IMAGING Management

THE OFFICIAL VOICE OF THE EUROPEAN IMAGING INITIATIVE

VOLUME 7 ISSUE 1
FEBRUARY 2007

ISSN = 1377-7629

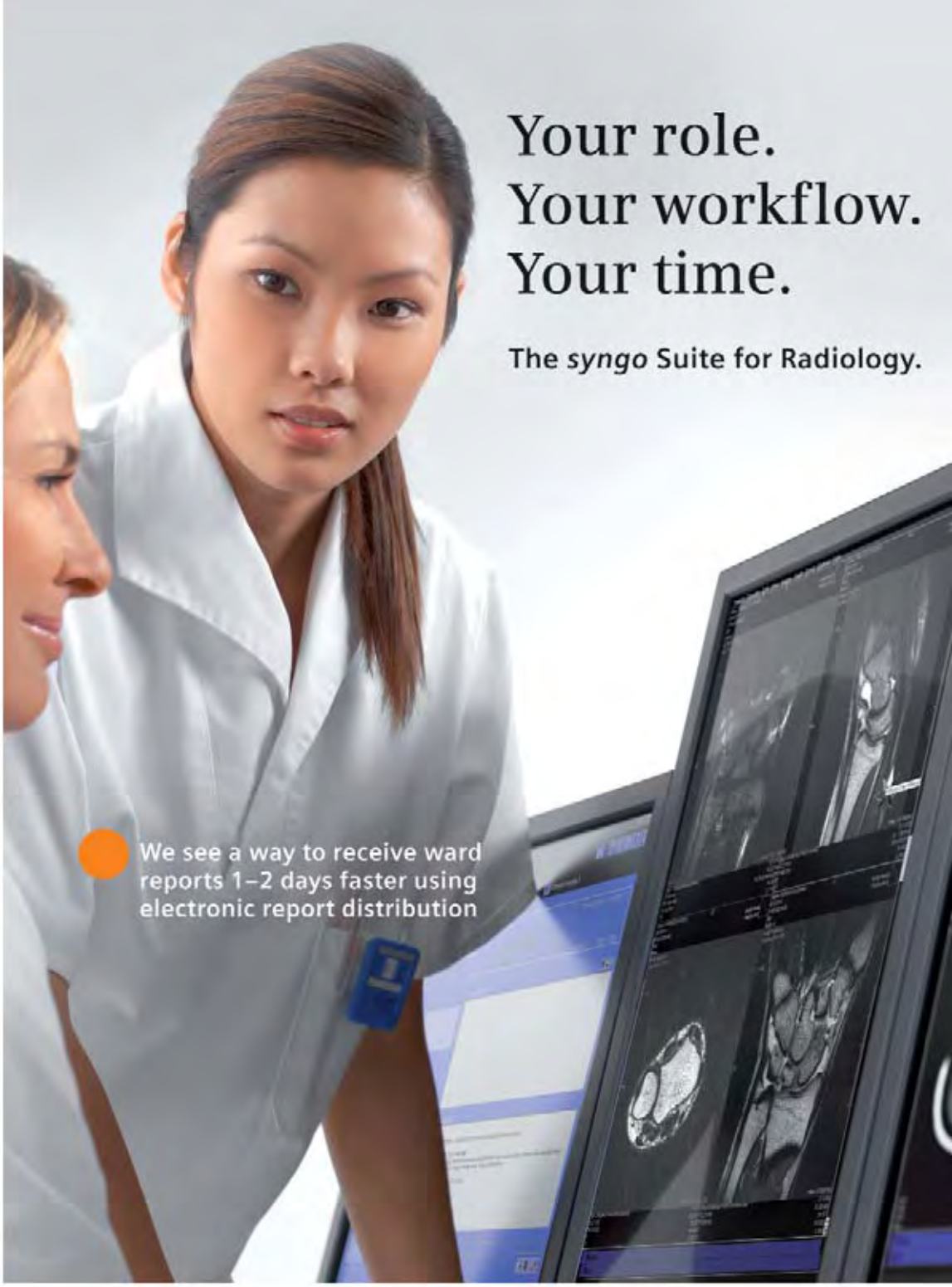
RADIOLOGY ▪ CARDIOLOGY ▪ INTERVENTION ▪ SURGERY ▪ IT MANAGEMENT ▪ EUROPE ▪ ECONOMY ▪ TRENDS ▪ TECHNOLOGY

MIR 2006 CONFERENCE REPORTER

Pros & Cons of Breast CAD | Treating Contrast Media Extravasation | Emergence of PACS in Italy

www.imagingmanagement.org

9 771377 762013 02



Proven Outcomes in Radiology.

Are you a radiologist? A technician? A referring physician? The *syngo*® Suite is designed with you in mind. Thanks to its role-based approach, you see what you need to know – in a clear and simple structure. With integrated RIS/PACS/Processing, *syngo* Suite allows you to work efficiently through Dynamic Loading, which allows fast image access. Or Smart Select, which considerably reduces head and eye movements. Portals keep everyone linked to the integrated workflow – both inside and outside radiology. That really saves you time. So how does that work for you? ***syngo*. It's all about you.**

www.siemens.com/*syngo*-suite

SIEMENS
medical

HS-Z991-2-7600

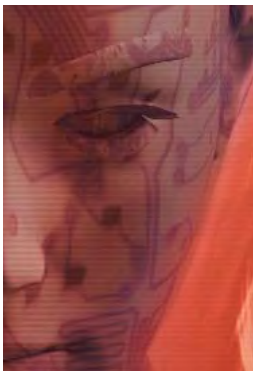
Results may vary. Data on file.

IMAGING
Management

The European Imaging Initiative (EII) is an informal network of related associations, professionals and leading European stakeholders concerned with good management practices in the imaging industry.

Content

COVER STORY: MANAGEMENT IN RADIOLOGY (MIR) 2006 TOP PRESENTATIONS



FEATURES This issue's features include:

COUNTRY FOCUS: RADIOLOGY IN ITALY

RICHARD WOLF

spirit of excellence

core

complete operating room endoscopy

Core – In this integrated OR concept, the individual system tools complement each other perfectly to produce the ideal result. The main task of Core is the networking of the individual devices in the OR and a special control system with interactive monitoring.

Just as a team of rowers all pull together in unison to reach their goal, the optimum interaction of the individual Core system tools allows all team members to work together economically in the OR.

Core – modular, universal, unique.

The perfect system

everything works together

RICHARD WOLF GmbH · 75434 Knittlingen · PF 1164 · Telephone +49 70 43 35-0 · Telefax +49 70 43 35-300 · GERMANY · info@richard-wolf.com · www.richard-wolf.com

AUSTRIA · BELGIUM / NETHERLANDS · FRANCE · GERMANY · INDIA · U.A.E. · UK · USA

Editorial

PROF. IAIN MCCALL
EDITOR-IN-CHIEF
EIC@IMAGINGMANAGEMENT.ORG

MIR Congress 2006:
Key Insights into Good Management Practices

Leading us into 2007, IMAGING Management's first issue of the year aims to confirm once more, the absolute necessity of good management practices in the field of healthcare delivery; never more so than in the changing field of radiology.

Why do radiologists need to develop their management skills? Some of the issues addressed by IMAGING Management during 2006 served to explain why, from the lack of consensus across Europe on the education of radiologists, to the speed at which the technology our daily work is based upon, is being revolutionised. Above all, what this journal continually underlines, is that the key to good management arises with strong, focused leadership.

One of the highlights of 2006, the Annual Management in Radiology (MIR) congress, (Budapest, Hungary, October 5 – 7, 2006), is the focus of our cover story in this issue. At the congress, one of the most provocative themes under debate was that of the future of the radiologist – expert speakers drew attention to the debilitating trend for the erosion of the profession by handing over our roles and responsibilities to other medical professionals, and by the need for a change in the educational structure for radiologists across Europe.

Our cover story therefore includes the top speeches from the congress in greater detail than allowed by the short presentations that took place. Following an introduction by Chair Prof. Georg Bongartz, these include Dr Nicola Strickland and Dr Philip Gishen, who argue either side of the coin, when considering the future of the radiologist as outlined above. Should we preserve the domain of the general radiologist or devolve the profession into teams of highly specialised, highly skilled individuals? We also include an informative article by Prof. Gabriel Krestin on good management practices in research programmes, as well as one by Prof. Jarl Jakobsen, who further explains his idea of the 'metaradiologist' and how this can aid other department managers in having a clear overview of their role.

Participants at the congress were motivated and encouraged by the clear increase in attention devoted to the subject of management: with increased attendee levels and an ever-higher standard of presentation, there was no doubt that the congress is growing in impact.

Finally, I hope that throughout 2007, you, the readers, continue to support our mission. We welcome your opinions, thoughts and feedback on articles covered in this journal, and look forward to providing you with a platform where you can exchange information and share your experiences and knowledge with other leading professionals across Europe. Send your responses to: editorial@imagingmanagement.org.

PROF. IAIN MCCALL

HAVE YOUR SAY!

Letters to the Editor at editorial@imagingmanagement.org

Workshop on the Art of Leadership, Gstaad, Switzerland, Jan. 4 - 6, 2007

Managers and leaders in the field of healthcare are under enormous pressure to deliver more, with fewer resources and in faster time. This pressure quickly translates into inefficiency, reduced effectiveness and personal stress, all of which are then transmitted to those people we manage and lead.

Organised by Management in Radiology (MIR), the 2007 winter course is based on the theme of "The Art of Leadership: Managing Priorities and Stress in Yourself and in Those you Lead". The course will enhance an understanding of the significance of effective leadership in terms of time and stress management. Participants will explore different approaches to the topic, focusing on leading a radiological department.

Participants will learn how to deal with time and stress issues by assessing their current situation, simulations, discussions with colleagues and group work. Trainers Tony Poots and Gerhard Pohl will present practical tools and lead you through a combination of theory and practice, reflection and feedback. The topics are:

- Prioritisation
- Managing time
- Coping with stress
- Saying no
- 'Work/life' balance
- Helping others to deal with the challenge
- Finding time for regeneration and renewal.

WWW.EWGMR.ORG

Dates Announced for 2007 Congress

EuroPACS have announced the dates of their 2007 meeting in Berlin. These annual international meetings are aimed at providing updated information on state-of-the-art PACS and related research activities. The programme usually features invited as well as submitted papers on new developments in the field, including clinical and technical topics. Taking place between June 27 – 30, 2007, this will be the 25th edition of the congress, which will take place in concert with the annual CARS meeting. Topics will include:

- PACS - Planning and Purchasing Strategies
- PACS - Evaluation and Economical Aspects
- PACS - Beyond Radiology
- Image Distribution, Storage and Archiving Strategies
- Workflow and Data Flow in Radiology
- PACS/RIS/HIS - Integration Issues
- Regional PACS and Teleradiology
- Security and Privacy, Quality Assurance, Legal Aspects
- Standardisation
- PACS and e-Learning in Radiology and Medical Sciences.

WWW.EUROPACS.ORG

Registration Closed for Upcoming Connect-a-thon

More than 100 systems and 70 companies have registered to participate in the next IHE European Connect-a-thon scheduled to take place during the eHealth Week in Berlin (April 15 - 20 2007). Participants of the Connect-a-thon now have three months to get their systems ready for the connectivity marathon. The first step in this preparation will take place in Berlin on February 7th and 8th with a two-day workshop. The Connect-a-thon serves as an industry-wide testing event where participants can test their implementations against those of other vendors. The output of the testing is a "scorecard" that lists the integration profile and actor combinations that each participant has successfully tested. The goal of the scorecard is to illustrate to industry and the user community that there is wide support for the profiles.

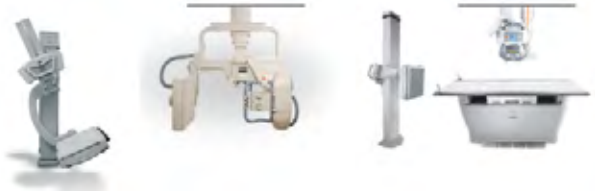
About IHE

IHE is an initiative by healthcare professionals and industry to improve the way computer systems in healthcare share information. IHE promotes the coordinated use of established standards such as DICOM and HL7 to address specific clinical needs in support of optimal patient care. Systems developed in accordance with IHE communicate with one another better, are easier to implement, and enable care providers to use information more effectively. Further information on IHE Europe can be found on the website mentioned below.

HTTP://WWW.IHE-EUROPE.ORG/CON_RESULT

YOU DON'T DO THINGS EXACTLY LIKE EVERYONE ELSE.

THAT'S WHY WE OFFER A CHOICE OF DR SOLUTIONS.



Kodak—making it easier to go digital.

Your digital radiography needs are unique. So we provide a range of DR solutions with one that's just right for your workflow, space, examinations, and budget. Our portfolio choices include:

Wall-stand system • Dual-detector system • U-arm system
Floor mounting • Ceiling suspension • CR/DR integration
Motorized and autopositioning • And more.

Each offers unique benefits. All provide the outstanding image quality, intuitive workflow, single control console, and world-class support you have come to expect from Kodak. Now there's a DR solution just right for you. **www.kodak.com/go/drflex**

ECR 2007, EXPO B

Kodak

ECRI Europe
A NONPROFIT AGENCY

Integrating Patient Care Devices with Information Technology

The escalating number of medical devices designed with software-based features presents new challenges for hospitals and healthcare systems. To ensure patient safety and optimal performance, clinicians and hospital staff must prepare for this integration of information technology into a wide range of diagnostic and therapeutic devices. During a recent audio conference, ECRI provided guidance on navigating some of the stumbling blocks associated with convergence.

Presenters discussed protecting patient privacy, ensuring that clinicians understand how to use complex devices and making informed purchasing decisions. Attendees gained an understanding of key convergence-related policies to develop (e.g., patient data security), practical considerations for purchase decision-making and critical patient safety concerns. Audio conference participants also learned about key infrastructure issues and staffing needs that must be addressed in order to effectively prepare for the use of IT-based medical technologies.

As part of the conference, entitled "Navigating New Territories: The Convergence of Medical Devices and Information Technology", expert speakers discussed:

- Core competencies required to manage IT/medical device convergence
- Technologies to adopt now, versus those to wait on
- New business issues to consider
- Lessons learned from IT-based medical device implementations (e.g., cardiology PACS).

WWW.ECRI.ORG.UK

Deadline for Submission Approaches

Submissions for presenters at the forthcoming CARS 2007 21st International Congress and Exhibition will be accepted until Jan. 10, 2007. Chaired by Prof. Stanley Baum and co-Chaired by Prof. Bernd Hamm, this year's 21st edition takes places in Berlin, Germany. Likely programme topics will include:

- Computer Assisted Cardiovascular Imaging
- Image Processing and Display
- Medical Workstations
- Image Guided Radiation Therapy
- Security, Legal and Ethical Aspects
- Clinical Applications and Evaluation
- Integrating the Healthcare Enterprise (IHE)
- Telemedicine
- Expert Systems and Computer Assisted Education
- Economic and Management Issues
- IMAC in Surgery, Pathology, Ophthalmology, Internal Medicine, etc.
- Inter- and Intrahospital IMAC
- IMAC Health Care Infrastructures for In-home Care
- E-health and Multimedia EPR.

WWW.CARS-INT.ORG

CIRSE

Submission Deadline for CIRSE 2007 Abstracts Announced

All abstracts for papers or posters to be presented at CIRSE 2007 must be submitted by February 12, 2007 at the very latest in order to be considered by the Scientific Programme Committee.

Submitters may indicate their preference regarding the presentation type. There is a two-step submission process. Step one is to submit scientific abstracts via internet on the CIRSE website (www.cirse.org). Acceptance of scientific contributions will be confirmed until the end of May 2007. Step two is if the abstract is accepted, submit a complete electronic poster via EPOSTM. Awards for the best posters will be given.

Submission of Abstracts

Abstracts must be written in accordance with the "Instructions for the Preparation of Abstracts" to be found on the CIRSE website. Abstracts must be between 50 and 200 words in length. For experimental clinical studies and animal studies, a copy of the approval received by the Local Ethical Committee must be sent to the CIRSE Central Office.

WWW.CIRSE.ORG

Athens, Greece
September 8-12

CIRSE 2007

INNOVATION INTERVENTION

Cirse 2007, Europe's most comprehensive forum for minimally invasive image-guided therapy, will offer more than 100 hours of educational presentations, hands-on workshops, case review sessions, foundation courses on peripheral vascular disease and transcatheter embolisation, learning centres, industry symposia, an all electronic poster exhibition and 3,000 m^2 of industry exhibition.

www.cirse.org

MAIN TOPICS

- **Vascular Interventions**
- **Non-Vascular Interventions**
- **Transcatheter Embolisation**
- **Interventional Oncology**
- **Clinical Practice**

Cardiovascular and Interventional Radiological Society of Europe

CIRSE

EUROPEAN ECONOMIC AND SOCIAL COMMITTEE (EESC)

Ilze Raath
Editor European Affairs
i@emcconsulting.eu

Increasing Involvement in the EU

The European Economic and Social Committee (EESC) was established by the Treaty of Rome in 1957 to unite different economic interest groups to establish the Common Market. It is a consultative/advisory body consisting of various European social and economic partners. Its 317 members are drawn from consumer groups, representatives of business, employers and trade unions. Each member state is represented in proportion to its population. Members, who are completely independent of their government, serve a four-year term. Members belong to one of three groups: Employers, Employees, and Various Interests. Germany, France, Italy and the United Kingdom have 24 members each, Spain and Poland have 21, Belgium, Greece, the Netherlands, Portugal, Austria, Sweden, Czech Republic and Hungary 12, Denmark, Ireland, Finland, Lithuania and Slovakia 9, Estonia, Latvia and Slovenia 7, Luxembourg and Cyprus 6, and Malta 5.

The EESC's main task is to advise the European Parliament, Commission and Council of the European Union. As the Treaty of Maastricht enlarged its domain considerably, its influence now extends to matters such as social policy, social and economic cohesion, environment, education, health, customers' protection, industry, trans-European Networks, indirect taxation and structural funds. During the EU's legislative process, the Commission has to ask the EESC's opinion on proposals for new legislation in many areas. Their opinions have no binding weight, although it examines about two-thirds of the proposals passing through legislature.

The Committee has two complementary tasks:

- Increasing involvement of civil society organisations in the European venture, at national and European level; and,
- Enhancing the role of civil society organisations in non-member countries or country groupings where the Committee is furthering structured dialogue with civil society organisations.

How does the EESC function?

Presidency and Bureau

Every two years the EESC elects a bureau made up of 37 members, and a president and two vice-presidents chosen from each of the three groups in rotation. The president is responsible for the orderly conduct of the Committee's business. He is assisted by the vice-presidents, who deputise for him in the event of his absence.

The bureau's main task is to organise and coordinate the work of the EESC's various bodies and lay down policy guidelines for this work.

Sections

The Committee has six specialist sections, which deal with the main areas covered by the Treaties. These include:

- Economic and Monetary Union and Economic and Social Cohesion (ECO)
- The Single Market, Production and Consumption (INT)
- Transport, energy, infrastructure and the information society (TEN)
- Employment, Social affairs and citizenship (SOC)
- Agriculture, rural development and the environment (NAT)
- External relations (REX)

Study Groups

Section opinions are drafted by study groups. These usually have 12 members, including a rapporteur. Study group members may be assisted by experts (normally four). Rapporteurs - assisted by a study group - prepare committee opinions. Members of the study group are selected from three different groups based on their expertise in a specific subject. Rapporteurs can also call on external experts for assistance. In the case of particularly important issues, the Committee may hold public hearings to hear the views of various parties concerned. After in-depth discussions in the study groups and then in the sections, opinions are adopted by a simple majority at plenary sessions (nine sessions per year). Once adopted, the opinions are forwarded to the Commission, the Council and the European Parliament and published in the Official Journal of the European Union.

The EESC can issue three types of opinions:

- Opinions in response to a referral from the Commission, the Council or the European Parliament;
- Own-initiative opinions, which enable it to express its views on any matter it thinks fit; or
- Exploratory opinions in which, at the request of the European Commission, the European Parliament or even Union presidencies, it is instructed to reflect and make suggestions on a given subject, which may later lead to a proposal from the Commission.

The Committee can also instruct one of its sections to draw up an information report to consider a question of general interest or of topical relevance. At the suggestion of one of the above-mentioned groups, the Committee can issue resolutions on any matter falling within its terms of reference.

Current Objectives

The Committee is working to set up a model of participatory democracy throughout Europe and the rest of the world as an adjunct to representative democracy. Its objectives are harmonious and balanced development and the promotion of a European social model comprising social provisions that focuses on human value. The EESC base their work programme on those of the Commission, the priorities of each presidency of the Council of the European Union and the work programme of each Committee president upon election.

Activities under the Finnish Presidency

Employment and working conditions

The Committee drew up some key opinions on the Guidelines for the employment policies of Member States and Employment and the Lisbon process. The Committee prepared a new opinion on the forthcoming Community Strategy on Health and Safety at Work. The Committee opinion on the proposed amended Working Time Directive was adopted in 2005, and is still relevant to on-going discussions in the Council. Opinions on Corporate Social Responsibility and Data protection in employment were also prepared during the Finnish Presidency.

Public Health

The Committee adopted an important and comprehensive own-initiative opinion on obesity in Europe and set up a task force to ensure follow-up at inter-institutional level during the Finnish Presidency. A new EESC own-initiative opinion on the rights of patients will be adopted during the Finnish Presidency. A major EESC opinion on a strategy on mental health for the European Union was recently adopted.

Future Perspectives

Over the last few years the EESC has stepped up its role in the European Union and has transcended the straightforward duties flowing from the Treaties. It acts as a forum for the single market and has hosted, with the support of other EU bodies, a series of events with the aim to bring the EU closer to the people.

The newly elected President of the EESC, Dimitris Dimitriadis, pledged his Committee's support in a speech to the Conference of the Greek Economic and Social Council: "... organised civil society – and especially the social partners – have an important role to play in the process, serving the so-called bridge between peoples and their national institutions on the one hand, and the other Member States, together with the European institutions and political bodies, on the other. The constant presence and support of the European Economic and Social Committee in this difficult task is and will remain forthcoming..."

Industry News

Siemens

Siemens Receive EC Approval for Bayer Acquisition

Siemens has received approval from the European Commission to acquire the diagnostics division of Bayer Healthcare without restrictions. The approval follows earlier approval by U.S. antitrust authorities at the beginning of October. This follows the acquisition of the U.S. firm Diagnostic Products Corporation (DPC), which was completed at the end of July 2006. The purchase price for Bayer Diagnostics is roughly EUR 4.2 billion. Upon completion of the Bayer acquisition, which is expected by early 2007, both companies will be merged and will operate as "Siemens Medical Solutions Diagnostics," an U.S.-based subsidiary and part of Siemens Medical Solutions.

Dr. Erich R. Reinhardt, President and CEO of Siemens Medical Solutions, stated that "This has paved the way for Siemens to create the world's first full-service diagnostics company." Siemens hopes the successful entry into the in-vitro diagnostics market will allow the company to combine the entire imaging diagnostics, laboratory diagnostics and clinical information technology value chain under one roof and offer its customised technologies to customers. It is expected that the acquisitions of Bayer Diagnostics and DPC (purchased for $1.86 billion) will make Siemens Medical Solutions second worldwide in the immunodiagnostics market.

Hologic

Hologic Announces Financial Results

Hologic, Inc., a provider of diagnostic and digital imaging systems directed towards women's health, announced its results for 2006.

Highlights of the quarter include:

- Record revenues of $154.1 million.
- Record 193 Selenia full field digital mammography systems installed and recognised as revenue.
- Record backlog of $194.7 million.

Fourth quarter fiscal 2006 revenues totaled $154,055,000, a 97% increase when compared to revenues of $78,217,000 in the fourth quarter of fiscal 2005. For the fourth quarter of fiscal 2006, Hologic reported a net loss of $1,473,000, or $0.03 per diluted share, compared with net income of $9,475,000, or $0.20 per diluted share, in the fourth quarter of fiscal 2005. Fourth quarter fiscal 2006 income from operations totaled $7,560,000 compared with $11,409,000 in the fourth quarter of fiscal 2005.

The reduction in the company's net income and income from operations in the current quarter were primarily attributable to the in-process research and development and other acquisition related charges incurred in the quarter, and the addition of stock based compensation charges resulting from the application of FASB Statement 123R which became effective at the beginning of the fiscal year.

Mercury

Mercury Announce Agreement with BRIT Systems

Mercury Computer Systems announced agreements with BRIT Systems for the integration and distribution of its medical image management system with Koning Corporation to provide a wide range of solutions to improve the entire medical imaging workflow. Under the agreement with BRIT Systems, a PACS/RIS company based in the US, BRIT will integrate the Mercury Visage PACS and Visage CS Thin Client Server in its Linux-based Roentgen RIS radiology information system. The partnership paves the way for providing integrated high-end PACS systems, enabling a significantly faster radiological workflow and higher image quality for 2D, 3D and 4D data.

Mercury also announced a multi-unit/multi-year agreement with Koning Corporation to provide an end-to-end solution for its next generation of CAT scanners. Koning selected Mercury's Visage VR Volume Rendering components, Visage WS Workstation, and Visage CS Client Server to visualise its image data locally and to transfer/network the data to various locations around the country.

Philips

Philips Introduce New MR Simulator and CT Applications

Philips has introduced new MR simulator and CT applications to help increase department efficiency and provide valuable information

Pioneers of Vision

Outstanding!
Up to 24-inch
detector diagonals

Sonialvision

High-performance RF universal system, remote-controlled

- world-wide first integrated large field flat-panel detector with direct conversion
- patented RSM-DSA technology (Real-time Smooth Mask DSA)
- outstanding image quality
- future-proof for new applications, for instance tomosynthesis

RADspeed

High-tech radiographic system

Heartspeed

Cardiology system

Opescope

Mobile surgical C-arm

MobileArt

Mobile X-ray system, motor-driven

With its visionary technology, Shimadzu has always offered physicians new possibilities for diagnosis, such as the development of the first commercial X-ray instrument in Japan soon after the discovery of X-rays. Countless patents and world premieres, setting the standard today, have contributed to Shimadzu's leading role in diagnostic imaging.

Shimadzu is also a pioneer in the groundbreaking direct-conversion FPD technology:

- direct conversion of X-rays to digital image data
- cassettes and X-ray films are unnecessary
- much higher image quality and expanded diagnostics
- radiation dose reduced by half
- fully digital and faster data handling
- full DICOM-compatibility.

Direct-conversion FPD is the technology of the 21st century. It is the present as well as the future. Shimadzu's X-ray and fluoroscopy systems are economical, meet the highest diagnostic requirements and are easy to operate.

Shimadzu Europa GmbH
Albert-Hahn-Straße 6-10
D-47269 Duisburg · Tel: 0203-7687-0

www.shimadzu.de

SHIMADZU
Solutions for Science
since 1875

during radiation oncology treatment planning. Recognising that console time is at a premium in busy imaging centres, Philips is announcing the availability of its Tumour LOC application on the workstation. The company is also unveiling Panorama 1.0T R/T, the first high-field open MR simulator. Until now, Tumour Localisation (Tumour LOC) has only been available to Philips Brilliance CT Big Bore customers on the console, but with software release 3.5, this application will be available for purchase on the Extended Brilliance Workspace (EBW). The added convenience will be particularly beneficial for Brilliance Big Bore customers with large respiratory correlated workloads. All of the 4D tools found on the console will now be available on the extended Brilliance Workspace, enhancing workflow efficiency and flexibility in the radiotherapy department.

Shimadzu

Shimadzu Introduce New Ultrasound Systems

Shimadzu, worldwide manufacturer of diagnostic imaging equipment, has introduced its latest generation of ultrasound systems. The fully digital platform of the SDU-1200 PRO and SDU-2200 PRO colour doppler series, features advanced operating modes and performance characteristics. Both instruments are suitable for hospital use as well as private medical practices for radiology, internal medicine, urology, paediatrics, angiology, gynaecology and obstetrics. The SDU-2200 PRO also serves as an all-round system that complies with the basic requirements of cardiologic diagnosis.

In comparison with the SDU-1200 PRO compact system, the universal SDU-2200 PRO system is also suitable for cardiological examinations. For this purpose, a digital beam former with 1024 processing channels is used, enabling optimum resolution and high image iteration frequencies in all imaging modes. Image acquisition in broadband technology up to 15 MHz as well as the phased-array technology is also part of the standard equipment for cardiology applications.

Sectra

Sectra Launches Next Generation Management Tool

Sectra is releasing a new, enhanced version of its advanced tool for optimising workflow and resource utilisation in radiology departments. Sectra's management tool, Sectra Control Tower, provides department managers full control and overview of current production statistics as well as historical data used for trend analysis. Sectra Control Tower now also features live reports, with capabilities of revealing and analysing bottlenecks in real time. The live reports provide the department manager with instant overview of such selected performance statistics as current queue lengths, patient waiting times and resource usage. Sectra Control Tower collects data from Sectra's radiological IT systems. The new version facilitates definition of individual queries creating special reports for certain occasions.

AO Medical

AO Medical Signs Agreement with Planilux

AO Medical Products AB, has signed an agreement with the manufacturing company Gerätebau Felix Schulte in Germany, known as Planilux. The cooperation is regarding sales and distribution of Carl's Table, AO Medical's ergodynamic PACS reading station, from Jan 1st, 2007. Planilux is a manufacturer of analogue film viewing equipment.

"Planilux is a natural partner for us since they also have the experience of working closely with the users and are knowledgeable of the radiologists' need of a good working environment. In total so far, more than 600 Carl's Tables have been sold worldwide and we are calculating on reaching a substantially higher amount of users with such a strong partner as Planilux", notifies Margareta Ohlson, MD AO Medical.

Onex Healthcare/Kodak Health Group

Onex Healthcare to Acquire Kodak Health Group

Onex and Kodak have announced that Onex Healthcare Holdings, Inc., a subsidiary of Onex Corporation, has entered into an agreement to acquire Kodak's Health Group. Onex will acquire Kodak's Health Group in a transaction initially valued at approximately $2.35 billion in cash. The deal is subject to customary regulatory approvals and closing is anticipated in the first half of this year.

Onex will acquire Kodak's medical imaging and healthcare information technology solutions that include digital x-ray systems, molecular imaging systems, x-ray film, dental imaging products, software and services.

Onex also will acquire Kodak's non-destructive testing business, which sells x-ray film and digital x-ray products into the non-destructive testing market. The objective of the sale is to allow the Health Group to focus on its transition to digital products. Aggregate revenues of the businesses being acquired were approximately $2.54 billion in the fiscal year ending Sept. 30, 2006.

The Health Group's approximately 8,100 employees will stay with the unit after the completion of the sale, according to Kodak. The transaction includes manufacturing operations and a building in Rochester, N.Y.

The most comprehensive DR systems now come standard with APS™.

For automatically faster results.

Swissray *ddR*Modulaire®

Swissray *ddR*Formula™

Swissray *ddR*Combi® Plus

Swissray *ddR*Combi® Trauma

The revolutionary ALLinONE™ stand performs special DR orthopedic applications such as scoliosis evaluations, long leg and weight bearing studies. Patient data such as weight and height are automatically collected and transmitted to the Swissray *ddR* Systems by wireless technology.

Swissray's unique APS™ – Automated Positioning System streamlines the radiography workflow to the maximum. With its remote control and memory function, the system can be moved quickly and precisely into the desired applications. The unique «AutoStitching» function will automatically combine up to four images. Orthopedic studies are performed with greater speed and precision than ever before.

Visit us at ECR 2007, Expo E #513 and find out why hundreds of healthcare facilities around the world use Swissray *ddR* systems to save time and money while improving patient care.

For more information call +41 41 914 12 12
or visit www.swissray.com

automatically
faster

featuring APS

Swissray

MANAGEMENT IN RADIOLOGY RESULTS OF THE 2006 CONGRESS

A Letter from the Chair

AUTHOR

Prof. Georg Bongartz

Chairman

Department of Radiology
University Hospital Basel
Basel, Switzerland

The increased number of participants and positive feedback from attendees of the recently-held 'Management in Radiology' (MIR) congress, underlined the growing interest in management topics in the field of radiology. The meeting, held in Budapest, Hungary, was coordinated locally by Prof. Andras Palko and Prof. Adam Mester, with major administrative support by Antonio Santoro who once again put enormous efforts into the organisation. It is the last MIR congress organised by him and I am extremely grateful for his long-lasting and effective support over the years. Prof. Paolo Pavone acted as Chair of the Programme Committee and successfully created a meeting that dealt with a stimulating and provocative range of issues. Attracting more than 150 attendees from 31 countries, including Asian countries, Australia, New Zealand, and the US, the congress comprised both general management and typical radiological topics, including information technology with its inherent challenges.

Exchanging Experiences

In the modern, medical world, which comes closer to a corporate, profit-making enterprise with every passing year, topics like budgeting, turf battles, benchmarking, reorganisation and change management are our daily business. Although most of this is still dealt with on a very individual basis, exchanging our own experiences can help to make these processes smoother and more effective for the future.

Management topics are not highlighted enough in the education of future radiologists, for example, good technical understanding of modern equipment used for various managerial imaging cases. Even very skilled radiologists do not automatically make very skilled managers, although most of us think we are! Especially in an imaging department, data management and data communication are inevitable topics and a thorough knowledge on the proper use of each is mandatory. A congress on management issues in radiology such as MIR 2006, addresses those shortfalls and acts as a platform to learn from others and to discuss common goals.

Winners of the Best Presentations

Highlights of the conference were discussions on the role of radiology in a changing political environment, related to specialisation and sub-specialisation and to co-operative models with other clinical departments. Nicola Strickland from Hammersmith Hospital, London, United Kingdom, presented her view of sub-specialisation in "The End of Radiology as an Independent Specialty: Managing Imaging of the Future" and her colleague Philip Gishen, contributed with "Why Radiology Should be Done by Radiologists: Manage our Profession". Consistently, strong and provocative arguments for the survival of radiologists were given. Both papers, along with three other, identically outstanding contributions, will be explored further in this issue of IMAGING Management.

'Management topics are not highlighted enough in education'

Jarl Jakobsen, from the University Hospital Oslo, took a philosophical approach to the role of a Chairman in a large academic department, which he innovatively entitled "metaradiology", exploring how one can be an effective leader.

Concepts of fostering radiological training and research cooperations were also presented and explored. "How to Manage Research in an Academic Department of Radiology" was addressed by Gabriel Krestin, Erasmus Medical Centre, Rotterdam and offered many interesting insights based on his own personal skills and experiences.

The presentations mentioned in this brief introduction, were selected as outstanding contributions and are reviewed within this issue of IMAGING Management.

Hoping this "appetiser" will attract your awareness of the next MIR Congress taking place in Oxford, UK, October 2007!

FUTURE IMAGERS: TIME TO CHAMPION THE INEVITABLE

Managing the Future of our Profession

AUTHOR

Dr Nicola H Strickland
Consultant Radiologist
Department of Imaging
Hammersmith Hospitals
NHS Trust
London, UK
nstrickland@hhnt.nhs.uk

The practice of medicine changes with the times, something that radiologists worldwide would rather ignore or, worse, pretend will have no effect on the practice of their profession. If we choose not to recognise these inevitable revolutions, we risk the extinction of the specialty of radiology. Twenty to thirty years ago, physicians and surgeons were generally trained doctors who would perhaps go on to specialist training in certain disciplines, but the majority would remain as physicians with an interest in, for example, cardiology, neurology, gastroenterology, etc. Today, specialty higher training is taken for granted, often followed by sub-specialisation. This article explores why we need to take the next step to maintain our role.

Our Evolving Profession

In radiology, the same evolution of specialisation applies, but has taken more time to develop. As technology advanced, modality-based specialist radiologists arose, with expertise in CT, ultrasound, intervention, nuclear medicine, etc. Gradually, more specialised radiologists developed, often a mixture of modality- and organ system-based. The next step saw body part/disease-process specialised radiologists become more common.

Radiologists are becoming increasingly sub-specialised in organ systems, for example the breast, gynaecology, chest (lungs), vascular, neurology, etc. This trend is not merely copying the practice in North America, Australasia and South Africa, it is now reflected in the organ-based modules of the UK FRCR (Fellowship of the Royal College of Radiologists) part 2 examination. This changing pattern of specialisation in radiology, culminating in relatively narrow sub-specialised radiologists, follows directly from the increasingly important role of the multi-disciplinary team meeting (MDTM) in clinical practice.

Multidisciplinary Team Meetings

One of the crucial motivators behind the growing focus on sub-specialised imagers is the central importance of MDTMs to radiology. The radiologist only has a role in an MDTM if (s)he can add value to the interpretation of the image over and above that provided by the other non-radiological members of the MDTM. It is only to be expected that the non-radiologist clinician who spends his/her life dealing exclusively with a particular organ system will become as proficient as, if not more proficient than, a general radiologist in interpreting images of that organ system.

To add value and maintain a role, the radiologist must be more competent at interpreting these images than his/her non-radiological colleagues and must equal their knowledge in understanding the significance of this interpretation in the clinical scenario pertaining to that patient. The pace of technological progress in imaging today and the vast amount of imaging expertise and clinical specialist knowledge associated with every organ system, means that it is impossible for the general

radiologist to remain "one step ahead" of non-radiological clinicians in more than one or two organ systems.

Why Do We Need Sub-specialisation?

To be at the cutting edge of imaging in a particular body part requires sub-specialisation in imaging of that organ system, with the radiologist having an up-to-date knowledge of the whole clinical pathway, including an understanding of:

1. Presenting symptoms and signs,
2. Interpretation of clinical investigations, in particular imaging examinations (including diagnosis and staging for cancer),
3. Treatment and management options,
4. Disease progression, and,
5. Treatment of complications.

Items (2), (4) and (5) are directly relevant to the imager, and item (3) requires an appreciation of whether biopsy, drainage, etc., is relevant. To maintain such knowledge, the imager needs to work closely with the relevant clinical team(s), read specialist journals and attend pertinent clinical meetings focussed on that organ system. Now that teleradiology and teleconferencing has become a practical reality, if no local imaging expertise exists for such subspecialisation, it can be obtained remotely via MDTM teleconferences.

Situation in the UK

In the UK, medical careers have already been "modernised", such that all newly qualified doctors undergo two foundation years of work on the wards, rotating usually every four months to a different job and specialty. At the end of this time they specialise in a discipline of their choice. I predict that in future this choice of specialty will be organ-based, for example, they will then choose to specialise in the cardiovascular system, the central nervous system, the gastrointestinal system, etc.

In terms of education, I advocate that they follow a "two plus three" year specialisation, spending initially two years on the wards and in clinics clerking in and examining patients admitted to their particular organ-based discipline, requesting investigations and interpreting them, undertaking ward care, prescribing and follow-up clinics. They would then spend three years sub-specialising within that organ-based discipline, choosing from the following types of sub-specialisation:

- Highly invasive: corresponds to today's conventional surgery
- Minimally invasive: corresponds to the interventional radiologist, the endoscopist or bronchoscopist, etc.
- Medical treatment: corresponds to the traditional physician who treats patients with drugs
- Imaging: corresponds to the non-interventional radiologist.

If we illustrate the above with cardiology, the categories would be as follows:

- Highly invasive: the cardiac surgeon performing open cardiac surgical procedures (a diminishing demand)
- Minimally invasive: the invasive cardiologist performing percutaneous cardiac intervention, including angioplasty and stent placement, valvotomy, etc.
- Medical treatment: drug treatment
- Imaging: echocardiography, PET and nuclear medicine, CT and MR imaging of the heart.

Disadvantages

So what is the downside? Small hospitals cannot

▸▸ *continued on p.41*

PROTECTING THE ROLE OF RADIOLOGISTS

The Situation in the UK

AUTHORS

Prof. Philip Gishen (above)
Director of Imaging

Dr Dominic Blunt
Director of Training

Hammersmith Hospitals
NHS Trust
London, United Kingdom

pgishen@hhnt.nhs.uk

The problems faced by the National Health System (NHS) in the United Kingdom, are well known. Recent studies predict an annual deficit of nearly £7bn in 2010, which has worsened financial pressure to cut spending. Among the negative effects, are postponed operations, cuts to training expenditure and frozen plans for the recruitment and retention of health workers in the NHS. Radiology has not been immune to these political shortfalls.

This article delves into the issues surrounding the politics that threaten the future of our profession. Rather than shifting piles of film to radiographers and ignoring the fragmentation of the profession, PACS and voice recognition technology offer a concrete way to consolidate departmental performance, circumvent the handover of our profession to radiographers and meet the needs of our customers.

In an Ideal World…

What do our customers, namely referring clinicians, and, by proxy, also the government of the day, require from us? Ideally, they would like every imaging investigation performed immediately and seamlessly, in a beautiful environment and with respect and dignity to the patient. They also want studies reported immediately.

They want them interpreted by someone they trust, who understands the clinical question and is aware of any previous medical history, with no delay, whilst being available for discussion if there are any queries. Patients would like this for free. Some doctors would even like the radiologists to pay money to them when they refer a patient. Imaging associations set stringent standards they require radiologists to work to, while the government doesn't care who reports cases, or to what standards, as long as their statistics look good.

Old Versus New: How we did it

Four years ago, one of my departments still used film, leading to many problems. We reported about 60% of our plain films and had a four-week delay in report turnaround. We had the usual complaints due to unreported films and often could not report scans, because the clinicians had removed films from the department. Comparison with old films proved tricky; our film store was on another floor, and though we tried to pre-fetch packets, the retrieval rate was under 50%. We were constantly answering the phone to give 'a quick verbal report' on a scan which had been reported but was not yet available on the radiology and hospital systems.

Four years later, we report all exams, including casualty films, inpatients and outpatients on the same day and the report is available on the hospital information system the same day. We do not run hot reporting because everything is hot reported. Our improved training scheme trains 32 registrars and we train them better than before.

We have done all this in the face of a relentless increase in the complexity of the work carried out by the department and a painful cost-improvement programme. How have we done this? Greater number of radiologists? Radiographer reporting? No. PACS and voice recognition dictation systems were installed to our specifications, to improve workflow and eliminate delay from the reporting and transcription end of the process.

This was accompanied by timetabling on an hourly basis, sharing work fairly, reorganisation of on-call services so that those on-call could do the procedures and were paid extra, whilst those not on-call chose 'lifestyle' instead, elongating the routine departmental working time and creating a comfortable reporting environment.

Dealing with the Shortage of Radiologists

Despite complaints that there is a shortage of radiologists, we are in fact training more and more radiologists. One hospital close to mine used to have an advertisement in the British medical journal almost every month for a radiologist, with no takers. It recently appointed someone, from a field of eight applicants. Not only this, but in the future, British radiologists will have even less of a toehold, since teleradiology will mean that radiologists will be logging into your hospital PACS system and the electronic patient record from virtual sweatshops across the globe.

Radiographer reporting is clearly not the answer. Radiology is a very demanding science. I don't know what a routine study is! I know that outpa-

tient brain scans have a high rate of normality or insignificant findings, the same for lumbar spine MRI and for many plain films. However, I take pride in spotting the unexpected, and am mortified when I miss it. Spending two years studying real anatomy at medical school, and five years in front-line clinical specialties before I began in radiology, has made me better at complicated cases, because I still look at the 'routine' the 'normal' or 'unlikely to be abnormal' cases.

The Value of a Well-Trained Radiologist

It may be uncommon that a study throws up something unexpected, but I should be able to spot it, drawing on wide experience of what any body part looks like. It is utter rubbish to think it helps us not to have to look at these so-called routine studies. Unless we are much, much better than our referrers, we will lose our specialty. They will buy the equipment and control the patients. Any move which helps us towards mediocrity must be avoided.

Finally, any argument based on unit activity and unit cost only plays into the hands of a government terrified of anything it cannot measure and turn into electoral success. We must rise above this. They fight hard to remove our professionalism, dumb down our training, and insult our skills: we must not stoop to their levels.

CHALLENGES FOR RESEARCH IN RADIOLOGY

Research Management in an Academic Radiology Department

AUTHOR

Prof. Gabriel P. Krestin
Chairman
Department of Radiology
Erasmus University
Medical Centre
Rotterdam
The Netherlands

Research is essential in the field of radiology, for many different reasons. Not only is it a crucial factor in concretising the future development of the medical imaging industry, by exploring new technologies, applications, and extending the scope of the science, but by influencing daily clinical work by generating new information which can then be translated into practice. Also, it contributes significantly to the cohesion of the radiological profession by ensuring that radiologists continue to perform their roles and tasks better than non-radiologists. In a nutshell, it appeals to the curious nature of mankind, and as a by-product, happens to improves healthcare!

Challenges for Research in Radiology

In university hospitals across the world, where resources are concerned, the general case is that both clinical work and teaching and education are prioritised significantly over research. But why, since it is research in radiology departments that is the foundation of its clinical and teaching work, does it often receive mere budgetary scraps? Is it simply the lack of immediate, day-to-day financial rewards seen in research programmes? Are financial planners unable to see the long-term benefits for the science?

In fact, there are clearly many complex answers to this question. Number one is the ever-increasing deficiency in human resources, which makes it difficult to balance the demands of clinical, teaching and research aims. This is coupled with increasing hurdles to performing research, including gaining Institutional Review Board (IRB) approval, respecting patient confidentiality, the use of animals in research, funding, space and equipment provision and finally, and most damning of all, the financial rewards of clinical work exceed those of research, which does not cover its true costs.

What is Needed for Research?

The fundamental elements necessary for constructing a well-balanced research programme include people, money and ideas, underpinned by strong leadership and vision. Research entails considerable hard work and effort, and is a business in the same manner as clinical work, that must be well-managed in order to generate financial income, as well as prestige for the scientist and the department in which he or she is working. It requires not just scientific exploration but also financial investment, a clear structure and

long-term vision so that its achievements can be quantified, and it must generate output in the form of publications, scientific presentations, etc.

Managing the Process

There is a clear process to good management of a research programme. This is:

- Allocate resources;
- Start small;
- Provide research infrastructure that optimises investigator efficiency and improves job satisfaction;
- Develop a research strategy with clearly defined goals and structures;
- Define and monitor processes; and,
- Build in an incentive system that rewards good output.

Other factors in ensuring a well-managed, successful research programme, entail having a culture in which research is prized and not viewed merely as a drain on clinical and teaching efforts in the department. A research infrastructure should not only facilitate research, but also contribute to the culture. It is therefore essential to consider and plan well not just for the required space and equipment needed by the programme itself, but for key personnel, such as:

- Technicians (perform research exams)
- Trial Nurses (perform clinical trials, interface with patients, handle forms)
- Animal Handlers
- Data Managers, Biostatisticians (study design, data analysis, help publish)
- Grant Managers (accountant)
- Grant Facilitators

A Grant Facilitator's role is to identify potential sources of funding, select those most aligned with the investigator or project, read the grant for content and perform feasibility studies. He or she must also read carefully through the grant for language, correct errors/inconsistencies, organise signature collection prior to submission and get IRB approval.

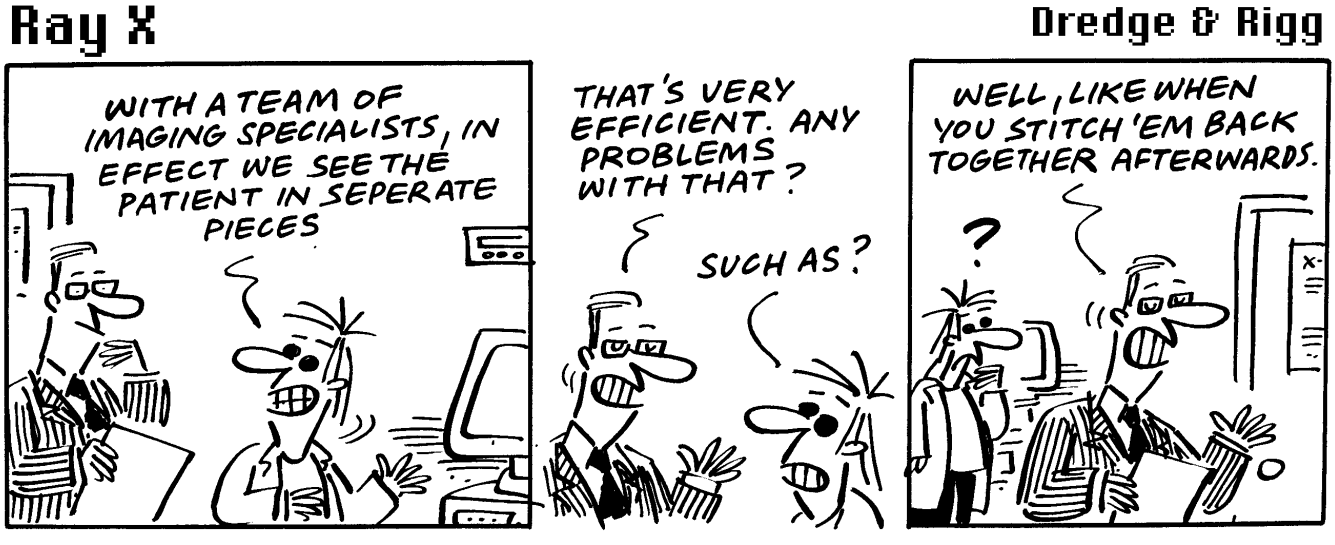
Strategic Planning

It is essential to have a clear vision of where you are going, a long-term view of your end goal. Strategic planning includes elements such as:

- SWOT analysis (strengths, weaknesses, opportunities and threats)
- Environmental scan
- Formulate mission and vision
- Define goals to achieve mission
- Develop actions and strategies to achieve goals
- Monitor actions

Solutions for Research

Finally, to summarise the elements which will go a long way towards guaranteeing the success of a research programme in a department of radiology, one must create a culture in which research is valued, ensure good training of principal investigators, dedicate "protected time" from clinical obligations for researchers, start small, build up the research infrastructure, develop a strategic plan, manage research and reward good quality output. In this way we can ensure the foundations of the future of radiology.



METARADIOLOGY

A New Specialty for Chairmen of Large Academic Departments

AUTHOR

Prof. Jarl Jakobsen

Chairman

Centre for Imaging and Interventions
Rikshospitalet-Radiumhospital HF
Oslo, Norway
jarl.jakobsen@rikshospitalet.no

For many decades now, radiologists have been urged to forward the progress of radiology by keeping up-to-date with current literature and attending ongoing imaging gatherings to avoid becoming restricted in their view of what it takes to be an effective medical professional. This is especially true today, as Chairmen of imaging departments find their roles becoming increasingly demanding and complex. And sub-specialisation is nearly always required in large academic departments. How does the Chairman of a large academic department of radiology, keep in touch with what is happening at ground level in his department, yet also maintain strong leadership? In this paper, I present some thoughts on the role of today's Chairman, by exploring the term 'metaradiology'.

Why 'Metaradiology'?

Meta (Greek: 'about', 'beyond'), is a prefix used to indicate a concept which is one level of description higher than the original process or concept, used to analyse the latter. For example, 'metaphysics' refers to things beyond physics, rather than the science itself. 'Meta' therefore refers to, for example, the comprehensive overview needed by a Chairman in leading his department, maintaining a higher level of awareness of all the ongoing developments as well as the future of the department. This is in contrast to ongoing sub-specialisation. It is, in essence, a frame of reference that aids the Chairman to run his department the best he can without on one hand, losing touch with what's really happening on ground level or on the other hand, over-delegating. It also enables him/her to make the best strategy for the whole department, as the one with the broadest knowledge of what is going on in all the specialised areas.

From Radiologist to Chairman

Picture the following typical situation; a promising, engaged resident becomes a consultant, and afterwards, the best in his subspecialty. He or she may take an interest in research and receive a PhD. If he or she shows initiative in taking responsibility within the section to improve the way it works, in due time, this person can become head of the section. A few years after that he or she becomes head of the department. However, as with many parts of the career ladder, a few years later, they might find a younger member of staff taking the lead in the particular subspecialty, which he or she previously led, due to the Chairman's inevitable preoccupation with administration. The Chairman develops an inferiority complex and thus begins to become over-involved, in order to demonstrate his or her power as head of the department. In fact, with the proper management practices in place, there is no need for a Chairman to either maintain absolute control over every level of operation or interaction in the department, or to lose touch with the reason for joining the science in the first place.

Role of the Metaradiologist

The science of radiology is based on a complex, multi-disciplinary integration between several units and functions. In essence, the radiologist and radiographer influence and are influenced by a wide variety of surrounding factors. Metaradiology involves integrating and balancing all these factors.

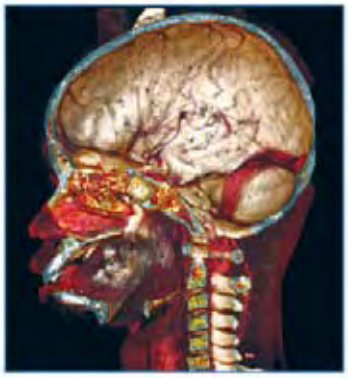
In my view, a meta-radiologist is not the practical, performing radiologist, but the leader and strategic head of all activities in the department. A meta-radiologist is not only in charge of conventional radiology, but also oversees many different fields: teleradiology, PACS, CT, US, PET/CT, etc. as well as retaining a meta-perspective over all relations inside and outside the department, between the patients, referring units and doctors, and the CEO. It also includes departmental resources within the radiology department such as Competence, Modalities, IT, Organisation, Personnel, Budget, Infrastructure, etc. Lastly, metaradiology incorporates the patient's perspective, mega-trends in imaging, managing academia in the department (following trends in research and education), political issues (within and outside the department) and turf battles, internationalisation and the best use of resources on a meta-level. All this cannot be undertaken by those engaged in very specific areas, e.g., developing new sequences in MRI.

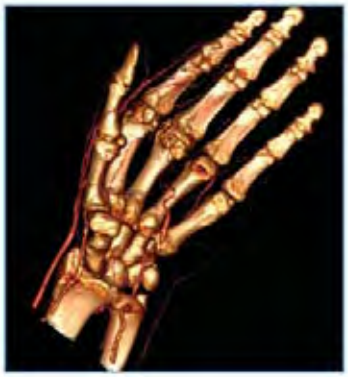
Metastrategies

To enable such a higher analysis and overview of the department, it is essential for the Chairman to have a radiology advisory board that provides updates on the frontlines in the various subspecialties. This meeting place is not for discussion

»» *continued on p.43*

aycan





SAVE 90% OFF YOUR MEDICAL IMAGING HARDCOPY COSTS.*

aycan xray-print

enables you to print any kind of medical image to standard paper!

- no hidden costs
- near diagnostic quality
- easily file and share images
- print color and/or black & white images

* average cost of an aycan paper print b&w (A3): less than 10 Cent.

international dealers welcome.

aycan is a leading provider of plain paper imaging solutions for radiology.

VISIT US AT ECR 2007, Vienna, Extension Expo A, Booth #24
OR www.dicom-paper-print.com

Tel. +49.(0)9 31.270 40 8.0 . Fax +49.(0)9 31.270 40 8.1 . sales@aycan.de

CAD FOR MAMMOGRAPHY AND MR MAMMOGRAPHY

AUTHOR

PROF. ANSGAR MALICH

HEAD OF DIVISION

DEPARTMENT OF DIAGNOSTIC RADIOLOGY

SUEDHARZ-HOSPITAL NORDHAUSEN

NORDHAUSEN, GERMANY

ANSGAR.MALICH@SHK-NDH.DE

What are the Pros and Cons?

CAD technology is widely used in radiology, to analyse breast lesions, lung nodules, prostate glands, lymph nodes, bone structures and many other features. In the past decade, CAD technology has undergone significant refinement and is now a highly sensitive technology. In this review, the pros and cons of CAD are summarised.

CAD on Mammograms

Most studies regarding CAD systems report on those that are used with analogue films. With the increasing number of full field digital mammograms, most CAD companies focused on the development of related CAD systems. These tools are mainly available directly on the workstations. This saves time as it can be used in daily routine in one step. The application of CAD for mammography differs thus from other CAD options, which are developed for use at the PACS and not at the workstation.

The most relevant value of a diagnostic system is its sensitivity and specificity, obtained under conditions close to routine workflow, that is, CAD performance in screening of mammograms. Regarding detection rate, the number of false positive markers is of outstanding importance for the clinical usability of CAD, due to the overall low number of malignancies within the screening population (approx. 6 out of 1000 screened cases).

FDA approval studies can't be considered as the most relevant for clinical routine being mainly performed with initial software releases causing a highly sensitive detection of cancers (for masses ranging from 75% to 85%, for microcalcifications ranging from 98% to 99%) associated with very low specificity (high number of falsely detected structures, 87% and 95%, respectively for masses and microcalcifications using Second Look for example, similar for Imagechecker). In other clinical studies, overall sensitivities of about 90% were reached. Typically higher sensitivities for microcalcifications than masses were found on several systems in various studies.

CAD Performance on Priors

According to published data, 89 out of 115 missed cancers, (30 out of 35 missed microcalcifications and 58 out of 80 missed masses, i.e. 86% versus 73%) were detected using a CAD system. This value increased with more updated software versions used and the extent of the CAD performance was proven by other CAD systems with similar results. Most non-detected malignancies are visible as masses. A relevant number of missed cancers (about 40%) were seen by the radiologists and misinterpreted as benign. Despite this encouraging data, it is still questionable whether the higher detection rate of CAD really causes a higher detection rate for the radiologist.

CAD as an Aid to the Radiologist

Many factors influence performance, including selection criteria of the cases, the number of included cases and of cancers, the radiological experience of the participating radiologists, the experience in the use of CAD of the participating radiologists etc. Also, diagnostic strategies differ among the United States, Great Britain and continental Europe due to differing ways. Consequently, results on the clinical impact of CAD differ significantly. Butler and colleagues reported on a detection rate of about 87% of those cancers not being localised at the clinically suspicious region. Thurfjell et al. found an increased sensitivity (from 80 to 84% and 67% to 75%, respectively) due to the additional use of CAD prompts. These values were going along with an unchanged (experienced radiologist) and a slightly decreased specificity (non experienced radiologist).

Contradicting these findings, Marx et al. reported an unchanged sensitivity of the participating radiologists when using CAD vs. without (80.6% vs. 80.0%) and a slightly increased specificity (83.2% vs. 86.4%). This effect, however, was statistically not significant. Similarily, Malich et al. could not verify a significant diagnostic effect of an additional CAD application on official test case samples in Germany. All these studies are synergic regarding the high sensitivity of CAD, which is usually higher than the radiologists value. A number of other studies report an unchanged sensitivity of the radiologists when using CAD prompts.

Clinical and Financial Effect of CAD

Freer and Ulissey found in a screening population, a slightly increased recall rate of 7.7% (vs. 6.5%) with the additional use of CAD but an increased detection rate of malignancies as well. Similar effects were found by most other authors. Contradicting this, Marx et al. found a decreased rate of recommended interventions associated with the use of CAD. With CAD usage, the number of additionally false positive lesions did not

increase, the number of unnecessary biopsies, however, decreased, mainly in the screening group. In screening, CAD systems seem to increase the detection rate of malignancies. This effect seems to be associated with an increased recall rate. Most additionally detected malignant lesions in the prospective screening trials were DCIS (75%).

False Positive Markers

Up to 40% of the non-detected malignant lesions were masses not overlooked but wrongly judged as benign by the radiologist. Tools associated with a high number of false positive results will probably not cause a significant increase in the detection rate of malignant lesions because the radiologist expects wrong markings per case and probably would not change the decision due to that high rate. As stated by a couple of authors, the recently developed software versions of both systems decreased the number of false positives from 30 - 56%, which might affect the impact of correct CAD markings on falsely as benign categorised lesions for the diagnosing radiologist. Nevertheless, the ratio of false positive markers per case is still the major limitation of clinical application of CAD.

Extensions of Current Uses of CAD

Due to the high detection rate of microcalcs it was examined whether the negative predictive value is sufficient to apply CAD prior to the radiologist in order to exclude any microcalc-associated malignant or premalignant structure. Resulting PPV of 60.1% and NPV of 86% do not support the clinical use of CAD as a primary diagnostic tool to exclude suspicious microcalcifications, yet. Both in Scandinavia as well as in Germany, the used CAD systems failed the requirements of the screening programmes due to the insufficient specificity despite the high sensitivity values. Additionally CAD did not support the analysing radiologists enough, to pass the official tests required for screening in Germany.

CAD in Breast MRI

CAD for breast MR uses an entirely new class of temporal features. Its central feature is the automated analysis of time versus percent of enhancement curve using the market leader Confirma, which offers six different curve types highlighting the related parts of the entire lesion using six different colours. The curve type characteristics can be modified for each observer. The system of CADSciences is based on calculations of permeability and extracellular volume fraction and uses the calculations introduced by Toft. Thus, both technologies offer similar images but the underlining calculations differ significantly.

CAD MR systems offer analyses of the entire lesion and distributions of enhancement curves in relation to the whole enhancing lesion. Furthermore automated motion corrections are embedded (usually 2D), multiplanar reconstructions and maximum intensity projections are available, usually depending on the technology and software version used. Additionally MR-guided localisation of enhancing breast tumours can be supported by commercially available systems. An automated volume calculation of the entire enhancing lesion is integrated in the analysis process.

Diagnostic Benefits

The application of CAD offers for the first time the option to analyse the dynamic uptake of the whole lesion in a computer-based display. It has been reported that CAD application causes time saving during the analysis of the images. Taking into account technological options and additional diagnostic data, using CAD in MR it should be possible in future, to stage and grade a breast tumour automatically on the images obtained by the computer. If initial results are proven, lymph node clarification (TN-status) can be integrated in the CAD analysis process. These three aims could help to improve the role of interventional treatment of breast tumours (tumour heating or freezing) without surgery. This however, is not yet available and requires still further software development.

Limitations

Till now, CAD-based analysis of dynamic breast MR images exclusively focus on dynamic data. It has been published recently, that morphologic features are of major importance as well, especially including T2w imaging. Thus, the currently available CAD systems do not yet replace the

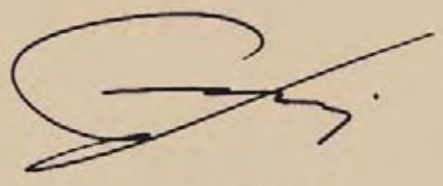
continued on p.26

European Society of Radiology

ESR

Become a member

The bigger we are, the better we can serve you!



Nicholas Gourtsoyiannis
ESR President

See you at ECR 2007 at the ESR booth in the entrance hall

myESR.org

CLINICAL IMAGES AND THE ELECTRONIC PATIENT RECORD

The Best Way to Integrate Images

AUTHOR

Liz Beckmann

Managing Director

Lanmark Medical

Beaconsfield, UK

lizbeckmann@lanmarkmedical.co.uk

Since the introduction of the Electronic Patient Record (EPR), there has been significant debate about the best way to integrate images. Initially, there was discussion as to whether the EPR would be the centre for storage of images, or if images were to be stored on an external source (such as a radiological PACS). Over recent years, the very definition of what we mean by EPR has changed and other terms have been introduced to cover several of the areas originally referred to as the EPR. There is still some variance internationally on the use of the phrase, whether it means a record held, possibly on a smart card by the patient, or a record held centrally within a hospital environment. If the latter is the case, is this record available nationally or even internationally or only across a hospital-wide enterprise?

Introduction

This article works on the premise that EPR is held centrally within a hospital environment, which is the current thinking in the UK. Ideally an EPR integrates all the data of a patient from different clinical systems, or at least provides links and access to such data. In this context what the EPR has provided is a clinical results solution to enable easy access to and switching between different clinical applications without the need for re-authentication and re-login, enabling access to clinical data, including images, at a single mouse click.

When looking at how images are handled and integrated within the EPR, it is key to define what we mean by "images" and the range of images. It is often assumed that the only images to be considered are radiological, and while this is the area with most experience, in practice there are a broad spectrum of other images, which are in some ways more significant and more of a challenge to integrate since they are in a wider variety of formats.

Storage of Radiological Images

Radiological images are normally stored in a PACS and in DICOM format. Other images such as pathology, endoscopy, retinal, etc., can often be generated in other formats including JPEG. Pathology images, for example, are also large file sizes and colour images and therefore present different issues. In many centres the primary archive is the original pathology slide and a digital archive is seen only as an option. This will have to become standard if pathology images are going to be accessible through the EPR.

There are currently two main approaches being considered for handling and accessing images within the EPR. Firstly, that of using a reference within the EPR to what clinical images exist for the patient and a link to where they are stored, enabling direct access to the images. The second is to store the images, or more normally a key subset of the images, within the EPR storage space itself. Given the size of the image datasets the first solution, which links to the images stored in the clinical system, has the benefit of saving storage space within the EPR and enables access to the entire image dataset stored within the clinical PACS system, whilst the second solution has the potential benefit of providing a truly integrated patient record.

Storing Non-Radiological Images

With non-radiological images the decision is whether the EPR has a reference to where the images are stored within a local clinical system, or whether to transfer these images into the established PACS system (and to store all images, radiological or not, in the PACS) or to store the images within the EPR itself.

In several cases, additional images are being generated within hospitals such as scanning request forms. The issue of how these are handled by the EPR raises the question of which images to include or exclude from the EPR. One option is to define the boundary based upon a formula which considers the volume of data and how clinical the information is. When considering how much information is integrated from clinical systems into the EPR, many hospitals differentiate

between clinical and non-clinical information, retaining clinical information within clinical systems and using the EPR to predominantly store non-clinical data, since, within the EPR, data cannot be changed and updated in the same way as it can be in the clinical systems (for example PACS).

Accessibility

The EPR is often considered as a portal, providing access to collections of data, either stored locally or with links to storage in other clinical applications and the way that the links are set up through such a portal is the key to the success of the EPR and to the accessibility of the data. The interlinking of the different elements of the EPR to other systems is critical to ensure that the different users are aware of what data is available, how to access it and the ease of access. It is critical that once working within the EPR, images can be accessed by a single mouse click, whether they are stored within the EPR or not.

Standards Key to Ease of Access

Standards such as those defined by CEN and ISO are key to inter-accessibility, not only for image format but also the language for talking between EPR systems and hospitals. There are still areas to be defined in the standards. For example, the data structure in which image data such as multimedia reports are conveyed, has not yet been developed for diagnostic imaging reports. Standards currently used for images and text data, DICOM and HL7, do not necessarily fully meet the range of standards required. However, a significant number of organisations throughout Europe are working on a wide range of projects to define how to handle image data within the EPR.

A New Approach

One Europe-wide initiative has been working on an approach, which uses a system of building blocks, similar in concept to Lego. Each of the building blocks acts like a template for a different area. (For example: a template for orthopaedic surgery, a template for blood pressure measurement, potentially, a template for images) Here each hospital enterprise can create their own optimised EPR selecting and using the blocks that are appropriate to their needs. Since there is compatibility in the Lego type building blocks, different hospitals, using this approach, would be able to exchange EPR data freely; institution to institution. In practise most patients re-present at the same hospital or within a local geographic area, so the ability to exchange EPR data between hospitals at a distance may not be considered a major requirement, though it contradicts the initial objective of creating a comprehensive transportable record of a patient's medical history.

Although the concept of EPR systems has been around for several years, there is no fixed approach on how to integrate the range of images into the EPR. There are few proven commercial systems with integrated resilience and there is limited experience in creating a fully operational integrated system. There is still some way to go to universally agree on a single approach for images as part of the EPR, and to achieve an enterprise-wide working solution which can be extended to enable interchange of patient information, including images or links to images, between hospitals across a region, country or internationally.

continued from p.23 ⏭

analysis of the entire examination, but shorten the evaluation of the contrast uptake only and induce a more reliable analysis. Depending on the presets, CAD systems are in part unable to highlight segmental enhancements, being the most relevant feature for non-invasive premalignant lesions. Diagnostic potential of currently available systems varies significantly. Whereas CADSciences technology is highly sensitive it seems to be significantly less specific compared to the currently available Confirma CAD solution.

There is still no optimal 3D motion correction available. Resulting analysis of enhancement pattern of a breast lesion is not congruent among the different CAD systems, but differs significantly. Similar results were observed regarding the volume calculation of a breast lesion. Volume calculation is limited to enhancing structures of a lesion.

This causes a miscalculation of tumours after presurgical chemotherapy, for instance, because these lesions are characterised by necrotic components as well.

Conclusion

CAD systems are developed to assist the human reader in the detection of breast cancer. This development seems to be necessary due to financial and logistical problems associated with the double reading of radi-ologists.

CAD systems on the market are highly sensitive and are characteristically more sensitive than the radiologist, mainly in the detection of malignant microcalcifications and masses.

CARS 2007
Computer Assisted Radiology and Surgery
21st International Congress and Exhibition

June 27–30, 2007
***ICC Berlin,** Germany*

Main Themes

- Medical Imaging
- Cardiovascular Imaging
- Computed Maxillofacial Imaging
- Image Processing and Display
- PACS and IHE
- Telemedicine and E-Health
- Computer Aided Diagnosis
- Computer Assisted Radiation Therapy
- Surgical Navigation
- Surgical Robotics and Instrumentation
- Surgical Simulation and Education
- Computer Assisted Orthopaedic and Spinal Surgery
- Computer Assisted Head and Neck, and ENT Surgery
- Image Guided Neurosurgery
- Minimal Invasive Cardiac, Thoracic and Abdominal Surgery

11th Annual Conference of the International Society for Computer Aided Surgery
President: Takeyoshi Dohi, PhD (J)

25th International EuroPACS Meeting
President: Jarmo Reponen, MD (FIN)

9th International Workshop on Computer-Aided Diagnosis
Chairman: Kunio Doi, PhD (USA)

13th Computed Maxillofacial Imaging Congress
Chairman: Allan G. Farman, PhD, DSc (USA)

For detailed information please visit

www.cars-int.org

RECOGNITION AND MANAGEMENT OF CONTRAST MEDIA EXTRAVASATION

How Europe Can Learn From the Australian Experience

Despite the well-recognised complications of contrast media extravasation (CME), its treatment remains an enigma to many. Reported morbidities range from minor skin reactions, to severe skin necrosis/ulceration and vascular and nerve compression (compartment syndrome). There is no clear consensus in the current literature regarding CME treatment. Confusion in the application of appropriate care may not only delay treatment for these patients, but also potentially place the patient at increased risk of complications. This paper highlights the key points in CME management.

AUTHORS

Dr W. Sum

Dr L.J. Ridley

Department of Diagnostic Radiology

Concord Repatriation General Hospital

Sydney, New South Wales, Australia

wynnesum@hotmail.com

Examining the Evidence

Information from Medline and the Australian Adverse Drug Reactions Advisory Committee (ADRAC) databases was used to review the incidence and management of CME. A CME policy was then established in our institution and a prospective study performed over a twelve month period on the extent of injuries encountered following implementation of this policy.

Five cases of skin injuries were reported in the ADRAC database, although anecdotal evidence suggests this is a marked underestimate. In the twelve months following the implementation of our CME policy, eight cases of CME were reported in our department, all of whom attended CT exams. All of these patients sustained mild erythema and oedema at the injection site. Treatment was commenced immediately (within 5 minutes) on recognition of CME, using the policy guidelines. In all cases, manifestations had subsided with no adverse outcomes, within 24 hours.

Key Points

Epidemiology

Traditionally, extravasation of radiographic contrast material is most frequently seen during lower limb venography, particularly when contrast agents are injected into oedematous extremities (and with the tourniquet still in place). However, with the widespread use of automated power injectors, CME occurs predominantly during CT examinations. The reported frequency of CME in radiology practices vary from 0.04-1.3%.

Risk Factors for Extravasation

CME occurs mostly as a result of incorrectly positioned intravenous access or venous rupture. Various factors increase the likelihood of CME, including:

- Infants, small children, elderly and unconscious patients
- Use of small peripheral veins, i.e., over the dorsum of the hand and foot
- Use of indwelling intravenous catheters inserted over 20 hours prior to use (due to thrombophlebitis that may have developed in the cannulated veins)
- Use of fragile or damaged veins, particularly those with multiple punctures
- Use of metal needles (as compared with plastic cannulas)
- Patients with arterial or venous insufficiency, as well as those with lymphatic obstruction, e.g., diabetics, venous thrombosis and those following radiation or regional lymph node dissection
- Use of automated power injectors, although no correlation has been demonstrated between injection rate and extravasation frequency
- Use of high osmolar media. The osmolality threshold for significant tissue injury is estimated at 1.025-1.420mOsm/kg water.

Clinical Presentation

Subclinical CME occurs when no soft tissue injury is discernible, usually when the extravasated volume is less than 20ml. Some patients may complain of stinging or burning pain but the majority are asymptomatic. With larger volumes of CME, the affected area appears erythematous, oedematous and tender. Whilst the majority of cases resolve spontaneously in 2 - 4 days, a few may progress to skin blistering, ulceration, necrosis and soft tissue injury. Severe skin ulceration, although rare, has also been reported in a few cases of low volume (less than 10ml) extravasation. Often, the severity of CME injury cannot be ascertained at the initial examination; scarring around nerves, tendons or joints may occur even if the skin is intact initially. Compartment syndrome, one of the most serious CME complications, pres-

OptiVantage™ DH

contrast under control

Convincing

Contrast Delivery System for Dual Head Injector CT Protocols

Fully programmable powerhead: For highest patient-side safety. Allows to change protocols without changing rooms.

Tilt enable: Enable button not active until enabling sequence has been properly followed and powerhead is tilted downward.

Patency check: Injection of saline flush prior to contrast injection, to check for venous access.

Contrast delivery solution: Just with a simple change of the faceplate, the OptiVantage™ DH can accomodate prefilled syringes.

Tyco Healthcare GmbH
EMEA Department
Josef-Dietzgen-Straße 1
D-53773 Hennef
Tel.: +49 2242 887138
Fax: +49 2242 887302

OptiVantage™ DH

tyco / Healthcare / Mallinckrodt

Swiss Medical Care

www.swissmedicalcare.com

New: CT EXPRES III®

IMPROVEMENT IN CONTRAST INJECTION

A new approach for contrast injection: the CT Exprés III® automatic syringe-less Injector offers safety, simplicity and speed. This 3-way syringe-less injector allows injections directly from two contrast media bottles of any kind of brand and volume, from 50 cc to 500 cc, plus one saline bag. CT Exprés III® offers a flexible "always ready" solution, compared to pre-filled syringes.

TIME SAVING AND ASEPSIS

The "plug and play" concept, a very quick, simple and clean patient set installation, saves time in between patients, improving patient throughput. **No more syringe filling, handling waste or associated risk of contamination.**

PATIENT SAFETY AND USER COMFORT

The CT Exprés III, dedicated to safety and ease of use, is equipped with air detectors to prevent any risk of air injection into the patient. Its novel cassette-based system also limits the pressure needed to inject the patient. Finally, the CT Exprés III® offers professional users more **comfort in daily use and more time available for patient care and CT operation.**

EASIER THAN PRE-FILLED SYRINGES

With 3 channels, the CT Exprés III® is "always ready", allowing **multiple injections from the two bottles of contrast and the one bag of saline, without preparation in between patients** and without the cost of a pre-filled syringe. CT Exprés III® is the only available multi-dosing CT injector cleared in the US by the FDA.

LET'S TALK SAVINGS !

The "Automatic Switch Over" between the two bottles of contrast media, while injecting, improves savings by limiting the usual wastage of contrast within the syringes. Contrast media is used "until the last drop"! **Savings can be significant when referenced with number of injections per year.**

CTA : A SUCCESSFUL CLINICAL EXPERIENCE

Clinique Cécil, Radiology Department, Lausanne, part of Hirslanden Group (13 clinics in Switzerland)

"In less than 2 years we performed more than 600 heart examinations with our CT scanner and our Swiss Medical Care injector." says Dr. Robert Androux. "This equipment allowed us to satisfactorily diagnose every cardiac patient".

"CT Exprés III contrast media injector is **extraordinarily simple to use, is clean and provides us with great savings**: it minimises technician operations and only uses the volume of contrast we need" adds Mr Pascal Soudani, Head of the technical team.

ents with a dense, dusky and oedematous extremity with reduced or absent arterial pulses.

Recognition and Prevention

CME should be suspected if there is either absence of contrast on images, pain during and following contrast administration or skin oedema and erythema. Preventative measures include:

- Venous access into large calibre veins when ever possible e.g. cubital fossa
- Replacement of cannula if it has been inserted over 20 hours in duration
- Flushing the cannula with normal saline to ensure patency
- Use of plastic cannulas instead of butterfly needles
- Avoiding multiple puncture of the same vein
- Use of non-ionic contrast agents
- Use of central venous catheters (if present), although use of such devices is not without risk
- Monitoring the patient/injection site whilst the contrast is being administered. Whilst direct observation of the whole injection is often not possible, such as during CT angiography, it is usually possible to observe the commencement of the injection.

An extravasation detection accessory has been described in the literature aimed at reducing significant CME. It consists of a small, pliable, adhesive-backed electrode patch measuring 8x5cm which is attached over the patient's arm directly above the cannula tip. In the authors' knowledge, this device has not been readily available for use in clinical practice in Australia until recently (previous devices were available but anecdotal evidence from the vendors did not support their use).

CME Management

Most CME resolves with the following methods of conservative treatment:

- Aspiration of fluid via the needle/cannula – generally of limited value as only a small amount of fluid (if any) can be removed
- Elevation of affected limb above the level of the heart to allow for resorption of extravasated fluid into the capillaries and, more importantly, the lymphatics
- Topical application of ice packs for 15 - 60 minutes, three to four times a day. This has been shown to reduce the size of potential skin ulcers that may develop following extravasation.

»continued on p.37

ECRI Europe
A NONPROFIT AGENCY

CONTRAST MEDIA INJECTORS
PRODUCT COMPARISON CHART

ECRI is a totally independent non profit research agency designated as a Collaborating Centre of the World Health Organization (WHO). Such organisations are appointed to contribute to WHO's public health mission by providing specialised knowledge, expertise, and support in the health field to the WHO and its member nations. ECRI is widely recognised as one of the world's leading independent organisations committed to advancing the quality of healthcare with over 240 employees globally.

ECRI'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 organizations, ministries of health, government and planning agencies, voluntary sector organizations and accrediting agencies worldwide. Its databases (over 30), publications, information services and technical assistance services set the standard for the healthcare community.

All of ECRI's products and services are available through the European Office, addressing the special requirements of Europe and the UK. Utilising some of the world's largest health related databases, help, support and guidance can be given to our European clients at a local level.

CONTACT

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

	ECRI[1]	MEDEX BIOMEDICAL
BRAND	Contrast Media Injectors for Computed Tomography	MEDEX BIOMEDICAL
MODEL		SBI 5002 CT
WHERE MARKETED		Europe
FDA CLEARANCE		NA
CE MARK (MDD)		CE 0459 by G-MED, France
TYPE		Dual fluid CT injector
DRIVE MECHANISM		Hydraulic power station
SYRINGES		Bags
Disposable	Yes	KSB25, KSB50 and KSB/I/S
Reusable		When combined with MEDEX patented safety patient line REF RPVARD/20
SYRINGE CAPACITY, mL		
Disposable	125	250ml, 500ml, and 250ml cm + 250ml saline
Reusable		When combined with MEDEX patented safety patient line REF RPVARD/20
FLOW RANGE, mL/sec	0.1-7	0.5 to 10 ml/sec
VOLUME RANGE, mL		1 ml to 200ml per injection
DELIVERY PRESSURE RANGE, bar (psi)	0-20 (0-300)	0 to 21 bars (300 psi)
SELECTABLE PRESSURE	Yes	Yes
Increments	10 psi	1 Kpa (approx. 0.1bar)
ADJUSTABLE RISE TIME		No
ADJUSTABLE VOLUME STOP TYPE	Yes	Pause available during injection
Increments, mL	1	1ml
EXTRAVASATION DETECT		No
SYNCHRONIZATION		Dry contact input
X-ray generator	Yes	See above
ECG		NA
CONSOLE SIZE, H x W x D, cm (in)		24 x 29 x 24 (7 screen alone)
WEIGHT, kg (lb)		console: 5.4 kg head of injection: 20 kg power station: 35 kg
VOLTAGE, VAC		230 Vac
PRICE		
Injector system		35 333 €
Disposables		5.40 €, 5.55 € and 9.00 €
WARRANTY		1 year
OTHER SPECIFICATIONS		• Automatic bag filler system provided • Ceiling Mount and Wall Mount systems available • Software upgrade by USB Memory stick • Logfile registering every injection details
WEBSITE		www.medexbio.com

Footnotes to the Product Comparison Chart

1 These recommendations are the opinions of ECRI's technology experts. ECRI assumes no liability for decisions made based on this data.

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

CT 9000™ ADV	OptiStat™	OptiVantage™ DH	EMPOWER CTA CTA
Worldwide with limited exceptions	Worldwide with limited exceptions	Worldwide with limited exceptions	Worldwide
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
CT	CT	CT	
Electromechanical	Electromechanical	Electromechanical	Motor/electro mechanical
Empty and prefilled No	Empty and prefilled No	Empty and prefilled No	Yes, disposable Yes No
30,50 hand held; 50,75,100,125 high pressure prefilled; 200 empty	50,75,100,125 high pressure prefilled; 130 empty	50,75,100,125 high pressure prefilled; 200 empty	200 Yes No
0.1-9.9	0.1-6.0	0.1-10.0	0.1 to 10 mls per sec
1-200	1-130	1-200	1ml to 200ml
25-300 (1.7-20.7)	225 (up to 15.5)	50-325 (3.5-22.4)	Variable dependant on media 40 to 300 psi
Yes 50psi	No N/A	Yes 5psi	Yes 40 to 300 psi
No	No	No	No
Automatic electronic 1	Automatic electronic 1	Automatic electronic 1	N/A N/A
Not specified	Not specified	Patency check	Yes
Yes	Yes	Yes	Yes, with Philips range of CT scanners Not applicable
No	No	No	Not applicable
21.6 x 31.8 x 6.4 (8.5 x 12.5 x 2.5) 17.2 (38)	4.6 x 15.2 x 5.0 (1.8 x 6 x 2.0) 1.8 (4) n	64 x 31.1 x 21.6 (2.5 x 12.25 x 8.5) 11.9 (26.3)	11" x 13" x 4" EmpowerCTA Injector with: Mounting Arm, 200ml syringe; EDA, heater and cables: 20 lbs; Wall Mount: 5 lbs; Articulating Arm: 22 lbs; Injector Mounting Arm: 5 lbs; Total System Weight: 52 lbs
115-125:220	100:230	115:230	220-240 volt supply and 28 volt dc in injector head
			Varies in different markets Varies in different markets
1 year full	1 year full	1 year full	Yes, 12 months
"The CT 9000™ ADV Contrast Delivery System is fully featured, and upgradeable to meet all the specific needs of today's demanding CT procedures. A multi-purpose injector that can be utilized as a single powerhead delivery system or, with the addition of the Tyco Healthcare/Mallinckrodt OptiStat™ Injector, can serve as the ideal solution for dual head injector protocols. The system also accommodates Tyco Healthcare/Mallinckrodt's unique prefilled syringes for maximum ease and efficiency. **SPECIAL FEATURES** **Touchscreen** • New easy to read colour touchscreen. • Requires only 3 simple key strokes to activate injection. • Program up to four phases with inject or scan delay features. • Protocol manager to store and recall up to 12 userdefined protocols. **Syringes** • The system accomodates both front loading 200ml disposable syringes and prefilled syringes. **Powerhead** • The powerhead LED display provides a highly visible indication of remaining volume. • The programmable Auto-Fill feature automatically moves the syringe to the selected volume."	"The first compact power injector of its kind, OptiStat™ allows single-handed power injection with unprecedented economy, space efficiency, portability and control. It is ideal for CT, X-Ray and mobile coaches. It can also be used to inject saline following a contrast injection. **SPECIAL FEATURES** **Powerhead** • The powerhead is small, compact and lightweight. • Quick loading of 130 ml empty syringes and prefilled high pressure syringes. • Flow rate and volume can be adjusted at the powerhead or the console. • The display indicates the programmed volume and rate throughout the injection. • An injection can be started, stopped and paused from the powerhead or the console. **Syringes** • Compatible with prefilled syringes and 130 ml empty syringes. Flexible Mounting Options • A wall hanger (included) offers easy accessibility and convenient storage between procedures. • Special adapters allow simple attachment to the CT9000™/CT9000™ ADV or to an infusion rack. **Interface Solutions** • Utilise independently. • Interface to another OptiStat™ injector. • Interface to the CT9000™/CT9000™ ADV injector."	"The OptiVantage™ DH has a unique, user-friendly LCD powerhead which is fully programmable at the remote console, allowing technologists to change protocols, perform saline injections, fill syringes and much more with just the touch of a button. Special safety features include Tilt Enable -- which allows an injection to occur if the proper sequence has been followed and the powerhead is tilted downward to reduce the risk of embolism. The injection system accommodates both 200 ml disposable and 125 ml prefilled syringes, with easy front loading and removal. **SPECIAL FEATURES** **Fully Programmable Powerhead** • Enables the technologist to stay with the patient longer. • Saline can be programmed to inject prior to, or immediately following, contrast. • Colour coded display and manual flow knobs. • Auto Fill function to minimize the introduction of air. • All programming can also be achieved in the control room at the remote console. **Patency Check** • Perform a saline flush first to check for patent veins, and correct placement of the cannula, prior to contrast injection. • Stay at patient's side while testing. **Timing Bolus** • Perform a Timing Bolus injection of contrast medium followed by a saline flush to determine ideal scan delay for optimum image quality.	N/A

	ECRI[1]	ulrich medical	ulrich medical
BRAND	**Contrast Media Injectors for Computed Tomography**	**ulrich medical**	**ulrich medical**
MODEL		**CT injector XD 2002 ohio *tandem***	**CT/MRI injector XD 2004 ohio M**
WHERE MARKETED		Worldwide	Worldwide
FDA CLEARANCE		Submitted	Submitted
CE MARK (MDD)		Yes	Yes
TYPE		CT	CT, MRI
DRIVE MECHANISM		Roll pump	Roll pump
SYRINGES			
Disposable	Yes	Multidosing containers, 2-part hose system	Multidosing containers, 2-part hose system
Reusable		Multidosing containers	Multidosing containers
SYRINGE CAPACITY, mL			
Disposable	125	Tubes fed from containers of 2,000 mL maximum volume	Tubes fed from containers of 2,000 mL maximum volume
Reusable		Pump hose for multidosing, one patient hose per patient	Pump hose for multidosing, one patient hose per patient
FLOW RANGE, mL/sec	0.1-7	0.2 - 8	0.2 - 8
VOLUME RANGE, mL		400	400 CT, 250 MRI
DELIVERY PRESSURE			
RANGE, bar (psi)	0-20 (0-300)	Max. 16 (232) (auto adjust)	Max. 16 (232) (auto adjust)
SELECTABLE PRESSURE	Yes	Yes	Yes
Increments	10 psi	Software adjusts pressure according to selected flow rate	Software adjusts pressure according to selected flow rate
ADJUSTABLE RISE TIME		Software adjusts pressure according to selected flow rate	Software adjusts pressure according to selected flow rate
ADJUSTABLE VOLUME STOP TYPE	Yes	Software	Software
Increments, mL	1	1	1
EXTRAVASATION DETECT		Not specified	Not specified
SYNCHRONIZATION			
X-ray generator	Yes	Yes	Yes
ECG		No	No
CONSOLE SIZE, H x W x D, cm (in)		25.2 x 33 x 12.6 (9.9 x 12.9 x 5)	25.2 x 33 x 12.6 (9.9 x 12.9 x 5)
WEIGHT, kg (lb)		5.3 (11.7) console, 61 (134.5)	5.3 (11.7) console, 66 (145.5)
VOLTAGE, VAC		85 - 240	Battery powered
PRICE			
Injector system		Not specified	Not specified
Disposables		Not specified	Not specified
WARRANTY		1 year, extended on request	1 year, extended on request
OTHER SPECIFICATIONS		Tandem function allows for a choice between two different contrast agents without changing media containers.	Tandem function allows for a choice between two different contrast agents without changing media containers.
WEBSITE		www.ulrichmedical.com	www.ulrichmedical.com

GE Healthcare

Leadership in ultrasound technology.

At GE Healthcare, we are committed to innovation that optimizes every step of the diagnostic process. We focus our research and development efforts on technologies that offer the greatest clinical value across a broad range of applications. The Logiq Family exemplifies this strategy by delivering:

- Industry-leading image quality for clarity
- Analytical tools to increase diagnostic confidence
- Outstanding design for ergonomic scanning
- Automatic applications to streamline clinical workflow

www.gehealthcare.com

Breakthrough after breakthrough.

GE imagination at work

GE Ultraschall Deutschland GmbH & Co. KG
Beethovenstr. 239, D-42655 Solingen
Fax: (+49) 212 28 02-28, Tel: (+49) 212 28 02-0

OVERVIEW OF THE NATIONAL HEALTH SYSTEM IN ITALY

Reforming the System

The Italian National Health Service (Sistema Sanitario Nazionale, SSN) was established in 1978, almost thirty years later than the system in the UK, replacing the previous system of state and professional insurances introduced after 1945. The aim of the SSN is to provide a uniform health system for the whole population without distinction as to social status, income or contributions, based on the principles of the Italian Constitution Chart (art. 32).

AUTHOR

Prof. Biagio Merlino

Associate Professor of Radiology

Department of Clinical Sciences and Bioimaging
Catholic University of Rome
Rome, Italy

Introduction

The introduction of the SSN has been particularly difficult in the adaptation of the Italian health system to the standard of most advanced western countries. Particularly relevant was the transformation from a "curative" into a "preventive" and "rehabilitative" system, which was a major improvement, with respect to the previous insurance system. The SSN provides the majority of healthcare in Italy, from general practitioners to Accident and Emergency Departments and long-term healthcare.

It is based on public funding, although health budgeting and financing have been slightly changed in the last 15 years due to the introduction of still-in-progress reforms.
SSN services are "free at the point of delivery" and patients do not pay for them when they use them. This is similar to what most European National Health Systems (NHS) provide (e.g. UK, Netherlands, Spain, Portugal, Sweden, Austria, Denmark, Finland, etc.), though different from the United States and Japan where a "compensation for expenses" principle is used (patients usually pay first for the services delivered and are later reimbursed).

Financing the System

Financing is almost completely realised through both general taxation and by employers' and employees' contributions (about 50% for each, respectively). The national government (and specifically the Ministry of Health, supported by the National Health Council) is in charge of political planning, regulation and supervision, but the main administrative level is regional: the twenty Italian regions are responsible for implementing central decisions and for providing health services through the operational activity of Health Units distributed at the municipal level, providing health services (primary care, prevention, education, provision of occupational services, etc.) and coordinating between hospitals.

Reforming the System

Since the beginning, the SSN has faced some relevant problems common to other national health systems; difficult expense containment, reduced efficiency and inappropriate use of resources. Mainly, most of the public funds were used for financing public hospitals or public health units, thus creating a sort of short-circuit effect contributing to inefficiency of the whole system.

Between 1992 and1996, an important reform has been introduced, both administrative and financial. A more pronounced "regionalisation" has been supported for financial aspects and, more importantly, for tax imposition, together with autonomy of regions in terms of health regulation and organisation. According to acts DL 502/92 and DL 517/93, the central government is in charge of the health national planning, determination of uniform care levels, financing models, criteria and quality standards ("chart of services"). Health units and public hospitals are converted into companies and management as well as cost/benefit models are largely introduced. Hospitals are financed on a DRG (Diagnosis Related Group) basis. Moreover, the role of possible private operators is improved through the introduction of the so-called "accreditation", on the basis of minimal law requirements, which opens for patients the possibility of choice among several possible providers of services.

Further Reforms

In 2001, (Law 405, 16 November 2001), following an agreement between central and regional governments, a further evolution of the reform was introduced. It ratifies the autonomy of regions in terms of management of health expense and taxation, according to the so-called "devolution" and "subsidiary" principles. An important counterbalance to this change, potentially in conflict with the recalled principle of territorial equity, was the introduction of the "Essential Levels of Care" (Livelli Essenziali di Assistenza), which has even been inserted in the recent modification of the Constitution Chart (October 2001), e.g. "levels of care to be guaranteed to all citizens" which have to be determined by the State. True private healthcare role is limited and mainly financed through private insurance companies.

Radiology in the Health System

Within the described scenario, radiology is performed on a service basis, mainly in public hospitals or in health units, or in accredited private centres. There are several reference laws, the most important being 187/2000, which enforces the 97/43 Euratom Directive "on health protection of individuals against the dangers of ionizing radiation in relation to medical exposure". Radiology, and diagnostic imaging at large, suffer the same limitations as for the whole SSN, i.e. expense increase, relative shortage of resources, increase of the so-called "waiting lists".

Although appropriateness and justification assessments in radiological practice are up to the radiologist, the lack of common knowledge and sharing of protocols and guidelines in prescription, together with a rigid separation between clinicians and radiologists, contributes to a relative inefficiency of diagnostic imaging. The government and several scientific societies (i.e. the Italian Society of Radiology, SIRM) are presently strongly committed to publishing guidelines in order to define the range of appropriate use of diagnostic tests, according to the concepts of evidence-based medicine and radiology and cost-effectiveness, due to the needs of governance of healthcare today.

continued from p.31

Documentation of the incident and subsequent progress is essential for quality assurance. Follow-up phone calls not only allow monitoring of any delayed complications but also serve to reassure the patient. A surgical consultation is warranted if the following clinical findings occur; skin blistering; altered tissue perfusion; paraesthesia, or persistent or increasing pain after 2 - 4 hours.

An emergency fasciotomy is required in these circumstances to decompress the neurovascular structures involved. Other, somewhat controversial, treatment options recommended in the literature include:

- Silver sulfadiazine to prevent secondary infection if skin blistering is present
- Local dilution (by injecting normal saline or water) to reduce the concentration of extravasated agent in the subcutaneous tissue. However, the amount of injection required to obtain adequate dilution is substantial - this may cause further mechanical damage to the soft tissues
- Hyaluronidase for rapid dissipation of oedema – although conflicting results have been published concerning its efficacy.
- Dimethylsulfoxide, a free-radical scavenger with anti-bacterial, anti-inflammatory and vasodilatory effects. Its efficacy has not yet been proven.

Acknowledgements and references are available upon request at **editorial@imagingmanagement.org.**

(Australasian Radiology, Volume 50 Issue 6 Page 549 - December 2006)

DEVELOPMENT OF PACS IN ITALY

A National Research Programme with Worldwide Impact

AUTHOR

Prof. Paolo Inchingolo

Professor of Bioengineering and Health Telematics

University of Trieste

Trieste, Italy

paolo.inchingolo@bioing.units.it

There is long-standing tradition of Italian research in the management of images, from departmental to nationwide level. Much research began at the end of the Eighties in Trieste, thanks to tight cooperation between the Group of Bioengineering and ICT (BICT) and the Higher Education in Clinical Engineering (HECE) Department of the University of Trieste, headed by myself and the department of radiology of the University of Trieste, the Centre for Research in Biomedical & Health Technologies (CRSTBS) of the Area Science Park of Trieste, the University Hospital Enterprise AOOR and the Scientific Childrens' Hospital "Burlo". These research initiatives involved the collaboration over the years of many industrial institutions, as well as various medical departments in Italy and abroad.

PACS: First European Installation

In Trieste, a CommView AT&T Philips multi-site PACS system was installed in 1988 at Trieste's Cattinara and Maggiore hospitals. This was the first European installation of a commercial PACS system in a hospital enterprise and also the first installation in Europe of two PACS systems connected over a metropolitan area network. A lot of work was done at that time by the department of radiology of Trieste to evaluate the impact and to set-up the organisation of a computer-based system to manage radiological activity.

The bioengineering research work carried out by BICT and HECE to support the expansion and the operative extension of this PACS installation started in 1991. Despite that system being so innovative for that time, it was clear that the proprietary installation was forcing users to adapt to the system and not vice-versa. The Health Telematics Laboratory (HTL) of BICT worked to open the proprietary installation by developing versatile and open source tools (essentially gateways and client workstations) for LAN, MAN and WAN communications with the PACS. In this way, it has been possible to distribute images over the hospital departments and surgery rooms of the three hospitals and the bioengineering and medical physics research centres of Trieste, with some connections overseas to the NIH in the US. In 1994, the first PACS browsing interface in the world was developed, allowing virtually worldwide image distribution without dedicated client software.

Taking the Next Step

In 1995, a totally new system named DPACS (Data and Picture Archiving and Communication System) was started. The goal of DPACS was "the development of an open, scalable, cheap and universal system with accompanying tools, to store, exchange and retrieve all health information of each citizen at hospital, metropolitan, regional, national and European levels, thus offering an integrated virtual health card of the European Citizens". In a decade, the idea of DPACS was diffused worldwide and its basic concept can be found today in the European Union Research Programmes, in particular in the FP7. A first version of DPACS was implemented in 1996-1997 at the Cattinara Hospital. In 1998 the DPACS system was running routinely for managing all radiological images (CT, MRI, DR, US, etc.).

Some new needs have been identified and used to direct developments of the project, such as a multi-lingual approach to both client and server managing interfaces and to the presentation of medical contents, a simple data & image display client interface, automatically updatable, highly portable from a PC or a MAC or a LINUX workstation to a palm or a cellular-based communicator and the ability to connect with a wide variety of communication means, both fixed and mobile. Also it requires a highly modular data & image manager/archiver, independent of the platform (UNIX/LINUX, WINDOWS, MAC) and of the selected database, improved interoperability of both server and client system components among them and with all the other information systems components in the hospital and in the health enterprise and an efficient and effective tool to "create" the integrated virtual clinical record in the hospital at home or during the travel of a citizen.

The O3 Consortium

Over the years, the EuroPACS conference has proved an invaluable platform to stimulate discussion and collaboration on these new projects. As a result, the research group of Trieste, who presented the new open source version of their DPACS-2004 project together with a universal workstation named HDW2 at the Trieste EuroPACS and the group of the radiology department of Padova, which presented the new open-source ver-

sion of their Raynux /MARiS project, decided to fuse and integrate their projects and efforts.

Hence, the "Open Three (O3) Consortium" Project has been formally constituted by HECE (see www.o3consortium.eu). O3 deals with open source products for the three domains of tomorrow's e-Health, in the frame of the European e-Health programmes: hospital, territory and home-care/mobile-care/ambient assisted living (AAL) in a citizen-centric vision. The main characteristics of the O3 open source products are multi-language support, high scalability and modularity, use of Java and web technologies at any level, support of any platform, high level of security and safety management, support of various types of databases and application contexts, treatment of any type of medical information, i.e., images, data and signals and interoperability through full compliance to the "Integrating the Healthcare Enterprise" (IHE) project.

The first set of O3 products cover all the needs of image management in radiology and in nuclear medicine at intra- and inter-enterprise levels. The most important are: O3-DPACS, the new version of DPACS enriched with many new features as, e.g., the XDS (Cross-Enterprise Clinical Document Sharing) and the XDS-I (Cross-Enterprise Document Sharing for Imaging) profiles, which allow images and data be exchanged very easily within any territorial environment; O3-RWS, a revolutionary radiological workstation, including managing of and access to MIRC (Medical Images Resource Centre) data and structured reports; O3-MARIS, a "super" RIS offering many new integration features and MIRC support; O3-XDS, one of the first XDS document repository and registry; O3-PDA, a first step toward the opening to the home-care and mobile-care world and finally, O3-TEBAM allowing true reconstruction of the electrical brain in 3D in the presence of pathologies.

How is the O3 Community Structured?

From an organisational point of view, the O3 Community is made by all the institutions having an agreement with HECE. They are, in particular, those belonging to the international networks ABIC-BME (Adriatic Balcanic Ionian Cooperation in Biomedical Engineering) and ALADIN (Alpe Adria Initiative Universities Network), and the institutions - about 60 healthcare and industrial enterprises and governmental agencies, each having a bilateral agreement active with HECE.

In the O3 Community, an O3 Users' Community and an O3 Developers' Community are identified. Every member of the O3 Community can in principle ask to participate to both communities.

The developers' community started under the responsibility and administration of HECE, with the main contributions of the Universities of Trieste and Padova and grew with many other European and US contributions, from universities to research centres and from industrial institutions. It provides the active members of the Users' Community with all the necessary project design, site analysis, implementation, logging, authoring, bug solving, and high-level 24-hour, full-risk service. Additionally, training is highly monitored by HECE, starting with preparing clinical engineering professionals at three different levels, offering both traditional and e-Learning courses with particular skills in clinical informatics, health telematics, e-Health integration standards and IHE-based interoperability, and providing also specific courses and training on site.

Industrial Cooperations

The growing cooperation of O3 with large industries belonging to the O3 Community is another very interesting aspect, as it is especially focused on integration with territory and home-care.
Two important examples are noteworthy.

Firstly, the latest developments of Technology in Ultrasound, with the introduction of High End Compact machines, are at the centre of the cooperation with GE Healthcare, focused on integration. The challenge is to improve solutions to move health services from hospitals to patients, with regards to such social groups as the elderly, children and disabled patients. Compact Ultrasound, with their capabilities to receive and transmit full patient data and exams to a remote location for a real time consultation, could help to overcome territorial or physical restraints providing high quality health services at the patient site, from prevention to treatment.

Secondly, the development of a Cardiologic Information System (CIS), able to address the patient at home, mobile or in the hospital, in relation to all the types of cardiologic information collected from him/her and with the goal to coordinate the integration with all other his/her clinical data, will be at the centre of a cooperation with AGFA Healthcare. In this way, Trieste has, over the last few decades, been at the epicentre of technological advances, with the end result of more accurate and accessible healthcare for all patients.

ITALIAN SOCIETY OF MEDICAL RADIOLOGY

Presentations of its History and Activities

Founded in 1913, the Italian Society of Medical Radiology (SIRM) is a scientific association of which its membership includes the majority of Italian radiologists, counting about 8,400 members at the end of 2006.

AUTHOR

Prof. Palmino Sacco
Policlinic 'Le Scotte'
Siena, Italy
psacco@sirm.org

Aim

SIRM's aim is to encourage the progression of diagnostic imaging by promoting studies and research regarding its physical, biological, safety-related and clinical aspects, to culturally and professionally stimulate its members through developing educational and research projects and through supporting scientific meetings and seminars. In effect, it promotes any initiative intended to enhance the professionalism of its members and to improve the efficacy of radiology within the health system.

Structure

SIRM is composed of regional groups which mainly participate in professional activities and in specific scientific sections, of which the main purposes are to spread scientific knowledge concerning diagnostic imaging. The scientific sections cover all radiologic interests: chest, breast, musculoskeletal, gastroenteric, urogenital, neuro, sport medicine, head and neck and dentomaxillofacial, paediatrics, imaging management, etc. Groups and sections organise annual meetings to debate and share knowledge and research activities. In the last years, SIRM has started to organise research groups and to sponsor national research projects, in particular CT-colonography, coronary-CT, contrast-enhanced ultrasound in the study of hepatic focal lesions, molecular imaging and several screening projects. SIRM organises a free biennial National Congress as well as annual courses and scientific meetings. It promotes editorial initiatives and subsidises scholarships and research awards.

Editorial Capacities

SIRM has many editorial activities. The official journal is "La Radiologia Medica'. Founded by Felice Perussia in 1914, it is a peer-reviewed journal and the official organ of the Italian Society of Medical Radiology (SIRM). The Editor-in-chief is Prof. Roberto Pozzi Mucelli, MD. The journal is accessible in bibliographic databases such as Medline. "La Radiologia Medica" is intended as a medium for the communication of results and developments in the field of radiology, particularly on advances in diagnostic imaging and its allied sciences. The journal welcomes original contributions on both basic and clinical aspects of modern radiology, including diagnostic radiology and interventional techniques, with special emphasis on modern imaging techniques, radiotherapy, nuclear medicine, radiobiology and health physics. A distinguished editorial board and a selection of reports published in the form of original articles, review articles, editorials, short communications and letters to the editor, render this publication indispensable for radiologists and related specialists. All articles are published in English and Italian.

Website

The website www.sirm.org was set up in 1995 and has recently been renovated with the following aims that reflect many of SIRM's purposes: to improve, speed up and simplify communication with members; to provide useful member services; to become a catalyst for continuing scientific and professional education; to provide a space for the study groups and regional groups; to publicise the activities of study and regional groups to all members; to provide patients with information about the nature and purposes of Diagnostic Imaging and to dispel the myth of radiation; to promote the use of the internet, and to improve and publicise the image of SIRM in Italy and abroad.

The official website contains information about the organisation of SIRM, how to join, its constitution and regulations, the composition of the executive council and the study groups and regional groups (and access their pages that are managed independently). Members can access the journal with the table of contents and text of all the articles published; a link to the site www.eurorad.org; a description of the physical principles and main examinations used in diagnostic imaging mainly addressed to non-radiologists (physicians and patients); a list of links for those who wish to visit the major websites dedicated to radiology and diagnostic imaging; a list of meetings and congresses in Italy and abroad, vacancies for posts in Italian healthcare institu-

tions and the main scientific and professional documents produced by SIRM in these past few years about teleradiology, digital imaging archive, indicators for the measurement of radiology activity volumes, osteoporosis, contrast media and many others.

Annual Congress

Since the 39th National Congress in Milan from June 10 to 14, 2000 the SIRM Congress has had its own site (www.congresso.sirm.org) where it posts all the main scientific and organisational information. This site is jointly maintained by the congress scientific and organisational secretariats, to ensure autonomy of content and fast dissemination of the information. In technical and operational terms, the site reflects the greater value it places on the internet as a tool for communicating with its members, following the example of the major foreign societies. More than 4000 delegates participated in the SIRMs 42nd Annual Meeting in June 2006 in Milan.

continued from p.16

provide sufficient work in any one specialty to support numerous sub-specialty radiologists. Also, now that all imaging services are rapidly becoming entirely digital throughout England (and shortly thereafter, throughout the whole of the UK) the reporting of imaging studies will cease to be location-dependent. Thus organ-specialised imagers are likely to be responsible for reporting some imaging studies referred via teleradiology from healthcare institutions physically distant from their workbase. This is already the case for many MDTMs performed via teleconferencing.

Also, from time to time an important unexpected imaging finding incidentally affecting a different organ system risks being missed by an imager not specialised in that body part. Clearly, such a miss would have dire consequences for the individual patient, but would be rare and also be more than compensated for in the total population by the infinitely larger number of patients who will benefit substantially from a timely specialist opinion giving an accurate diagnosis of the organ pathology in question.

Radiology as an Integrated Discipline

If radiologists are to become a collection of organ-specialised imagers, I would advocate that (taking the UK system) the Royal College of Radiologists should gradually mutate into a college of imagers, uniting imagers from all the different medical specialties into one body with common standards of imaging excellence, promoting uniform best practice in imaging.

To become accredited as a specialist organ-imager, it should be necessary to pass the appropriate module of a specialist FRCR (or "FRCI ", where I stands for "imaging"!), set by this college of imagers. The situation in radiology has already progressed substantially in this direction, e.g., dedicated breast radiologists now have little in common with other radiologists, and radiologists who never perform mammography are unlikely to attend specialist national or international meetings on breast radiology or breast disease.

Conclusion

The evolution of specialist organ-based imagers is inevitable, driven by the need to provide specialist expert imaging opinion at MDTMs. To add value in image interpretation, over and above an opinion expressed by an organ specialised physician/surgeon, an imager must dedicate him/herself to the specialist imaging of a single (or very limited number) of organ(s) to become highly competent and sufficiently experienced. Imaging will simply become one sub-specialty within each clinical discipline, and imagers will work closely within individual clinical teams.

The training of imagers will be pertinent only to their clinical practice, and will be aimed at highly specialised state-of-the-art imaging in both expertise and equipment. This will provide a streamlined service to patients, with an efficient "one stop shop" investigation and treatment of the clinical problem by a dedicated clinical team and could potentially reduce waiting lists. Such practice will be predicated upon initial referral to the appropriate clinical team, which is why there will, in my view, always be a role for the general practitioner and the more general emergency medicine doctor responsible for the initial triage of the patient into the most pertinent clinical discipline.

EDUCATION AND TRAINING IN RADIOLOGY

The Experience in Italy

In Italy, there are thirty-eight universities to which students may apply in order to enter medical school. A very competitive admission test is obligatory in order to begin the six-year medical school training. In this period, medical students are exposed to radiology and related topics in several of their mandatory courses, namely: medical physics, diagnostic imaging, radiotherapy and medical oncology and neurological sciences.

After successful completion of medical school and after a period of practical training, young doctors may apply for admission to one of the residential programmes, which is offered by the universities. Admission is based on the medical school curriculum of the candidates and on the results of a complex admission test whose characteristics are described on the following webpage: http://scuole-specializzazione.miur.it/index.html

AUTHOR

Prof. Davide Caramella

Associate Professor of Radiology

Department of Diagnostic and Interventional Radiology
University of Pisa
Pisa, Italy
caramella@med.unipi.it

Residency Programmes

Presently, all residency programmes in diagnostic and interventional radiology are four years long, although in the near future a five year residency programme will be implemented. The residency programme covers all main subspecialty fields of radiology and allows the resident to gain experience of both diagnostic and interventional aspects of the discipline. Special emphasis is given to teaching and discussing appropriateness criteria for diagnostic exams and interventional procedures. An in-depth study is devoted to radiobiology and radiation protection. No management course is provided during residency, as radiological education in Italy is mainly clinically oriented.

At the end of a very intense full-time programme, in which residents are required to rotate in all the different sections of their departments, they have to pass a final examination that includes the discussion of a thesis, which has the typical format of a scientific paper. After completion of the programme, all residents who have successfully passed the examination, can start working as certified radiologists in private practices, as well as in public and private hospitals and clinics

Continued Education

During the professional life of radiologists, there is no formal re-certification exam, but it is required that all radiologists, as any other medical professional in Italy, accumulate CME credits in order to prevent obsolescence of their professional knowledge. Overall, the radiological profession in Italy is enjoying a very good phase. Presently there is no evidence of radiological unemployment in Italy. The proportions of young and female radiologists are constantly increasing and due to the competitive access both to medical school and to residency programmes, the quality of new professionals is reaching a high standard of excellence. This may explain the very high number of abstracts submitted by Italian radiologists to the ECR 2007, that successfully passed the peer-review process. It is noteworthy that the number of Italian educational exhibits is second only to Spain, another country in which a very active radiological community is flourishing.

Another characteristic of Italian radiologists is their marked interest in e-learning, as a part of their continuing education. This is well-documented by the active participation of Italian radiologists in Eurorad, the e-learning initiative of the ESR, as authors, reviewers and readers. This highly merited teaching file database is accessible at the address: www.eurorad.org.

The Italian Society of Radiology (SIRM) is actively upgrading its systems to satisfy the growing requirements coming from its members in terms of innovative services. The SIRM website is constantly updated by Prof. Biagio Merlino and his team, in order to provide, for example, all main official documents produced by the society that may be needed in daily practice as well as for research purposes. A sample of this wealth of data that is freely available, can be viewed at the address:
http://www.sirm.org/professione/lineeguida/. On the website, members of the scientific society may read issues of "La Radiologia Medica", downloading individual articles (written in Italian and English) as .pdf files and can gain access to many challenging "quiz" cases.

ANNUAL **JFR CONGRESS** REVIEW

As well as a scientific congress and technical exhibit, the 2006 edition of the 'Journées Françaises de Radiologie' (JFR) meeting, welcomed radiologists, physicians, technologists, industrial and all other healthcare professionals. As with each year, the JFR assembled numerous French and French-speaking radiologists, actors and industry representatives from all horizons. Strengthened by participation levels in excess of 16,000, over 600 posters and over 90 scientific and educational sessions, the JFR allowed attendees to refresh their knowledge of the latest developments in the field of medical imaging and to assess their impact on practical, organisational and economic concerns.

New Additions to the Congress

New additions to the scientific and educational programme for 2006 included the following workshops:

- Integrating the Healthcare Enterprise (IHE);
- Management;
- Practical oncology;
- Interventional radiology;
- Virtual colonoscopy; and,
- Accredited training in radioprotection.

By organising an accredited training session on radioprotection of patients, the SFR wished to raise awareness for its members, of the consequences of the application of the Euratom 97/43 Directive. Through its organisation, in association with CERF, of a series of classes for advanced imaging, it demonstrated on a practical level, that this Directive will be absorbed into our profession during the next five to ten years.

Also, in its role as a medical and informatics management congress, it demonstrated the most innovative propositions, with regards to medical healthcare networks for radiology. As an interface between imaging and informatics it held demonstrations of the applications of integrated informatics solutions on essential themes such as aiding diagnosis and treatment decisions, security of transactions, networks, training and research and the electronic medical record. Its technical exhibition included more than 120 exhibitors presenting their products, equipment and new technologies.

Three New Honorary Members of the JFR

Prof. Guy Frija, Secretary General of the Société Française de Radiologie (SFR), welcomed three new Honorary Members of the Society, namely Prof. Antonio Chiesa, Brescia, Italy, Prof. Iain McCall, Oswestry, UK and Prof. Elias Zerhouni, Bethesda, USA.

In his laudatio, Prof. Francis Joffre explained the significant work performed by Prof. Chiesa throughout his distinguished career, not only within Italy but all across Europe. Furthermore he drew attention to Prof. Chiesa's devotion to the crucial importance of good management practices in ensuring the future of radiology.

Prof. Bruno Silberman then gave an account of the professional achievements of Prof. Iain McCall. In his role as the the Vice-President of the European Society of (ESR), he continues to unify and promote the cohesiveness of the profession of radiology. He also pointed out McCall's dedication to the importance of good management practices, demonstrated by his role as Editor-in-Chief of IMAGING Management.

Prof. McCall thanked the SFR for this honour and pointed out his own personal close ties to France, having spent time there during his early career.

Finally, welcoming its third new Honorary Member, Prof. Norbert Vasile praised Prof. Elias Zerhouni as an international leader of his profession. Having studied in Algeria, his exemplary career path brought him to leading medical institutions such as Johns Hopkins University Hospital.

WWW.SFRNET.ORG

continued from p.20

about resources (a holy place!). In this way, you are provided with accurate, informed viewpoints on the reality of the situation in every area of the department, without losing touch with what's going on or getting over-involved. Also advisable, is a clinical advisory board, which is a meeting between the main clinical heads (customers). In this way you can cover all the necessary ground, distilling the essential information and continuing to perform in the optimal way. Compulsory training for the metaradiologist, should include working with the following associations: MIR, AUR-E, ECR, RSNA, and general management competences for meta-radiologists should be covered through other courses and lectures. There is no doubt that a meta-radiologist needs to be informed by comprehensive training in management.

The term metaradiology, covers knowledge about radiology and proper leadership and governance of a radiology department. Metaradiology is an approach that does not necessitate detailed knowledge or practical information about specific radiology procedures and interpretation of examinations, but rather methods for planning, modelling, organisational learning, education and research (associated sciences included).

RSNA CONGRESS REVIEW

The 92nd Scientific Assembly and Annual Meeting of the Radiological Society of North America (RSNA) saw attendance increased by three percent from last year. The congress included 1,625 scientific papers in 17 subspecialties, more than 300 refresher courses, 1,428 education exhibits and 638 scientific posters. 738 technical exhibits occupied 514,800 square feet, an increase of six percent over last year.

Opening Address

Kicking off RSNA 2006 was President Robert R. Hattery, who urged attendees to renew commitment to professionalism. Hattery said physicians should engage in self assessment and periodically gauge themselves against medical standards. They should teach and mentor, proactively deal with unprofessional behaviour and help bolster public confidence in medicine. Meanwhile, the congress itself showcased some of the most recent and cutting-edge research available.

Showcasing Leading Research

Back Pain and the Brain

Using diffusion tension magnetic imaging technology on a 1.5 Tesla platform, German researchers suggest their findings may be helpful to patients with chronic low back pain whose condition is often greeted with skepticism from friends, relatives, coworkers, doctors and insurers. "Many of these people go from doctor to doctor and are told they can't find anything wrong, yet the pain they suffer is real," said Jurgen Lutz, a resident in radiology at the University Hospital, Ludwig-Maximilians University, Munich. Dr. Lutz enrolled 20 patients with chronic low back pain who had no apparent cause for the pain and compared their brain functioning with diffusion tensor imaging with 20 matched individuals with no back pain. "There appears to be structural changes in patients with pain in certain parts of the brain," Dr Lutz explained. He said there appeared to be increased trafficking of signals along neural highways that usually carry pain messages in the brain.

Ultrasound and Breast Cancer

Fifty percent or more of negative breast cancer biopsies performed in the United States might be eliminated if tests support preliminary findings using ultrasound "elasticity" testing. The non-invasive tests showed 100% sensitivity and 99% specificity in a pilot study involving 80 women who required a diagnosis for breast lesions. "If the use of the ultrasound elasticity test is extended into general treatment, I think we would be able to make at least half the biopsies being performed for breast cancer unnecessary," said Richard Barr, Professor of radiology at Northeastern Ohio Universities College of Medicine. Using ultrasound "elasticity" testing, patients undergo a standard ultrasound test in order to visualise the lesion seen on mammography. Then a second ultrasound examination that takes about two additional minutes is performed. The second test, in Dr Barr's trial, was performed with Siemens Ultrasound equipment and software - a system recently approved by the Food and Drug Administration. This system highlights certain characteristics of the lump, including its size and how much the lesion moves or stretches.

Radiofrequency Ablation and Lung Cancer

In lung cancer patients where surgery is not an option, the use of radiofrequency ablation of tumours can be performed with a low incidence of major complications. "We had a 9% rate of serious complications in 100 procedures to ablate primary lung cancer tumors or metastases in these patients," said Laura Crocetti, Assistant Professor of radiology at the University of Pisa, Italy. "We also had 16 minor complications." One patient died due to pneumothorax refractory to treatment, she said. The major complications included pneumothorax requiring drainage in four patients and hemothorax that was treated conservatively in three patients. Dr Crocetti said those complications occurred immediately or shortly after the ablation treatment. Two other major complications occurred within 30 day after the treatment. "Overall, however, we have shown that radiofrequency ablation of lung malignancies is associated with acceptable rates of complications in a large series of consecutive cases," Dr Crocetti said.

Smoking and MR Spectroscopy

Imaging studies that compared smokers to non-smokers found smokers have depleted levels of several key chemicals in the brains. By using proton magnetic resonance spectroscopy, Okan Gür, MD, a fellow in radiology at the University of Bonn, Germany, demonstrated that while smoking can create chemical imbalances, by quitting smoking those chemical changes can be reversed. "This is the first imaging study to focus on the relationship between brain metabolites and nicotine dependence," Dr Gur said. In particular, researchers were attempting to see the impact of smoking and smoking cessation on concentrations of the key amino acid N-aceytlaspartate (NAA) as well as total creatine and choline. Low levels of these chemicals are associated psychiatric and mood disorders, including schizophrenia, Alzheimer's disease, bipolar disorder and substance abuse.

AUTHOR
Harry Granito
Chief Operating Officer
Ross School of Business
University of Michigan
Michigan, United States
hgranito@bus.umich.edu

HOW TO...

MANAGE EMPLOYEES IN A RADIOLOGY DEPARTMENT

PART TWO: EMPLOYEE MANAGEMENT STRATEGIES

Cost-reduction and Employees

Every hospital must remain diligent in expense management, and typically the focus of hospital administration is to reduce the cost/exam to the bare minimum. However, this is the wrong emphasis for a radiology department. Radiology departments need to focus on throughput as a priority and the staffing levels needed to produce high throughput are higher than if you focus on achieving the lowest cost/exam. Let me provide a hypothetical example: One technologist (tech) ($50,000/yr salary) can do 20 exams/day, but if you add a tech assistant ($30,000/yr salary), together they can do 30/day. Assuming 365 days/yr, the first method costs $6.85/exam while the second costs $7.30/exam. However, by doing more cases per day, the patient waiting list and response time is shorter, thereby contributing to a shorter length of stay. A shorter length of stay is the key to hospital financial success in a DRG-based payment scheme. Further, at least in the US, the financial margin on outpatient exams is significant, and by doing more outpatient exams, one can make a greater total margin.

Dealing with Difficult Staff Members

Certain employees can be difficult because behavioural deficiencies are harder to address than technical ones, as they are harder to quantify and as a result are more easily rejected or denied by those with the problem. Problems can either be directly observed by the manager, or more frequently brought to the attention of the managers by others. It is particularly important to have HR be a partner with management in these types of issues because you need them to support the final decision, which could be termination. Having them be part of the solution is better than them questioning the process at the end when the employee grieves. We always put in writing, and post in the work unit, the set of behavioural expectations, with a clear statement as to the consequences of not following them. It is also important for supervisors to model these behaviours to the staff. Finally, the annual performance evaluation must be done in a constructive tone and not avoided or minimised by the managers who often find this task conflict-producing and painful for both them and the employee.

Continual Staff Problems

Continual staff problems are often a result of one or more of the following:

- Continual poor supervisors and managers;
- Expectations (behavioural and technical) of staff not clearly set; and,
- Poor internal communication.

Internal communication is extremely important. Keeping the workforce knowledgeable about the environmental and political pressures being placed on the department, often draws the department into a tighter unit. When staff doesn't know the details they often believe in rumours. To accomplish this, I held a monthly meeting of all supervisors in the department. Also monthly, I held a meeting of all the technical managers and yet another of the eight senior administrators who formed the senior leadership team. I expected each section in the department to hold all employee meetings. In addition, a senior administrator met with each new employee approximately six months after their hire to discuss their satisfaction and transition into the department.

Staff Motivation

Without a reward and recognition (R&R) programme it is not possible to achieve maximum staff motivation. Our R&R programme consists of a range of options for supervisors to use, from giving out coupons worth $5, to restaurant coupons worth $25 - $35, to one-time payments up to $1000 and more, as well as rewards of time off from 15 min to 1 hour/day. In addition to these we always tried to link the work performed by the staff, with the overall success of the department. For example, when we were ranked #1 (NIH funding), I made lapel pins for all employees and we had a celebration. Having the success of the department drive the satisfaction of the staff is the ultimate goal. Lastly, we created multiple career paths for various types of employee, and the staff were motivated by the promotional opportunities. For example:

- Clerical to tech assistant;
- General tech to specialised tech;
- Clerical to PACS assistant;

Good Staff Morale in a Crisis Situation

Communication is a key ingredient to keeping up morale during a crisis. Staff wants to be informed of the facts, and feel if they work together, can survive the crisis. A number of years ago I was given a significant cost reduction target exceeding 15% which meant that eliminating positions could not be avoided. Every effort was made to transfer and re-train staff into critical vacancies and to not backfill and eliminate in areas where we could pull together and survive. We stressed we would treat all units consistently. Rather than allocate the 15% reduction evenly across all sections, we collectively analysed all units and made variable cuts with the goal of having every unit feel the brunt equally. When staff feel they are being treated 'fairly' and with respect, morale remains relatively high.

INTERVIEW WITH
PROF. CHRISTOPHER ZOLLIKOFER

Blending biomedical imaging on living subjects with fossil imaging: *The Dmanisi project*

INTERVIEWEE
Prof. Dr Christoph P.E. Zollikofer
Anthropologisches Institut
und Museum
Universitaet Zuerich-Irchel
Zurich, Switzerland
zolli@aim.unizh.ch

How did you come to be involved in the Dmanisi research project?

My original training is in neurobiology. During my postdoctoral studies in computer science, I got involved in paleoanthropology. My specific involvement in Dmanisi goes back to the late nineties, before the "big finds" were made. We were joking about the hominin fossils that might appear on the site, and asked David Lordkipanidze, the project leader in Georgia, to send us an email when they were located. This happened just one year later. Work in Dmanisi has now evolved into an international research project under the auspices of the Georgian Academy of Sciences, including colleagues from Germany, the US, France and Spain.

What are the origins of your project?

The original idea was to combine biomedical imaging and computer graphics to implement new tools to reconstruct fragmentary and distorted fossil hominins in virtual reality, to maximise relevant biological information with a minimum of invasiveness. We used these tools to reconstruct Neanderthal specimens from birth to adulthood and to compare their development with that of our own species.

For more than a decade, the team included just two researchers; my colleague Marcia Ponce de León, then a PhD student, and myself, then a postdoctorate. Our expertise was relatively broad (general biology, computer science), but it was a major challenge to bring together a diverse array of research approaches and technologies.

Who are the main supporters of the project?

Originally funded by the Swiss National Science Foundation, we received major support from Prof. Peter Stucki, former Director of the MultiMedia Lab at the Dept. of Computer Science, Univ. of Zurich. Interestingly, he was a former IBM manager, who went back to academia.

Which imaging technology was used to carry out your project?

We used computed tomography (CT), both medical and industrial.

How have international collaborations with other anthropologists helped your project?

We were quite alone regarding methodologies and technologies. Classical anthropology was rather sceptical about the use of computerised methods. However, the entire project would have been impossible without the collaboration and support of anthropologists in giving us access to the precious original specimens and permitting them to be CT-scanned.

How has modern imaging technology provided information on the specimens?

3D reconstruction was a crucial step, particularly because it is non-invasive. Using CAD paradigms, it can be cast into a rigorous scientific framework, which can be tested and replicated by other scientists.

Imaging technology provides volume data from fossil specimens, in other words, it is possible to have a look inside the specimens without touching them. Applying image processing technology such as data segmentation and 3D reconstruction, permits inspection and interactive manipulation of virtual fossils, as well as acquisition of quantitative data with complex virtual measurement tools.

Is imaging technology becoming more commonly used in paleoanthropology?

We now see a real 'hype' in applying imaging technology to fossil specimens. There was a switch of paradigms, so that it is now fashionable to scan almost everything. However, we need to keep in mind that imaging technology is a tool for scientists, like a Steinway piano is a tool for musicians. The piano itself does not produce high-quality music, we need a good score and, more importantly, skilled and knowledgeable musicians.

What is foreseen for the future of the project?

One especially interesting area of research is to blend clinical biomedical imaging on living subjects with fossil imaging, to learn more about how fossils were when they were living beings.

IMAGING Management

Subscription Form
for Imaging Management

Title & First Name:

Surname:

Job title:

Institution:

Address:

Postcode & City:

Country:

Telephone:

Email:

Subscription Rates (6 Issues / Year)

One year	❑ Europe 85 Euros	❑ Overseas 105 Euros
Two years	❑ Europe 150 Euros	❑ Overseas 180 Euros

How to Subscribe?

- Send an email with name and address to subs@imagingmanagement.org;
- Complete this form and post it to 28, rue de la Loi - B-1040 Brussels - Belgium;
- Complete this form and fax it to +32 2 286 8508.

Medical Doctors (respond below)

1. What is your occupation? (check only one)
   - ❑ Diagnostic Radiologist
   - ❑ Other Physician (please specify)

1a. 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)

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

Non-physician professionals (respond below)

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

Administrator/Manager:
- ❑ Radiology Administrator
- ❑ Radiology Business Manager
- ❑ PACS Administrator

Executive
- ❑ Chief Information Officer / IT Manager
- ❑ Chairman / Managing Director / Executive Director
- ❑ Chief Financial Officer / other executive titles

Other
- ❑ Medical Physicist
- ❑ Academic
- ❑ Chief Technologist / Senior Radiographer
- ❑ Manufacturer
- ❑ Business Consultant
- ❑ Distributor / Dealer

All respondents reply to the questions below

2. In what type of facility do you work? (check only one)
   - ❑ 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)
   - ❑ Diagnostic X-ray
   - ❑ Nuclear Imaging
   - ❑ Interventional Radiology
   - ❑ CT
   - ❑ Ultrasound
   - ❑ MRI
   - ❑ Mammography
   - ❑ Bone Densitometry
   - ❑ PACS/Teleradiology
   - ❑ Cardiac Imaging
   - ❑ PET
   - ❑ Echography
   - ❑ Angio/Fluoroscopy

FAX BACK TO +32 2 286 8508

Key Seminars & Conferences

JANUARY 2007

25 – 26 12TH EUROPEAN SYMPOSIUM ON ULTRASOUND CONTRAST IMAGING
ROTTERDAM, THE NETHERLANDS
http://www2.eur.nl/fgg/thorax/contrast

FEBRUARY 2007

1 – 3 MR 2007: 12TH INTERNATIONAL MRI SYMPOSIUM
GARMISCH-PARTENKIRCHEN, GERMANY
www.mr2007.org

25 – 1 HEALTHCARE INFORMATION AND MANAGEMENT SYSTEMS SOCIETY ANNUAL MEETING
NEW ORLEANS, UNITED STATES
www.himss07.org

MARCH 2007

8 EUROPEAN SOCIETY OF BREAST IMAGING (EUSOBI) CONGRESS
VIENNA, AUSTRIA
www.eusobi.org

9 – 13 EUROPEAN CONGRESS OF RADIOLOGY
VIENNA, AUSTRIA
www.ecr.org

15 – 20 32ND ANNUAL SOCIETY OF INTERVENTIONAL RADIOLOGY (SIR) MEETING
WASHINGTON DC, UNITED STATES
www.sirweb.org

19 – 21 BRITISH NUCLEAR MEDICINE SOCIETY SPRING MEETING 2007
MANCHESTER, UNITED KINGDOM
www.bnms.org.uk

20 – 23 PACS 2007 ANNUAL CONFERENCE
SAN ANTONIO, TEXAS, UNITED STATES
www.urmc.rochester.edu/pacs2007

APRIL 2007

25 – 28 55TH ANNUAL MEETING OF THE ASSOCIATION OF UNIVERSITY RADIOLOGISTS
DENVER, COLORADO, UNITED STATES
www.aur.org

MAY 2007

9 – 12 57TH ANNUAL NORDIC RADIOLOGICAL CONGRESS
MALMO, SWEDEN
www.nordiccongress.org

16 – 19 GERMAN RADIOLOGY CONGRESS ANNUAL MEETING
BERLIN, GERMANY
www.roentgenkongress.de

19 – 25 ISMRM/ESMRMB JOINT ANNUAL MEETING
BERLIN, GERMANY
www.ismrm.org

JUNE 2007

3 – 7 44TH ANNUAL EUROPEAN SOCIETY OF PAEDIATRIC RADIOLOGY MEETING
BARCELONA, SPAIN
www.espr2007.info

11 – 13 UK RADIOLOGICAL CONGRESS 2007
BIRMINGHAM, UNITED KINGDOM
www.ukrc.org.uk

12 – 15 EUROPEAN SOCIETY OF GASTROINTESTINAL AND ABDOMINAL RADIOLOGY (ESGAR)
LISBON, PORTUGAL
www.esgar.org

27 – 30 25TH EUROPACS ANNUAL CONGRESS
BERLIN, GERMANY
www.europacs.org

27 – 30 21STCARS 2007 ANNUAL CONGRESS
BERLIN, GERMANY
www.cars-int.org

SEPTEMBER 2007

8 – 12 CARDIOVASCULAR AND INTERVENTIONAL RADIOLOGICAL SOCIETY OF EUROPE (CIRSE) ANNUAL CONGRESS
ATHENS, GREECE
www.cirse.org

IMAGING Management

IMAGING MANAGEMENT
28/7, rue de la Loi
B-1040 Bruxelles, Belgium
T: +32/2/ 286 85 00
F: +32/2/ 286 85 08
www.imagingmanagement.org

PUBLISHER
Christian Marolt
c.m@imagingmanagement.org

MANAGING EDITOR
Dervla Sains
editorial@imagingmanagement.org

INTERNATIONAL EDITOR
Edward Susman
ed@imagingmanagement.org

EDITORS
Ilze Raath
Caroline Hommez
Sonja Planitzer

GLOBAL COMMUNICATIONS
Dr Don I. Idrees
d.idrees.cd@imagingmanagement.org

JOURNAL MANAGEMENT
Katya Mitreva
office@imagingmanagement.org

ART DIRECTOR
Astrid Mentzik

SUBSCRIPTION RATES
1 year:
Europe €85, Overseas €105
2 years:
Europe €150, Overseas €180

PRODUCTION AND PRINTING
PPS
Print run: 12000
ISSN = 1377-7629

European Society of Radiology ESR Congress

: imaging generations

ECR 2007

March 9–13, 2007
Vienna, Austria

REGISTRATION AND HOTEL BOOKING ONLINE until February 25

myESR.org

Be part of it!

16,000 Participants
92 Countries
270 Scientific and Educational Sessions
1,700 Accepted Proffered Papers & Exhibits
62 % Rejection Rate
CME Accreditation
25,000 m² Technical Exhibition
200 Companies

ESR Membership
... coming soon!

The annual meeting of the European Society of Radiology

you can

Canon

Canon DR: Nothing compares

Enhance workflow efficiency and speed up patient throughput with our economical and versatile DR anywhere solutions. Less DR rooms are needed compared to conventional technology.
You can cope better with critically high workloads whenever they arise. Just one staff member can handle DR imaging with ease. Only Canon can offer the extensive DR range and the vision to make it all possible. See for yourself: nothing compares.

Whatever situation you encounter as a Radiographer or Radiologist, with Canon Digital Radiography (DR) solutions you can create your images instantly, right where you need them. The world's first portable flat panel detector - the Canon CXDI-31 produces exceptional image quality and combines this with unsurpassed versatility in trauma situations.

The world's largest portable flat panel detector - the Canon CXDI-50G, when connected to a mobile or portable X-ray unit, brings Canon DR technology anywhere that you can imagine; from ICU to operating theatre and from nursing home to rescue scenes - anywhere in the world.

See it in action now at the ECR 2007
Hall A - Booth number: 104

www.canon-europe.com/medical
medical.x-ray@canon-europe.com