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Prof. Iain McCall
Editor-in-Chief
editorial@imagingmanagement.org

Dear readers,

Successful business requires a variety of management skills, but one essential factor is to project the business forward and evaluate future trends and technological advances both for the product range and methods, and delivery of services. Radiology is no different, and its success has been partly due to the far-sightedness of our predecessors to embrace and develop many new and increasingly sophisticated imaging modalities.

Delivering these new imaging modalities as a service to the patient, however, often requires a comprehensive change management process, of which education is a major component. This educational programme involves two major parts. The first is training of the current workforce in the new techniques, facilitated by proper preparation. This will form part of the ongoing continuous professional development process through courses, workshops and secondments.

The second part is the training programme for new entrants to the field. It is important to work from a well-organised curriculum and teaching programme, structured into group and individual lectures and tutorials and computer-based teaching balanced with supervised practical experience. It is vital that trainees are provided with an excellent grounding in the fundamental skills and knowledge of the specialty before embarking on more sophisticated and specialised fields.

The curriculum is of major importance. Most European countries have these in place, many based around the detailed curriculum produced by the European Society of Radiology (ESR) and the radiological section of the Union of European Medical Specialists (UEMS). However, this curriculum must be an active document designed for the radiologists of tomorrow.

Trainees undertake a five-year training programme and are expected to be at the forefront of the specialty when they become fully registered specialists. They must therefore have the knowledge and skills with which to enter the workplace already able to understand and perform the latest procedures and hopefully eager to develop those in the earlier stages of gestation. A key feature of this change is the increased use of molecular imaging to evaluate function and changes at molecular level. This requires greater emphasis on physiology and cell biology in the early years of the curriculum and more focused training in the latter years.

This training must also recognise changes that are occurring in the delivery of imaging to the patient and be geared up to adapt. The European working time directive had a dramatic effect on training in many countries by altering the work to training balance and the availability of trainees to develop their skills. The development of teleradiology has also had a detrimental effect on some training programmes and the availability of material to trainees in some clinical conditions.

However, these factors have paralleled the development of sophisticated computer training and assessment models, which have enabled a change in the delivery of training programmes. It is clear that computer-based teaching will play a major part in future educational structures. The delivery of new techniques and services requires resources and changes in work patterns and roles. It is important that radiological personnel are at the forefront of this process and to do so they require training in management concepts and techniques. As with all education, this should be an ongoing process of career development but should also be included in the specialist training period.

This issue of the journal provides an example of all these processes through a complete revamp of the education system in Sweden where functional and pathological imaging are being amalgamated. This will profoundly affect training and service delivery and require workforce adjustments and altered management structures illustrating the interdependency of these elements and the importance of always looking forward, planning accordingly and managing change.

Prof. Iain McCall

HAVE YOUR SAY! Letters to the Editor at editorial@imagingmanagement.org

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WE ASKED HENRIK TO DESCRIBE HIS DAY

No, Henrik is not a radiologist.

He's one of our PACS designers.

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RIS/PACS | MAMMOGRAPHY | ORTHOPEDICS

SECTRA

Association News

MIR News

Dear colleagues,

I write to urge you to attend the Management in Radiology (MIR) annual conference to be held in Vouliagmeni, Athens, Greece from Wednesday 29 until Friday 31 October 2008. The local chairmen are Greek radiologists Prof. Nikolaos Batakis, Dr. Athanasios Chalazonitis and Dr. Fotios Takis.

We have an exciting and interesting programme already organised with numerous national and international invited speakers, and proffered paper sessions.

Topics include:

- Financial and human resources management in imaging;
- How to manage imaging education;
- Management issues in ultrasound;
- Managing CD/DVD referrals;
- Managing data security and many associated ethical issues;
- The difficult question of managing imaging private practice and integrating into a public health system;
- The management of change; and
- Clinical audit and safety management.

All these issues are worthy of detailed debate, and we hope to air them fully at the congress. Make sure you are a part of it and we look forward to seeing you there.

There will also be an interesting social aspect to the programme, with a Gala dinner, and plenty of opportunity to organise sight-seeing in Athens and its surrounding islands during the weekend after the congress, as an added incentive to come!

Best wishes,

Dr. Nicola H Strickland
Chairman, Management in Radiology (MIR)

IHE NEWS – Report from Recent Connectathon

Integrating the Healthcare Enterprise (IHE) recently held the eighth IHE-Europe interoperability testing event, or Connectathon, from 7 - 11 April in Oxford, England.

Over 300 engineers from 83 companies representing a majority of countries across the continent gathered at St. Catherine's College, Oxford, testing the ability of their medical equipment to communicate with each other, or interoperate. This year, vendors from Japan, Korea and the US also took part.

More than 1,850 interoperability tests were carried out over the five days, verified by a team of over 31 volunteer monitors led by Eric Poiseau (INRIA), IHE-Europe Technical Project Manager.

IHE covers nine areas, called domains, which are essential for delivering healthcare services using computer support and information systems for patient monitoring, laboratory results and even assisting with surgeries. The IHE domains include IT infrastructure, radiology, cardiology, laboratory, radiation oncology, patient care coordination, patient care devices, pathology and pharmacy.

Exchanging radiology images and information was once again the leading domain tested during the Connectathon, but this year for the first time there were an equal number of tests conducted in the IT Infrastructure domain, particularly Cross-Enterprise Document Exchange (XDS) integration profiles.

CIRSE Launches New Information Highway for UFE

CIRSE has launched a new website (http://www.uterinefibroids.eu/) to provide accurate and up-to-date information based on scientific evidence, internationally published recommendations and the expertise of its membership about fibroids of the uterus, also known as leiomyoma, fibromyoma or myoma. Since they were first treated with Uterine Fibroid Embolisation (UFE) in France in 1989, the procedure has become widely available and is now routinely performed in many European countries.

Unfortunately, the general public and many patients suffering from fibroids have not yet heard of this alternative. Indeed, many gynaecologists and referring doctors remain unaware of its advantages. The vast majority of specialist medical practitioners performing UFE in Europe are members of CIRSE. With this in mind, it is to be hoped that the new website will go a long way towards raising awareness of this minimally-invasive procedure and its potential benefits. More information can be found on the CIRSE website at www.cirse.org.

Management in Radiology

stands for cost-effective management – live this motto and register now on www.mir-online.org for the MIR – Annual Scientific Meeting from October 29-31, 2008 in Athens/GR!

ECRI Institute's 2008 Third Annual Health Devices Achievement Award

The ECRI Institute is now accepting submissions to its third annual Health Devices Achievement Award programme. The award honours healthcare facilities for achieving excellence in health technology management. Submissions are accepted online at http://www.ecri.org/hdaward. ECRI Institute will recognise top finalists on the ECRI Institute website prior to the announcement of the top honouree.

ECRI Institute's 2008 Health Devices Achievement Award overall winner will receive a plaque honouring its accomplishment and will be featured in ECRI Institute's Health Devices Journal. Finalists and overall winner may also be highlighted in other Health Devices System promotions.

Submission Requirements

Applicants should submit a 1,000- to 2,000 -word essay to ECRI Institute describing an initiative (or initiatives) undertaken at their facility that demonstrates excellence in the field of health technology management.

Please include:

- A description of the initiative(s).
- The motivation behind the initiative(s).
- Methodology used.
- The impact of the initiative, including outcomes and cost savings (as applicable).

Submissions should also include the institution's name, the name of the individual or department(s) initiating the programme, and contact information (name, title, phone number and email address) for the person submitting the nomination.

EuroPACS Announce Future Congresses

EuroPACS have announced that the next edition of their annual conference, covering hot topics in PACS, will be held in Berlin, Germany in 2009, and in Krakow, Poland, in 2010.

About the Association

EuroPACS' core interest is centred on medical images embedded into electronic healthcare whatever the producer (radiology, nuclear medicine, surgery, cardiology and other clinical fields). Its objective is to promote the exchange of information in the fields of research, user experience, implementation, assessment and audit of the benefit of the development and the use of digital systems for the acquisition, storage, transport, processing, display and reproduction of medical pictures (PACS) and related technologies as well as their integration in the eHealth context

Annual Congress Promotes Knowledge-Sharing

With this in mind, an annual congress is held to promote the exchange and presentation of this kind of information between all different users. This year's edition took place in Barcelona, Spain from June 25 – 28, 2008, held in conjunction with the annual CARS congress, chaired by expert topic leaders such as Dr Jarmo Reponen, Prof. Davide Caramella and Prof. Berthold Wein.

It included between 400 - 600 delegates from different countries and highlighted the following topics in PACS and radiology IT:

- Achieving RIS/PACS/CR productivity - the need for a comprehensive approach involving systematic redesign of workflows and procedures
- O3-DPACS system: challenges and original solutions in developing an open source project for the PACS critical system
- Development of an automated search method to find lost images in PACS environment by use of "biological fingerprints" and image-matching technique
- Remote teleradiology in mobile PET-CT unit
- A DICOM based telemedicine record
- Integration of multidisciplinary PACS with teaching files and eLearning platform
- Utilisation of medical imaging informatics and biometrics technologies in healthcare delivery
- Visible light imaging in PACS - unexpected benefits to radiologists and clinicians
- E-learning and video conference for distance learning in mini-invasive surgery
- Wireless "low-delay"-live streaming for telepresence in the OR
- E-atlas with advanced image analysis functions
- Workflow driven user interface for radiological system: a human factors approach
- Enhanced MR objects address multi-vendor interoperability issues in clinical radiology
- How about the end-users? Critical factors during the implementation of PACS

Each of these topics is at the core of an interoperable and intelligent data management system for healthcare IT and radiology departments across the globe. To find further information, please visit www.europacs.org.

CARS 22nd International Congress & Exhibition

The 22nd International Congress and Exhibition of Computer Assisted Radiology and Surgery (CARS) took place in Barcelona from 25 - 28 June 2008 in the new hotel NH Constanza, located in the centre of Barcelona, providing ample opportunities for presentations, workshops, discussions, posters and exhibits.

As is well known, the CARS congress (www.cars-int.org) is the most important forum at an international level on the application of advanced information technologies in radiology and surgery. It covers a wide spectrum beginning with the radiological image and its management (PACS), to informatics and engineering applications in surgery (planning, simulation, navigation, robotics, etc).

The 22nd CARS in 2008 included in its programme the following events:

- 12th Annual Conference of the International Society for Computer Aided Surgery - ISCAS (President: T. Dohi)
- 22nd International Congress and Exhibition on Computer Assisted Radiology - CAR (Chairmen: S. Baum, L. Donoso Bach)
- 26th International Meeting of the European Society for the promotion of Picture Archiving and Communication Systems in Medicine - EuroPACS (President: J. Reponen)
- 10th International Workshop on Computer-Aided Diagnosis - CAD (Chairmen: K. Doi, U. Bick)
- 14th Computed Maxillofacial Imaging Congress - CMI (Chairman: A.G. Farman)

In order to make the new technologies available to medical and healthcare specialists, the scientific committee decided to extend the programme with a clinical day, an educational event where experts from radiological and surgical specialities presented advanced IT applications in diagnosis and therapy of highly relevant clinical topics.

Engineers, physicians, surgeons, industrial representatives and healthcare managers met during the management day with a focus on the application of new technologies in the present healthcare system.

CARS information is available at www.cars-int.org.

Dervla Gleeson
Managing Editor
IMAGING Management
editorial@imagingmanagement.org

INITIAL INFORMATION ON PLANNED EU ACTION ON HEALTHCARE SERVICES

Following its Consultation from early 2007, the Commission now is preparing its action on healthcare services and cross-border healthcare.

In recent years these issues have been discussed widely at European level and the Commission has recognised the need to address current uncertainties about the application of Community law to health services, and to provide support for efforts to improve effectiveness, efficiency, quality and safety of national health systems. Also health ministers have welcomed the Commission's initiative and endorsed the need for action.

The planned EU action, which is to be tabled very shortly is likely to be a package of legislative and non-legislative measures, a directive and a communication. The Commission together with representatives from Member States is drawing up a list of highly specialised and expensive services, for which in case of a cross-border performance in a hospital a prior authorisation of the payment provider would be needed. For non-hospital care, no such authorisation would be required.

Also planned are extensive information rights for patients as well as the duty to inform from service providers and member states. The latter would have to set up "patient information centres", that would support patients from abroad to find the right service provider and in case of potential damage claims.

At the European Health Forum in Bad Hofgastein, Markos Kyprianou also gave some insight:"We should therefore aim to reduce inequalities and disparities between regions by enabling interaction and cooperation between different health systems. Health technology assessment is a good example, where it is more efficient for everyone to collaborate on assessing new health technologies rather than duplicating assessments across the Member States.

A clear framework at EU level would also provide clarity for healthcare purchasers and health insurers to take full advantage of expertise in other Member States, such as through European networks of centres of reference."

Next to this initiative, the Commission is planning two further specific initiatives in 2008 – one on patient safety and another on a health workforce in Europe, the Commissioner said.

In all cases, the benchmark should remain what works in practice for patients, physicians, hospitals and for health systems as a whole, he finished.

SECOND PROGRAMME OF COMMUNITY ACTION IN THE FIELD OF HEALTH

On 9 October 2007 the Council adopted a decision establishing a second programme of action in the field of health. Ministers approved all amendments as proposed by the European Parliament in second reading.

The programme is established for the period from 1 January 2008 to 31 December 2013 on the basis of a budget of 321,5 million Euro. The objectives are:

- To improve citizens' health security;
- To promote health, including the reduction of health inequalities,
- To generate and disseminate health information and knowledge.

To ensure full participation in the Programme by organisations which promote a health agenda in line with the programme objectives, a wider variety of financing mechanisms are offered.

These include:

- Cofinancing of projects intended to achieve a programme objective;
- Tendering actions to achieve a programme objective;
- Cofinancing of the operating costs of a non-governmental organisation or a specialised network;
- Joint financing of a public body or non-governmental organisation by the Community and one or more Member States;
- Joint actions with other Community programmes, which will generate coherence between this instrument and other Community programmes.

The Health Programme 2008 - 2013 is intended to complement, support and add value to the policies of the Member States and contribute to increased solidarity and prosperity in the European Union by protecting and promoting human health and safety and by improving public health.

In Memory of

Prof. Paolo Inchingolo

1949 - 2007

The international PACS community recently lost one of its most active and enthusiastic leaders. Paolo Inchingolo, Professor of Bioengineering at the University of Trieste, passed away during October 2007. One of the most esteemed local faculty members, he was Rector's Delegate for nearly two decades with responsibilities ranging from biomedical network coordination to relationships with external institutions with particular reference to Central European universities and governments.

Paolo Inchingolo was born in Trieste, Italy in 1949. He received his Dr. Eng. degree from the University of Trieste in 1975. Since 1991 he was the Director of the postgraduate specialisation school of clinical engineering, University of Trieste. His diverse scientific interests covered many areas including modelling of physiological systems, distributed-parallel motor control, sensory-motor integration, neural adaptation, oculo-motor controls, 3D EEG reconstruction of brain lesions, smart biomedical instrumentation, clinical informatics, distributed health systems, health telematics and telemedicine, health technology assessment and planning of health systems, clinical engineering, telecare, e-learning, design and planning of innovative ICT infrastructures and multimedia health services at local, metropolitan, regional and transregional levels.

Personally, I retain a vivid memory of his outstanding endeavours in the organisation of the EuroPACS meeting in Trieste in 2004, that was held in conjunction with the annual Management in Radiology (MIR) meeting. After that brilliantly organised congress he joined the EuroPACS Board giving an invaluable contribution by sharing the vast experience that he accumulated in many international scientific projects.

After his sad departure, EuroPACS will miss a friend and a trusted leader.

Prof. Davide Caramella

On behalf of the editorial team and his colleagues on the Editorial Board of IMAGING Management, we would like to extend our deepest sympathies to Prof. Inchingolo's family and friends.

TRANSFORMING IMAGING EDUCATION IN SWEDEN

Subspecialisation Reflects Impact of Digital Age

Author
Prof. Katrine Riklund-Ahlstrom

Head of Radiation Sciences
Umea University Hospital
Umea, Sweden
katrine.riklund.ahlstrom@diagrad.umu.se

The imaging education system in Sweden is undergoing a transformation that will ultimately exploit the advantages offered by the digital era. Not only are activities in the radiology department changing and developing, but its structure and content is also under audit. Radiology is being customised to adapt to the changing landscape towards imaging of functions in combination with imaging of structure and more knowledge in physiology and medical biology. Imaging of morphology and functional/molecular structures is melding together in a new specialty that will change the organisation and how it works in several aspects. The most striking news is that radiology and nuclear medicine are harmonised by this new specialty. The new specialty also sets new demands on arrangements for training, documentation during training and eventually on the hospital organisation.

During the last two years, specialist educational matters in Sweden have been the focus of reorganisation. Following a government commission, a new specialist structure was created for medical specialties, put into practice during 2006. The specialties are arranged in a structure with so-called base and branch specialties. Focus is set at the quality of specialist education and specialist competence is achieved after five years of training with tutorial. In Sweden, it is possible to get licensed for more than one specialty, and to achieve a branch specialty you must also achieve the base specialty to which your planned branch is attached.

How the New System Works

The new structure involves a common general medical education of three years. With the option to spend one of the five years of the specialty education focusing on the subspecialty subject, both foundation as well as specialist medical training can be completed in a minimum of six years. The order of training is not set, which means that the education can start with the subspecialty subject and follows with the specialty. The scientific content of the education will also increase and during training an individual scientific work has to be completed. The most important part of the curricula are the goals, of which 12 are medical; three are dealing with management, three with communication and three with science, evidence and quality matters.

Education of the Future

In detail, the former specialties of medical radiology, paediatric radiology, neuroradiology, nuclear medicine and clinical physiology have melded together to form a base specialty containing both structural and functional imaging as well as interventional radiology. This means that the European Curriculum for Clinical Radiology is not entirely suitable for the specialist education in Sweden. The new curriculum for all specialties will be approved as a constitution of the Swedish National Board of Health and Welfare in the second quarter this year. The upshot of this is that not only the department head and the tutor approve the license application before authorisation of the Swedish National Board of Health and Welfare but also, two external specialists will review and approve each application.

Re-designing Radiology

A group consisting of members from the national societies for medical radiology and the branch specialties are working together to form the new specialty. The main discussion is how to design the specialty education and the content in the general core education. The main difference for radiology is that the specialist-to-be will have more knowledge in physiology, biology and functional imaging than the previous ones. This will make them better suited for advanced imaging with CT, MR and ultrasound and they will also be prepared for the rapidly increasing hybrid imaging with SPECT/CT, PET/CT and in the future also PET/MR.

When trying to define learning goals and what to cover in the base specialty it is obvious that the base is too broad to be appropriately covered by one specialist. There is a need for sub-specialisation in the field of organs or age. It is important to stress that general or emergency imaging has to be one field. It will not be possible to cover all modalities, all organ systems and all ages without losing a deeper knowledge and therefore concentration in one or two fields is needed. In this area, the European curricula is easy to adopt.

Defining New Learning Methods

In the new specialty, learning methods are also defined in the constitution. Theoretical studies and practical elements as well as clinical rounds and scientific meetings are defined as methods of learning. The most important activity for the Swedish Society of Medical Radiology, SFMR, is the annual congress, Röntgenveckan, which is held each autumn.

SFMR with all its sub-specialty societies is the main organiser together with the Swedish Society of Radiographers. The national societies for radiation physics, oral diagnostic radiology, and medical secretaries are also invited to participate. Approximately 1,500 delegates visit the congress and the technical exhibition. The next Röntgenvecka will be held in Uppsala, August 25 - 29 2008 and I invite you all to visit the congress.

Digital Radiology & Education

Imaging in Sweden revolves almost entirely around RIS/PACS, which has enabled a multidisciplinary approach to clinical rounds, with imaging at the heart of this. Making rounds using a relevant mixture of specialists, with radiology as the connection point is a great way to take care of patients and to increase knowledge and is also a great learning occasion during training. Digital radiology has opened the new possibility of distance rounds and today several departments have chosen long-distance multidisciplinary rounds.

Finally, the new organisation of the imaging department and the new specialty will push imaging forward. In Sweden, we have a mixture of organisations ranging from nuclear medicine and radiology organised as an individual department to a situation where they are completely separated. In many hospitals there are collaborations between radiology and nuclear medicine irrespective of organisation, and the growing activity with PET/CT increases the demand for such collaborations. In order to use all the equipment in an efficient way it should be put together even if the radiologists, or imaging specialists, need to specialise in organs or age.

The creation of imaging centres taking care of both structural and functional/molecular imaging including interventions seems to be the most proper way to take care of patients, at least at larger hospitals or universities. Of course, the necessary qualifications are of utmost importance also for such a department. In several of the university hospitals in Sweden such imaging centres have been established or are underway. A few have a more reluctant strategy which might leave them behind in education, science and development.

Conclusion

To sum up, collaboration between education and science is needed to develop imaging of the future and since radiology is still rapidly transforming it is becoming more important to audit the possibilities offered by specialist education. The aim is that our specialists-to-be are more prepared to meet the new imaging era. ❇

PROMOTING LIFELONG LEARNING

A Look Back at the International Diagnostic Course in Davos (IDKD)

Author
Prof. Juerg Hodler
On behalf of the IDKD Scientific Directors (Christoph Zollikofer, Gustav von Schulthess, Juerg Hodler)
Department of Radiology
Orthopaedic University Hospital Balgrist
Zurich, Switzerland
juerg.hodler@balgrist.ch

Lifelong learning necessitates an open attitude towards new ideas, skills and behaviour. In radiology, lifelong learning is crucial. Few other healthcare professions have to deal with such high-paced technological and organisational change. Professional radiological organisations have provided continuing medical education for a long time. The American Roentgen Ray Society (ARRS) was founded in 1900, the German Radiological Society was founded in 1905, the French Radiological Society in 1909 and the RSNA in 1915. We are also looking at Volumes 246 of Radiology, 81 of the British Journal of Radiology and 113 of the Italian journal Radiologia Medica.

Education is undergoing a transformation, bringing new opportunities as well as challenges. Both the availability of computers and computer skills have increased. Broadband internet is widely available, and nearly 20% of inhabitants in the OECD are broadband subscribers, with percentages above 30% in Denmark, the Netherlands and Switzerland. On the other hand, the ubiquity of information leads to information overload, which radiologists have to deal with at the same time as an increase in productivity demands.

In the US, workload per hour increased sharply during the last decade, by approximately 15% between 2000 and 2003 alone. Teaching has to adapt both to new opportunities and problems.

Background

The International Diagnostic Course in Davos (IDKD, or "Davos Course") debuted in 1969, when Swiss radiologists Prof. Alois Rüttimann and Dr. Peter Braun decided to address the increasing debate regarding the need for specificity in lymphographic diagnoses by organising an interactive course in Davos, held in Dr. Braun's clinic.

Teaching at this time was based on films and slides. However, because there were only a few lightboxes in Davos, the technical support team at Clavadel built viewboxes, and some teachers brought along their own slide projectors. The course was an immediate success and was repeated in the early 1970's. The courses were then continued annually with changing subjects such as abdominal angiography and lung imaging in combination with lung physiology. Contemporary "big shots" were recruited, such as Ben Felson, Bob Frazer, Elias Theros and Morris Simon.

One of the reasons behind the positive response of delegates was the "spirit of Davos", which is characterised even today by a highly interested audience, the specific interactive teaching format, the Davos hospitality and also the Swiss Alps. Very early on, methods of continuing improvement were introduced, such as questionnaires for participants. The course grew quickly, and though the congress centre was enlarged twice, its facilities were occasionally supplemented by rented meeting rooms in hotels and schools or the congress centre's cellars had to be adapted to the needs of a medical meeting.

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MIR Prelimary Programme

annual scientific meeting

wednesday, 29th october

14:00 – 15:50
EARLY AFTERNOON SESSION
Chairman: N. Batakis, Athens/GR

a) How imaging is practised in Greece and its islands
b) Managing inequalities – European Imaging practice

15.50 - 16.20
COFFEE BREAK

16.20 - 17.00
LATE AFTERNOON SESSION
Chairman: A.N. Chalazonitis, Athens/GR

a) The Financial Management of Imaging departments
b) Human Resources Management in Imaging

thursday, 30th october

08.30 - 10.20
HOW TO MANAGE IMAGING EDUCATION
AURE (Academic and University Radiologists in Europe)
Chairman: H. Blickman, Nijmegen/NL

a) Debate and future actions

10.20 - 10.50
COFFEE BREAK

10.50 - 13.00
MANAGEMENT ISSUES IN ULTRASOUND
Chairman: M. Claudon, Vandoeuvre Les Nancy Cedex/FR

a) Managing new techniques and their consequences
b) Managing the place of ultrasound:
(b1) prioritise it!
(b2) minimise it!

13.00 - 14.00
LUNCH BREAK

14.00 - 15.50
MANAGING CD REFERRALS
Chairman: F. Takis, Athens/GR

a) Failure to manage the problem
b) The robotic solution
c) Industry presentations

15.50. - 16.20
COFFEE BREAK

16.20 - 18.00
MANAGING DATA SECURITY
Chairman: N. Strickland, London/UK

a) Managing digital quality control
b) The role of HIPPA
c) Managing selective access
d) Restricting data access: do we need to?
e) Proffered Paper
f) Proffered Paper

friday, 31th october

08.30 - 10.20
MANAGING IMAGING PRIVATE PRACTICE
Chairman: P. Gishen, London/UK

a) Private imaging practice in the UK
b) Managing a multidisciplinary French private practice
c) The Dutch model of private practice
d) The Greek approach to private practice

10.20 - 10.50
COFFEE BREAK

10.50 - 13.00
CHANGE MANAGEMENT
Chairman: J. Jakobsen, Oslo/NO

a) How to organise a reorganisation
b) Imaging and intervention as an industrial process
c) What is the optimal organisational structure of an Imaging department: the hospital management view

13.00 - 14.00
LUNCH BREAK

14.00 - 16.00
CLINICAL AUDIT AND SAFETY MANAGEMENT
Chairman: S. Nazarenko, Tallinn/EE

a) How to organise clinical audit in an Imaging department
b) How to organise clinical audit at national level
c) Developing a safety culture through clinical audit
d) Proffered Paper
e) Proffered Paper
f) Proffered Paper

MIR

TELERADIOLOGY AS AN EDUCATIONAL TOOL

Collaboration Essential to Promote Learning

Author
Dr. Hans Billing
Director
Telemedicine Clinic
Barcelona, Spain
hb@telemedicineclinic.com

Teleradiology, a tool for remote work in radiology, is now recognised as a way of adding resources to a specialty in need. Teleradiology providers are mostly looked on as a remote anonymous "black box" that may live up to the contractual standards but is at the same time considered to be "cherry picking" the fast and easy cases, leaving all the heavy obligations to traditional radiology departments. But the service has been welcomed, since it covers an urgent resource need.

An even greater function of teleradiology is to provide subspecialised knowledge to small and medium sized hospitals unequipped to cover certain subspecialties in-house. Today's radiologists have a difficult task with the increased number of new modalities and the huge amount of detailed information on anatomy, pathology, function and metabolism that is now increasingly available. If radiology is to survive as a specialty, we need to know more than the referring consultants, otherwise they will take over radiology interpretation. This fact increases the need for subspecialisation even more within very narrow parameters.

Knowledge-Sharing Network

One use for teleradiology is to connect a number of hospitals into a knowledge-sharing network. With the large volumes a teleradiology provider can obtain, many different subspecialised readings can be structured to cover every need. A large teleradiology provider has a number of different client hospitals in different countries, of different sizes and with different case mixes. The clients range from small private radiology sites to large tertiary care and university hospitals. Exam protocols differ across hospitals. The reporting culture differs from one country to another, from one region to another and even between neighbouring hospitals. According to the idiosyncrasy of the hospital, radiologists may report for specialists as well as for primary care physicians.

How Teleradiology Fits the Bill for Education

These factors together form a perfect scenario for radiology education. Learning radiology is to a large extent a matter of volume training. You need to see a large number of normal and "almost normal" exams to calibrate your mind to the detection of abnormalities. Then you have to see a large number of different pathologies. In small or mid-sized hospitals, it may be difficult to meet both the quota of normal exams and pathologies. In a teleradiology setting, being a regional network or an established teleradiology provider, the number of cases per day can easily reach 500 – 1,000, giving almost unlimited volumes to read. They range from simple routine exams to very complex consultation cases, often with a large variety of pathologies. This mix of normal and abnormal in large numbers is a very suitable school for young radiologists.

For a young radiologist in training, it is essential to understand that there isn't any one correct way of performing certain exams. Different routines can be equally valuable from a diagnostic point of view and local traditions and needs often play an important role when elaborating a protocol. Seeing different exam protocols makes you reflect on the protocol and its pros and cons, leading to a better understanding of radiology.

The information that a specialist needs to obtain from a radiology report is quite different from that of a general practitioner. While the specialist wants to know details of a lesion, its characteristics, relations with other organs, vascular supply, etc, the general practitioner needs to find out the reason for the patient's symptoms and to direct possible further investigations. He/she is more confused than helped by a very detailed report. In the teleradiology scenario it is very probable that you find referrals from all kinds of physicians which helps educate the young radiologist in the difficult skill of making good and differentiated reports, provided care is taken to elaborate on the reporting format.

Solving the Flexible Storage Problem

Are Multi-Purpose Archives the Solution?

Mark Clark
Director Healthcare EMEA

Europe Headquarters Sefton Park
Stoke Poges Buckinghamshire, UK

The healthcare sector is undergoing an IT revolution. Since hospitals and other healthcare organisations traditionally purchase IT at departmental level, difficulties in sharing data between departments have arisen. Since data-sharing is fundamental to efficient operation and effective patient care, hospitals and national health systems are now investing primarily in infrastructure to support interoperability and data-sharing in an intelligent and structured way.

The Problem of Fragmented Data

For decades, healthcare organisations have suffered from highly fragmented data. With individual departments managing their own IT, a plethora of incompatible systems have arisen. This lack of interoperability has caused difficulties for all of the information pertaining to any given situation to be gathered together where and when it is needed.

For example, discharging a patient requires the gathering together of a wide range of clinical and non-clinical data, including laboratory and pharmacy data, doctors' notes and a range of administrative information. With different data types being held on separate systems, collating all of the required information is a significant task. Problems also arise at an organisational level. An estimated 5,000 patient procedures are cancelled each year as a result of lost paper or film, and 13.5 million GP appointments are missed each year, in part because of incorrectly addressed letters.

Is a Virtualised Multi-purpose Infrastructure the Solution?

The Hitachi Content Archive Platform (HCAP) addresses these challenges, and more. It provides a centralised repository for all kinds of digital information, including clinical and non-clinical, fixed content and transactional data. Interfacing via industry-standard communications protocols, it accepts data from multiple applications, protects and preserves it, and makes it available when and where it is needed.

Built to an open architecture, HCAP stores data so that it will be retrievable, despite technology refreshes, well into the future. With some clinical data required by law to be retained for 30 years, this is of key importance. Data integrity is maintained at standards demanded by courts of law, providing protection for the organisation in cases of legal challenge, and minimising the occurrence of diagnostic and prescription errors.

With compliance a major issue for healthcare organisations, the ability to set up policies in HCAP is an important feature. Where data must be retained for a set period, a policy can be set up accordingly. Once the policy is set up, if a user attempts to delete protected data at the application level, HCAP will stop it from being deleted at the physical storage level.

In some countries data must be irretrievably destroyed in certain circumstances. HCAP provides the ability to electronically shred such data at the physical storage level, making it, for all practical purposes, irretrievable.

With Hitachi, You're Ready!

HCAP is a remarkably powerful solution. Protecting and securing content, and with the ability to grow with the organisation, it saves time and money and supports regulatory and corporate governance requirements. It will deliver significant value in organisations such as regional hospital networks, medium-to-large hospitals and regional and national bodies.

Once any institution has made the decision to go digital it is only a matter of time before they begin to want the image or report to make its way through the healthcare workflow process. While standards like DICOM, HL7 and XML have helped to promote more openness and collaboration with regard to patient data, the next evolution will be with hospitals and national health systems investing in infrastructure so that they can leverage the market for applications without being locked to a specific vendor. In many of the cost saving and efficiency initiatives it is the infrastructure that is being heavily contemplated and contested and not the application.

Hitachi are helping to facilitate data-sharing and improve workflow through the clinical applications module, a fully integrated grid based component of HCAP where all clinical and non-clinical information can be managed shared and protected across the organisation ultimately providing information where it is needed at the point of care.
Once the information is available then it can be mined to facilitate knowledge and ultimately decision making. In conclusion, Hitachi is anticipating the needs of large healthcare organisations for a centralised, well-structured and intelligent data storage system that anticipates the demands that will be placed on healthcare IT by the advent of the electronic medical record.

Mentorship Needed to Enhance Education

A resident or young radiologist needs guidance while seeing all these exams, normal or abnormal, and also to understand the reason why a certain protocol is used. Mentorship is essential and it is of no use providing this case volume if the resident is left alone with it. It is the obligation of the teleradiology provider or network organiser to arrange for mentors to give feedback to the young radiologists and to serve as a forum for discussion.

Teleradiology providers don't always welcome the obligation to arrange non-profit mentors that don't produce reports. However, for teleradiology to find its proper place within today's global radiology, it is of utter importance to stress the need for collaboration between provider and client, so that the teleradiologists are looked upon as colleagues to the local radiologists, not as remote competitors. In line with this, teleradiology providers must take responsibility in the teaching of the next generation of radiologists. This might lead to a decreased need for outsourcing, but on the other hand the full potential of teleradiology within the global setting will become obvious.

What Else is Needed From Teleradiology Providers?

There are other critical requirements that teleradiology providers must fulfill in order to be apt for teaching. Cases must be archived in teaching files, organised and coded. This often means that special permits must be obtained to be able to use an anonymous version of the client's exams for teaching purposes. It requires willingness from client hospitals to provide feedback and follow-up from clinicians, surgery and pathology. Shared clinical sessions are a good way of getting to know each other and to learn from discussion with colleagues. An exchange of work between the local radiologist and a teleradiologist can also be a suitable way to achieve a better understanding and a closer collaboration, bridging the clefts between the traditional radiology departments and the teleradiology providers.

Easy means of communication is essential for teleradiology providers to enable close collaboration. With today's advances in communication technology there are a large number of different communication tools that can be incorporated into the logistics of the provider. These tools are perfect for the young radiologist in need of explanations and discussion, making it possible to achieve this without having to bring the suitable specialists to him/her physically, interfering less with their daily tasks.

Conclusion

If all these aspects are taken into account and if proper collaboration is achieved, then teleradiology can be a goldmine of learning for the next generation of radiologists. We all – both radiologists in a traditional departmental setting and the teleradiologists – have the responsibility and obligation to make every effort to educate tomorrow's colleagues and to promote our specialty and adapt it to tomorrow's increased demands. ❇

Marketing Your Healthcare Services

Authors
Dr. Leonie Ruhmann
Prof. Mathias Goyen
UKE Consult und Management GmbH
Hamburg, Germany
goyen@uke.de

Healthcare's once-upon-a-time days are gone. Simply being the nearby hospital does not automatically stake your organisation's financial claim. So, in an increasingly competitive industry, what is the ideal way to market a hospital or healthcare service to consumers - who are often no longer just patients?

Throughout Europe, healthcare has to date remained largely insulated from normal market mechanisms. Rather, healthcare providers are operating in a jungle of rules and regulations created by bureaucrats and enacted by politicians. Obviously, there are many reasons why healthcare cannot be considered a "normal market". First and foremost, health is a very special commodity which should be affordable for all members of a society regardless of their income levels. Acceptance of this paradigm remains the basis for all European healthcare systems. Despite the introduction of patient co-payments for physician visits as well as medication, thankfully there appears to be consensus that healthcare needs to remain available for all in need.

Insulation from market mechanisms has resulted in highly inefficient healthcare service structures. Ever-increasing healthcare costs have now resulted in a growing trend towards the introduction of market mechanisms based on supply and demand. In some regions, particularly large metropolitan areas, healthcare providers are therefore confronted with increasing competition mandating the development of marketing and sales strategies for individual healthcare providers.

Take home points:
- Current health systems based on state-governed regulations have failed to provide affordable and efficient healthcare.
- The introduction of market mechanisms based on supply and demand to healthcare is rapidly gaining acceptance.

Healthcare - a Special Product

In an abstract sense, healthcare is a product rather different from most other commodities. From a customer perspective it is of unsurpassed value, as it represents the virtual bases for a productive life. Despite its importance to the individual patient, it is difficult for the customer, i.e. the patient, to define its monetary value or the required product quality. Healthcare providers expect their patients to trust that their product is of high quality and priced correctly. In view of the multitude of regulations governing the way healthcare is provided, patients only too willingly place this trust into health care providers and their professionals including physicians, nurses and technologists.

Unfortunately, relying on rules and regulations does not necessarily assure sufficient quality of healthcare. In contrast to all other products, regulations governing the health sector only affect the process of administrating healthcare regardless of outcome. If the same principles were applied to the production of cars, the assembly of brakes in a car would be regulated whereas performance of the same brakes would not be subject to any checks at all.

Increasingly, patients are becoming aware of this central shortcoming of European healthcare systems. The pressure has grown to a point where even governments are reacting. New rules and regulations are being implemented. Most again fall short of what is needed: transparency of quality and pricing for healthcare products to the customer, i.e the patient. Efforts to provide reliable quality data can hence be considered one of the most important contributions to any health marketing strategy.

The process of pricing healthcare products has remained as elusive to the average patient as the assessment of product quality. For many healthcare services, patients do not even receive a bill. Rather, payments are provided by anonymous insurance or health service agencies in accordance to rules lacking in transparency and frequently sense. For the healthcare market to gain

in efficiency, it is of utmost importance that pricing becomes transparent to the patient. Clearly this does not mean that bills should also be directly paid by the patient. Rather, the underlying insurance system with acceptable co-payments should be maintained.

Take home points:
• For market mechanisms to unfold their desirable effects, healthcare products must become far more transparent to the customer, i.e. the patient, regarding pricing and quality. The latter should be based on outcome and should represent a central theme in all marketing strategies.
• While transparency in pricing requires patients to be billed, it does not require the patient to pay those bills themselves. Rather, the underlying risk sharing systems should be maintained as payers.

Hospital Marketing Strategy

Just like in other industries, marketing a hospital or healthcare system comes down to brand awareness. If your hospital's name is well-regarded within the community and by potential patients, you have a distinct advantage over competitors.

Most healthcare professionals would probably associate marketing with advertisement strategies. First and foremost, such strategies should focus on information to the patient. Transparency should be provided regarding the quality of the medical products offered. The creation of an attractive and content-rich internet platform clearly represents a corner-stone in this undertaking. Furthermore, occasional press releases documenting the success of medical treatments should be prepared and distributed into all available channels. Finally, advertisement strategies can also include direct marketing measures such as letters to treated patients outlining progress in diagnosis and therapy regarding their disease. The healthcare provider should be careful however to respect all laws and regulations governing advertisement in the healthcare sector in most European countries. Marketing, however, covers far more ground than mere 'advertisement'. In a sense, marketing represents the very core of any company by first and foremost defining a product portfolio.

Hence we can summarise as follows:
The central aspect of any marketing concept relates to the definition of products. Advertisement strategies only represent the tail end of a marketing concept.

Product Portfolio

In our current hospital world, product portfolios have by large developed in a historic sense. While there are variations in the number and type of healthcare products offered by different hospitals, few providers have consciously decided upon what is offered as part of the existent product portfolio. Rather, portfolios appear to be the results of historic processes based on individual physicians' interests and abilities as well as perceived patient needs, expressed by insurance carriers. Frequently, a hospital offers various healthcare products for no identifiable reason at all.

As a first step in the process of developing any marketing strategy, the currently offered products should be listed. Using portfolio analysis tools each of these products should be analysed regarding quality, profitability, and future relevance. The assessment of quality and profitability should be based on comparative benchmarking data. Both factors generally relate to volume.

Thus, there is ample data illustrating a direct relationship between outcome quality of a particular procedure or operation and the number of times that this procedure is performed within the same hospital in a given time frame. Case volume has also emerged as a direct predictor for cost. Similar to most other products, economy-of-scale effects contribute toward reduced cost also of medical procedures. Put differently: the same procedure becomes less expensive if it is performed more often within the same hospital.

Take home points:
Product portfolios should be consciously defined based on different criteria including quality, cost and 'future relevance'.

Unique Selling Proposals (USPs)

Future relevance of products relates to existing Unique Selling Proposals (USPs) of the hospital offering the product. Each hospital should define these USPs which set it apart from its most direct competitors. USPs can relate directly to the type of patient group served by the hospital (community hospital vs. specialised referral centre), offered medical services (cardiac surgery or organ transplantation), or the quality of care provided. In addition to that, USPs can also relate to aspects of process affecting all products such as a special means of nursing, the implementation of a quality assurance program or a particularly innovative means of electronically archiving medical patient data.

USPs should be designed to be as defensible as possible. Thus, USPs which can easily be copied by a competitor are of considerably less value than those, which will remain truly unique preferably over a very long period of

» *continued on p. 46*

UPDATE FROM INTERNATIONAL RADIOLOGY QUALITY NETWORK

Feedback Sought for Development of Clinical Standards

Author
Dr. Lawrence Lau
Consultant Radiologist
Chairman
International Radiology Quality Network
Sydney, Australia
lawrence.lau@pobox.com

The International Radiology Quality Network (IRQN) is a network of organisations established in 2002 with members from across the globe, including America, Japan, the UK and New Zealand. It aims to promote quality in radiology through collaboration, experience sharing and mutual assistance. Its current activities include:

1. An International Clinical Teleradiology Standards Workgroup;
2. A Performance Metrics and Indicators Project;
3. A Quality Improvement in Practices Programme in collaboration with the JACR; and
4. An Awareness Programme.

Feedback Sought for International Clinical Teleradiology Standards

In 2006, an International Clinical Teleradiology Standards Workgroup was formed to review the published international teleradiology standards and to develop a set of common principles in which more detailed standards could be subsequently developed.

Since that time, the members have revised and refined the drafted 'Top 10 Principles of International Clinical Teleradiology' approved by IRQN members earlier this year. The network recognises that this draft is an evolving document and would be refined over time. These principles are now available at: www.irqn.net. Feedback is welcome, and can be forwarded via: irqn@ranzcr.edu.au.

Performance Metrics and Indicators Project

The Performance Metrics and Indicators Project commenced in 2007 to provide us with a better insight into the performance of different types of facilities across the globe. The TATs for radiology reports over a one-month period were selected as the metrics to be benchmarked. 13 institutions from three continents took part in a trial last year. Based on the trial experience, data collection and methodology are being refined. The network is preparing to launch this project later this year and is aiming at 100 participating facilities worldwide. The TAT data collected is a small subset of the routine statistics generated by the facility's RIS at the end of each month. Therefore, the additional effort for the participating facility is minimal. Participation is voluntary and will be based on RIS vendors' introduction, direct recruitment through members of the Performance Metrics and Indicators Workgroup and newsletters.

Each facility can benchmark its performance against other similar facilities and identify areas of improvement. Each facility's participation will be acknowledged and the data collected will remain confidential. After analysis, each participant will receive a report containing its own de-identified aggregated data for comparison.

To participate, please provide the name of your facility and the contact details for the principle liaison person to Laura Coombs Ph.D. at: lcoombs@acr.org by 31st July 2008.

Quality Improvement in Practice Competition

The network approved the establishment of a Quality Improvement in Practice paper competition in collaboration with the JACR to:

- Increase the awareness of the importance of quality improvement in the workplace;
- Enable radiology practices to learn from others and apply other practices' quality improvement experience to their own practice; and
- Facilitate a cultural change in radiology practices so that quality improvement forms an integral part of day-to-day practice rather than perceived as a burden.

It has assembled a judging panel to review manuscripts and to work with the authors and the Editor-in-Chief, JACR, to edit and improve suitable manuscripts prior to publication.

A certificate of merit will be awarded to each month's winning author(s). At the conclusion of each year, the Panel will select an annual winner who will receive a cash award of 1,000 US dollars sponsored by The Royal Australian and New Zealand College of Radiologists.

WHY ENCOURAGE GASTROENTEROLOGISTS TO LEARN ULTRASOUND?

The Situation in Romania

Authors
Prof. Ioan Sporea (above)
Prof. Alina Popescu
Dept. of Gastroenterology and Hepatology
University of Medicine and Pharmacy
Timisoara, Romania
alinamircea.popescu@gmail.com

During the last few years, medical specialties have expanded their use of ultrasound to examine certain organs: the thyroid by endocrinologists, the kidneys by urologists, and the urinary bladder and prostate and abdomen by gastroenterologists. Ultrasonography is well known as a very operator-dependent and time-consuming evaluation, with an average of 15 - 20 minutes for a complex case. Though generally speaking, the radiologist is largely responsible for performing imaging evaluations, echography seems to be slipping from their diagnostic algorithm, as cardiologists and gynaecologists have begun performing ultrasonic evaluation themselves. This is a positive development for patients as well as for the medical community.

First of all, I would like to give a brief presentation of present examination models of the abdomen worldwide to illustrate this point. In the US, the UK, the Netherlands and Scandinavian countries, radiologists and ultrasonographers are exclusively involved in evaluating a patient's abdomen by using ultrasonography and clinicians don't perform trans-abdominal echography.

In other countries such as Germany, Italy or Romania the clinician uses echography for patient examination, allowing him to integrate the obtained data. Subsequently, in these countries the gastroenterologist, the internal medicine doctor, the endocrinologist, etc. perform their own ultrasonic evaluation leading to a more complete patient evaluation together with anamnesis and clinical examination. In this manner, the diagnosis can be quickly obtained and therapy can be decided immediately in many cases.

Which model is better? This is not a simple question. It is hard to change a tradition and to involve different kinds of specialists in ultrasonic evaluation. Here I would like to share my personal experience as a gastroenterologist that has performed ultrasonography for over 25 years.

Firstly, I believe that echography is the next mandatory step in evaluating a patient with abdominal pain after anamnesis and clinical examination. How can we benefit from this prompt examination: by confirming or excluding a certain pathology? In this way we can diagnose a simple or already complicated gall bladder lithiasis, chronic pancreatitis, aneurism of the aorta, ascites or obstructive kidney calculus etc. Due to the immediately performed echography, we can decide which examination will follow: gastroscopy or colonoscopy, an ecoendoscopy or we can send the patient for a different imaging exploration (CT or MRI), in case the lesions found on echography can not be completely evaluated (e.g., hepatic tumours). In the near future this strategy might be changed due to contrast-enhanced ultrasound (CEUS), which allows the description of echographic lesions during the same session.

What is Proper Protocol?

Ultrasonography should always follow a clinical examination and should have a prompt diagnosis. If transferring the patient to another department for echography, time is being wasted as usually there are long waiting lists, information on the patient is being lost, not to mention the eventual delay until proper diagnosis.

In case of abdominal emergencies, echography performed by a gastroenterologist is a great asset allowing a correct diagnosis almost instantly in many cases (including difficult pathologies such as acute appendicitis, diverticulitis, intestinal occlusion, etc).

Having in mind all of these, we consider beneficial, teaching the gastroenterology resident early on to perform echography in ambulatory as well as in emergency

settings or on already hospitalised patients. In Romania, as well as in Germany, the curriculum of a gastroenterology resident contains a period of training for clinical echography, which allows him to get familiar with the echography that he will be using in his daily routine.

This aspect is mentioned in European Gastroenterology Diploma (available online at http://www.gastrohep.com/eums/), the European curriculum of the future gastroenterologist. It stipulates that 300 echographies should be performed by the gastroenterology resident together with a certain number of endoscopies. At the same time, learning to perform trans-abdominal echography will help the gastroenterologist understand echoendoscopy, which is an indispensable method of evaluation in gastroenterology.

Gastroenterology & Echography in Romania

In the gastroenterology department at Timisoara, all gastroenterologists trained during the last 15 years are using ultrasonic evaluation successfully, which allows them a proper and rapid orientation when facing emergencies, ambulatory patients or hospitalised patients. Altogether, having a great experience in echography, some members of our staff perform interventional echography: echo-guided and assisted liver biopsy (in diffuse hepato-pathologies and abdominal tumours), percutaneous ethanol injection therapy (PEIT) for hepatic tumours or radiofrequency ablation (RFA) or diagnostic and therapeutic approaches for abdominal collections. This strategy is common for the majority of gastroenterology centres in Romania.

During the last few years, the United European Gastroenterology Federation, through its annual meetings is making efforts to encourage gastroenterologists worldwide to learn ultrasound by organising postgraduate courses on how to use abdominal echography in daily practice. Therefore we have to thank Prof. Dr. Lucas Greiner from Wuppertal, Germany, director of the postgraduate course of ultrasonography from UEGW for the special efforts made within the last ten years.

Other domains in which the gastroenterologist is involved actively include supervising inflammatory bowel diseases through performant echography, as well as hepatic cirrhosis. Trans-abdominal echography examination of patients with digestive tract pathology in everyday practice, together with endoscopic and echoendoscopic data will allow not only a correct diagnosis but also a large personal experience in this type of pathology domains.

Conclusion

For the clinician who uses echography in daily clinical practice, I see the transducer as a sort of third eye for visualising the abdomen. That is why this article is meant to be a plea for gastroenterologists to learn how to use abdominal echography in daily clinical activity. For gastroenterology residents, they should be guided by the curricula of the European Gastroenterology Diploma that stipulates explicitly the fact that training for abdominal echography is part of European gastroenterologist education.

ULTRASONIC SCANNERS

Product Comparison Chart

ECRI Institute, a non-profit organisation, dedicates itself to bringing the discipline of applied scientific research in healthcare to uncover the best approaches to improving patient care. As pioneers in this science for nearly 40 years, ECRI Institute marries experience and independence with the objectivity of evidence-based research.

ECRI Institute's focus is medical device technology, healthcare risk and quality management, and health technology assessment. It provides information services and technical assistance to more than 5,000 hospitals, healthcare organisations, ministries of health, government and planning agencies, voluntary sector organisations and accrediting agencies worldwide. Its databases (over 30), publications, information services and technical assistance services set the standard for the healthcare community.

More than 5,000 healthcare organisations worldwide rely on ECRI Institute's expertise in patient safety improvement, risk and quality management, healthcare processes, devices, procedures and drug technology. ECRI Institute is one of only a handful of organisations designated as both a Collaborating Centre of the World Health Organisation and an evidence-based practice centre by the US Agency for healthcare research and quality.

For more information, visit www.ecri.org

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The Discipline of Science. The Integrity of Independence.

Contact
ECRI Institute Europe
Weltech Centre Ridgeway, Welwyn Garden City, Herts AL7 2AA, United Kingdom
info@ecri.org.uk
www.ecri.org.uk

SUPPLIER	ECRI INSTITUTE'S RECOMMENDED SPECIFICATIONS[1]	
MODEL	**GENERAL-PURPOSE ULTRASONIC SCANNERS WITH SMALL-PARTS CAPABILITIES**	
WHERE MARKETED		
FDA CLEARANCE		
CE MARK (MDD)		
CLINICAL APPLICATION	General-purpose, small parts	
PROBE TYPES, MHZ		
Mechanical sector		
Annular array		
Linear array	2.5-5 (abdomen), 5-10 (small parts)	
Convex array	2.5-5 (abdomen), 5-10 (small parts)	
Phased array	2.5-5 (abdomen)	
Multifrequency		
Endovaginal		
Endorectal	5-7.5 (prostate)	
Others		
FRAME RATE, FPS		
GRAYSCALE LEVELS	64	
PREPROCESSING		
POSTPROCESSING		
MAXIMUM DISPLAY DEPTH, CM		
IMAGING MODES		
M-mode display		
M-mode and 2-D		
3-D (freehand)		
3-D (automatic)		
4-D (live 3-D)		
Harmonic imaging	Yes	
DOPPLER		
Type	CFM	
Frequency display		
Velocity display		
Power Doppler		
Duplex mode		
Triplex mode		
FUNCTIONALITY		
Digital calipers	Yes	
Selectable dynamic range		
Adjustable transmit focus	Yes	
Dynamic receive focus		
Measurements on VCR replay		
PAN/ZOOM		
Real-time image	Yes	
Frozen image		
IMAGE STORAGE		
Capacity, number of stored images		
Cine		
DICOM 3.0 COMPLIANT	Yes	
ANALYSIS PACKAGES		
Cardiac scanning		
Vascular scanning		
OB/GYN scanning		
Others		
NUMBER OF USER-PROGRAMMABLE PROTOCOLS		
OTHER SPECIFICATIONS	Digital and TV video outputs; full-screen annotation.	
LAST UPDATED		

Footnotes to the Product Comparison Chart

1 These recommendations are the opinions of ECRI Institute's technology experts. ECRI Institute assumes no liability for decisions made based on this data.
2 multibeam processing; tissue Doppler imaging; Quintrix mode; DICOM-compatible data management system. Meets requirements of EN 60601-1 and UL 2601; ETL listed.
3 DICOM-compatible data management system. Meets requirements of EN 60601-1 and UL 2601; ETL listed.
4 Meets requirements of EN 60601-1 and UL 2601; ETL listed.
5 Meets requirements of ISO 9000, IEC 60601-1 Class I Type BF, and UL 544; ETL listed.
6 lossy jpg, 3-D rotation/4-D as DICOM MF, batch print/send, spooler, simultaneous worklist/local archive.
7 3-D rotation/4-D as DICOM MF, batch print/send, spooler, simultaneous worklist/local archive.
8 real-time Doppler measurements; baseline shift in freeze; optional SonoElastography (E-mode), stress echo, wideview, omnidirectional M-mode, and real-time archiving.
9 Hanafy lens technology; arterial health package with IMT; Axius edge assisted ejection fraction.
10 directional Power Doppler, Pulse Wave Doppler (PWD) and Continuous Wave Doppler (CWD) Tissue Doppler imaging.

Publication of all submitted data is not possible: for further information please contact ECRI Institute or editorial@imagingmanagement.org.

	ALOKA Science & Humanity	ALOKA Science & Humanity	ALOKA Science & Humanity	ALOKA Science & Humanity	ALOKA Science & Humanity
	PROSOUND ALPHA 10	**PROSOUND ALPHA 7**	**PROSOUND ALPHA 5**	**PROSOUND SSD-3500SX**	**PROSOUND 6**
	Worldwide	Worldwide	Worldwide	Worldwide	Worldwide
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Radiology, Cardiology, OB/GYN, Vascular, Urology, Small Parts, Surgery, Endocavity, EUS	Radiology, Cardiology, OB/GYN, Vascular, Urology, Small Parts, Surgery, Endocavity	Radiology, Cardiology, OB/GYN, Vascular, Urology, Small Parts, Surgery, Endocavity, EUS	Radiology, Cardiology, OB/GYN, Vascular, Urology, Small Parts, Surgery, Endocavity	Radiology, OB/GYN, Cardiology, Urology, Small Parts, Surgery, Endocavity
	No	No	No	No	No
	Optional	No	No	No	No
	Yes	Yes	Yes	Yes	Yes
	2-D, 3-D	2-D, 3-D	2-D, 3-D	2-D, 3-D	Yes
	Yes	Yes	Yes	Yes	No
	Yes	Yes	Yes	Yes	Yes
	2-D, 3-D	2-D, 3-D	2-D, 3-D	2-D, 3-D	Yes
	Endfire, biplane, radial	Endfire, biplane, radial	Endfire, biplane, radial	Endfire, biplane	Endfire, biplane
	TEE , Intraoperative	TEE, Intraoperative	TEE , Intraoperative	TEE, Intraoperative	Intraoperative
	>900	>700	>700	>700	N/A
	256	256	256	256	256
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	30	30	24	24	24
	FAM	FAM	FAM	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Not specified	Not specified	Not specified	Not specified	No
	Yes	Yes	Yes	Yes	No
	Yes	Yes	Yes	Yes	No
	THE, CHE	THE, CHE	THE, CHE	THE	THE
	PW, CW, HPRF, CFM	PW, CW, HPRF, CFM	PW, CW, HPRF, CFM	PW, HPRF, CFM	No
	Yes	Yes	Yes	Yes	No
	Yes	Yes	Yes	Yes	No
	Yes	Yes	Yes	Yes	No
	Yes	Yes	Yes	Yes	No
	Yes	Yes	Yes	Yes	No
	Yes	Yes	Yes	Yes	N/A
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	No
	Yes	Yes	Yes	Yes	Yes
	FD, HDD, MOD, CD-R/DVD-RAM , USB Memory	FD, HDD, MOD, CD-R/DVD-RAM, USB Memory	FD, HDD, MOD, CD-R /DVD-RAM, USB-Memory	FD, HDD, MOD, CD-R /DVD-RAM, USB-Memory	Compact Flash Memory, CD-R, USB-Memory
	70GByte HDD	40GByte HDD	999 images HD	999 images HD	999 images Compact Flash Memory
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Urology, pediatric hip	Urology, Pediatric Hip	Urology, pediatric hip	Urology, pediatric hip	Urology, pediatric hip
	45	45	15	15	15
	12-bit A/D conversion; Broadband harmonics, Adaptive image processing, Spatial compound scan, Directional eFlow, free angular M-mode (real-time or cine); tissue harmonics; HST and HST+ probes; [2]	12-bit A/D conversion; Broadband harmonics, Directional eFlow, free angular M-mode (real-time or cine); tissue harmonics; HST and HST+ probes; multibeam processing; tissue Doppler imaging; Quintrix mode; [3]	12-bit A/D conversion; free angular M-mode (real-time or cine); tissue harmonics; HST probes; multibeam processing; tissue Doppler imaging; Quintrix mode; DICOM-compatible data management subsystem (DMS). [4]	12-bit A/D conversion; DICOM-compatible built-in management software; multifrequency imaging; adjustable monitor height and operation panel. [5]	Full digital system, Extended Pure Harmonic Detection, Widedband Super High Density Probes. Meets requirements of ISO 9000, IEC 60601-1 Class I Type BF, and UL 544; ETL listed.
	Apr-08	Apr-08	Apr-08	Apr-08	Apr-08

Product Comparison Chart

SUPPLIER	ECRI INSTITUTE'S RECOMMENDED SPECIFICATIONS[1]	GE Healthcare	GE Healthcare	HITACHI	
MODEL	**GENERAL-PURPOSE ULTRASONIC SCANNERS WITH SMALL-PARTS CAPABILITIES**	**VOLUSON 730 PRO**	**VOLUSON 730 PRO V**	**HI VISION 5500**	
WHERE MARKETED		Worldwide	Worldwide	Worldwide	
FDA CLEARANCE		Yes	Yes	Yes	
CE MARK (MDD)		Yes	Yes	Yes	
CLINICAL APPLICATION	General-purpose, small parts	Abdominal, breast, cardiology, OB/GYN, transcranial, pediatric and neonatal, musculoskeletal, small parts, urologic, vascular	Abdominal, breast, cardiology, OB/GYN, transcranial, pediatric and neonatal, musculoskeletal, small parts, urologic, vascular	Cardiology, OB/GYN, urology, pediatric, breast, neonatal, vascular, intraoperative, endorectal, endovaginal, laparoscopic	
PROBE TYPES, MHZ					
Mechanical sector		PA2-5P, PA6-8 (sector)	PA2-5P, PA6-9 (sector)	No	
Annular array		No	No	No	
Linear array	2.5-5 (abdomen), 5-10 (small parts)	SP4-10, SP6-12, SP10-16, RSP6-16	SP4-10, SP6-12, SP10-16, RSP6-16	13-Apr	
Convex array	2.5-5 (abdomen), 5-10 (small parts)	SP4-10, SP6-12, SP10-16, RSP6-16	SP4-10, SP6-12, SP10-16, RSP6-16	09-Jan	
Phased array	2.5-5 (abdomen)	1.3-4, 4-9.8	1.3-4, 4-9.8	2-7.5	
Multifrequency		Yes	Yes	Yes	
Endovaginal		3.3-10	3.3-10	Yes	
Endorectal	5-7.5 (prostate)	No	No	Yes	
Others		1.5-5, 2-7 3-D/4-D curved; 3-11, 3.5-11 3-D/4-D linear; 3.3-10 3-D/4-D endovaginal; 2, 4 CW	1.5-5, 2-7 3-D/4-D curved; 3-11, 3.5-11 3-D/4-D linear; 3.3-10 3-D/4-D endovaginal	Fingertip Interventional, Intraoperative, EUS, min-proes, thru-crystal	
FRAME RATE, FPS		Variable to 300	Variable to 300	400 maximum	
GRAYSCALE LEVELS	64	256	256	256	
PREPROCESSING		Yes	Yes	Yes	
POSTPROCESSING		Yes	Yes	Yes	
MAXIMUM DISPLAY DEPTH, CM		24	24	36	
IMAGING MODES					
M-mode display		Yes	Yes	Yes	
M-mode and 2-D		Yes	Yes	Yes	
3-D (freehand)		Yes	Yes	Optional	
3-D (automatic)		Not specified	Not specified	Not specified	
4-D (live 3-D)		Yes	Yes	Yes	
Harmonic imaging	Yes	Yes	Yes	Yes	
DOPPLER					
Type	CFM	Color, tissue, PD, CW, PW with HPRF	Color, tissue, PD, CW, PW with HPRF	CW, PW, CFM	
Frequency display		Yes	Yes	Yes	
Velocity display		Yes	Yes	Yes	
Power Doppler		Yes	Yes	Directional	
Duplex mode		Yes	Yes	Yes	
Triplex mode		Yes	Yes	Yes	
FUNCTIONALITY					
Digital calipers	Yes	Yes	Yes	Yes	
Selectable dynamic range		Yes	Yes	Yes	
Adjustable transmit focus	Yes	Yes	Yes	Yes	
Dynamic receive focus		Yes	Yes	Yes	
Measurements on VCR replay		Yes	Yes	Yes	
PAN/ZOOM					
Real-time image	Yes	Yes	Yes	Yes	
Frozen image		Yes	Yes	Yes	
IMAGE STORAGE		Hard disk, MOD, CD-RW, DVD	Hard disk, MOD, CD-RW, DVD	DVD+RW, DVD-RAM, USB, CD-R, HDD	
Capacity, number of stored images		80 GB hard disk (~40,000 images)	80 GB hard disk (~40,000 images)	69,000 max	
Cine		Up to 256 MB, up to 3,000 2-D images	Up to 256 MB, up to 3,000 2-D images	4,000 frames	
DICOM 3.0 COMPLIANT	Yes	Yes	Yes	Yes	
ANALYSIS PACKAGES					
Cardiac scanning		Yes	Yes	Yes	
Vascular scanning		Yes	Yes	Yes	
OB/GYN scanning		Yes	Yes	Yes	
Others		M-mode, B-mode, Doppler calculations	M-mode, B-mode, Doppler calculations	General, urology	
NUMBER OF USER-PROGRAMMABLE PROTOCOLS		Extensive	Extensive	32	
OTHER SPECIFICATIONS	Digital and TV video outputs; full-screen annotation.	Real-time 4-D; volume calculation (VOCAL); tissue color Doppler imaging; auto optimization frequency and focus composite (FFC); RT 4-D biopsy; coded excitation; RSP biopsy kit; DICOM print, store, worklist, [6]	Real-time 4-D; harmonics; tissue color Doppler imaging; automatic optimization frequency and focus composite (FFC); coded excitation; RSP biopsy kit; DICOM print, store, worklist, lossy jpg, [7]	4 modes of harmonic imaging; pulse inversion harmonics; High definition Tissue Harmonic Imaging; real-time Doppler measurements; baseline shift in freeze; optional contrast harmonics, stress echo, wideview, and omnidirectional M-mode.	
LAST UPDATED		Nov-05	Nov-05	Mar-07	

	HITACHI	SIEMENS	SIEMENS	PHILIPS	PHILIPS
	HI VISION 8500	**ACUSON X300**	**SONOLINE G20 ULTRA-SOUND PLATFORM**	**ENVISOR**	**HD11 XE**
	Worldwide	Worldwide	Worldwide	Worldwide	Worldwide
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Cardiology, OB/GYN, urology, pediatric, breast, neonatal, vascular, intraoperative, endorectal, endovaginal, laparoscopic	Abdominal, OB/GYN, renal, vascular; cranial, small parts, urology, musculoskeletal, pediatric cardiology, adult cardiology, early obstetrics, orthopedics, prostate, emergency medicine	Abdominal, OB/GYN, vascular; transcranial, small parts, urology, endovaginal, endorectal, brachytherapy, musculoskeletal, adult, pediatric, orthopedic	Abdominal, OB/GYN, vascular; TCD, breast, small parts, musculoskeletal, pediatric, prostate, cardiology, endocavity, surgical	Abdominal, OB/GYN, vascular; TCD, breast, small parts, musculoskeletal, pediatric, prostate, endocavity, surgical, cardiology
	No	No	No	No	No
	No	No	No	No	No
	13-May	13-5, 10-5, 10-3	6-9, 6.5-10	L12-3, L12-5, 15-6L, L7535, L5035	L15-7io, L12-5, L12-3, L9-3, L8-4
	2.5-9	8-5, 5-2	2-4, 5-8	C8-5, C8-4v, C6-3, C5040, E6509	C9-4, C8-5, C6-3, C5-2 / V6-2, V8-4, 3D9-3v
	2-7.5	02-Apr	No	S12, S8, S4-2	S12-4, S8-3, S7-3t, S7-2omni, S4-2, S3-1
	Yes	All transducers	All transducers	Broadband	Broadband
	Yes	04-Sep	4.2-8, 4.2-9	C8-4v	C8-4v, 3D9-3v
	Yes	04-Sep	4.2-9	E6509	C9-5ec
	Intraoperative, EUS, miniprobes, biopsy, thru-crystal	2 CW Doppler pencil	Biplane endorectal	D1914, D5009V, D1914V	Static CW Doppler and PW Doppler
	410 maximum	498	>106	>230	785 2-D; 320 CFM
	256	256	256	256	256
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	[24]	[30]	[24]	[30]	35
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes, A-mode	Yes	Yes
	Optional	Yes	No	Yes	Yes
	Not specified	Not specified	No	N/A	Yes
	Not specified	Not specified	No	N/A	Yes
	Yes	Yes	Yes	Yes - Multivariate	Yes-Multivariate
	CW, PW, CFM, tissue Doppler	PW, color Doppler, power Doppler, directional power Doppler, CW, DTI, 2-D, M-mode	TGO (tissue grayscale optimization), brachytherapy template software	PW, steerable CW, CFM, color power angio	PW, steerable CW, CFM, color power angio
	Yes	Yes	NA	Yes	Yes
	Yes	Yes	NA	Yes	yes
	Directional	Yes	NA	Yes	Yes
	Yes	Yes	NA	Yes	Yes
	Yes	Yes	NA	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	No
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	DVD+RW, HDD, MO, floppy	DIMAQ-IP workstation CD-R/RW, DVD-R/RW, DICOM, syngo Dynamics	DIMAQ-IP, videotape CD-RW, TIFF, DICOM, syngo Dynamics	HD, CD, USB	HD, CD, USB
	69,000 max	Up to 95,780; 80 GB	Up to 42,000; 40 GB	80 GB for data storage	80 GB for data storage
	2,977 frames	2,729 frames	Yes	1,000 frames	1,000 frames
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	2-D, M-mode	Yes, Stress Echo	Yes, Stress Echo
	Yes	Yes	2-D	Yes	Yes, IMT
	Yes	Yes	Yes	Yes	Yes
	General, urology	Urology, breast, testes, thyroid, orthopedic, optional stress echo imaging	Urology, orthopedic, abdomen, breast, thyroid, testes, cranial	Pediatric, urology	QLAB 3DQ, 2DQ, ROI, MVI, Pediatric, urology
	32	Up to 32	Up to 32	5 per clinical application	20 per exam type
	HI COMPOUND multiangle compound imaging; high resolution adaptive imaging; raw data freeze; Sono IQ one-touch optimization; 4 modes of harmonic imaging; wideband pulse inversion imaging; [8]	All-digital architecture; TCO system optimization technology; Clarify vascular enhancement technology; SieClear multiview spatial compounding; SynAps synthetic aperture technology; [9]	All-digital architecture; TGO; SynAps synthetic aperture; Ready Set onscreen workflow shortcuts; HomeBase layout control panel; microCase transducer miniaturization technology; 4-wheel pivoting; SuppleFlex transducer cables.	Trapezoid imaging; panoramic; moveable, rotatable control panel; stress echo; 3-D imaging/data management and reporting; tissue harmonic imaging; contrast; iSCAN one-control optimization; High Q auto Doppler analysis.	SonoCT real-time compound imaging; XRES processing; adjustable LCD with articulating arm; lightweight transducers; anatomical M-mode; 2D; 3D; 4D, STIC, MPR, iSlice; iSCAN one-control optimization; High Q auto Doppler analysis
	Mar-07	Aug-07	Aug-07	Mar-07	Mar-07

Product Comparison Chart

SUPPLIER	ECRI INSTITUTE'S RECOMMENDED SPECIFICATIONS[1]	MEDISON	MEDISON	MEDISON
MODEL	**GENERAL-PURPOSE ULTRASONIC SCANNERS WITH SMALL-PARTS CAPABILITIES**	**SONOACE X4**	**SONOACE PICO**	**SONOACE 8000 SE**
WHERE MARKETED		Worldwide	Worldwide	Worldwide
FDA CLEARANCE		Yes	Yes	Yes
CE MARK (MDD)		Yes	Yes	Yes
CLINICAL APPLICATION	General-purpose, small parts	General, OB/GYN, internal medicine, urology, surgery, breast, renal, vascular, pediatric, abdominal, cardiology, neonatal	General, internal medicine, urology, surgery, breast, renal, vascular, pediatric, abdominal, cardiology, neonatal	General, OB/GYN, internal medicine, urology, surgery, breast, renal, vascular, pediatric, abdominal, cardiology, neonatal
PROBE TYPES, MHZ				
Mechanical sector		No	No	No
Annular array		No	No	No
Linear array	2.5-5 (abdomen), 5-10 (small parts)	HL5-9ED, L5-9EC, L5-9EE, HL5-12ED	HL5-9ED,L5-9EC,L5-9EE,L4-7EL,HL5-12ED	HL5-9ED, L5-9EE, L5-9EC, HL5-12ED
Convex array	2.5-5 (abdomen), 5-10 (small parts)	C3-7ED, C3-7EP, C2-5ET, C4-9/10ED, C2-4ES	C3-7ED, C2-4ES, C4-7ED, C2-5ET, C4-9ED/10ED, HC2-5ED	C3-7ED, C3-7EP, C2-5ET, C4-9/10ED
Phased array	2.5-5 (abdomen)	No	No	P3-7AC
Multifrequency		All probes	All probes	All probes
Endovaginal		EC4-9/10ED, EC4-9ES	EC4-9ES, EC4-9ED	EC4-9/10ED, EC4-9ES
Endorectal	5-7.5 (prostate)	EC4-9/10ED, EC4-9ES	EC4-9ES, EC4-9ED	EC4-9/10ED, EC4-9ES
Others		Not specified	Not specified	Pencil CW2.0, CW4.0
FRAME RATE, FPS		Up to 169 maximum	Variable, depends on probe	Up to 100 maximum
GRAYSCALE LEVELS	64	256	256	256
PREPROCESSING		Yes	Yes	Yes
POSTPROCESSING		Yes	Yes	Yes
MAXIMUM DISPLAY DEPTH, CM		30	30	24
IMAGING MODES				
M-mode display		Yes	Yes	Yes
M-mode and 2-D		Yes	Yes	Yes
3-D (freehand)		Yes	Yes	Yes
3-D (automatic)		No	No	No
4-D (live 3-D)		No	No	No
Harmonic imaging	Yes	Yes	Yes	Yes
DOPPLER		Yes	Yes	Yes
Type	CFM	Pulsed-wave Doppler	Power/angio Doppler mode, Pulsed-wave Doppler, color Doppler,	Power/angio Doppler mode, pulsed-wave Doppler, color Doppler, tissue Doppler imaging, steered CW Doppler
Frequency display		Yes	Yes	Yes
Velocity display		Yes	Yes	Yes
Power Doppler		Yes	Yes	Yes
Duplex mode		Yes	Yes	Yes
Triplex mode		No	No	Yes
FUNCTIONALITY				
Digital calipers	Yes	Yes	Yes	Yes
Selectable dynamic range		Yes	Yes	Yes
Adjustable transmit focus	Yes	Yes	Yes	Yes
Dynamic receive focus		Yes	Yes	Yes
Measurements on VCR replay		No	No	No
PAN/ZOOM				
Real-time image	Yes	Yes	No	Yes
Frozen image		Yes	Yes	Yes
IMAGE STORAGE		Cine, CD-RW, MOD,VCR, USB, LAN	Sonoview, external CDRW	Cine, CD-RW, MOD,VCR, USB, LAN
Capacity, number of stored images		35,000	20,000	35,000
Cine		512	256	256
DICOM 3.0 COMPLIANT	Yes	Yes	Yes	Yes
ANALYSIS PACKAGES				
Cardiac scanning		Yes	Yes	Yes
Vascular scanning		Yes	Yes	Yes
OB/GYN scanning		Yes	Yes	Yes
Others		Urology	Urology	Urology
NUMBER OF USER-PROGRAMMABLE PROTOCOLS		Not specified	Not specified	Not specified
OTHER SPECIFICATIONS	Digital and TV video outputs; full-screen annotation.	Trapezoid scanning, image filing, PC printer, ECG module	Image filing,PC printer, ECG module	Trapezoid scanning, image filing, PC printer, ECG module
LAST UPDATED		May-08	May-08	May-08

	MEDISON	MEDISON	MEDISON	MEDISON	ESAOTE
	SONOACE 8000LIVE* / EX PRIME	**SONOACE X8**	**ACCUVIX V10**	**ACCUVIX-XQ**	**TECHNOS MPX**
	Worldwide	Worldwide	Worldwide	Worldwide	Worldwide
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Abdominal, OB/GYN, vascular, small parts, endovaginal, endorectal, urology, cardiology, (volume 3-D, live 3-D, 4D*)	General, OB/GYN, internal medicine, urology, surgery, breast, renal, vascular, pediatric, abdominal, cardiology, neonatal,volume 3-D, live 3-D, 4D	General, OB/GYN, internal medicine, urology, surgery, breast, renal, vascular, pediatric, abdominal, cardiology, neonatal, volume 3-D, live 3-D, 4D	General, OB/GYN, internal medicine, urology, surgery, breast, renal, vascular, pediatric, abdominal, cardiology, neonatal, volume 3-D, live 3-D, 4D	Abdominal, OB/GYN, cardiology, small parts, vascular, endorectal, endovaginal, intraoperative, laparoscopic, TCD, pediatric, musculoskeletal
	No	No	No	No	No
	No	No	No	No	No
	L5-9EC, HL5-9ED, L5-9EE, L4-7EL	L5-12EC, HL5-12ED, L5-12/50EP, L5-13EC, L4-7EL	L6-12IS, L8-15IS, L5-12/50EP, L4-7EL, L5-13IS, L7-16IS	L5-12IM, L6-12IS, L8-15IS, L5-9EE, L4-7EL	14-Mar
	C3-7ED, C3-7EP, C2-5EL, C2-5ET, C4-9ED, C2-4ES, CL4-8EV	C2-5EL, C3-7EP, C4-9/10ED	C2-6IC, C2-5EL, C3-7IM, C4-9/10ED, EC4-9IS	C2-6IC, C5-2EL, C3-7IM, C1-4EC, C4-9ED	09-Feb
	P2-5AC, P2-3AC, P2-4AC, P2-4AH, P3-7AC	P2-4AH, P3-5AC	P2-4AC, P3-5AC	P2-4AC, P3-5AC, P3-7AC	07-Feb
	All probes	All probes	All probes	All probes	Yes
	EC4-9ES, EC4-9ED (3D5-8EK,VDW5-8B*)	NEV4-9ES	NEV4-9ES	EC4-9IS, EC4-9ES	09-May
	EC4-9ES, EC4-9ED (3D5-8EK,VDW5-8B*)	NER4-9ES	NER4-9ES	EC4-9IS, EC4-9ES	10-Feb
	Pencil CW2.0, CW4.0 (3D3-5EK, 3D4-7EK, 3D5-8EK, 3D2-6ET, 3D4-8ET*)	Pencil CW2.0, CW4.0 Volume probe:3D2-6ET, 3D4-8ET, 3D4-8EK, 3D5-9EK, 3D4-9ES	Pencil CW2.0, CW4.0 Volume probe:3D2-6ET, 3D4-8ET, 3D5-9EK, 3D4-9ES	Pencil CW2.0, CW4.0 Volume probe:3D3-5EK, 3D4-7EK, 3D5-8EK, 3D2-6ET,VNW 6-12	Laparoscopic, intraoperative, 2, 5 pencil CW
	Not specified	Up to 700 maximum	Up to 700 maximum	Up to 500 maximum	Up to 128
	256	256	256	256	256
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	24	30	30	30	28,5
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	No, (Yes*)	Yes	Yes	Yes	Not specified
	No, (Yes*)	Yes	Yes	Yes	Not specified
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	
	Power/angio Doppler mode, pulsed-wave Doppler, color Doppler, tissue Doppler imaging, steered CW Doppler	Color Doppler imaging with quad-beam receiving, Power Doppler imaging with quad-beam recieving,[10]	Color Doppler imaging with quad-beam receiving, Power Doppler imaging with quad-beam recieving,[10]	Color Doppler imaging with quad-beam receiving, Power Doppler imaging with quad-beam recieving,[10]	Steerable CW, PW, color, HPRF, CFM, directional power
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	No	No	No	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Cine, CD-RW, MOD, SonoView, Memory Stick	Cine, DVD, DVD/RW, CD-RW, MOD, SonoView, Memory Stick	Cine, DVD, DVD/RW, CD-RW, MOD, SonoView, Memory Stick	Cine, DVD, DVD/RW, CD-RW, MOD, SonoView, Memory Stick	MOD, CD burner, DVD RAM, network, floppy
	30,000	35,000	35,000	35,000	40 GB hard drive
	256	10000	10000	2048	Up to 1,700 frames
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Urology	Urology	Urology	Urology	Pediatric, urology, transcranial
	Not specified	5 per application per transducer	5 per application per transducer	5 per application per transducer	400
	Trapezoid scanning, ECG module	Trapezoid scanning, Spatial Compound ImagingTM (SCI), Pulse Inversion Harmonic Imaging, Full Spectrum ImagingTM, ECG module, PC printer	Trapezoid scanning, Spatial Compound ImagingTM (SCI), Pulse Inversion Harmonic Imaging, Full Spectrum ImagingTM, Color Edge Processing,Vocal, Oblique view, Volume CT, ECG module	Trapezoid scanning, Spatial Compound ImagingTM (SCI), Pulse Inversion Harmonic Imaging, Full Spectrum ImagingTM, Color Edge Processing,Vocal, Oblique view,Volume CT, ECG modu-letrapezoidal mode; 5 probe ports.	Ultrahigh-frequency and multifrequency imaging; directional power Doppler; Vpan; CnTI (contrast); digital archival and network communication with DICOM; B-color. Meets requirements of IEC 60601-1.
	May-08	May-08	mai-08	May-08;	Nov-05

Tungsten X-ray Tubes with Rhodium and Silver Filters Optimise Image Quality

Contributors
Andrew Smith, Ph.D.
Biao Chen, Ph.D.
Alan Semine, M.D.

Mammography is a technically demanding radiographic procedure. High resolution is needed and dose performance is an important concern. Clinical trials and scientific investigations using Hologic Selenia systems have found that a tungsten x-ray tube with a combination of rhodium and silver filters optimises image quality while minimising dose. This combination allows for important dose reductions (up to 30%), while maintaining the excellent image quality already achieved with the Selenia system. The use of a tungsten anode in the x-ray tube also offers superior performance for some of the advanced applications under development, such as digital breast tomosynthesis, iodinated contrast, and dual energy breast imaging.

DETECTIVE QUANTUM EFFICIENCY

The dose performance of a Hologic Selenia digital mammography system equipped with a tungsten x-ray tube was compared to a Selenia equipped with a molybdenum x-ray tube using the Detective Quantum Efficiency (DQE) at conditions simulating the same patient radiation dose of 1.0 mGy to the ACR phantom (standard breast). The DQE curves shown in Fig. 1 show that a Selenia system equipped with a tungsten x-ray tube Selenia system produced superior imaging to a system with a molybdenum tube.

RESOLUTION

Using the Modulation Transfer Function (MTF), the resolutions of a Selenia system equipped with a tungsten x-ray tube and a Selenia equipped with a molybdenum x-ray tube are compared in Fig. 2. The two MTF curves are identical and show that a Selenia system equipped with a tungsten x-ray tube offers the same high imaging resolution as a Selenia system equipped with a molybdenum x-ray tube. This conclusion is expected since both x-ray tubes have the same focal spot size, and both digital mammography systems use the same selenium image receptor with its high dose efficiency.

THE IMPACT OF X-RAY TUBE AND FILTER ON DOSE PERFORMANCE

The tube/filter combination used has a significant impact on dose performance. Our research has shown that a tungsten x-ray tube equipped Selenia system using both rhodium and silver filters has superior performance compared with traditional systems using molybdenum x-ray tubes and molybdenum filters. The silver filter is used for larger breasts and not only results in superior imaging performance at lower dose but also significantly reduces the x-ray exposure time to eliminate potential patient motion problems.

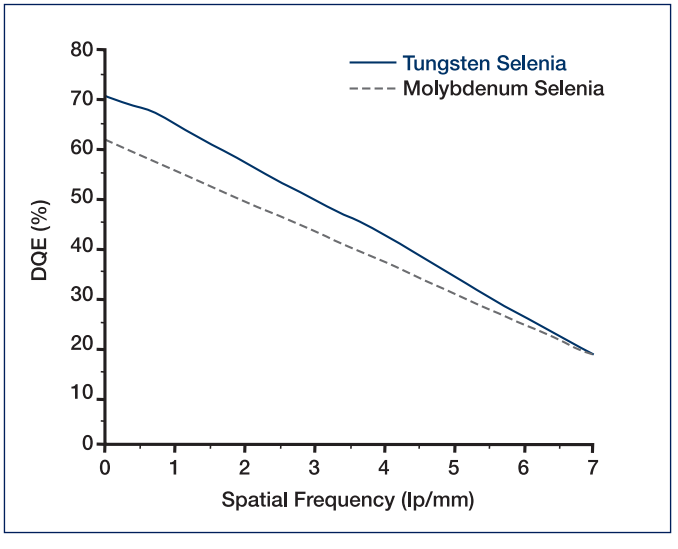


Fig. 1: DQE curves for systems using tungsten and molybdenum x-ray tubes at dose levels typical for a 4.5 cm breast show that tungsten is superior to molybdenum.

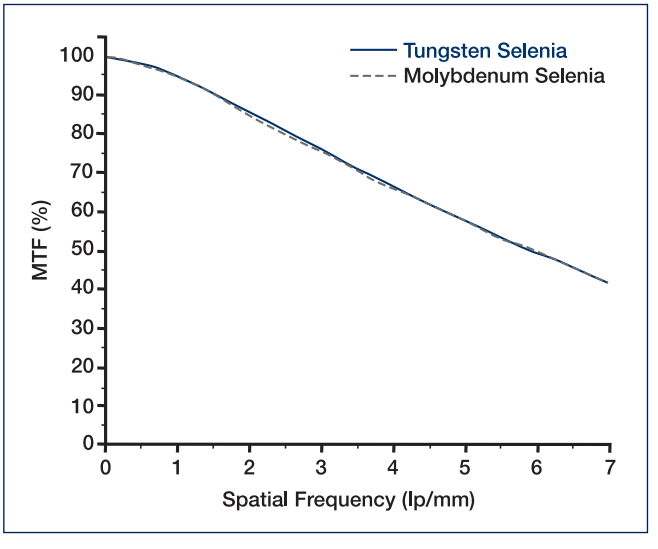


Fig. 2: The resolution performance for both tungsten and molybdenum equipped systems as measured by an MTF curve are equivalently high.

Clinical Benefits of Tungsten Digital Mammography

- **Reduced patient dose**
- **Improved image quality**
- **Advanced applications such as tomosynthesis, dual energy, and contrast mammography**

DUAL VERSUS SINGLE TRACK ANODE X-RAY TUBES

While it might appear that a dual track tube is advantageous for digital mammography because it offers more choices of anode material, there are significant technical downsides to the use of dual track tubes. Single track x-ray tubes are more reliable and less expensive. In addition, the maximum anode heat loading of dual track tubes are considerably inferior to the anode loads for single track tubes. A digital mammography system equipped with a single track tube can deliver the high current exposure needed for the largest breasts at an acceptable exposure time, reducing motion artifacts. Without this, images of large breasts are under-penetrated, suffer from long exposure motion blur, and have poor image quality.

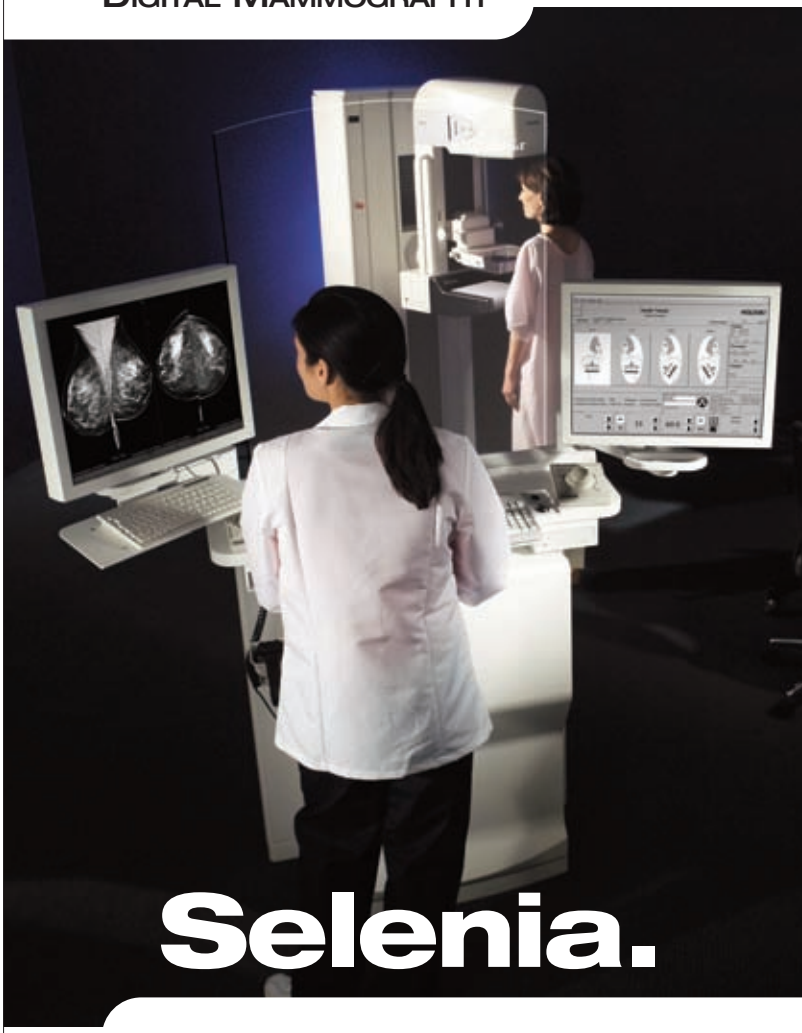
The single track tungsten tube supports two to three times the maximum anode load compared to any dual track x-ray tube. More importantly, the use of a tungsten x-ray tube in combination with a rhodium filter provides equivalent or better imaging performance compared to a rhodium anode with a rhodium filter and indicates that the dual track x-ray tube is a poor choice for digital mammography systems.

CONCLUSIONS

The use of a Hologic Selenia digital mammography system with tungsten x-ray tubes offers superior imaging performance relative to x-ray tubes equipped with molybdenum or rhodium anodes.

The use of a tungsten x-ray tube with a rhodium filter offers superior performance to a molybdenum x-ray tube and a molybdenum filter. The use of a silver filter is superior to molybdenum or rhodium filters for the largest breasts. Single track x-ray tubes are superior to dual track x-ray tubes as their high anode heat loading allow for shorter exposure times.

In summary, the unique combination of a tungsten x-ray tube with rhodium and silver filters offers optimal dose and image quality performance for Selenia digital mammography over a wide range of breast thicknesses.



Not all digital mammography systems are created equal

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Part II: Maximising Efficiency to Cope with Increased Demand

KEY ADVANTAGES OF NEW STAFF MONITORING TOOLS

Radiology Gains Workflow Benefits

Author
Wouter Verduyn
Manager
Department of Radiology
Leiden University Medical Centre
Leiden, The Netherlands
w.w.verduyn@lumc.nl

Last year's RIS/PACS (Sectra) implementation in the radiology department at Leiden University Medical Centre (LUMC) has enabled significant workflow benefits. One of the key cost control issues in the department is, of course, maintaining a motivated and proactive team of staff members with as low a turnover as possible. The advent of PACS, and in particular, the Control Tower, has allowed us to monitor and streamline not only patient flow through the department, but also to access real-time data on staff productivity so as to improve staff performance.

A Supportive Environment for Employees

One of the functions I share as radiology manager with the medical manager is staff management. Selecting and retaining the right personnel for the department as well as a maintaining a highly developed personnel policy that includes aspects such as 'management skills development' are primary points of focus for us. We try to assess each staff member's role, as well as asking in what ways they are looking to expand their career in the future, and trying to match this with our department's growing needs. Promoting a dynamic staff morale is a key goal of the department.

Facts & Figures

LUMC comprises Leiden University Hospital and the Faculty of Medicine of Leiden University. The LUMC, which employs approximately 7000 people, is one of several academic medical centres in the Netherlands. The core tasks of the LUMC are:

- Patient care: routine care, high-level clinical care, and in particular, high-level reference care.
- Research: both fundamental and bedside, healthcare-oriented research.
- Education for the faculties of Medicine and Biomedical Sciences.
- Training for residents to become medical specialists
- Training for paramedics, such as nurses and technicians
- Additional training, both post-doctoral and post-vocational.

Sectra Control Tower makes real-time monitoring possible in areas such as per-doctor output levels and waiting times for each modality. I use this data to create a limited number of standard reports for the section heads and other employees with managerial responsibilities. On top of that Control Tower gives technicians and radiologists direct access to their data, empowering them to visualise their contribution to the team and to make reports that are useful for their area of interest.

High Demanding Referring Physicians and Efficiency

At Leiden, we are experiencing the same financial pressure as radiology departments across Europe. Although we have no shortage of technicians and doctors at this moment, demands for CT and MR are increasing out of all proportion. This is despite stagnant budgets not increasing to match heightened demand. Only by increasing operational efficiency can we address these challenges.

Waiting Lists and Patient Management

In the Netherlands many hospitals have long waiting lists for CT and MRI exams. These patients are divided into three obvious categories: emergency patients who are seen as quickly as possible, inpatients who must be seen the same day or at the latest, the very next day, and finally outpatients referred e.g. by a neurologist, who may end up waiting for months to have their exams. For these non-urgent cases, the processing times are quite long. There are, in my opinion, two solutions to this.

The first solution is that we increase capacity, purchasing more machines and hiring more staff, as well as offering a 24/7/365 service. However, this is quite cost-intensive! The second, more cost-effective solution, is to make the most of the resources already at hand, by making the hospital's technicians and radiologists responsible for their own output. By providing them access to the Control Tower reports where they can easily check their precise productivity data and the utilization rate of individual modalities, we can empower the employees to optimise their own efficiency, and thus increase the productivity of the department.

Key Advantages

One of the key advantages is that the solution is entirely customisable. The solution was upgraded a few weeks ago to fit our needs – for example in the Netherlands a Dutch radiologist called Sanders has developed a points system that is commonly used to show how much work a doctor has done, measured in units known as 'Sanders-points'. We were pleased to discover that Sectra can integrate this into the Control Tower solution.

Finally, the greatest advantage offered by the solution is that by sharing the information produced in the department, we can inspire staff members and others in the department to monitor and manage their own productivity and output. Control Tower is a management tool that enables utilizing intelligent data access for maximising productivity in the radiology department, resulting in increased staff satisfaction and, ultimately, patient satisfaction.

Author *Guidelines*

CONTENT

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The IMAGING Management Editorial Team

THE USE OF CAD IN THE DETECTION OF LUNG NODULES ON DIGITAL CHEST RADIOGRAPHS

Early Detection Key to Survival

Author
Thomas Rohse
International Product Manager General X-ray Digital Radiography IO/ Medical IT
Philips Medical Systems DMC GmbH
Hamburg, Germany

Computer Assisted Detection (CAD) helps radiologists analysing images to detect cancers and diseases of the breast, lung and colon. Using CAD, suspicious regions can automatically be highlighted and marked. This steers the radiologist to review or confirm a specific area that may require further analysis after the initial assessment.

The most common x-ray examination is a plain x-ray chest image. Approximately 50 percent of all x- ray examinations are standard chest x-rays that are carried out for a range of different purposes, from pre-operative planning to routine check-ups.

Latest Stats Highlight Deadliness of Lung Cancer

At the same time, lung cancer is the leading cause of cancer deaths among both men and women worldwide, claiming almost as many lives each year as liver and colon cancer combined. Patients with lung cancer often die within one year after the onset of clinical symptoms, so screening and early detection can play a crucial role in saving a patient's life.

For example, Cancer Research UK reports that the one-year survival rate for lung cancer in England and Wales is around 25 percent, falling to seven percent after five years. Also, the American Cancer Society found that if lung cancer is found and treated while it is localised, survival rates increase from 15 percent to 47 percent five years after diagnosis. Currently, only 16 percent of lung cancers are found in the early, more treatable stages.

The motivation of this large body of evidence demonstrating the positive impact of early detection of lung cancer has led to a remarkable increase in the number of diagnostic tools available. With the increased volume of information from a range of modalities, the complexity of data available to clinicians has also grown, and there is now a substantial demand for decision support tools to help interpret this complex information.

Controversy Surrounding CAD

The clinical application of CAD started during the last decade with screening mammography. Controversy exists as to whether CAD has a positive impact as a diagnostic tool. One recent study has suggested that the use of CAD in helping practitioners detect breast cancer at an early, curable stage may be harmful because false-positive results could lead to more call-backs and follow ups (e.g. a biopsy to validate breast cancer). Other studies, both prospectively and retrospectively, demonstrated the value of CAD in improving the detection of early stage cancers when utilised in conjunction with screening mammography.

CAD has been put forward during the last few years as a combined viewing and reporting tool which can help interpret the growing amount of information generated by constantly evolving imaging modalities. In the application of lung nodule detection, there have been a number of studies suggesting that digital radiography in combination with CAD could be a valuable adjunct to CT diagnosis and has the potential to become a first-line screening tool.

Studies Provide Interesting Data

A multi-centre study carried out by the Beijing Union Medical College and Beijing Friendship Hospital revealed a significant difference in physician's detection rates and inter-observer variation between reading results carried out with and without the use of CAD (by EDDA Technology). The group gathered chest DR screening studies from a total of more than 500 patient studies and tested the diagnostic performance of CAD software on the DR images.

According to preliminary results, the individual radiologists' detection rate without CAD averaged 50 percent. But the collective detection rate for small actionable nodules confirmed as true positives averaged 40 percent, underscoring an important inter-observer variation. With xLNA (x-ray Lung Nodule Assessment) – Philips' CAD system for the lung – the individual and collective detection rates recorded were about 85 percent. In addition, the inter-observer variation decreased significantly.

These results suggest that CAD technology not only significantly increases the chances of small nodule detection but that it also helps decrease the occurrence of inter-observer variation. In addition, it implies that an individual practitioner, aided by CAD technology, will put forward a similar level of diagnosis as one carried out by a collective of practitioners, which is typically considered to be more accurate and reliable.

Chest x-ray CAD can be incorporated into routine clinical workload, and should be particularly beneficial for solitary practitioners. Over time, as it assists the practitioner to obtain accurate diagnostics, it helps increase their confidence, thereby providing the patient with better, faster and more accurate treatments.

xLNA 2.0 (based on EDDA Technology's IQQA-Chest product) supports clinicians in the identification, quantification, evaluation and reporting of pulmonary nodules at an early stage. As the first real-time interactive diagnostic analysis system, it integrates advanced computer analysis technology into the diagnostic process. In clinical environments, it has been shown to increase the discovery rates of small nodules (between 5 - 15 mm) to 85 percent.

Advantages of Lung CAD

Recognised as a high-quality diagnostic tool, CAD enables hospitals to provide a consistent level of healthcare. The software is resistant to fatigue and attention distracters that physicians often have to deal with and consistently checks areas of interest in every single image for physicians. At the same time, less experienced users or residents can make use of CAD as a training tool and therefore reach a high level of expertise with the support of a CAD system.

By providing high-quality fully integrated workflow solutions, CAD can potentially make positive impact on not only accuracy but efficiency. As a result, practitioners working with CAD can focus on their patients' needs, reducing the amount of time spent researching complex information to reach the correct diagnosis. This enables clinics to expand their client-facing services and provide patients with a faster and more personalised service, resulting in better quality of care for patients and improved outcomes in treating life-threatening diseases such as lung cancer.

How Does Lung CAD Work?

The CAD software marks locations that may be suspicious of solitary pulmonary nodules and presents a report list that can be easily reviewed and extended by the radiologist. The digital x-ray data is processed by the CAD package to provide accurate automatic segmentation and quantification tools for the detected nodules, which is crucial for follow-up examinations to observe growth rates and decide on the likely presence of malignancies.

It is essential to have the CAD functionality embedded directly in the reading process. Because of that, xLNA can be integrated into virtually any existing PACS environment. Neither code-level integration nor the installation of additional software at the PACS workstation is required. The application can be launched at the PACS workstation by simply selecting the relevant case from the PACS worklist. A report including user-confirmed findings, measurements, statistics and free text can be stored in the PACS in DICOM format.

CAD a Complimentary Tool for Chest Exams

The ease with which CAD can be incorporated into the average practitioner's workflow demonstrates that radiologists should not view CAD functions as a potentially threatening tool which might make their positions obsolete, but rather to view it as a complimentary tool which aids them in reading chest x-rays and hence supplements their skills. It functions as 'a second pair of eyes', which can assist radiologists in providing a better quality of care for their patients. Using CAD helps bridge the gap between the clinician's interpretation based upon patient-specific knowledge and computer analysis of the information captured by the x-ray.

INTERVIEW WITH PROF. JAMES H THRALL

Interviewee
Prof. James H Thrall
Radiologist-in-Chief
Massachusetts General Hospital
jthrall@partners.org

also
'Juan M Taveras' Professor of Radiology
Harvard Medical School
Boston, MA, US

Please tell us about your background in radiology – what are the highlights of your career in this field?

I trained in radiology and nuclear medicine at Walter Reed Army Medical Centre and had the opportunity there to do research for the first time. I realised that I enjoyed it and when I left the army I returned to my alma mater, the University of Michigan, where I had a wonderful academic environment. I was active across the field of nuclear medicine publishing in diverse areas of nuclear cardiology, thyroid imaging, skeletal scintigraphy and hepatic scintigraphy among other topics.

To what do you attribute your continued success, and how would you advise other radiologists to advance their careers?

In 1983 I became Chairman of Radiology at the Henry Ford Hospital and in 1988 I came to Boston as Radiologist-in-Chief at the Massachusetts general Hospital and Professor of Radiology at Harvard Medical School. I have had the opportunity here to build a major radiology research programme and to also build a diversified radiology professional practice. I believe success in academic radiology is actually easy because there are so many opportunities to perform research. No one can possibly lack for interesting and important issues to study. So, it is really a matter of interest and energy and staying focused. Choosing a reasonably well-defined area in which to become expert is usually more productive than trying to do everything and will lead to more extramural recognition for a persons work.

In your opinion, must one necessarily sacrifice personal time in order to achieve or maximise professional success in radiology?

The question rightly comes up whether one has to sacrifice personal time for academic success. Frankly, I do not know any successful academic person who works just 40 hours per week. Yet, many of them also seem to have time to do other things as well. My conclusion is that there is plenty of time to do both academic and personal things if we do not squander our time.

What were your most memorable achievements during your leadership of the American Roentgen Ray Society?

I served on the Executive Council of the American Roentgen Ray Society for 16 years and was always proud to be associated with both the Society and my fellow Council members. Working for the ARRS brought me together with other leaders in radiology and provided the opportunity for us to support our profession. I am most proud of having taken part in establishing several programmes designed to promote the careers of young radiologists such as the ARRS Scholars programme and the Figley and Rogers Fellowships in radiology journalism. I also was among the original organisations supporting the Academy of Radiology Research and the ARRS has been a supporter of the AFIP.

How do you think the use of nighthawking and overseas radiology will impact on the future?

Nighthawking whether done in the US or overseas has been widely embraced by radiologists to help them deal with coverage. It has improved the quality of life for many groups and has helped alleviate manpower shortages. Long term there is a substantial risk that teleradiology will make people look at radiology professional services as a commodity that can be bought and sold and brokered by others. This will not be good for the profession.

Do you think today's education prepares residents adequately for the challenges they will face in their career? How could this be improved?

Radiology education is more than adequate in the sense of learning radiology but does not teach people how to navigate in the real world. We do not teach much about the business of medicine or radiology and it is often a shook to new radiologists when they go into practice how little they know about these issues.

What is one of your favourite memories from your own residentship?
I loved my own residency. The day started with a teaching conference - a case review conference. We each had a chance to look at unknowns. I couldn't wait to get to the hospital and take a case.

How has the role of radiologists changed within the hospital environment, and what changes do you see this causing in the years to come?
The biggest change in radiology in the last 40 years is that instead of being ancillary to the care process we are in its critical path. Therefore, radiology is important to all the other specialties and to just about every patient with a serious illness. We need to take this central role seriously and make sure we are not a bottleneck in the care process.

Leadership is an increasingly frequent buzzword for radiologists - do you think their type of role encourages leadership on a greater scale?
Leadership has always been important but is even more so now because of radiology's central role in the care process. Everything happens faster today with less latitude for idiosyncrasy. Therefore, leaders must foster good practice cultures and understand the importance of thinking systemically and not transactionally.

What three key pieces of managerial advice would you offer other radiological chairmen to help them balance their workloads?
My three keys to success are to engage everyone and celebrate their contributions rather than trying to do everything oneself, to solve problems systemically at their root causes and to periodically stop to reassess whether strategies and directions are still optimal.

Finally, if you had to choose an alternate career, what would that be?
I have had the chance to be involved in a number of business activities related to our department and more generally in the medical vendor community. I wonder sometimes what it would have been like on that side of the fence. ❄

⋈ *continued from p.14*

Adapting to New Requirements

The Davos course now attracts more than 1,000 participants for the general course and approximately 200 participants for the three weekend courses in nuclear medicine, paediatric imaging and management in radiology. This makes the Davos course one of the biggest workshop-only meetings in radiology. Currently, there are four course topics, which are rotated annually:
1) Neuroradiology including head and spine;
2) Musculoskeletal;
3) Abdominal imaging, and
4) Chest including heart and breast.

Although the original course organisers have handed over responsibility to a new team, the 39 year-old principles of interactivity, case-based teaching and top teachers as well as the surroundings of Davos are crucial course ingredients and were not changed. However, the Davos course also systematically adapts to modern requirements. For instance, the course began to migrate from hardcopies and slide projectors to purely computer-based teaching since 2001.

Currently, all classrooms are fully equipped with laptop computers with IDKD's bespoke software, which provides interactive viewing of cases, a voting system for increased course interactivity and an online teacher evaluation system providing fast feedback to teachers. This software also provides online learning. Course participants have permanent internet-based access to more than 80 well-documented cases per year with questions, answers, as well as references.

Management Courses

Besides the classic course, there is a tradition of satellite courses taking place during weekends that precede the workshops, following the same IDKD principle of case-based, interactive teaching by top experts. The newest addition to the IDKD course is a management course. There are four 90-minute workshops dealing with a business case. In 2008, the subject was negotiation. In addition, there are 2 - 3 lectures by experts, including industry representatives. In addition to case discussion, the exchange of ideas between like-minded radiologists is an important part of the course.

Harmonisation of Education Standards across Europe

IDKD obtained CME credits at a European level and is in close contact with major organisations such as RSNA and the ECR. IDKD is willing to adhere to any quality standards and formal requirements improving the quality of teaching. This does not mean, however, that the form and scientific contents of the course have to become homogenised. Though IDKD has its own distinct "spirit" and a unique, decades-old teaching system, it continues to offer a special teaching experience. ❄

For further information, please visit www.idkd.org

Author
Prof. Juerg Hodler
On Behalf of the IDKD Scientific Directors
Orthopaedic University Hospital Balgrist
Department of Radiology
Zurich, Switzerland
juerg.hodler@balgrist.ch

CONFERENCE PREVIEW

International Diagnostic Course Davos Expands to Greece

IDKD in Greece: Anavyssos/Athens, September 25 - 28, 2008

The case-based International Diagnostic Course (IDKD) in Davos celebrates its 40th birthday in 2008. The course is always fully booked. Additional expansion is hardly possible due to room constraints at the Davos congress centre. In addition, the IDKD should not grow too much in order to be able to maintain the "spirit of Davos" which includes the possibility to meet teachers and other colleagues face-to-face.

IDKD has discussed for quite some time to offer an additional course outside of Switzerland at a different time of the year. This would increase participant choices and would also provide economies of scale. Investments in IDKD-specific software (classroom viewer, electronic teacher evaluation, voting system and others) have steadily increased. Distribution of the cost over additional courses is desirable.

Why Organise an IDKD Course in Greece?

There is an increasing interest from Southeastern European, Eastern European and Mediterranean countries in postgraduate educatio. For them, Greece may be easier to reach or may better fit climate preferences. Greek radiologists have been very supportive with regard to an IDKD course in their country which is for instances demonstrated by the local advisory board helping with the organisation. Greece also offers an excellent infrastructure, a flair for informatics which is crucial for IDKD and a world-renowned cultural heritage.

Course Concept for IDKD in Greece

The concept of the Greece course is the same as in Davos. This means that there are case-based, interactive workshops presented by a top faculty. The workshop teachers for the 2008 course in Greece have been selected from the 2007 chest course faculty in Davos. They will give 75 minutes workshops concentrated in early morning and late afternoon. As in Davos, there will be highlight lectures before the noon break. However, the course will be shorter than its parent in Switzerland (three instead of six days) and the number of topics has been reduced from 21 to 12.

Course Details

Course dates are September 25-28, 2008. The course is held in Anavyssos on the Sounion peninsula. The city of Athens, Cape Sounion and the Athens airport can be reached by car within 30 - 60 minutes. The course hotel (www.plaza-resort.com) provides the infrastructure required for IDKD and also provides 5* comfort. Additional hotels will be offered for budget travellers.

Course registration has started on February 29, 2008 and is available on www.idkd.org. Reduced early bird rates are available till June 15, 2008. Participants will receive the 2007 teaching case collection (80+ cases) on CD ROM and the 2007 high quality course syllabus with more than 200 pages of up-to-date information.

Workshops subjects include: CT diagnosis of management of focal lung disease (Peter Armstrong,UK), plain flim and CT evaluation of the adult mediastinum and hilum (Sanjeev Bhalla, US), applications of MR imaging in cardiac disease (Didier Revel, FR), cardiac and pericardiac imaging for the chest radiologist (Albert De Roos, NL), plain film and HRCT diagnosis of interstitial lung disease (Tomas Franquet, ES), imaging of pulmonary infections (Philip C. Goodman, US), acute and chronic airways diseases (Philippe Grenier, FR), CT and CT-nuclear imaging of the heart (Philip A. Kaufmann, CH), chest manifestations of systemic diseases (Ella Kazerooni, US), current concepts in the diagnosis and staging of lung cancer (Jeremy Erasmus, US), a systematic approach to chest x-ray analysis (Katerina Malagari, GR), imaging of chest trauma (Robert Novelline, US). Highlight lectures are presented by Dimitris Karnabatidis (GR), Dimitrios Siablis (GR), Maria Pomoni-Grammenou (GR) and Walter Weder (CH).

Contact information

MCI, Zurich office, Flughofstrasse 54
8152 Zurich-Glattbrugg, Switzerland
Phone: +41 (0)44 809 42 80; fax: +41 (0) 44 809 42 01
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1. What is your occupation? (check only one)
   - ❑ Diagnostic Radiologist
   - ❑ Other Physician (please specify)

1a. I am Chief of my Department
   - ❑ Yes
   - ❑ No

1b. What is your radiology sub-specialty? (check only one)
   - ❑ General Radiology
   - ❑ Neuroradiology
   - ❑ Nuclear Medicine
   - ❑ Vascular & Interventional
   - ❑ Nuclear Radiology
   - ❑ Cardiovascular Diseases
   - ❑ Paediatric Radiology
   - ❑ Other (please specify)

Non-physician professionals (respond below)

1c. What is your occupation? (check only one)

Administrator/Manager:
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Other
- ❑ Medical Physicist
- ❑ Academic
- ❑ Chief Technologist / Senior Radiographer
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- ❑ Business Consultant
- ❑ Distributor / Dealer

All respondents reply to the questions below

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   - ❑ Private clinic
   - ❑ Hospital (check number of beds)
   - ❑ More than 500 beds
   - ❑ 400-499 beds
   - ❑ 300-399 beds

3. With what technologies or disciplines do you work? (check all that apply)
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   - ❑ Nuclear Imaging
   - ❑ Interventional Radiology
   - ❑ CT
   - ❑ Ultrasound
   - ❑ MRI
   - ❑ Mammography
   - ❑ Bone Densitometry
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HOW TO...

LEAD A PLAN TO SUCCESSFUL COMPLETION

PART I: WHAT ARE THE STEPS INVOLVED?

Author
Dr. Elizabeth Robertson
National Clinical Lead Radiology
Scottish Diagnostic Collaborative
Consultant Radiologist
NHS Grampian
Scotland, UK
e.m.robertson@
arh.grampian.scot.nhs.uk

Clinical leadership means different things to different people. Purists differentiate administration from management and management from leadership. Leadership in this context pertains to forming a vision of the future, articulating it and aligning colleagues, staff or indeed troops behind it. Management is the conversion of the vision to a plan of action with timescales, monitoring arrangements, performance management and milestones. Administration in this sense means the execution of the plan, deadlines, budget, etc. within the performance management structure. Leaders therefore exist at a strategic level, managers and administrators at an operational level, with managers managing administrators. Is this beginning to sound complex?

Some use the terms administrator, manager and leader interchangeably, due simply to a lack of consideration of the detail of the functions involved. Yet others use the terms interchangeably with a degree of contempt for the function, seeing clinical colleagues in positions of leadership as having vaulted the fence and 'gone native' with the collective enemy! This then begs the other question. What does it mean to be good followers? I suspect most of us do not often consider these questions or what constitutes a good follower. Some do not even recognise that there might exist responsibilities in this regard.

We all have different personalities, perceptions and preferred styles of dealing with situations. These different approaches can sometimes result in misunderstandings, although each party is clear in their mind what they intend. The receiver of the information may interpret it in a way that was not intended. We are all heroes in our own minds with upright intentions. So why can this go so wrong sometimes?

Recognised Types of Leadership

The heroic leader
The military model is the clear analogy of a typical heroic leader. When the situation looks difficult, complex or impossible to unravel, the heroic leader arrives on a white charger and presents a solution that saves the day.

The charismatic leader
A 'film star' model. This leader is personally charming, attractive and persuasive and carries influence through others wishing to be associated with him and be with him.

The authoritative leader
By dint of appointment and position, significant authority is invested in this type of leader. He has the responsibility and accountability to deliver.

The command and control leader
Due to the ethos of the organisation, this leader can dictate the agenda and expect his will to be done.

You may already be beginning to smell a rat. Some of the descriptions lead by appointment and some by gaining respect and influence. In fact, there is a variety of starting points in relation to this on that basis. It is probably worth acknowledging that other than in military and quasi-military situations, the command and control model will not work. Where there is no imperative to follow or obey blindly, generally people will not do so unless they are persuaded of the merit of

doing so and only then if 'there is something in it for them'.

Leadership in Clinical Settings

In clinical situations, we do not have the command and control model but that of the clinical team leader who leads his or her colleagues through appointment. In theory this person is in control. In practical terms their demeanour, how he or she conducts business and that of the service are absolutely critical to carrying colleagues and getting not only cooperation, but an ability to team build and give a common sense of purpose and ability to deliver a commonly agreed agenda.

Hallmarks of a Successful Leader

So what are the hallmarks of the successful leader? Definition of a successful leader will be different in different groups' eyes. The chief executive will require delivery of agreed outcomes as a measure. By contrast, colleagues require delivery and progression of their priorities, which are patient-focused and altruistic. Direct reports require that their needs are addressed and interests protected. Is it possible to triangulate all these expectations?

If a service is to develop, then the fundamental requirement for a leader is to be transformational: to take a service from where it is now to a future model fit for projected purpose, but also to understand the steps necessary to get there. Inherent is the need to understand the co-dependencies and collateral implications and deal with them along the way.

Leading a Plan to Successful Completion

A good starting point in leading a plan to successful completion, is the articulation of the vision and a statement of its aims. It is important that these are relevant to those at the receiving end. This may require a complex communication strategy, depending on how many staff are involved from which disciplines and the level of impact on their working practice. Stressing the end point and its advantage for individual staff groups will help their understanding and ownership of the agenda and their willingness to engage with it.

This cannot happen in isolation, and in fact isolation may create the opinion amongst staff as to why things should not change. To offset this, acknowledgement of the good work of the past is important in order for staff to feel valued. It is important that the human factors of change are recognised and that understandable fear of change or negative individual impacts are acknowledged. This creates a sense of mutual trust and understanding of what individuals and staff groups are facing and the emotional response they may have to the proposal.

Where similar changes have been achieved elsewhere or where the direction of travel has been tested within the organisation, seductive examples of previous success from reputable, credible sources are powerful in engagement. If it is known that a respected clinical colleague or clinical department has gone through a similar change to their advantage this is persuasive.

Once the process has started, small wins are important. Evidence of these can be a basis for future development. It is important to draw attention to success and ensure those responsible feel credited and valued for their commitment to making these happen once a change programme starts.

Engendering a sense of sharing of learning and willingness to receive and give detail of experience good and bad which has changed the course of the project is useful. It creates a sense of reality, openness and added value together with mutual trust which is a helpful environment for proceeding in a change project. Shared good practice raises standards and can transform services incrementally. This obviates the need for everybody to go through the same steps or reinvent the proverbial wheel. Short cuts in progress can be made on the basis of standing on the shoulders of others experience.

It is inevitably true that we are influenced by those we respect. They in turn influence us through action, achievement, example and negotiation earning our respect. Building on positive relationships cements sharing of good practice in a safe environment where experience is respected. ❄

Part II of this article will be published in Issue 4 of IMAGING Management. To subscribe, please visit www.imagingmanagement.org

THE BELGIAN HEALTHCARE SYSTEM

Author
Kristof Eeckloo

Centre for Health Services and Nursing Research, Faculty of Medicine, Catholic University of Leuven, Belgium
kristof.eeckloo@med.kuleuven.be

Belgium is a federal state. There are three levels of government: federal, regional (three regions and three communities) and local (provinces and municipalities). The Belgian healthcare system is mainly organised on the federal and regional level. The federal government is responsible for regulating the compulsory health insurance, determining licensing criteria for healthcare facilities, financing the operations of healthcare facilities, regulating qualifications of healthcare professionals and registration and price control of pharmaceuticals. Regional governments are responsible for preventive care and health promotion, maternity and child health services, different aspects of elderly care, implementation of licensing criteria of healthcare facilities and financing of infrastructure (within basic rules enacted at federal level).

In 2005, total health expenditure as a percentage of gross domestic product (GDP) was 9.7%. Public sector funding as a percentage of total expenditure on healthcare fluctuates around 70%. (Source: WHO)

Key features of the Belgian healthcare system are: 1) Compulsory health insurance, managed jointly by the major stakeholders of the sector (insurers, healthcare providers and public authorities), 2) Liberal ideas of medicine (majority of providers are self-employed, with predominantly fee-for-service payment) and 3) Freedom of patients to choose both their healthcare provider and their hospital.

Healthcare Financing and Expenditure

Compulsory health insurance is financed through employer and employee income contributions as well as through taxation. It covers the whole population and has a broad benefits package. A public body endowed with legal personality, the National Institute for Sickness and Disability Insurance (RIZIV/INAMI), is charged with the implementation and control of the compulsory insurance scheme. All individuals entitled to health insurance must join or register with a sickness fund: either one of the six not-for-profit and privately managed funds or a regional service of the public Auxiliary Fund for Sickness and Disability Insurance. Since 1995, Belgian sickness funds are held financially accountable for a small proportion of any discrepancy between their actual spending and their so-called normative, i.e. risk-adjusted, healthcare expenditures.

Patients participate in healthcare financing via co-payments (fixed amounts) and co-insurance (percentage of the overall charge). For ambulatory care, patients pay the full costs of services to service providers and afterwards receive a refund from the sickness fund. For inpatient care and pharmaceuticals there is a third-party payer system, which means that the sickness fund directly pays the provider, leaving the patient only to pay the co-payment or co-insurance.

Healthcare Provision

In the mid-1990s a supply planning system was established for healthcare providers. A quota mechanism is applied immediately after basic training, at the moment of application for recognition as a dentist or physiotherapist and at the application for specialisation for a physician (GP or specialist). In order to achieve these

objectives, the communities, which are responsible for education policy, were requested to limit the number of medical and dental students. In 1997, the Flemish community introduced entrance examinations to limit the number of students entering medical schools. The French community has chosen to limit the number of medical students after their third year of medical education on the basis of the first three years' results.

Delivery of ambulatory care in Belgium is mainly private. The vast majority of physicians work as independent self-employed health professionals. Medical specialists can work in institutions (mostly hospitals) and/or on an ambulatory basis, in private practice. GPs mostly work in private practice. Because there is no referral system between these two different types of physicians, every citizen has free access to medical specialists and hospital care, even as the first point of contact with the health system.

Hospital care is provided either by private non-profit or by public hospitals. The hospital legislation and financing mechanisms are the same in both sectors. In 2005, there were 215 hospitals, of which 146 were general and 69 psychiatric. The basic feature of Belgian hospital financing is its dual remuneration structure according to the type of services provided: Services of accommodation (nursing units), emergency admission (accident and emergency services), and nursing activities in the surgical department are financed via a fixed prospective budget system based on diagnosis-related groups (DRGs); while medical and medico-technical services (consultations, laboratories, medical imaging and technical procedures) and paramedical activities (physiotherapy) are predominantly remunerated via a fee-for-service system.

Pharmaceuticals are exclusively distributed through community and hospital pharmacies. Only physicians, dentists and midwives can prescribe pharmaceuticals. About 2.500 pharmaceutical products are on a positive list and therefore partly or fully reimbursable. The reimbursable percentage of the cost varies depending on the therapeutic importance of the pharmaceutical.

Strengths, Weaknesses and Recent Reforms

The overall strength of the Belgian health system is that care is highly accessible and responsive to patients. The drawbacks of the Belgian system are in its cost and complexity. Although the system has not undergone any major structural reforms since the 1980s, various measures have been taken mainly to improve its performance. Reform policy included: hospital financing reform; strengthening of primary care; restriction of the supply of physicians; increase of accountability of healthcare providers and sickness funds; tariff cuts; and more emphasis on quality of care, equity, evidence-based medicine, healthcare technology, benchmarking with financial consequences and economic evaluations.

Prospects

Three recent policy initiatives are worth mentioning. Until recently, a difference was made between a general scheme of social health insurance and a scheme for self-employed persons. The latter were only insured for major risks, which mainly coincide with hospital care. As from January 2008, this distinction will be abolished progressively. No difference will any longer be made based on the professional situation of the insured.

A second reform concerns the introduction of a so called "maximum billing". In Belgium, 5% of the patients consume 61% of the total social health insurance expenditure. The same 5% are also charged 35% of the total amount of co-payments and co-insurance. In case of a long-term or serious illness financial burden can be high. Some years ago, the maximum billing-system was introduced as a solution to this problem. This reform aims to limit the healthcare cost of each family to a maximum amount per year that varies according to the income of the family the person belongs to. Nearly 10% of households are concerned with this reform.

A third reform area consists of pharmaceutical policy. To advance the use of generic pharmaceuticals, a reference pricing scheme was introduced for products with generic equivalents. Furthermore, a lump-sum reimbursement system for pharmaceuticals was introduced for in-hospital patients. And finally, the gross annual budget for pharmaceuticals is now established in consultation with the industry. If the budget is exceeded, a claw-back mechanism is applied and the pharmaceutical industry has to finance part of the overspending. ❊

WEB-BASED LEARNING CREATES TOP-LEVEL RADIOLOGY RESIDENTS

Experience of a Belgian Radiology Department

Author
Prof. Dr. K. Verstraete
Chairman
Department of Radiology
Ghent University Hospital
Ghent, Belgium
koenraad.verstraete@ugent.be

Ghent University Hospital (UZ Ghent) has 1,000 beds in the hospital in total, and 500 doctors. The radiology department is staffed by 22 full-time radiologists and a further 15 radiologists in training with another six training at peripheral hospitals. We offer every modern radiological exam, including thoraco-abdominal, multi-detector CT, ultrasound, three MRI machines, angio-, PET/CT, and general radiological exams. We process on average 160,000 patients per year, with a total of 200,000 exams per annum.

I am a general radiologist with a subspecialty in musculoskeletal radiology and teaching, with e-learning as a special focus. I did my PhD on dynamic contrast enhanced MRI in bone and soft tissue tumours over 15 years ago. I am still researching this topic as well as cartilage and meniscus transplantation, and whole-body MRI in bone marrow diseases. I am also active in national and international radiological societies, including the education committee of the European Society of Radiology and in professional defence at EU level for the UEMS, and the Belgian Society of Radiology. I am also on the board of the European Journal of Radiology.

PACS in our Department

We made a very rapid and seamless transition to PACS over four years ago. The advantages are that it provides a faster service, images are much more readily available, reports are visible very rapidly, there are no lost images and in terms of income for the department, the tarification system is much better with a 99.9% reimbursement level for exams. Prior to PACS, there was a 3 – 4 % rate of income loss due to poor registration of reports. The quality of reporting is also higher.

Though implementing PACS was difficult at first, it is now well absorbed into our daily working lives. Not only this, but the ability to compare scans to previous ones is now much improved to the pre-PACS era and with speech recognition we now require less administrative support. However, transcription is not always 100% accurate so it doesn't cut out the human element completely. This may waste a certain amount of time but it is still faster than before.

High Demand Exams

In conventional radiology, thorax exams are in the highest demand at our hospital, compounded by the demands placed by ICU and surgery. This is followed by conventional radiology of the bone and joints, imaging of tumours and MRI of the head, spine and musculo-skeletal system, where we have waiting lists. PET/CT for oncology is also in high demand.

We also provide specialised exams in fields of special research and are pioneering research e.g. in prostate spectroscopy, whole-body MRI and MRI of the cartilage. In our core lab we do multi-centre studies for other parties, mainly in tissue engineering. We provide these extra imaging services in Phase II, III and IV studies for companies such as large pharmaceuticals who want to trial new medicines by performing imaging of test case patients. We currently have 100 of these kinds of studies running.

MRI is the only area in which we have a waiting list and in two months we will install a fourth MRI machine and run the service from 7am to 10pm every weekday plus 8am to 4pm on Saturdays. Maximising operating hours helps.

Education & Training

We educate residents using the EU training charter for radiologists initiated by the ESR and UEMS. After the general medical training period of seven years, residents who choose radiology have a five-year training period including three years at the UMC department of radiology and one to two years at a peripheral centre to experience both pathologies.

Before the five-year period, residents have entrance exams on radiological anatomy and the radiology of diseases. The advantage of this exam is that residents enter at a higher level. Residents get local teaching and inter-hospital training from four different Belgian universities for two years at the end of their training. In the Flemish part of Belgium there is an exam during year two to determine competency. In the French part, this occurs at the end of year one.

An exit exam at the start of year five allows radiologists-in-training to use their remaining time to improve weak areas of learning. We also have objectives clearly stated for residents. We stimulate them to go to internal meetings. They must publish at least one article and give at least one oral presentation before they can qualify as a radiologist.

eLearning

In 2003, we began an e-learning programme at undergraduate level. We still perform basic concept training using traditional methods, but web-based learning is available to students anywhere to improve their interpretation skills and learn how to order appropriate exams. The students have had a positive response to the system - this site gets hundreds of thousands of hits every year. It speeds up learning and reinforces lessons already given. It took two years to get the system running as effectively as possible, and now students are more independent than ever.

We are also pioneering a web-based system that is used for exams. We have a large classroom in which there are 100 PCs installed and use it to perform 3,000 exams every year. We allow a maximum of two minutes per question and can easily examine large groups this way. Students are already used to the system due to using the web-based tools for learning, so it is less stressful on them. After the exam is concluded, it takes only five minutes to see exam results and assess if the students are good. In my opinion, it helps recruit the best students for radiology. ❊

RADIOLOGY RESIDENCY IN BELGIUM

The Resident's Perspective

In the Flemish-speaking region of Belgium, Flanders, there are four large universities where one can pursue studies in medicine: Antwerp, Brussels, Ghent and Leuven. I am a third-year resident studying radiology at the University Hospital of Leuven. For most students of medicine, radiology is an unknown discipline but with a half-day tour of the radiology department that takes place during the first master year of medicine, the faculty tries to give students a better idea of what radiology is about and why they should be interested. In this article I will share my experiences as a radiology resident.

Author
Dr. Annelies Rappaport
Radiology Resident
University Hospital of Leuven
Leuven, Belgium
annelies.rappaport@uz.kuleuven.ac.be

It is at the end of the third master year of medicine, which is a full year of apprenticeship in one major and a few minor disciplines in medicine, when students can take their first tentative steps towards choosing radiology as their eventual specialty. Based on your selection during this year and your interests, you can then choose during your fourth and last year in which discipline you would like to continue.

During this apprenticeship year, radiology was not included, but because of my interest in imaging, computers and anatomy I asked if it was possible for me to spend a few days in the radiology department. Though it was a brief period of only a couple of days, this experience cemented my interest in radiology.

Government Imposes Strict Criteria

However, this alone is not sufficient to become a resident in radiology. The Flemish government has limited the number of residents that can study radiology. With this in mind, our department has to select only those students that, in their eyes, best meet these qualifications. Their final decision is based on academic grades from the previous bachelor and master years, the apprenticeship that takes place in the radiology department, an exam in basic radiology concepts and an interview. In your fourth master year of medicine, you work for more than half a year in the radiology department in Leuven University Hospital. So, even before starting your residency you will have already obtained a good basis to start your residency.

If you are accepted as a resident, a five-year residency lies ahead of you. You have the option to spend one or two years of your residency in certain non-university hospitals throughout Belgium. Normally that takes place in the first years of your residency. I followed a two-year residency in the St. Elisabeth hospital in Brussels, where I learned basic radiology such as plain radiography and ultrasound, and also had the opportunity to learn CT

and the basics of MRI. This was a good experience and I learned to appreciate radiology even more than before.

The final years of your residency you spend in Leuven University Hospital, where you obtain a broader range of pathology than in the smaller hospitals. During your fifth and last year you can sub-specialise by extra months residency in certain subdisciplines. There is a work rotation system that takes place on a monthly basis (during the fifth year this becomes bimonthly) which means that we will have passed through every subdiscipline a couple of times at the end of the five years.

In the university hospital, the working day normally starts at 8.15am and ends at 6pm. Regularly, we are on call during the evenings, weekends and sometimes spend a whole week doing only night work.

At the moment I am in the second half of my third year of residency. This year we obtain mostly basic radiology training, but CT and MRI training is occasionally scheduled. After the second year and final year there are exams. The second year exam is inter-university (only for Flemish universities) and is scheduled after completion of two years of monthly inter-university courses, which are the subject of the exam. The exams in the fifth year are organised separately in each university.

Quality a Key Concern

The government has made regulations about radiology residency in order to ensure that every resident has obtained enough experience in every subdiscipline after the residency period. In my experience, the Belgian residency in radiology is of a good quality and I am looking forward to the career that lies ahead of me. ❇

⏭ *continued from p. 20*

time. But differently, Unique Selling Proposals should be associated with 'high barriers of entry' for any potential competitor.

For a University Medical Centre (UMC) the following USPs seem to bear relevance:

All products requiring an interdisciplinary approach:
Since UMCs will generally be home to more sub-specialists than any other hospital, diseases requiring a multidisciplinary approach will be treated in a more efficient manner.

Complex diseases requiring intensive care:
Since UMCs are generally equipped with vast intensive care resources, they should be used for the treatment for the most complex disease entities requiring such services.

Ability to adapt to new therapies:
Since UMCs encompass research as well as medical care, it should be far easier to implement new medical advances in health care products.

Once defined, the USPs should be checked against those products, which have been determined to be both of high quality and high profitability. At the end, only those products combining defensible USPs with high medical quality and profitability should be further developed and entered into a future product portfolio.

Take home points:
- USPs can relate to various aspects defining the character, infrastructure or medical abilities of a hospital.
- Defensible USPs are those associated with high barriers of entry for any direct competitor.

Sales Strategies

Once a product portfolio has been defined, the hospital infrastructure has to be developed in a manner that strengthens the ability to deliver these products at maximal quality in minimal cost. These efforts should be made transparent to the customer by publishing them on the web. Furthermore, these efforts must provide the basis for any direct sales strategy which, in analogy to all other industries, can only be based on quality and pricing. In this regard it will be most important to provide transparency regarding the definition of quality. Clearly, these aspects will need to be regulated in a homogeneous, hopefully European manner.

Take home points:
- Any sales strategy must be based on transparency regarding the quality and pricing of the medical products offered.
- Attention must be paid to existing laws and regulations governing the healthcare sector.

Summary

Healthcare is rapidly evolving from a totally non-transparent and heavily process-regulated system to a competitive market. To survive in such a market, hospitals will require the conscious development of marketing and sales strategies. These should be based on a product portfolio defined by quality, profitability and USPs. The bases of marketing and sales strategies must, however, lie in providing transparency to the customer, i. e. the patient, regarding outcome quality and pricing of healthcare products. ❇

Hologic Receives Order for 17 Selenia Mobile Systems

Hologic has announced that thay have received an order for 17 Selenia digital mammography mobile systems, the first order placed under The Netherlands Breast Cancer Screening Tender. Installation will begin during the course of this summer. More than 50 additional digital mammography systems will be installed under the tender over a four year period. Hologic and their dealer in the Netherlands, Tromp Medical, already have 60 Selenia digital mammography systems sold in The Netherlands – over 75% of the installed base.

Agfa Selected by Canadian e-Health Programme

Agfa HealthCare has announced it has been selected as the vendor of choice by New Brunswick, one of Canada's provinces, to deliver a Diagnostic Imaging Repository (DI-r). The agreement is a part of the e-Health strategy - One Patient One Record - which will provide the infrastructure and functionality required to capture, store, view and link relevant patient information for its 740,000 residents.

New Brunswick has partnered with Canada Health Infoway, which is contributing $18.2 million to the overall initiative, with the remaining $17.7 million coming from the province. The province expects to implement its One Patient One Record system during the next three years.

Agfa HealthCare will create a Diagnostic Imaging Repository based on its IMPAX® Data Center concept, for consolidating images and radiology reports into a central system. The information can be retained for a patient's lifetime, and is available in a standardised format, for the use of authorised clinicians. Doctors, nurses and technologists will have secure log-in access to relevant prior patient images, regardless of where they were acquired. Not only will the repository help clinicians make informed decisions about the optimal care given to patients, healthcare facilities can also expect to significantly reduce costs, by for example, avoiding the duplication of imaging exams due to lost paper files.

UK Hospital Chooses New Siemens System

Chelsea and Westminster Hospital NHS Foundation Trust has ordered the newly launched SOMATOM Definition AS and AS+ CT systems from Siemens via the NHS Supply Chain Framework.

The SOMATOM Definition AS and AS were launched at RSNA in late 2007 and into the UK in February. The NHS Supply Chain infrastructure is helping to speed up the process of medical equipment procurement by opening up dialogue between suppliers and Trusts and delivering greater value for money.

The SOMATOM Definition AS and AS+ are CT scanners that adapt to virtually any patient and clinical need. The systems are suitable for routine diagnostic work and complex examinations including oncology, neurology and cardiology.

The Definition AS combines an Adaptive Dose Shield, which blocks unnecessary radiation thus ensuring the patient is only exposed to clinically relevant dose; a scan length of up to 200cm and a 78cm gantry opening all resulting in fast and problem-free head-to-foot scanning. The Definition AS+ takes functionality further, combining extremely fast coverage with up to 128 slices per rotation whilst maintaining delivery of crystal-clear images, free from movement artefacts and showing the finest anatomical details.

Philips and MediGuide Enter Into Cooperation for Trial

Philips and MediGuide have started planned clinical trials in the US Columbia New York Presbyterian Hospital using the Philips Integris Allura Flat Detector catheterisation lab integrated with MediGuide's Medical Positioning System (gMPS) technology and using the MediGuide gMPS-enabled guided measurement catheter (GMC).

The gMPS is intended for intravascular evaluation of coronary anatomy and for use as an adjunct to coronary angiography. It is intended to enable real-time tip positioning and navigation of a gMPS-enabled (equipped with a gMPS sensor) diagnostic or therapeutic invasive device used in coronary or cardiac intervention in the cath lab environment, on either live fluoroscopy or recorded background.

The gMPS-enabled GMC intravascular device is intended to be used in conjunction with conventional x-ray angiography systems to enable real-time tip positioning and navigation, quantitative length measurement, 3D lumen reconstruction, qualitative 3D foreshortening indication and landmarking, in patients who are candidates for coronary angiography and/or percutaneous coronary intervention.

Draxis Shares to be Acquired for 255 Million Dollars

Organosys and Draxis Health have entered into an agreement whereby a wholly owned subsidiary of Jubilant will acquire all the outstanding common shares of Draxis for approximately $255 million.

Draxis' board said it expects the transaction to provide operational and technical resources to accelerate the growth of Draxis' business and its customer base. The transaction will be carried out by way of a statutory plan of arrangement pursuant to the Canada Business Corporations Act and must be approved by the Québec Superior Court and the affirmative vote of Draxis' shareholders at a special meeting of shareholders, according to the companies.

AGENDA

Key Seminars & Conferences

August 2008

2 – 3 **Applications & Interpretation of Breast MRI**
Heraklion, Greece
www.sbi-online.org

3 – 15 **Head & Neck Oncology in the Baltic**
Harwich, UK
www.ryalsmeet.com

4 – 7 **Latest Advances in Interventional Techniques**
Kauai, US
http://radiologycme.stanford.edu/2008lava/

24 – 28 **18th World Congress on Ultrasound in Obstetrics and Gynaecology**
Chicago, IL, US
www.isuog.org

25 – 29 **Röntgenveckan 2008**
Uppsala, Sweden
www.rontgenveckan.se

September 2008

4 – 6 **School of MRI – Advanced Breast & Pelvis MR Imaging**
Brussels, Belgium
www.school-of-mri.org

5 – 9 **MRI Update in Neurological & Orthopaedic Imaging**
Oostende, Belgium
www.oostende-mri-congress.be

8 – 10 **International Workshop in Practical Implementation of Clinical Audit for Medical Exposure**
Tampere, Finland
www.clinicalaudit.net

10 – 14 **American Society of Head & Neck Radiology – 42nd Annual Meeting**
Toronto, Canada
www.ryalsmeet.com

11 – 13 **9th ESGAR Hands-on Workshop on CT-Colonography**
Berlin, Germany
www.esgar.org

11 – 14 **ESUR 2008**
Munich, Germany
www.esur.org

13 – 17 **CIRSE Annual Congress**
Copenhagen, Denmark
www.cirse.org

15 – 19 **Erasmus Course on MRI of the Musculoskeletal System**
Valencia, Spain
www.adeit.uv.es/emrivalencia2008/

17 – 21 **11th ESH Congress: Hypnosis & Hypnotherapy: Trauma & Pain**
Vienna, Austria
www.hypno-mega.at

18 – 21 **European Society of Neuroradiology Congress**
Krakow, Poland
www.esnr.org

20 – 27 **Musculoskeletal MRI**
Boston, MA, US
www.ryalsmeet.com

October 2008

2 – 4 **ESMRMB 2008 Annual Scientific Meeting**
Valencia, Spain
www.esmrmb.org

9 – 11 **3rd ESGAR Liver Imaging Workshop**
Munich, Germany
www.esgar.org

10 – 11 **ESIR Non-Vascular Upper GI Interventions**
Novi Sad, Serbia & Montenegro
www.esir.org

16 – 18 **59th Annual Scientific Meeting of the Royal Australian & New Zealand College of Radiologists**
Adelaide, Australia
www.ranzcr.edu.au

24 – 28 **12th Asian Oceanian Congress of Radiology**
Seoul, Korea
www.aocr2008.org

29 – 1 **International Skeletal Society 35th Annual Refresher Course**
New Delhi, India
www.internationalskeletalsociety.com

29 – 31 **Management in Radiology Annual Scientific Meeting**
Athens, Greece
www.mironline.org

31 – 1 **ESIR Carotid & Renal Stenting Course**
Prague, Czech Republic
www.esir.org

November 2008

2 – 4 **ESMRMB 2008 Annual Scientific Meeting**
Valencia, Spain
www.esmrmb.org

6 – 8 **School of MRI Advanced MR Imaging in Paediatric Radiology**
Brussels, Belgium
www.school-of-mri.org

7 – 8 **ESIR Vascular Interventions, Basic Course**
Moscow, Russian Federation
www.cirse.org

9 – 11 **3rd ESGAR Liver Imaging Workshop**
Munich, Germany
www.esgar.org

13 – 15 **School of MRI Advanced MR Imaging of the Vascular System**
Valencia, Spain
www.school-of-mri.org

31 – 5 **RSNA 2008 Annual Scientific Congress**
Chicago, IL, US
www.rsna.org

Coming in issue four:

- *Cover Story: Cost Management in the Imaging Department*
- *Plus, a Special Focus on PACS*
- *Are DICOM Toolkits Money Savers?*
- *Radiology Quality Assessment - Is Your Department up to Scratch?*

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