such innovative systems in the field of functional imaging. Here, trendsetting technologies, such as ultra-high-field magnetic resonance imaging, allow an unprecedented view into the human body. For example, dramatically increases our understanding of the causes of many neurological diseases, such as Alzheimer’s or Parkinson’s. This understanding of the genesis of diseases is the prerequisite to develop new and even more individualised therapies for people all around the world, as well as to discover new possibilities in preventing diseases.

DZ: Although every system is discussing the full integration of medical workflow, no-one seems to have a clear idea what it really entails. So, first, who is involved in any kind of integration?
Tom Miller: The answer is simple: Everybody! Looking at the near future, most very modern thinking healthcare providers are looking at care teams, instead of single clinicians, because the likelihood that a single individual could assess all the medical knowledge necessary to handle the complexity of care that our aging population requires is increasingly low. The real problem for hospitals will become patients with three or four conditions. For example, to exaggerate that, it could be a HIV-positive, diabetic, schizophrenic patient with chest pain. Therefore, it’s not a single clinician who will treat that patient, but a whole team. In this scenario, a question arises: How can we co-ordinate all the data and how do we ensure the team works efficiently? So every clinician would be frustrated by the lack of holistic information surrounding the patient.

Another example, if a patient has shown up for a radiology examination, and the radiologist does not know what to image, that is a worse case scenario of inefficiency — and it’s not that rare. An analogue problem occurs looking at treatment options: How does knowledge arrive today? Most often through epidemiology — in other words, we must wait ten years, see what happens to the patient, and then change the standard of care.

Again, the problem is due to a lack of available information. So, in terms of integration, this not only means creating teams but, more importantly, also creating networks of knowledge — through IT. This can be used to bring epidemiological data together, by collecting relevant data from all over the world. So information about treatment options can be obtained in six months instead of ten years.

Another example: Only ten years ago the breast cancer death rate was significantly higher and it was seen as only one disease. Now we know there are different forms and these may be diagnosed through digital mammography followed by biopsy, which then leads to a blood test to evaluate HER-2/neu serum levels that show a special protein. Its presence can lead to a Herceptin regimen, which is only effective in a certain type of breast cancer, and contra indicates for certain chemotherapy agents that are given at the same time, and can cause congestive heart failure. So, cardiac enzymes must also be tested.

That example describes a very personalised treatment for a particular breast cancer, which is only possible with the ability to bring all the pieces of information together — via a personal exchange as well as a technological exchange.

Are these future scenarios, or are they happening already?
TM: The availability of information and a clinical workflow based on IT is already happening with our Soarian system. To continue the example of breast cancer, we can take women from screening to biopsy, testing, guided chemotherapy, surgery, through to radiation therapy with all the data from her pre-existing therapies, which are necessary to understand each single step along the treatment of that disease.

Of course this is a very ambitious approach, but we are already very successful with it; Soarian already runs in seven hospitals in Europe with 57 automated workflows. Some university hospitals, such as the University Hospital Eppendorf in Hamburg, Germany, are very forward thinking. They plan to implement Soarian and, from the CEO down, only speak of the optimisation of care processes throughout the enterprise.

The advantage of our Soarian is that we have designed the system to take into account the fact that information comes from different places. It is the only service-oriented architecture that can manage and process data from other sources and treat it as if it were integrated — a single source. This is the only way such a data process can work, because there are hardly any hospitals working with homogenous IT and technologies across all departments.

How does Siemens deal with its own internal integration of different business units?
TM: It’s a huge change. Siemens established a new organisational structure and created the Workflow and Solutions division to co-ordinate all our business units: cardiology, women’s health or oncology, aiming to figure out how best to take this incredibly rich set of technological resources and apply it efficiently to these disease settings. It’s also an absolutely new approach in applying a disease-centric focus, rather than a technological focus to solutions. It’s a huge opportunity that will provide us with the tools to manage future healthcare challenges...
Cardiovascular molecular imaging

Is it ready for routine medical diagnostics?

Professor Wolfgang Bauer

Image in Internal Medicine is among the main topics for 114th Congress of the German Society of Internal Medicine (March, Wiesbaden). Specialists in internal medicine, radiologists, and nuclear medicine in Germany developed a programme that will not only provide an overview of the value of new imaging procedures but also tackle controversial subjects.

Professor Wolfgang Bauer MD, Chair of Medical Imaging and with special expertise in the cardiovascular field, writes: “The objective of molecular imaging is to capture physiological and pathophysiological processes on a molecular to cellular level, not only to gain new insights but also to be able to use appropriate therapy strategies at an early stage. Optical technologies, ultrasound, nuclear medical procedures and magnetic resonance imaging (MRI) are all suitable imaging procedures. The latter two procedures have particular potential for clinical use. Two examples, especially relevant for cardiovascular medicine: arteriosclerosis in the coronary vessel or the onset of heart attack and healing of the heart after the occurrence of heart attacks.

The motivation for the first topic is that the cause of a heart attack is a tear in an unstable arterial plaque. A thrombus then forms on this tear which, in tum, blocks the coronary vessel and thereupon the blood supply to the muscle heart. The problem is the non-invasive identification of this unstable plaque as it normally doesn’t restrict the coronary vessel, and therefore does not produce any symptoms. The plaque is also not characterised by an excessive calcification so that CT, for instance, is of no help here. However, molecular imaging should be able to capture and show the appropriate molecular structures known to us from cellular and molecular biology. It is known, for instance, that the whole of the cell structures are located in the unstable plaque. These can be shown, for example, through the use of superparamagnetic iron ferro-nanoparticles (Jaffer, Libby et al. 2006), or through MR contrast media that specifically bind to surfaces molecules specifically present in apoptotic cells (Nahrendorf, Hu et al. 2006). The lack of spatial resolution was compensated by using functional imaging via MRI (Sosnovik, Nahrendorf et al. 2007). Further strategies to improve the impact on programmed cell death (apoptosis) which is an important factor for the development of heart insufficiency after the occurrence of heart attacks. In animal experiments it has been possible to activating apoptosis with MRI (Hiller, Waller et al. 2006) and optical contrast media (Sosnovik, Schellenberger et al. 2005), which binds the surface molecules specifically present in apoptotic cells. In conclusion, molecular imaging offers fascinating opportunities for fundamental, medical research to study processes in a largely non-invasive manner and to derive and verify the accepting therapy concepts. However, this is still in its beginnings with regards to direct use on patients. Ideally, we would be able to obtain optimum levels of information by combining highly sensitive, nuclear medical procedures and morphologically functional, high resolution MRI in the sense of fusion imaging.

MR probes for molecular imaging

By Silvio Aime, of the Department of Chemistry & Molecular Imaging Centre, University of Torino, Italy

Molecular imaging aims at the in vivo quantitative visualisation of molecules and molecular events that occur at cellular level. The potential towards clinical translation is huge, because the same modalities used in medical imaging are used in molecular imaging investigations. Traditionally, medical imaging was a tool for non-invasive mapping of anatomy and for the detection and localisation of a disease process. The advent of molecular imaging-based protocols will allow the detection of the onset of diseases at an early stage, well before the biochemical abnormalities result in change in the anatomical structures. Moreover, it will offer efficient methods to monitor the effect of therapeutic treatments.

Molecular imaging agents provide the crucial link between the specificity of the target and the quantitative visualisation of its in vivo distribution.

The possibility of carrying out molecular imaging protocols by means of MRI is very attractive for the superb anatomical resolution that is attainable by this technique. However, MRI suffers from an intrinsic insensitivity with respect to the competing imaging modalities that has to be overcome by designing suitable amplification procedures based on the development of reporting units endowed with an enhanced sensitivity and on the identification of efficient routes of accumulation of the imaging probes. MRI definitively suffers when compared with nuclear medicine and optical molecular imaging, but then the set-up of molecular imaging protocols, as its low sensitivity implies the use of 1017-1019 imaging reporting units per cell, when few are necessary for the latter modalities. Now, the need to target molecules that are present at very low concentration requires the development of novel classes of contrast agents, characterised by enhanced contrastability and targeting capabilities. Efficient targeting procedures for cellular labelling and recognition of epitopes characterising important pathological are therefore as important as the task of developing more efficient image contrast units. The possibility of delivering a high number of imaging agents to the target of interest appears the solution of choice, to overcome the drawbacks associated with the low sensitivity of the MRI approach. The use of antibodies or aptamers entered the armory of MRI contrast agents very early, with the Superparamagnetic Oxides’ family, which are still among the most sensitive systems. Currently, much attention is devoted to the design and use of self-assembled systems based on lipophilic molecules, where the imaging reporters are invariably represented by highly stable paramagnetic lanthanide (III) complexes. In general, whatever the paramagnetic lanthanide (III) ion is, the pre-requisite is the susceptibility agents whose contrasting abilities increase by increasing the magnetic field strength. In the case of Gd(III) complexes, the systems act mainly as shell-type agents whose efficiency is eventually enhanced by the long relaxation times of the supramolecular aggregates.

In addition, to tackle sensitivity issues, such systems may also be designed for the targeting of C13 pyruvate can act as an efficient metabolic reporter for cancer cells in prostate tumour bearing mice.

By Rudolf Schwarz and Andreas Krüll, of the Section of Radiation Oncology Department, Ambulanzenzentrum GmbH of the University Medical Center Hamburg-Eppendorf

Designed in the 1990s, the TomoTherapy HiArt treatment system looks like an enormous X-ray scanner, allowing efficient 3-D-CT imaging. It is used to ensure daily treatment accuracy for all patients (Fig. 1). It was designed to overcome the problem of standard imaging and helical radiation delivery (Fig. 2). The acceptance of the HiArt in the field of megavoltage in the gantry, is used for CT scanning and irradiation. It delivers intensity modulated radiotherapy (IMRT) that uses tens of thousands of narrow beams, producing the most precise conformal radiotherapy available. HiArt delivers radiation from all angles around the patient. The beam is rotated around the body, while the treatment couch simultaneously moves into the machine. The system ensures accurate delivery of precise helical IMRT plans via 3-D image-guided radiotherapy (IGRT), based on daily pre-treatment megavoltage CTs in treatment position for higher accuracy and precision. Necessary adjustments in patient position can be easily made by using planning and daily CT images for references (Fig. 3). With every treatment fraction, one can see where the anatomy is, compared with where it should be. An overlay of planned dose
Helical tomotherapy offers further assurance that the prescription dose level will cover targeted anatomy. Imaging dose with 1-3 cGy is consistently low. The system allows for organ movements. Radiation exposure to healthy tissue and organs is minimised. The system integrates tools for optimised, individualised treatment planning, quality assurance, imaging technology, helical IMRT, recording and verification. Delivery Quality Assurance (DQA) is integrated in the planning software, allowing seamless calculation of the dose with the patient’s plan applied to a phantom. The DQA plan can be selected and delivered from the Operator Station, and compared with point dose and planar film dose measurements. This ensures the prescription will be carried out according to plan.

On average, the full procedure takes about 20 minutes from patients’ arrival in the treatment room until they leave. This includes about five minutes for performance of the daily CT and another five to ten minutes for treatment delivery. The TomoTherapy HiArt System was installed at our institution in autumn 2006, and up to December 2007, we had irradiated over 120 patients. Comparison of treatment planning showed that helical tomotherapy brings better dose conformity to the tumour and better sparing of normal tissues than 3-D-conformal radiotherapy and intensity-modulated radiotherapy with the step-and-shoot technique.

Many patients with tumours of head and neck, brain, upper abdomen, and prostate cancer, benefit from tomotherapy. It can be used to re-treat patients who had been irradiated and have a local recurrence. It can be dangerous to re-irradiate, because one can risk complications. So it is important to reduce doses to critical, pre-irradiated structures. Tomotherapy can offer this.

Tomotherapy can be used to re-treat patients who had been irradiated, and can be beneficial for special cases. It can be used to re-treat patients over 120 patients with helical tomotherapy. Tomotherapy can offer this. Helical tomotherapy can be done for curative as well as in palliative purposes. Dose escalation over 80 Gy is essential for the primary treatment of prostate cancer. The limiting factor for this dose escalation can be proctitis. Tomotherapy is a safe tool to reduce the rectal dose and minimise the incidence of proctitis. The higher accuracy and precision brings further benefit by reducing the security margins around the targets. Integration of simultaneous boost with higher doses per fraction presents another treatment option (Fig. 4). The Tomotherapy system allows delivery of a conformal dose or multiple dose levels to complex targets in the head and neck (Fig. 5). With cancers of the tongue, throat, and larynx, often all the lymph nodes must be irradiated, along with the primary tumour. This usually results in permanent damage to the salivary gland, with a life-long dry mouth — xerostomia. With tomotherapy doses to radiosensitive structures (e.g. spinal and parotid glands) can be kept low.

Brain tumours: Tomotherapy can treat multiple tumours, such as and the neuroaxis in one treatment plan and process (Fig. 6). Tomotherapy in a stereotactic mode can also treat lung cancer. Smaller tumours can be irradiated with hypofractionation at the same time, with low doses to the spinal cord and the lung. Multiple targets especially multiple metastases can be irradiated simultaneously in one treatment plan.

It is important to evaluate every patient’s cancer to determine which form of radiation therapy is appropriate. 3-D-conformal radiotherapy, IMRT with step- and-shoot or dynamic leaf or stereotactic radiotherapy, are other methods of irradiation and can be beneficial for special cases.

On average, the full procedure takes about 20 minutes from patients’ arrival in the treatment room until they leave. This includes about five minutes for performance of the daily CT and another five to ten minutes for treatment delivery. The TomoTherapy HiArt System was installed at our institution in autumn 2006, and up to December 2007, we had irradiated over 120 patients. Comparison of treatment planning showed that helical tomotherapy brings better dose conformity to the tumour and better sparing of normal tissues than 3-D-conformal radiotherapy and intensity-modulated radiotherapy with the step-and-shoot technique.

Many patients with tumours such as head and neck, brain, upper abdomen, and prostate cancer, benefit from tomotherapy. It can be used to re-treat patients who had been irradiated and have a local recurrence. It can be dangerous to re-irradiate, because one can risk complications. So it is important to reduce doses to critical, pre-irradiated structures.

Tomotherapy can offer this. Helical tomotherapy can be done for curative as well as in palliative purposes. Dose escalation over 80 Gy is essential for the primary treatment of prostate cancer. The limiting factor for this dose escalation can be proctitis. Tomotherapy is a safe tool to reduce the rectal dose and minimise the incidence of proctitis. The higher accuracy and precision brings further benefit by reducing the security margins around the targets. Integration of simultaneous boost with higher doses per fraction presents another treatment option (Fig. 4). The Tomotherapy system allows delivery of a conformal dose or multiple dose levels to complex targets in the head and neck (Fig. 5). With cancers of the tongue, throat, and larynx, often all the lymph nodes must be irradiated, along with the primary tumour. This usually results in permanent damage to the salivary gland, with a life-long dry mouth — xerostomia. With tomotherapy doses to radiosensitive structures (e.g. spinal and parotid glands) can be kept low.

Brain tumours: Tomotherapy can treat multiple tumours, such as and the neuroaxis in one treatment plan and process (Fig. 6). Tomotherapy in a stereotactic mode can also treat lung cancer. Smaller tumours can be irradiated with hypofractionation at the same time, with low doses to the spinal cord and the lung. Multiple targets especially multiple metastases can be irradiated simultaneously in one treatment plan.

It is important to evaluate every patient’s cancer to determine which form of radiation therapy is appropriate. 3-D-conformal radiotherapy, IMRT with step- and-shoot or dynamic leaf or stereotactic radiotherapy, are other methods of irradiation and can be beneficial for special cases.
SAFIRE: THE WORLD’S FIRST DIRECT-CONVERSION R/F-FPD

The 52-bed, acute care Hachiya Orthopaedic Hospital conducts 330 surgical operations annually, including minimally invasive artificial joint surgery and endoscopic surgery. In 1996, the hospital digitised ordering; in 1998, imaging was digitised; in 2004, a urology department was added.

Dr Hiroyasu Yano reports on the effective use of tomosynthesis in orthopaedic surgery.

During orthopaedic surgery, metal implants, plates, and screws are commonly employed. These frequently cause problems with metal artifacts during CT or MRI examinations of bone union and in post-surgical follow-up observations. Therefore, the emphasis is on the use of tomosynthesis to restrict metal artifacts in images.

Current tomosynthesis status: Since introducing the flat-panel detector (FPD) in 2005, we have conducted tomosynthesis examinations on 35 artificial joint cases (20 hip, 10 knee, 5 elbow), 8 spondylodesis cases, 3 arthrodesis cases, and 4 osteosynthesis cases.

Evaluation as clinical images: Tomosynthesis images created by the shift-and-add method and filtered back projection (FBP) method were compared with CT images. For this we used the Shimadzu Soralvision Safire* R/F system with Tomosynthesis Workstation option and the MSCT: Company A, 6-slice CT.

Evaluation of the bone union of the grafted bone is based on the continuity between the grafted bone and original bone, and on the reduction in radiolucent lines. As doctors found evaluation difficult due to the strong enhancement of the FBP image in Fig.3 (d), subsequently the shift- and-add method image in Fig.3 (c1) was used. The shift-and-add method image in Fig.3 (c2) was taken 14 months after surgery. It shows that bone union is almost complete.

Conclusions

Fig.4 compares CT and tomosynthesis images. For a CT examination in which radiography is conducted while rotating the body axis, the significant metal artifacts centred on the metal, and the beam hardening occurring between metals, affect the raw images. Blurring occurs along the path of the X-ray tube during tomography. However, as the images are two-dimensional, the effects of the artifacts are less than with CT. Low-artifact images can be achieved by selecting shift-and-add method images or FBP images according to the aim of the examination. CT is superior in some aspects, as it allows flexible image reconstruction and produces 3-D images. However, due to concerns about X-ray exposure from radiodiagnosis since the publication of a paper in the Lancet in 2004 (A. Berrington de Gonzalez, S. Darby: Risk of cancer from diagnostic X-rays: estimates for the UK and 14 other countries. Lancet 363: 345-351, 2004), CT examinations have been classified in the highest exposure class of all radiodiagnostic techniques, with a tissue-absorbed dose between 10 and 100 mGy (T Ishiguchi: Risk Management in Radiology, Nichi-Doku Iryo, Vol. 31 - 3849, 2004). As tomosynthesis requires fewer images than CT, the exposure dose should be lower. Examining these topics and efficiently applying digital image technologies to take even better images in the future should make tomosynthesis an effective means of post-operative follow-up.

* Safire = Shimadzu Advanced Flat Imaging Receptor

---

**Fig. 1:** Post-surgical images of bilateral total hip replacement. Due to looseness of the stem, 11 years after bilateral total hip replacement surgery the left joint was replaced in a 73-year-old female. The bilateral hip replacement post-surgical CT image in Fig.1 (b) includes significant artifacts due to the implant between the acetabulum and trochanter. The shift-and-add method image in Fig.1 (c) exhibits no effects of artifacts, whereas the FBP image in Fig.1 (d) exhibits artifacts in the tube-shift direction and at the boundary of the implant.

**Fig. 2:** Fracture after knee replacement. A 59-year-old female, who had undergone knee replacement surgery due to osteo-arthritis, fractured the lateral tibial plateau in a fall. The CT image in Fig.2 (b) exhibits effects of the implant artifacts to the lateral side of the tibia. However, the effects do not extend to the lateral side in the shift and add method image or the FBP image (Fig.2 c, 2 d).

---

**Fig. 3:** Follow-up of anterior fusion of cervical vertebrae. After surgery for a cervical hernia on a 39-year-old male, anterior fusion was conducted from the 3rd to the 6th cervical vertebrae. Periodic follow-up observations were required due to delays in bone union at the bone graft paraply in the 5th and 6th cervical vertebrae. Due to its lower X-ray dose than CT, tomosynthesis was used.

---

**Table 1:**

<table>
<thead>
<tr>
<th>Method</th>
<th>Artifacts</th>
<th>Artifacts generated</th>
<th>Flexible image reconstruction and 3D images</th>
<th>Exposure (mGy)</th>
<th>No. of Images</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT</td>
<td>Large</td>
<td>Metal artifact</td>
<td>Beam hardening</td>
<td>12 and 20</td>
<td>200 to 300</td>
</tr>
<tr>
<td>Shift and add</td>
<td>small</td>
<td>Blurring</td>
<td>Metal artifact</td>
<td>4 to 5 mGy</td>
<td>57 images</td>
</tr>
<tr>
<td>FBP</td>
<td>small</td>
<td>Metal artifact</td>
<td>Beam hardening</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MR diffusion and perfusion

While, in the past, MRI was praised mainly for its superb anatomic display and tissue contrast, a number of advanced, non-enhanced and contrast enhanced MR imaging techniques have been developed within the past years that provide new insights into the physiology of tissues and the pathophysiology e.g. of tumours. These techniques include MR-spectroscopy, perfusion MRI imaging, dynamic contrast enhanced MRI and diffusion tensor MR.

At the ECR, in a new horizon session, on Friday morning, perfusion and diffusion MRI and their potential in oncological imaging will be described and the provocative question of whether they can replace PET will be discussed on the basis of the latest results from PET and PET-CT, presented by Professor Steinert from Zürich.

Today, the combined PET-CT acquisition is becoming the standard to assess focal and systemic cancer. PET-CT provides an excellent combination of morphological and metabolic imaging and, for example, can identify metastases that are 5 mm in diameter or larger, thanks to metabolic uptake of fluorine-18 FDG. The addition of anatomical information from CT then allows practitioners to precisely locate those metastases. However, lesions that are smaller than 3 mm cannot be detected reliably. This is one area where MRI could perhaps aim to compete. However, whilst FDG-PET is the standard tracer method in most cancer types, alternative tracers with a more specific uptake are being investigated and may enable better imaging of anti-tumour effects involving angiogenesis, apoptosis and reporter gene expression.

Should we see the modalities as rivals and how can they complement each other? What can functional MRI learn from PET and vice versa? Another key question for the radiological community, for the panel discussion, is how and when to use MRI instead of PET.

Prof. Herneth (Vienna) will present his results on diffusion weighted imaging in the assessment of lymph node metastases. DTI is a promising new methodology that allows insight into the integrity of tissue, not only of the brain. Lymph node imaging and prostate cancer are good examples to prove the potential use of this method in the description of tumour infiltration.

Later in the session Dr. Berger (Munich) will explain how perfusion MRI may assist treatment monitoring in anti-cancer therapy. As at initiation, tumours in a pre-vascular phase are supplied by oxygen and nutrients that diffuse from pre-existing normal vessels, ischemia leads to the secretion of angiogenic factors when the tumour reaches a critical size. These factors, such as vascular endothelial growth factor (VEGF), recruit and maintain tumour vessels that exhibit increased blood volume and permeability compared with normal vessels. MRI-based techniques, such as dynamic susceptibility weighted (DSI) MRI or dynamic contrast enhanced (DCE) MRI can be used to measure the blood volume, the vascularity, size of the vascular space within designated areas, and behaviour of contrast within those vessels. DCE-MRI has been investigated for a range of clinical oncologic applications including cancer detection, diagnosis, staging and assessment of treatment response. Tumour microvascular measurements by DCE and DSC-MRI have been found to correlate with prognostic factors such as tumour grade, microvessel density (MVD), and vascular endothelial growth factor expression (VEGF) and with recurrence and survival outcomes (Figure 1).

In addition, changes of DCE-MRI in follow-up studies during therapeutic intervention have been shown to correlate with outcome, suggesting a role for DCE-MRI as a predictive marker. The Munich researchers are trying to find out whether perfusion MRI can monitor the efficacy of anti-angiogenic treatment in kidney cancer. This type of cancer has been shown to respond particularly well to anti-angiogenic drugs. Functional measurements related to the tumour blood supply should provide a surrogate marker of whether the treatment strategy is working. This may not necessarily be obvious from measurements of the tumour size or morphology. Work to standardise and quantify diffusion and perfusion MRI procedures is just beginning. This will be most essential if multi-centre trials are to be conducted. Dr. Stieltjes (Heidelberg), an expert in quantification strategies for structural and functional MRI techniques, will give a brief overview of how MRI data can be reliably quantified to allow them to be used for follow-up assessments and in clinical trials. Both, DTI and PWI require specifically tuned sequences and extensive post-processing. In his presentation he will illustrate the importance of both sequence development and post-processing, by going through this process for DTI (Fig. 2). The availability of different measurement techniques and their applications will be addressed. Also, he will highlight common pitfalls in DTI quantification and potential approaches to overcome these issues.

Can they replace PET?

Marco Essig MD, Professor of Radiology at the German Cancer Research Centre, outlines relevant presentations at the ECR.

What a contrast!

mississippi | i missouri | i miss ohio | i miss tennessee
contrast agent injectors for CT/MRI

- safe and reliable
- user-friendly
- efficient

ulrich GmbH & Co. KG
Buchbrunnenweg 12
89081 Ulm | Germany
Phone +49 731 9654-234
E-Mail injector@ulrichmedical.com
Internet www.ulrichmedical.com
Open High-field MRI

By Georg Bohner MD.
of the Department of Neuroradiology, Charité
University of Medicine
Berlin, Germany

A 320-row CT scanner (Aquilion One, Toshiba Medical Systems Co.,
Tokyo), has been installed for the first time in Europe, at the Charité
University Hospital Berlin, Berlin, Germany, in November 2007. Its
capability to cover the whole brain in a single rotation means this
new technology has the potential to impact strongly on the
field of neuro-imaging.

Due to the limited detector width available in conventional multislice CT scanners dynamic imaging is used for perfusion studies, or time-resolved
angiography, was limited to partial organ coverage (20 to 40
mm scan length). To overcome this limitation, repeated scanning in an
adjacent region or table movement can be used. However, this
procedure was necessary, which limited time resolution in dynamic imaging
studies.

For the first time, this limitation has been overcome by volumetric,
time-resolved whole brain imaging using the 320-row scanner with its high-resolution
coverage of 160 mm during a single rotation.

Simultaneously morphological
data as well as functional image data are collected.
The dynamic volume CT uses a detector module arranged in a 320 \times 0.5 \text{mm} configuration. There are 896 detector rows \( \times \) 320 elements, with an element size of approximately 1 \times 1 \text{mm}, which corresponds to a 0.5 \text{mm} (transverse) \times 0.5 \text{mm} (longitudinal) beam width at the centre of rotation. The fastest gantry rotation time is 0.35 seconds and the data
sampling rate is 5,722 views per second.

Within the first few weeks of usage the following acquisition techniques were applied at the Charité for neuro-imaging studies using the
dynamic volume CT: Singlerotation cranial CT (SR-CT), incremental cinescanningshow Angiography (3-D-CTA), time resolved intracranial
Angiography (4-D-CTA) and a combined whole brain 4-D-CTA
and perfusion protocol (4-D-CTA/CTP).

Mental health and

Neuro-imaging in Psychiatry
(US)
The new ‘omics’ technologies (genomics, proteomics and metabolomics) heralded a new era of biomedical discovery that is
affecting every field of medicine. With the rapid growth of the
older population worldwide, there is great interest in applying these
technologies not only to diagnose and prevent disease, but also to
enhance brain longevity and wellness. Nearly two-thirds of the c.
30,000 genes in the human genome are related to brain function, and
up to half of the variance in age-related changes in cognition, brain
volume, and neuronal function appears to be genetically
determined. Neuro-imaging is being employed to study the effects of
genetics and how neurogenetics may affect future radiology research
and practice (Petrella et al, Department of Radiology, Duke University
Medical Centre, Pub. 2008).

Mood disorders
Clinical research in mood disorders increasingly involves advanced
neuro-imaging techniques.
The impact on neuro-imaging

**VOLUME CT**

The impact on neuro-imaging

**Brain scanning (Australia)**

Nevertheless, CT has its limitations according to some researchers. Agzarian et al (2006) published research on the use of routine CT brain scanning of psychosis patients in Australia. Their aim was to evaluate the usefulness of CT of the brain in patients presenting a psychiatric condition without focal neurological signs. The reports of 397 consecutive CT brain scans of patients at two acute tertiary hospital psychiatric services over a two-year period were assessed retrospectively. 377 (95%) of the CT scans showed no abnormality; specific abnormalities were described in 20 (5%). Three scans showed non-specific minor abnormalities, which, when followed up by MRI, showed no relevant abnormality. All the abnormalities shown on CT were considered clinically unrelated to the patient’s psychiatric condition. In conclusion, the pretreatment probability of finding a space-occupying lesion or other pertinent abnormality in the patients with psychiatric illnesses in this study appears not to be greater than that of the general population.

**FMRI (Japan)**

Functional magnetic resonance imaging (fMRI) has become the most widely used method for imaging normal brain function in a relatively short period of time. Its use in clinically related research has been much slower. However, fMRI is becoming a valuable tool in the study of many neurological and psychiatric disorders (Professor Matsuda, Japan).

**Clinical implications of neuro-imaging methodologies are widely recognized** (Konarski et al. Canada).

**Bipolar disorder**

Strakowski et al (2006) reviewed existing structural and functional neuro-imaging studies of patients with bipolar disorder and discussed how these investigations enhance our understanding of the neuropathology of this illness. Findings from structural magnetic resonance imaging (MRI) studies suggest that some abnormalities, such as those in prefrontal cortical areas (SOPFC), striatum and amygdala exist early in the course of illness and, therefore, potentially, predict illness onset. In contrast, other abnormalities, such as those found in the cerebellar vermis, lateral ventricles and other prefrontal regions (e.g. left inferior), appear to develop with repeated affective episodes, and may represent the effects of illness progression and associated factors. Magnetic resonance spectroscopy investigations have revealed abnormalities of membrane and second messenger metabolism, as well as bioenergetics, in striatum and prefrontal cortex. Functional imaging studies report activation differences between bipolar and healthy controls in these same anterior limbic regions. Together, these studies support a model of bipolar disorder that involves dysfunction within subcortical (striatal-thalamic)-prefrontal networks and the associated limbic modulating regions (amygdala, midline cerebellum). These studies suggest that, in bipolar disorder, there may be diminished prefrontal modulation of subcortical and medial-temporal structures within the anterior limbic network (e.g. amygdala, anterior striatum and thalamus) that results in dysregulation of mood. Future prospective and longitudinal studies focusing on these specific relationships are necessary to clarify the functional neuro-anatomy of bipolar disorder.

**radiology**

Advances in neuro-imaging technology have refined models of disease pathophysiology in mood disorders and the mechanistic basis of antidepressant action. Magnetic resonance (MR) approaches provide information on white and grey matter pathology (segmentation), cellular metabolism (MRS), oxygen consumption (BOLD), and neurocircuitry (DTI). Radioisotope-based neuro-imaging methodologies provide quantitative estimates of brain glucose metabolism, regional blood flow, and ligand-receptor/transporter binding.

**Eduardo de la Sota MD** reports on the increasing use of radiology and neuro-imaging in psychiatry

**Venous arterialisation or prolongation of venous outflow in the setting of veno-occlusive disease, especially in cortical vein thrombosis, remained limited using CT. All these neuromorphologically important issues can now be addressed directly and dynamically by whole brain 4-D-CTA.** However, with the new technique of dynamic volume CT not only the quality of information increases but also the quantity, as for a complete stroke examination, together with the postprocessed images, a total amount of up to 18,000 images can result. Not only high-end workstations for image reconstruction are needed to limit the time of data postprocessing, which can take up to 15 minutes only to calculate the parameter maps in stroke evaluation, but also high speed network connections and a powerful PACS system are needed to cope with the large amount of data.
Thin client products aim to ‘unleash the potential of scanner technologies’

The Visage Thin Client product range on show at the ECR provides a fully-integrated system with advanced tools for 2-D, 3-D, and 4-D image review and interpretation, post-processing, data management, and image distribution. The thin client-enabled PACS solution produced by Visage Imaging (a subsidiary of Mercury Computer Systems Inc.) has new features for use in radiology, cardiology, neurology, oncology, surgery and other subspecialties. These include application-specific display and post-processing protocols, saving and sharing of annotations as well as post-processing results, volume analysis of lesions and structures in 3-D, improved automatic bone removal, sharing of roaming sessions, easy switching of layouts and viewers, etc.

The latest version of the Visage CS Cardiac Analysis is also on show. Assets: new tools and optimisations such as calcium scoring, improved reporting, and efficient manual editing, the company points out. ‘This makes Visage Cardiac Analysis the only comprehensive and fully integrated cardiac analysis application on a thin-client-server platform. With Visage’s CS client-server technology the image data as well as the applications within the Visage platform are not bound to specific workstations and become instantly accessible anywhere, anytime within the PACS workflow. The Visage Thin Client platform allows sharing data and applications across radiology and cardiology departments, and helps to unleash the true potential of the latest scanner technologies and diagnostic tools.’

The web and thin-client technologies make it easy to deploy this integrated solution across an entire hospital.

Looking for the best online resource for diagnostic imaging news, information and education? (Membership is free. Sign up today.)

New injectors from ulrich

ulrich medical has added a number of new products to the firm’s wide range of injectors and accessories for computer and magnetic resonance tomography.

The new MRI injector tennessee is accumulator free and ready for use at any time, ulrich points out. ‘It avoids permanent time-consuming charging and handling of heavy accumulators. The tennessee is throughout flexible, comfortable and safe and simplifies daily workflow.’

The new passive temperature preservation for contrast agent system preserves the temperature of a contrast agent up to four hours without any need of power supply. The new ceiling suspension for CT injectors, a space-saving alternative that should prove particularly worthwhile for small examination rooms, ensures fast, comfortable positioning of the injector, the firm reports, adding: ‘The fully internal cabling establishes a secure and convenient examination environment for patient and user.’

ulrich injectors are known internationally for high quality “made in Germany”, economical performance, smooth and comfortable workflow and meet the requirements of modern imaging technology.

* ulrich medical, of Germany, has manufactured contrast agent injectors for 25 years. Today, they are available in about 40 countries.
The contribution of the anaesthesiologist

By Jean-Louis Vincent, from the Erasme Hospital, Université libre de Bruxelles, Brussels, Belgium

Since its early beginnings in Europe, during the polio epidemics of the 1950s, intensive care medicine has grown to become a specialty in its own right and the intensive care unit (ICU) has taken on a pivotal and important position in every hospital. Intensive care doctors are responsible for the management of very sick patients often with multiple and complex disease processes, and ICUs are now distinct areas of the hospital where such patients, who need specialized, ‘intensive’ (in terms of technology and personnel) care, can be managed in an environment that groups the necessary equipment and facilities.

Historically, medical and surgical ICUs were often not managed, respectively, by medical and surgical/anaesthetic teams, but with the evolution of anaesthesiology as a separate medicine, these separate units have progressively been integrated into large ICUs. The management of ICUs has changed, and having separate ICUs for different groups of patients is now rather outdated. Management of the surgical or medical status of a patient is now a rather composite process, and the necessary equipment and facilities.

The background training of intensive care doctors has also changed over time. In most countries, physicians wishing to specialize in intensive care medicine must still obtain a qualification in another specialty first, and then spend an additional period in one of the ICUs (which is usually considered as a subspecialty). In the US, the majority of intensive care specialists come from the field of anaesthesiology, and physicians starting from the management of respiratory failure. However, in Australia and New Zealand, the hospitals and the ICUs have been possible to choose critical care medicine as a primary specialty, and one is now able to train in a fellowship program in departments of anaesthesiology.

In Europe, the majority of intensivists have come from a background in anaesthesiology as a primary specialty, and it is estimated that a small majority of intensivists still have an anaesthesiology background, while other specialties are increasingly represented (internal medicine about 25-30%, paediatrics about 10%, surgery about 5%).

However, there are important international differences within Europe. For example in Scandinavia and Italy, virtually all ICUs doctors are anaesthesiologists, similarly, most intensivists in Germany and the UK have an anaesthesiology background. In UK and Ireland, notably Germany, the place of internal medicine or surgery is a separate specialty is causing considerable debate, with some doctors supporting the growth of an independent of their anaesthetic tasks to focus on intensive care, whilst others are concerned that the specialty of anaesthesia without its ICU component would be diluted and finding drawing in fewer young doctors.

Importantly, the input of a full-time intensivist on the ICU has been shown, in many studies, to be associated with improved outcomes. However, intensive care medicine is becoming increasingly specialized and changed. Research offers insight into the direct effects that acute illness has on the patient, and new techniques of diagnosis, monitoring and treatment are developed. Keeping up to date with all the latest advances in intensive care medicine is, in itself, a full-time occupation and, for doctors involved in more than one specialty or the ICU, it must be impossible. Therefore, to remain fully informed and competent in the specialty, ICU doctors will need to be full-time intensivists. As a famous Belgian anaesthesiologist once said, ‘You cannot drive two cars simultaneously’. In today’s ICU the anaesthesiologist may have to have doctors who are fully committed to intensive care, whilst the critical care, where vital signs are constantly monitored and trending are displayed on the other

The real management of the intensive care patient focuses around the organ failure (cardiorespiratory, renal, haematological, neurological, etc.) associated with the underlying disease processes, and it is as little to do with the original medical/surgical nature of the patient. Nevertheless, ICU has always had its heavy use in different geographical areas, with most ICUs in the US remaining either medical or surgical.

The background training of intensive care doctors has also changed over time. In most countries, physicians wishing to specialize in intensive care medicine must still obtain a qualification in another specialty first, and then spend an additional period in one of the ICUs (which is usually considered as a subspecialty). In the US, the majority of intensive care specialists come from the field of anaesthesiology, and physicians starting from the management of respiratory failure. However, in Australia and New Zealand, the hospitals and the ICUs have been possible to choose critical care medicine as a primary specialty, and one is now able to train in a fellowship program in departments of anaesthesiology.

In Europe, the majority of intensivists have come from a background in anaesthesiology as a primary specialty, and it is estimated that a small majority of intensivists still have an anaesthesiology background, while other specialties are increasingly represented (internal medicine about 25-30%, paediatrics about 10%, surgery about 5%).

However, there are important international differences within Europe. For example in Scandinavia and Italy, virtually all ICUs doctors are anaesthesiologists, similarly, most intensivists in Germany and the UK have an anaesthesiology background. In UK and Ireland, notably Germany, the place of internal medicine or surgery is a separate specialty is causing considerable debate, with some doctors supporting the growth of an independent of their anaesthetic tasks to focus on intensive care, whilst others are concerned that the specialty of anaesthesia without its ICU component would be diluted and finding drawing in fewer young doctors.

Importantly, the input of a full-time intensivist on the ICU has been shown, in many studies, to be associated with improved outcomes. However, intensive care medicine is becoming increasingly specialized and changed. Research offers insight into the direct effects that acute illness has on the patient, and new techniques of diagnosis, monitoring and treatment are developed. Keeping up to date with all the latest advances in intensive care medicine is, in itself, a full-time occupation and, for doctors involved in more than one specialty or the ICU, it must be impossible. Therefore, to remain fully informed and competent in the specialty, ICU doctors will need to be full-time intensivists. As a famous Belgian anaesthesiologist once said, ‘You cannot drive two cars simultaneously’. In today’s ICU the anaesthesiologist may have to have doctors who are fully committed to intensive care, whilst the critical care, where vital signs are constantly monitored and trending are displayed on the other

Second, the anaesthesiologist is responsible for monitoring vital signs or managing homeostasis. Anaesthesiologists are also the first or the third乱 —的人?” — the German Society for Anaesthesiology and Intensive Medicine (Deutsche Gesellschaft für Anästhesiologie und Intensivmedizin – DGAI) celebrates its 55th anniversary this year – it was here that anaesthesiology was expanded significantly beyond its originally one-dimensional task of intubating and ventilating. Modern anaesthesiology follows a truly interdisciplinary approach — it links anaesthesia with surgery and intensive care. Anaesthesiology thus contributes considerably to therapy success.

Professional development in medical and education programmes, anaesthesiology assumes a leading position in all these disciplines. This is particularly evident in Germany state: Anaesthesiology encompasses general, regional and local anaesthesia, including pre- and post-surgery, and anaesthesia of such special signs during surgical and diagnostic interventions as well as measures in critical, trauma and pain care.

In short, our discipline today focuses on two core issues: first, anaesthesia, which means insensitivity towards pain and touch. It is the task of the anaesthesiologist to ensure that any invasive medical intervention be it surgical, therapeutic or diagnostic — is as safe and pleasant as possible for the patient. The anaesthesiologist creates ideal conditions for the interven- tion and contributes to its success. The expertise required for this core task qualifies the anaesthesiologist for cer- tain areas of intensive care.

At the World Congress of Anaesthesiologists (WCA), March 2-7, Bueckle MD, head of the department of anaesthesiology, critical care and palliative care, at Memmingen Hospital, and Professor Hugo Van Aken MD, FRCA, FANZCA, director of the hospital and polyclinic for anaesthesiology and intensive care medicine, give an overview of anaesthesiology today

Second, the anaesthesiologist is responsible for monitoring vital signs or managing homeostasis. Anaesthesiologists are also the first or the third乱 —的人?” — the German Society for Anaesthesiology and Intensive Medicine (Deutsche Gesellschaft für Anästhesiologie und Intensivmedizin – DGAI) celebrates its 55th anniversary this year – it was here that anaesthesiology was expanded significantly beyond its originally one-dimensional task of intubating and ventilating. Modern anaesthesiology follows a truly interdisciplinary approach — it links anaesthesia with surgery and intensive care. Anaesthesiology thus contributes considerably to therapy success.

Professional development in medical and education programmes, anaesthesiology assumes a leading position in all these disciplines. This is particularly evident in Germany state: Anaesthesiology encompasses general, regional and local anaesthesia, including pre- and post-surgery, and anaesthesia of such special signs during surgical and diagnostic interventions as well as measures in critical, trauma and pain care.

In short, our discipline today focuses on two core issues: first, anaesthesia, which means insensitivity towards pain and touch. It is the task of the anaesthesiologist to ensure that any invasive medical intervention be it surgical, therapeutic or diagnostic — is as safe and pleasant as possible for the patient. The anaesthesiologist creates ideal conditions for the interven- tion and contributes to its success. The expertise required for this core task qualifies the anaesthesiologist for cer- tain areas of intensive care.

At the World Congress of Anaesthesiologists (WCA), March 2-7, Bueckle MD, head of the department of anaesthesiology, critical care and palliative care, at Memmingen Hospital, and Professor Hugo Van Aken MD, FRCA, FANZCA, director of the hospital and polyclinic for anaesthesiology and intensive care medicine, give an overview of anaesthesiology today

The Apollo

Emergency, peri-operative, critical, interventional and perinatal care — this system was designed for all

Drager points that the Apollo includes an advanced ventilation capability that can function in any operating theatre (OT), as well as a spontaneous breathing support option. The Apollo features a high efficiency particulate air (HEPA) filter, ensuring an optimal operating theatre (OT) environment. A choice of re-usable or consumable accessories, sensors for sterilisation or non-sterilisation, two or three mounted vaporizers, etc.

The Apollo also includes an advanced ventilation capability, one that was designed for the operating theatre (OT), as well as a spontaneous breathing support option. The Apollo features a high efficiency particulate air (HEPA) filter, ensuring an optimal operating theatre (OT) environment. A choice of re-usable or consumable accessories, sensors for sterilisation or non-sterilisation, two or three mounted vaporizers, etc.

The Apollo also includes an advanced ventilation capability, one that was designed for the operating theatre (OT), as well as a spontaneous breathing support option. The Apollo features a high efficiency particulate air (HEPA) filter, ensuring an optimal operating theatre (OT) environment. A choice of re-usable or consumable accessories, sensors for sterilisation or non-sterilisation, two or three mounted vaporizers, etc.

The Apollo also includes an advanced ventilation capability, one that was designed for the operating theatre (OT), as well as a spontaneous breathing support option. The Apollo features a high efficiency particulate air (HEPA) filter, ensuring an optimal operating theatre (OT) environment. A choice of re-usable or consumable accessories, sensors for sterilisation or non-sterilisation, two or three mounted vaporizers, etc.
Morbidly obese patients

Optimising pre-oxygenation by nasopharyngeal oxygen insufflation

n morbidly obese patients, oxyhaemoglobin desaturation during apnoea following standard pre-oxygenation is significantly reduced compared with normal obese patients. This is hazardous, since morbid obesity may be associated with increased risk of difficult tracheal intubation. The rapid haemoglobin desaturation during apnoea may be attributed to increased oxygen consumption associated with reduced oxygen reserve. The FRC, which is the main oxygen store, is decreased with obesity secondary to the increased mass of the chest and abdomen. Also, the supine position further decreases the FRC, due to cephalad displacement of the diaphragm by the abdominal contents, and hence the tidal volume of the obese may fall within the closing capacity. Whereas non-invasive ventilation in normal patients decreases by around 20% following induction of anaesthesia, it decreases by approximately 50% in morbidly obese patients, causing microatelectasis resulting in ventilation/perfusion (V/Q) mismatch, with a subsequent increase of alveolar-arterial oxygen gradient. Also, the intrapulmonary shunt in the obese patient is 10-20% compared with 2-5% in the non-obese (Fig 1).

The head-up position has been recommended to optimise pre-oxygenation in a pregnant woman, as well as in morbidly obese patients. The head-up position during the induction in morbidly obese patients has been shown to prolong the mean time of time to desaturate to 90%, as the FRC will return to pre-CPAP levels once the patient is anesthetised and the CPAP mask is removed. In critically ill patients, Buillard et al showed that pressure support ventilation was a significant improved oxygen saturation before, during and after endotracheal intubation as compared with the standard pre-oxygenation. In our department, we use non-invasive ventilatory support in the form of BiPAP to optimise pre-oxygenation in the morbidly obese patient having acute lung injury. Potential adverse effects of non-invasive BiPAP include gastric insufflation, distension and aspiration. However, there are no reported cases of barotrauma or serious haemodynamic changes associated with non-invasive BiPAP.

NUTRITION AND HEALTH

Strict weight control for ICU patients

Illnesses treated in intensive care units (ICUs) often result in significant problems with the balance of fluids and electrolytes. People can become unaccustomed to fluids in their fluid volumes, such as heart insufficiency, liver cirrhosis, lung diseases and hypothyroidism. Intensive care patients are often not able to weigh themselves on scales independently. This requires a solution that does not involve unnecessary moving or discomfort for these patients. The seca 985 bed- and dialysis scales have been designed for just this purpose, the manufacturer reports. With a reliable patient weight indication up to 250kg the weight determination and monitoring of very obese patients also does not present a problem. Patient weight is measured in graduations of 100g up to 200kg, after that in graduations of 200g. Because it facilitates the determination of very obese patients also does not present a problem. Patient weight is measured in graduations of 100g up to 200kg, after that in graduations of 200g. Because it facilitates the detection of the slightest fluctuations in weight, such precision can save lives. For treatments involving patients with high fluid retention, e.g. diuresis, it is important that the patient’s weight does not fall below a certain level and respectively that he reaches his target weight. For these cases, the seca 985 has a critical value function which acts as an alarm function, seca points out. All it requires is programming the patient’s target weight. Once this is reached the seca 985 indicates this through an audio alarm.

The bed scales are complemented by the optional multifunctional display seca 435. It offers an additional alarm function, which immediately acoustically alerts the ICU specialists to dangerous fluctuations in weight, both upwards and downwards. This ensures a stable fluid balance for burn patients, for example. When the pause function of the seca 435 is activated, items could be placed on the bed, or removed, without impacting the weight monitoring process. This means, seca suggests, that the patient can be handed another pillow etc. without any problems.

FDa ADVISORY ON FENTANYL PATCHES

Several cases of death and life-threatening side effects due to the incorrect use of fentanyl patches have led the US Food and Drug Administration (FDA) to issue a second public health advisory for the safe use of the very potent pain medication to healthcare professionals. The new reports indicate more factors still inappropriately prescribed fentanyl patches, e.g. to patients with acute postoperative pain, chronic pain or headaches. The use of the Fentanyl Transdermal System is only indicated for the treatment of severe pain – patients who need an around-the-clock narcotic pain medicine and often are opioid-tolerant. Opioid-tolerant people are more sensitive to the dangerous side effects of narcotic pain medicines, such as respiratory depression.

In addition, patients should be told precisely how to use the fentanyl patches. The FDA has informed about individual changes the patches more frequently than stated in the package information sheet. In contrast to the patches, resulting in dangerously high fentanyl blood levels. The FDA recommends fentanyl users to regularly update their product information immediately and to develop a medication guide for patients.
How to achieve tight glucose control

By Professor Jean-Charles Preiser MD PhD, of the Department of General Intensive Care, University Hospital Centre, University of Liege, Belgium

Following the publication of the landmark Leuven study, which reported a four percent decrease in the mortality rate following the restoration and maintenance of normoglycaemia by intensive insulin therapy in critically ill patients, there was a wide enthusiasm for this cheap and easily accessible technique. However, the successful implementation of tight glucose control is a major challenge for most intensive care units worldwide. The increase in workload related to the frequent checks of blood glucose (BG) levels, preparation of insulin, the frequent changes in infusion rate of insulin, and the risk of hypoglycaemia, all represent a major burden for the nursing teams.

A stepwise approach is therefore mandatory to implement safely tight glucose control. Whatever the desired target for blood glucose level, it is necessary to implement a systematic algorithm, which will not only indicate the rate of insulin but also the time for the next glucose check. The use of dynamic rather than sliding scale appears safer. Of course, such an algorithm must be user-friendly in order to be used and applied when any change of the intake of carbohydrate and/or insulin infusion rate is anticipated. For example, the adaptation of the insulin infusion rate must be planned when enteral nutrition is discontinued. This aspect, as many others, requires close collaboration between the nursing and medical staff, which should co-operate to develop locally applicable protocols. Importantly, the nurses and available medical equipment must also be adapted. Once developed, the protocol must be carefully explained, implying an educational aspect, particularly important in this area, which involves every ICU healthcare professional.

The basic questions raised for the design of an insulin algorithm are particularly suitable for computerised protocols that will calculate mathematical formulas with several entries. The relevant questions of the clinicians can be easily translated in binary language. Several centres have already designed and validated their own computerised protocol. Of note, the use of a computerised protocol does not decrease the number of glucose checks to be performed. For instance, the SPRINT protocol requires the recording of blood glucose, nutrition and insulin administration rate every two hours. Using such a stepwise approach, frequent evaluations of the rate of hypoglycaemia and the proportion of BG values within assigned range are probably valid quality indicators that could be used for self-evaluation of the performance and benchmarking. The calculation of the time within range requires the recording of each glucose value measured (and not only the morning value). Compared with the hypoglycaemia index, the time spent in range could be more reliable. In studies that compared two targets of blood glucose, the proportion of time spent within the assigned range was seldom reported. In the yet unpublished Glucontrol trial, which compared the outcome of patients assigned to 4.4-6.1 versus 7.8-10.0 mmol/l, we observed a time spent in range of about 50%. Finally, the reduction in glucose variability parameter could also positively influence the outcome, and could also represent a tool to compare the quality of different protocols for tight glucose control.
Hemicorporectomy

Czech Republic – The second successful hemicorporectomy (translumbar amputation) was carried out several months ago by surgeon Franziskus Antos and team at the Bulovka Faculty Hospital, Prague. The patient had severe pelvic and spinal cord injury from a motorbike accident when aged 19. Now 35 years old, due to many complications, including inflammatory arthritis, in his crumbling pelvis and deeply infected bed-sores, the paraplegic patient had undergone 32 surgical operations, which included a colostomy and urethrostomy. He was still struggling for life.

The surgeons decided on a hemicorporectomy, helpless 34-year old male who died within a month after surgery due to kidney failure and the lack of will to live.

Czech report: Rostislav Kuklik

A brief history?

Hemicorporectomy (translumbar amputation, or sometimes called halfleg amputation) is very radical and rare surgery. Thus there is little literature on the subject. One about 45 hemicorporectomy cases are thought to have been reported. Because post-operative morbidity and mortality rates are high, there is generally a protocol not to resuscitate patients presenting the kind of serious injuries or disease level that might suggest a hemicorporectomy as the only solution. In addition, most surgeons would not contemplate the procedure because they consider it pushes the boundaries of surgery beyond reasonable frontiers. Clearly, the decision to opt for this surgery is reached only as a last resort in cases of severe, potentially life-threatening cases or trauma in and around the pelvis.

Procedure - Depending on the circumscription of the lesion, hemicorporectomy may be carried out in one, two or even more stages, with a gap of weeks or months between procedures. The first stage(s) involves colostomy and ileostomy, transferring waste functions to the upper torso. The second stage is the sawing off of the entire lower half of the body by transection of the lumbar spine. Critical care - Because almost 50% of the circulatory system has gone, complications are inevitable. The usual monitoring parameters for kidney and cardiac functions and blood pressure have changed; temperature control, fluid replacement and pulmonary care become critical.

Postherapy - Because there is usually no remaining pelvic girdle musculature, it is extremely difficult to design comfortable and useful prostheses. The prosthetic use is referred to as a "bucket" which has an inflatable lining to prevent uneven pressure distribution.

The colostomy bag and ileal conduit are drained through two outlets in the bucket. Physiotherapy & body management - This is also an enormous issue. Needless to say, the long-term management of hypertension, temperature control, etoma management, as well as sex hormone replacement, patient's weight control and skin care is intensive. Almost above all in importance is the physical fitness and consultancy of the patient - his/her strength and will to live.

History - The type of severe injuries experienced during WWII pushed the boundaries for new surgical techniques. Reflecting on this period, B. E. Ferrara referred to hemicorporectomy in an article: "...battle field injuries quickly gained intensive treatment at congenital and acquired conditions... [the surgeon] devised extended upper operations including extended radical mastectomy, radical gynectectomy and pancreatectomy, pelvic exenteration, the 'Commando operation' (tongue, jaw and neck dissection), bilateral back dissection, hemipelvectomy, and total hemicorporectomy, as translumbar amputation, referred to as the most revolutionary of all operative procedures."

In 1950, Professor Frederick E Kredel at the Medical College of South Carolina declared the prospect of hemicorporectomy (or halfleg, as he referred to it) as an alternative to pelvic exenteration for patients with advanced pelvic malignancy. Although the procedure demonstrated the procedure in cadavers and recommended it be carried out in two stages, he did not perform his procedure on a living human.

Nine years later, in Detroit, Michigan, surgeon Charles N Kennedy carried out the first actual hemicorporectomy on a 74-year-old male patient with locally invasive rectal cancer. Surgery was carried out in a single stage and the man lived for 10 days. Cause of death: pulmonary oedema.

A year later (1961) surgeon J Bradley Aust, University of Minnesota, performed the first successful hemicorporectomy in two stages, on a 29-year-old paraplegic who suffered a malignant tumour in a decubitus ulcer. He survived for 19 years.

Other hemicorporectomies have been undertaken through the years; some 45 cases have been reported, among which the several successes based on experts to believe that results could be improved with greater multidisciplinary planning and aftercare.

Hemicorporectomy

PC diagnoses Alzheimer’s better than physicians Earlier, cheaper diagnosis predicted

Standard computers can be taught to diagnose Alzheimer’s disease from brain scans, according to researchers at the Wellcome Trust Centre for Neuroimaging at University College London. Publishing their findings in the journal Brain, Professor Richard Frackowiak said the computers were better able to distinguish signs of Alzheimer’s than humans, and proved quicker and more accurate than present methods, as well as less costly.

A standard computer was taught the difference between brain scans from patients with known Alzheimer’s disease and people with no signs of the disease. These two conditions are distinguishable with high accuracy on a single clinical MRI scan, without the need for time consuming follow-up tests, the researchers pointed out.

Diagnosis via the standard computer obtained a 96% success rate, diagnostic accuracy from standard scans, blood tests and interviews by a clinician was 85%. ‘Machines are clearly able to do that sort of thing better,’ it is beginning to look like it will have to come into clinical practice’, Prof. Frackowiak said. ‘In the long-run, we’d like to use these techniques as ways of classifying patients with something like a degenerative disease into various stages. From the point-of-view of developing new pharmaceuticals for these disorders,’ he added, ‘there’s great potential.’

DBS may improve memory

Six patients are taking part in a pilot study to test whether deep brain stimulation (DBS) can help in early Alzheimer’s disease to stop the progression.

This follows a finding by a Canadian team of doctors who came across an interesting finding when using DBS to treat a 56-year-old morbidly obese diabetic, who was sufferer of Alzheimer’s disease.

DBS became an experimental option because, in animal tests, it has been shown to have an impact on the animal models of Alzheimer’s disease, and the brain is thought to produce an extreme treatment for obesity in humans, but the procedure had some success in the treatment of Parkinson’s disease on the brain, severe cluster headaches and depression.

Following the implantation of electrodes into the brain’s limbic system (hypothalamus) which is thought to control the appetite, and stimulation by electrical impulses, the patient began to experience feelings of deja vu. The sudden perception of being in a park with friends followed, in which he was an observer. He felt younger, thought his age to be about 20, and that his then girlfriend was there. The scene was in colour, and as theervoltage increased, details in this scene became more vivid.

Following surgery, the patient recovered for two months. Later, when the electrodes were stimulated for again, he experienced a similar effect. After three weeks of constant electrical stimulation the patient performed better in memory tests than he had previously done.

A year later he again performed well in memory tests, when the electrodes were stimulated, but less well when they were switched off.

Reporting their findings in the Annals of Neurology, lead researcher Professor Andres Lozano, of the Toronto Western Hospital, said that this single case was completely unexpected, but added: ‘We knew immediately it was important and we were intrigued to see if this could help people with memory disorders. Hopefully, we have found a circuit in the brain that can be modulated by stimulation, and which might provide benefits to patients with memory disorders,’ said Professor Lozano.

The computer techniques could help to map the elderly with mild memory loss that they do not have Alzheimer’s, for those with the disease, it may enable them to slow progression.

The computer techniques could help to map the elderly with mild memory loss that they do not have Alzheimer’s, for those with the disease, it may enable them to slow progression.
Kidney donors: a long-term follow-up?

What is their quality of life after donation?

By A Chkhotua, T Pantsulaia*, N Maglakelidze

The National Centre of Urology, Tbilisi, Georgia

Kidney transplantation (Tx) is the treatment of choice for patients with end stage renal disease, providing the best results and highest quality of life (QoL). However, donor shortage remains the main problem in organ Tx. Today, only a few possible ways to enhance the organ supply are considered. One of these is the increasing use of living donor operations. It has been shown by numerous studies that kidney donation does not cause serious medical problems for the donor, it delays or prevents deterioration of kidney function, arterial hypertension or proteinuria. However, it should not be forgotten that a donor is not a patient; this is a healthy person voluntarily donating the organ. The decision-making process is complex for every donor and answering their postoperative health and QoL is a matter of utmost importance. Only limited reports examine the QoL issues in living donors.

The QoL concept is well-known in clinical medicine and frequently applied to assess surgical or other treatment modalities to determine their therapeutic success. It is a wide concept, comprised of four main aspects of human well-being: physical (health, mobility, somatic comfort etc.), psychological (happiness, satisfaction, tranquility etc.), social (family relationships, financial well-being etc.) and spiritual (sense of life, religious beliefs etc.). Several surveys and questionnaires have been used for this purpose. The Short-Form 36 (SF-36), Giessen Subjective Complaints List-24 (GBB) and Zerssen’s Mood-Scale (Bf-S) are internationally validated and frequently used questionnaires.

In the last 5 years, the European Society for Uro-Technology (ESUT) and the European Society for Oncological Urology (ESOU), will hold their annual meetings at the venue, as will the European Association of Urology Nurses (EAUN). In Berlin last year, the EAUN’s annual meeting drew over 240 participants; this, Prof. Artibani adds, ‘underlines the growing interest among professional nurses in Europe not only to hone their skills but also share their knowledge with colleagues from more than 25 countries.’

Along with various specialist events, the nurses will be invited to visit a local hospital. Along with various specialist events, the nurses will be invited to visit a local hospital. In addition, about 35 post-graduate training courses organised by the European School of Urology, will be held.

The Italian EAU presidents and hosts are Professor Walter Artibani (Padua), Prof Vincenzo Mirone (Neaples) and Prof Patrizio Rigatti (Milan). Advances covered in the scientific programme will include, for example, the use of biomarkers and the treatment of bladder and renal cell cancer and, as Prof. Artibani points out: ‘There is attention for every aspect of the urological spectrum.’

In addition, about 35 post-graduate training courses organised by the European School of Urology, in association with the congress, will be held.

The latest results from the Global Prevalence Study on Infections in Urology (GPIU study) also will be presented. ‘This worldwide study is internet based and investigates the prevalence of nosocomial infections, since these pose a serious threat to urological patients,’ Prof. Artibani explains.

Details: www.eaumilan2008.org

EUROPEAN HOSPITAL Vol 17 Issue 1/08

New... A highly practical male urinal

UnoComfort is a single-use male urinal designed to optimise safety and hygiene. Unomedical, its manufacturer, reports that the urinal is 100% leak-proof and incorporates a non-return valve that eliminates the risk of contact with infected urine and urinal spillage. Made of strong, transparent polyethylene, so that nurses can quickly check urine quality and level, the urinal also has a distinctive reservoir for urine testing.

Several bags can be hung on a hook, and an integrated carrying handle facilitates discreet bedside storage after use.

Unomedical reports that it has been intensively tested by Kathryn Harris, Urology Nurse Specialist at Southmead Hospital in Bristol, UK, who found the product to be overall very cost effective in terms of the time saved.

Flexible mobile imaging solutions

How many boxes can you tick?

- I'm upgrading my existing CT and/or MRI.
- I'm installing a new CT and/or MRI.
- I'm replacing my existing Cardiac Cath Labs CT and/or MRI.
- I need to reduce a workload.
- I have building work or a 'turnkey' project at the hospital that will leave us without scanning services for a number of months.
- I would like to evaluate the PET/CT technology before purchasing.
- I have a hard to fit project and I will need a PET/CT and/or MRI for a limited period.

An interim mobile imaging unit could be the solution!

- Immediate access to a choice of mobile imaging systems.
- A flexible and tailored mobile service.
- An all-inclusive competitive price.

* T. Pantsulaia: also at the Georgian Association of Psychology

Details: www.unomedical.org

unoComfort is a single-use male urinal designed to optimise safety and hygiene. Unomedical, its manufacturer, reports that the urinal is 100% leak-proof and incorporates a non-return valve that eliminates the risk of contact with infected urine and urinal spillage. Made of strong, transparent polyethylene, so that nurses can quickly check urine quality and level, the urinal also has a distinctive reservoir for urine testing.

Several bags can be hung on a hook, and an integrated carrying handle facilitates discreet bedside storage after use.

Unomedical reports that it has been intensively tested by Kathryn Harris, Urology Nurse Specialist at Southmead Hospital in Bristol, UK, who found the product to be overall very cost effective in terms of the time saved.

Flexible mobile imaging solutions

How many boxes can you tick?

- I'm upgrading my existing CT and/or MRI.
- I'm installing a new CT and/or MRI.
- I'm replacing my existing Cardiac Cath Labs CT and/or MRI.
- I need to reduce a workload.
- I have building work or a 'turnkey' project at the hospital that will leave us without scanning services for a number of months.
- I would like to evaluate the PET/CT technology before purchasing.
- I have a hard to fit project and I will need a PET/CT and/or MRI for a limited period.

An interim mobile imaging unit could be the solution!

- Immediate access to a choice of mobile imaging systems.
- A flexible and tailored mobile service.
- An all-inclusive competitive price.

* T. Pantsulaia: also at the Georgian Association of Psychology

Details: www.unomedical.org
Advances in prostate cancer imaging spark hopes for better therapies. Melke Lerner asked Professor Hartmut Huland (right), Medical Director of Martini-Klinik in Hamburg, and pioneer of the nerve-preserving prostatectomy method, currently the gold standard in prostate cancer surgery, about his technique and whether the optimism regarding imaging is justified or misplaced.

**Visualising prostate cancer**

**Real-time Tissue Elastography**

Aiming for a ‘manogram’ programme in Europe

Today, real-time tissue elastography (HI-RTE) provides a method to determine tissue elasticity of certain organs, such as the prostate, in real-time and to perform precise biopsies for reliable tumour diagnosis during standard examinations. Professor Ferdinand Frauscher (FF), consultant in radio diagnostics at the Innsbruck University Hospital, Austria, who has pioneered elastography, particularly in urogenital diagnostics, and regularly uses it in a screening programme, discussed the value of this method in an interview with Meike Lerner.

Professor Ferdinand Frauscher

**FF:** Real-time elastography is gaining increasing importance, because it is a patient-friendly, reliable and affordable method to diagnose cancer. The idea behind the method – to measure elasticity and the elasticity of tissue – is not new. However, for a long time this kind of measurement remained in the laboratory phase and therefore was not useful in clinical practice. The introduction of HI-RTE by Hitachi Medical Systems offered a rather simple method which can be applied relatively quickly.

**Real-time elastography is being used in two further Austrian clinics and in a hospital in Hamburg, Germany. So, thanks to real-time elastography the diagnosis of prostate cancer has become significantly improved. What are the next steps?**

**FF:** First, we want to look at possible new therapies. As far as men are concerned, we are lagging behind a bit. Our goal is – similar to breast cancer therapy – to avoid radical resection if at all possible. Resection is still the procedure of choice, even if a tumour has a size of only three to four millimetres. With the support of imaging methods, we can treat these cases with high-focal ultrasound or can apply special gene therapies. The US is ahead of us, because more funds are available for research. The term ‘manogram’ is already widely used in the US. We would like to see this trend for Europe, which would result in significantly improved diagnostics and treatment of prostate cancer.

**Real-time Tissue Elastography at the ECR**

Organised by Hitachi Medical Systems, the symposium ‘Real-time Tissue Elastography: matching diagnostic potential with a valuable clinical tool?’ will be held during the European Congress of Radiology (ECR), on Sunday, 9 March (12:30-13:30, room E1). High-profile specialists will present the latest developments in RTE, and Prof. Frauscher will describe his experiences with this method and explain ‘The value of real-time elastography in the diagnostic evaluation of prostate cancer and testicular masses’.

**Prof. Huland:** Nerve-preserving prostatectomy was originally done in the United States. Researchers discovered that the nerves that cause erection run along the surface of the prostate gland and that those nerves are destroyed in traditional prostate surgery. Our work generated important new insights regarding the actual sensitivity of these nerves and we concluded that any surgical intervention should stay clear of these nerve bundles. We were also the first to show exactly where and how many nerves are on each side of the prostate gland – namely fifty. That told us how much tissue had to be removed, how much surgery in order to preserve erectile function.

Based on this new knowledge, we developed a procedure, which — at Martini-Klinik — has proved very successful regarding the preservation of sexual potency. Because there usually is no comprehensive follow-up, it is not so easy to say definitively. Therefore, in 1991, we began to build a data base, which we feed with internationally validated questionnaires that patients fill out before and after surgery.

Surgical success depends to a great extent on the patient’s age and whether the nerves on both sides of the prostate can be spared during the intervention. Normally, this means that, if the patient is fit and is potent prior to the intervention, and if the nerves on both sides of the prostate can be preserved, 60% of patients can be potent following surgery. However, due to recent innovations, the method is now suitable for diagnostic purposes. In our framework of the research project, to test the specificity of the method we are looking at ‘normal’ prostate patients. We are examining patients who have to undergo a radical prostatectomy due to a bladder carcinoma. Using elastography, we assess the status of the prostate and prostatectomy surgery. We compare the actual status with the diagnostic image. Second, we test Doppler ultrasound, a modality also advanced by Professor Frauscher. This ultrasound procedure primarily visualises vessels. Since Doppler sensitivity by itself does not provide sufficient sensitivity, we use a combination of both methods. This test is repeated for nerves rather than blood vessels. We can achieve higher specificity for nerves. Third, we test Doppler ultrasound, a modality also advanced by Professor Frauscher. This ultrasound procedure primarily visualises vessels. Since Doppler sensitivity by itself does not provide sufficient sensitivity, we use a combination of both methods. This test is repeated for nerves rather than blood vessels. We can achieve higher specificity for nerves.

**How do developments in diagnostics impact on therapy?**

Currently, we assess the condition of patients who are suited for nerve-preserving prostatectomy. The nerves are located very close to the membrane of the prostate capsule. If the tumour has already penetrated the capsule, the nerves are affected. In the future, we could use the nerve bundle region to check whether the nerves are affected or not. This is what we hope for: that imaging will provide us with diagnostic confidence and complex and time-consuming methods become superfluous.

**Second, we certainly hope that imaging will improve early detection of prostate cancer, so that more patients will be able to benefit from the nerve-sparing procedure. Further the cancer has progressed, the smaller the chance for nerve-preserving tumour removal.**

**In the long term, does this mean that radical prostatectomy will remain the procedure of choice, or do you expect that at some stage you will be able to save the prostate at least partially?**

Radical prostatectomy will remain the procedure of choice. It is hotly debated whether we will reach the point where we can do a partial prostatectomy. However, many experts, including myself, consider this discussion dangerous because, in 96 percent of cases, prostate cancer, even in the early stage, is a multi-focal event, unlike kidney cancer, for example, where the carcinoma is limited to a single region. Molecular biological studies show that the entire prostate is always affected. Therefore partial prostate removal is risky. Certainly, we have to think about this idea, particularly if diagnostic imaging provides good results. But it is unlikely that it will ever be more than an idea.
Childless men show lower risk of the disease

Denmark – Childless men have a lower risk of developing prostate cancer than fathers; but, the more children a father has, that risk decreases, according to a new study led by Kristian Jørgensen of the Statens Serum Institut, in Copenhagen, published in the American Cancer Society journal, Cancer.

The research team used a national population-based register to analyse data from all men born in their country between 1935 and 1988. Among these, 3,400 had developed prostate cancer. They found men without children were 40% likely than those with children to be diagnosed with prostate cancer during up to 35-years of follow up. The analysis also revealed that, among fathers, with an increasing number of children the prostate cancer risk gradually reduced. The authors suggest that, theoretically, this might reflect a ‘healthy father’ phenomenon, in which men who retain fertility are somehow at lower risk of developing prostate cancer,” the authors wrote.

They add that additional studies are needed to identify the underlying biological, environmental, social and/or behavioural factors that explain the observed differences in prostate cancer risk between fathers and childless men and between men fathering few and those fathering many children.

* ‘Fatherhood Status and Prostate Cancer Risk.’ Kristian T. Jørgensen, Bo V. Pedersen, Christoffer Johannsen, and Morten Frisch. CANCER; Pub. online: 7/1/08 (DOI: 10.1002/cncr.23230; Print Issue Date: 15/08)

Prospective Phase III trial for MRI-guided galvanotherapy

Galvanotherapy is a tissue-saving procedure that utilises a direct electric current. ‘With galvanotherapy we are able to retain the function of the concerned organ and can protect healthy tissue in a more targeted and much better way than with conventional methods,’ explained Professor Ulrich Vogl of the University Hospital Frankfurt, Germany, who, developed the treatment with Dr Heinz Mayer (Regensburger Competence Centre for Non-Invasive Treatments) and the support of scientists at the Medical University of South Carolina, USA.

From February 2005 to August 2006 the researchers used the MRI-guided procedure to treat 44 patients suffering histologically confirmed prostate cancer. Under a local anaesthetic, in a translaprostatic puncture, two platinum-tipped electrodes were inserted into the right and left region of the prostate.

Three times a week, direct current charges of max. 350 coulombs were applied to the tumour during the treatment. Since the tumour cells show a high level of ions, the current focused on the tumour tissue whilst healthy tissues remained unaffected.

Three, six and twelve months after the treatment, the tumour size and the prostate-specific antigen (PSA) levels were measured. Median tumour size had decreased from 1.90 cm³ to 1.12 cm³ – a significant reduction of 41%. The treatment also reduced PSA levels: in the final follow-up examinations, one patient showed no signs and a partial reduction was recorded in 18 patients. The health status of 23 patients was stable; two patients showed disease progression with an increase in tumour size. No metastases were detected.

According to the scientists, this new method is particularly suited for tumours of less than 8 cm that are not located close to an artery or nerves. The therapy costs are less than for comparable treatments.

As soon as the procedure is approved, Prof. Vogl said he expects it to be covered by statutory health insurers.

Genes and cancer susceptibility

At least ten newly identified genetic variants are associated with increased susceptibility to prostate cancer, according to three studies published online at Nature Genetics (http://www.naturegenetics). These findings double the number of variants known to be associated with risk of prostate cancer and, in the future, may allow accurate prediction of risk in individual patients.

The three groups independently carried out genome-wide association studies of thousands of individuals with or without prostate cancer (Rosser Ellis and colleagues (Institute of Cancer Research, UK) identified seven loci that were significantly associated with the disease on chromosomes 3, 7, 10, 11 and X. Stephen Chanock and colleagues (National Institutes of Health, Bethesda, MD, USA) report risk loci on chromosomes 7, 10 (two loci) and 11, as well as nine other loci showing suggestive association. Julius Gudmundsson, Edward Farmer and Berglind Olafsdottir (deCODE Genetics, Reykjavik, Iceland) report risk loci on chromosomes 2 and X. Each group’s findings were replicated in an independent population, and each confirmed previous susceptibility loci on chromosomes 8 and 17.

Although the specific genes that are affected by these variants have not yet been pinpointed, the authors of the studies note a few candidates. One of the risk variants on chromosome 1 is just upstream of MSMB, which encodes a protein that is produced in the prostate, and loss of MSMB expression is associated with recurrence of disease after prostatectomy. The variant on chromosome 19 is near KLK3, which encodes PSA, an enzyme that liquefies semen and is used as a standard serum marker for screening and disease monitoring.

* ‘Short-Term Neoadjuvant Deprivation Therapy and External Beam Radiotherapy for Locally Advanced Prostate Cancer: Long-Term Results of RTOG 8610 ‘A Phase III Prospective Randomized Trial’.’ Mack Roach III, et al. University of California San Francisco, CA. Published by the peer-reviewed Journal of Clinical Oncology (JCO) of the American Society of Clinical Oncology (ASCO). Published online 21/08. Also, for consumer information go to ASCO’s patient website: www.precis.org/CancerAdvances.

Four months of ADT delays prostate cancer growth by up to eight years

USA – Just four months of hormonal therapy before and with standard external beam radiation therapy slowed cancer growth by as much as eight years, reduced development of bone metastases, according to a study* carried out at the University of California, San Francisco. The therapy also increased survival in older men with potentially aggressive prostate cancer. This ‘neo-adjuvant’ therapy did not allow men most at risk of developing bone metastases to avoid long-term hormone therapy, better in line with the adjuvant’ hormonal therapy may outweigh the risks,” said lead author. Mack Roach III MD, professor of urology at the University of California, San Francisco. ‘While four months of hormonal therapy isn’t enough to cause significant side effects, we found that it can delay the development of bone metastasis by as many as eight years, which is very significant.’

Starting in 1987, Radiation Therapy Oncology Group researchers studied 234 men with high-risk prostate cancer who received ADT (goserelin and flutamide) before and concurrent with external beam radiation therapy, and 232 men with the disease who received radiation therapy alone. After 17 years of follow up, they found better-10-year disease-specific death rates (the rate of death from prostate cancer) for men who received ADT plus radiation (23% versus 36% of the radiation-only group), disease metastasis rates (35% versus 47%), disease-free survival (the percentage of men free of cancer at 10 years; 11% v. 3%) and biochemical failure rates (3% in PSA levels; 65% v. 80%).

Among men who received neo-adjuvant hormonal therapy, there was a delay of four months to develop bone metastases compared with men receiving radiation alone. Men who develop bone metastases often require long-term hormonal therapy, which can increase their risk for side effects. ‘By taking a little bit of hormonal therapy early, patients may avoid having to take a lot of it later,’ Dr Roach added.

Fatal cardiac events occurred in 12% of patients in the ADT group compared with 9% of the radiation-only group — a difference that was not statistically significant.

‘ ‘Short-Term Neoadjuvant Deprivation Therapy and External Beam Radiotherapy for Locally Advanced Prostate Cancer: Long-Term Results of RTOG 8610 ‘A Phase III Prospective Randomized Trial’.’ Mack Roach III, et al. University of California San Francisco, CA. Published by the peer-reviewed Journal of Clinical Oncology (JCO) of the American Society of Clinical Oncology (ASCO). Published online 21/08. Also, for consumer information go to ASCO’s patient website: www.precis.org/CancerAdvances.
Even non-touch taps can harbour dangerous pathogens

How to banish waterborne infections

USA - Urging public health and infection control officers to be proactive against Legionella and other waterborne microbes that cause serious hospital-acquired infections (HAIs), the international Legionella expert Janet Stout PhD warned: ‘One small water line feeding one hospital faucet alone could house millions of these pathogens. By Georgia and the Waterborne Pathogens: Applying Lessons Learned from Legionella, published in Managing Infection Control, (1207) Dr Stout pointed out that technologies found most effective in controlling exposure to waterborne microbes – copper/silver ionisation, chlorine dioxide and point-of-use filtration by Pall-AquaSafe Filters. The best solution, she wrote, is likely to be a combination of chemical or physical disinfection together with point-of-use filtration.

The author also pointed out a surprising finding: Although effective in controlling the bacteria, exposure control, regulations, studies have shown them to be a source of dangerous germs that can cause serious pneumonia and other infections.

* "As reported in "The Sugar Spy: A Salute to Insulin" published in Pittsburg, and Associate Professor at the University of Pittsburgh. She founded SPL with Dr Victor Yu. Both have over 25 years experience in infectious disease and microbiology. The laboratory provides healthcare, water treatment and other clinical services to a number of hospitals, e.g., Cystic Fibrosis centres, Hemophilia, Mycobacteria and other clinically relevant pathogens.


HYGIENE

Simple checklist could save healthcare billions

Even non-touch taps can harbour dangerous pathogens

How to banish waterborne infections

USA - Urging public health and infection control officers to be proactive against Legionella and other waterborne microbes that cause serious hospital-acquired infections (HAIs), the international Legionella expert Janet Stout PhD warned: ‘One small water line feeding one hospital faucet alone could house millions of these pathogens. By Georgia and the Waterborne Pathogens: Applying Lessons Learned from Legionella, published in Managing Infection Control, (1207) Dr Stout pointed out that technologies found most effective in controlling exposure to waterborne microbes – copper/silver ionisation, chlorine dioxide and point-of-use filtration by Pall-AquaSafe Filters. The best solution, she wrote, is likely to be a combination of chemical or physical disinfection together with point-of-use filtration.

The author also pointed out a surprising finding: Although effective in controlling the bacteria, exposure control, regulations, studies have shown them to be a source of dangerous germs that can cause serious pneumonia and other infections.

* "As reported in "The Sugar Spy: A Salute to Insulin" published in Pittsburg, and Associate Professor at the University of Pittsburgh. She founded SPL with Dr Victor Yu. Both have over 25 years experience in infectious disease and microbiology. The laboratory provides healthcare, water treatment and other clinical services to a number of hospitals, e.g., Cystic Fibrosis centres, Hemophilia, Mycobacteria and other clinically relevant pathogens.


HYGIENE

Simple checklist could save healthcare billions

VACCINATION MAY COMBAT CLOSTRIDIUM DIFFICILE

UK – Whilst the life-threatening Clostridium difficile is absolutely not resistant to antibiotics, after an individual has been infected the bacteria can very quickly grow and multiply. This is the real problem with the disease as it can be difficult to spot and the only real way to prevent or decrease the number of cases is by vaccinating.

The problem is that scientists have long been looking for a vaccine that could prevent the disease and after much research and development a new vaccine could be about to hit the market.

Once the vaccine is ready for use it will prevent C. difficile from spreading throughout the body and this will help to prevent the condition from returning.

The vaccine is promising and scientists hope that it will be able to help prevent the disease from spreading throughout the body. It will also be able to help prevent the disease from returning once it has left the body.

The vaccine is being developed by the UK company GSK and it is being trialled in the UK and other countries around the world.

The vaccine is based on a dead form of the bacteria and it is hoped that this will mean that it will not cause any serious side effects.

The vaccine is being tested on a small group of people and if it is successful it is hoped that it will be available on the market within the next few years.

The vaccine is being developed by the UK company GSK and it is being trialled in the UK and other countries around the world.

The vaccine is based on a dead form of the bacteria and it is hoped that this will mean that it will not cause any serious side effects.

The vaccine is being tested on a small group of people and if it is successful it is hoped that it will be available on the market within the next few years.

The vaccine is being developed by the UK company GSK and it is being trialled in the UK and other countries around the world.

The vaccine is based on a dead form of the bacteria and it is hoped that this will mean that it will not cause any serious side effects.

The vaccine is being tested on a small group of people and if it is successful it is hoped that it will be available on the market within the next few years.

The vaccine is being developed by the UK company GSK and it is being trialled in the UK and other countries around the world.

The vaccine is based on a dead form of the bacteria and it is hoped that this will mean that it will not cause any serious side effects.

The vaccine is being tested on a small group of people and if it is successful it is hoped that it will be available on the market within the next few years.

The vaccine is being developed by the UK company GSK and it is being trialled in the UK and other countries around the world.

The vaccine is based on a dead form of the bacteria and it is hoped that this will mean that it will not cause any serious side effects.

The vaccine is being tested on a small group of people and if it is successful it is hoped that it will be available on the market within the next few years.

The vaccine is being developed by the UK company GSK and it is being trialled in the UK and other countries around the world.

The vaccine is based on a dead form of the bacteria and it is hoped that this will mean that it will not cause any serious side effects.

The vaccine is being tested on a small group of people and if it is successful it is hoped that it will be available on the market within the next few years.

The vaccine is being developed by the UK company GSK and it is being trialled in the UK and other countries around the world.

The vaccine is based on a dead form of the bacteria and it is hoped that this will mean that it will not cause any serious side effects.

The vaccine is being tested on a small group of people and if it is successful it is hoped that it will be available on the market within the next few years.

The vaccine is being developed by the UK company GSK and it is being trialled in the UK and other countries around the world.

The vaccine is based on a dead form of the bacteria and it is hoped that this will mean that it will not cause any serious side effects.

The vaccine is being tested on a small group of people and if it is successful it is hoped that it will be available on the market within the next few years.

The vaccine is being developed by the UK company GSK and it is being trialled in the UK and other countries around the world.

The vaccine is based on a dead form of the bacteria and it is hoped that this will mean that it will not cause any serious side effects.

The vaccine is being tested on a small group of people and if it is successful it is hoped that it will be available on the market within the next few years.

The vaccine is being developed by the UK company GSK and it is being trialled in the UK and other countries around the world.

The vaccine is based on a dead form of the bacteria and it is hoped that this will mean that it will not cause any serious side effects.

The vaccine is being tested on a small group of people and if it is successful it is hoped that it will be available on the market within the next few years.

The vaccine is being developed by the UK company GSK and it is being trialled in the UK and other countries around the world.

The vaccine is based on a dead form of the bacteria and it is hoped that this will mean that it will not cause any serious side effects.

The vaccine is being tested on a small group of people and if it is successful it is hoped that it will be available on the market within the next few years.
The art of making heavy work light.
Innovative scales and measuring devices by seca.

Medical personnel bear special responsibility. That’s reason enough for seca to make their lives easier. With seca column scales or multifunction and wheelchair scales. With convenient functions that reflect more than 165 years experience, the experience of the world market leader for medical weighing and measuring.

The seca 764 electronic weighing and measuring station with automatic BMI calculation.

With the innovative, electronic measuring station seca 764, both the height and weight of a patient can be ascertained in just one step. With its capacity of 250 kg, its low platform and very robust design, the measuring station is also extremely suitable for heavy/weighty patients.

The seca 677 electronic wheelchair scale with handrail and transport castors.

Thanks to its large platform and sturdy handrail, the seca 677 is very versatile. Patients can be weighed while seated in a wheelchair or on a chair. The handrail provides valuable support for trial persons and for those who can walk only with great difficulty. Its high capacity of 300 kg makes the seca 677 ideal for weighing very heavy persons.

www.seca.com
Последние достижения в получении изображения карциномы простаты позволяют надеяться на то, что в будущем методики лечения карциномы могут быть улучшены. Насколько эти ожидания обоснованы - об этом беседовал журналист газеты EUROPEAN HOSPITAL (ЕХ) с проф. Хардвигом Хуландом (НН), главным врачом клиники Мартини в Гамбурге, который разработал методику проведения операции простатэктомии с сохранением нервов, являющейся на данный момент - «новейшим словом» в терапии рака простаты.

При улучшении диагностики - улучшается лечение рака простаты

Институт Стенге Серум

Гальванотерапия под контролем МРТ

Шадящее лечение рака простаты

Гальванотерапия является терапевтическим методом, в котором применяется электрическое воздействие прямых зарядов электрического тока. Метод разработан немецкими исследователями профессором Томасом Фоглем (Thomas Vogl) и доктором Хайнем Майером (Heinz Mayer) в тесном сотрудничестве с американскими учеными. Ученые проводили лечение 44 пациентов с раком простаты. Осуществлялась трансдульпаторная процедура, после чего два электрода с наконечниками из платины вводились в прямую и простатическую области простаты. В ходе повторяющейся процедуры, контролируемой путем магнито-резонансной визуализации, на опухоль воздействовали прямым зарядом тока, который в 350 кулонтов пропускался в течение 5 секунд. Было показано, что метод позволяет существенно уменьшить размер опухоли у 44% пациентов. Кроме того, метод снизил интенсивность побочных эффектов и улучшил качество жизни пациентов.

Рак простаты-осторожность может являться фактором риска

Исследование, опубликованное в журнале CANCER, показало, что мужчины, не занимающиеся спортом, более подвержены риску заболевания раком простаты по сравнению с мужчинами, имеющими детей.

Группа исследователей Института статистики Статен Серума (Statens Serum Institut), Дания, Копенгаген, использовала в качестве источника национальный регистр населения и проанализировала данные о мужчинах, рожденных в Дании в 1935 и 1988 гг. При этом было отмечено, что мужчины, не имеющие детей, кажутся быть более подвержены риску диагноза рака простаты, чем те, у кого есть дети. Коэффициент составил 16%. Анализ выявил также последовательное уменьшение риска заболевания раком простаты по мере увеличения количества детей.

Проведенный анализ не выявил, какие факторы, связанные с бездетностью, могли стать ответственными за уменьшение вышеуказанного риска. Из известных факторов, возможное время факторы риска - это расовое происхождение, наличие заболеваний, которые могут быть вызваны, что нервы расположены в непосредственной близости к внешней оболочке капсулы простаты. Если опухоль уже в капсулу, то мы не сможем определить, на какую сторону располагается опухоль. Поэтому важным является определение специфичности метода. Для этого мы обращаемся к пациентам, которым из-за наличия карциноза маточного пузыря должна быть удалена и простата, и в операции с помощью эпиргастрии определить состояние простаты. Мы можем сравнить диагностическое изображение с действительным состоянием простаты. Другой методикой, применяемой нами является метод УЗИ. Это показывает, что в то время как опухоль родилась в нижнюю границу области простаты. В ходе исследования у некоторых из них имелись проблемы с определением опухоли, поскольку опухоль, которую видел врач, не была видна на УЗИ. Второй метод, который мы используем дополнительно - это магнитно-резонансная томография, которая позволяет видеть опухоли во всей области простаты. Это ультразвуковое обследование, которое используется в качестве средства для получения изображения рака простаты на основе полученного с ее помощью было не четким. Следующим этапом является определение, где карцинома находится только в непосредственной близости к внешней оболочке капсулы простаты. После опухоли, уже в капсулу, то мы находимся в более сложной ситуации, так как опухоль расположена в непосредственной близости к внешней оболочке капсулы простаты. Если опухоль уже в капсулу, то мы не сможем определить, на какую сторону расположена опухоль. Поэтому важно учесть, что опухоль не только диагностируется, но и удаляется. При контроле пациентов после операции, как здоровые ткани не были затронуты, были проведены повторные процедуры. Несмотря на это, мы повторно были в состоянии провести операцию с сохранением нервов. Кроме того, радикальные операции, как правило, требуют дополнительных методов. Достоверные результаты получены при помощи которых нервы соединяются с прямой мышцей. Мы можем удалять как часть опухоли, так и часть нервов. Это позволяет определить специфичность метода при помощи которых нервы соединяются с прямой мышцей. Мы можем удалять как часть опухоли, так и часть нервов. Это позволяет определить специфичность метода, когда опухоль демонстрирует рентгеновские особенности. Но, так как мы не знаем точно, где расположены нервы, чтобы убедиться, что опухоль действительно находится внутри капсулы, а не вблизи ее, мы включаем в ближайшее время будут получены результаты. Важное влияние оказывают новые достижения в диагностике на терапию. У нас нет рецептурных средств для лечения, которые позволяют получить изображение кровоснабжающих сосудов. У нас нет рецептурных средств для лечения, которые позволяют получить изображение кровоснабжающих сосудов. Однако, у нас есть возможность, что в будущем методы лечения карциномы могут быть улучшены. Насколько эти ожидания обоснованы - об этом беседовал журналист газеты EUROPEAN HOSPITAL (ЕХ) с проф. Хардвигом Хуландом (НН), главным врачом клиники Мартини в Гамбурге, который разработал методику проведения операции простатэктомии с сохранением нервов, являющейся на данный момент - «новейшим словом» в терапии рака простаты.
Диагностика заболеваний простаты при помощи метода эластографии в режиме реального времени

Благодаря методике «эластография тканей в режиме реального времени» теперь стало возможно получать данные об эластичности тканей определенных органов, таких, например, как простата, в режиме реального времени. Это дает возможность делать более точные биопсии в целях надежной диагностики опухолей в рамках стандартных обследований. Профессор Др. Фердинанд Фрауше (FF), директор радиологической Диагностики Университетской клиники в Инсбруке, Австрия, является одним из пионеров в области эластографии, в особенности, в области терапии мочеполовых органов. Он применяет эту методику в рамках рутинной практики проведения массовых медицинских обследований.

В интервью, данном им газете EUROPEAN HOSPITAL (EH), он говорит о преимуществах этой технологии, о которой упоминает в своих докладах новейшие достижения, включая в рамках работы на симпозиуме в Вене фирма «Медицинские Системы» (Hitachi Medical Systems) организует симпозиум в воскресенье 9 марта 2008 года по теме: „Эластография тканей в режиме реального времени как методика, которая становится все более популярной и в области онкологии, и в других областях медицины. Важно отметить, что в этом году впервые в Америке в данной области имеют место большие достижения, включая специальную генную терапию. В Америке в данной области имеет место еще большее развитие, об этом будет подробно рассказано в рамках симпозиума в Вене."
Analystica, to be held in Munich for the 21st time, has become a leading international fair for innovation in laboratory technology and biotechnology, showcasing the entire range of equipment, solutions and services for laboratories and research. About 400 exhibitors will fill five halls in the New Munich Trade Fair Centre.

The Innovations Area is dedicated to research institutes and small innovative companies, presenting their products and concepts to industry. The area will also hold a Technology & Innovations Forum.

Life Sciences and Diagnostics – From genetic testing for diagnostic purposes to protein analyses on chips – the latest tools in molecular biology, bio-analysis and the move towards personalised medicine will be on show. Personalized medicine revolves around DNA chips, e.g. for breast cancer; a microarray from Eppendorf will allow physicians to determine whether a patient should undergo radiation or chemotherapy following a lumpectomy, and which patients do not need this treatment. The breast-cancer chip has over 200 genes that identify the type and stage of a tumour.

Roche has developed the Amplichip CYP 2D6 (already licensed for diagnostic purposes in the USA and Europe). This recognizes deviations in two genes that coded for liver enzymes in the Cytochrome P450 family. Patients with a deviation, for example, break down beta-blockers used to lower blood pressure too quickly or too slowly. Using genetic testing, physicians can adapt medication treatment to their patients’ metabolisms. Among other chips being developed is Amplichip p53, which detects defects in the tumour-suppressing gene p53, making customised cancer therapy possible.

Chip technology is also becoming user friendly. Detection kits with ready-to-use reagents, all-in-one concepts consisting of microarrays, hybridization stations, scanners and analysis software as well as ongoing advances in automation, are making it easier for chip technology to be incorporated into routine clinical applications.

Identifying minor genetic defects – When patients react differently to a therapy depending on their 99.9% genetic match, it’s frequently due to single-nucleotide polymorphisms (SNPs, pronounced ‘SNPs’). A SNP is a minor defect in the script of the genetic mapping. Only a single letter, i.e. a base, is interchanged. Experts assume that there are ten million SNPs in the human genome. In many cases, SNPs are the cause of diseases.

Aiming to identify the genetic causes of obesity, Alzheimer’s, neurodermatitis, and many other diseases, the NGFN (Germany’s National Genome Research Network), wants to use DNA chips to examine 25,000 patients and a control group. Peter Nürnberger, Professor of Genetics at Cologne University and co-ordinator of the NGFN operating platform, and his colleagues are collecting over 20,000 individual samples; the chips used will have over a half million SNPs and other gene variations.

The tools for such research are but a few of the many laboratory attractions at analystica. Details: www.analystica.de

1st International ATTD (Advanced Technologies and Treatments for Diabetes) Meeting

27 Feb – 1 March, Prague, Czech Republic

Current therapeutic strategies for diabetes are aimed at improving metabolic control, thus achieving near normal glycaemia, minimising the risk of severe hypoglycaemia, improving quality of life and delay or prevent vascular complications at a later stage. The use of an insulin pump has become increasingly popular; providing a treatment that can help to achieve these goals. An insulin pump adapts insulin doses, this also necessitates repeated measurements of blood glucose. Similarly, continuous glucose monitoring devices have been developed to gain more intensive and accurate treatment measurements. Many entrepreneurs today are racing to develop a wireless, cabinet-size way of measuring blood glucose levels. The ultimate goal is ‘to close the loop’, namely that such a sensor would be tied to an insulin pump that would deliver the correct amount of insulin precisely when needed, without involving the patient in the process, thus creating an artificial pancreas. With this in mind, Professor Moshe Phillip and Professor Tadej Batlle, as part of the ECR, have organised this first international ATTD meeting in Prague, which will highlight innovative technologies in diabetes treatment. It aims to draw together new technology developers and diabetes specialists, training and frontline clinicians for new treatments, including new insulins, pumps and glucose sensors.

Participants will include diabetologists, endocrinologists, glycobiologists, and general practitioners. Details: Conference Secretariat: Kmeroveho 1-3, 214 11 Prague 1, Czech Republic. Phone: +420 222 600 000, Fax: +420 222 712 200. E-mail: info@attd2008.cz

For the diary 2008 kicks off with three key IT events

In February, the Healthcare Information and Management Systems Society (HIMSS ‘08) Annual Conference and Exhibition took place in Orlando, Florida. This presented almost 200 exhibitors the opportunity to showcase workshops, symposia, electronic sessions, and the involvement of more than 500000 visitors.

To be held in Berlin, Germany (9-10 April), the one day successor of the (IDEC) will still focus on its industry exhibition, but the organising teams have expanded the number of educational sessions to be held. With both face-to-face and networking events the exhibition & congress should prove an effective information and communication platform for all participants.

MoDo, the International Education and Networking Forum for eHealth, Telemedicine and Digital Health will be held in the same month (16-18 April in Luxemburg). The conference programme will again feature international speakers presenting a wide variety of topics e.g. telemedicine and eHealth applications in diabetes management.

New products and technology will also be on show, and the forum will provide opportunities to forge new partnerships.

1-4 April, Munich, Germany

Analytica 2008

From 1-4 April, in Munich, Germany, our European Hospital journals will be available (free) at the trade press stand

Why not tell us about your hospital, scientific or product news?

Meet our European Hospital team at

G O B L A L

March

2008

EVENTS

May

24–28 Orlando, FL, USA

HIMSS HIMSS08 Informatics and Management Systems Society Annual Conference & Exhibition, www.himss.org

25–29 Antalya, Turkey


26–29 Milan, Italy

EAU – The 23rd Congress of the European Association of Urology The EAU has developed the 23rd congress event in urology, www.euau2008.org

27–29 Mannheim, Germany

74th Meeting of the German Society of Cardiology (DGK) www.dgk.org

27–30 Monte Carlo, Monaco

POCS Europe 2008 European Symposium of the Paediatric Cardiovascular Intensive Care Contact: pico@ehemes.com