Laughing gas likely cause of babies’ deformities

Six babies born to nurses in the Leynburg Hospital, The Hague, have serious deformities. Following a confidential investigation by Nijmegen University Medical Centre, the inhalation of the anaesthetic laughing gas was blamed for these abnormalities. During pregnan-

cy, the mothers, who worked as nurs-
es in the delivery room, would have inhaled the gas when changing gas cylinders and when removing masks from women who had been given it as an anaesthetic during delivery. The nurses were unaware of the dangers, and that in the second and third month of pregnancy defects can occur in the unborn.

Six of the 19 children born to nurses who worked in the obstetrics department, between 1994 and 2004, were born with gullet, anus, lips and palate, and heart defects - a figure regarded as very high by Nijmegen University. In addition, two children have Down’s syndrome and a remarkable number of the nurses are infertile.

Laughing gas, discovered 233 years ago, is nitrous oxide, N₂O (dinitrogen oxide). This colourless, non-

Toxic gas is odorless and tasteless, and is dissociative - i.e. when inhaled, it can produce disorientation, euphoria, numbness, and loss of motor co-ordination. If too much is inhaled too quickly, the gas can also produce mild nausea or lingering dizziness and loss of consciousness. N₂O is thought to enteract with the plasma synapses. Long-term use of this gas, in large quantities, has been associated with anaemia and neuropathy.

The investigators conclude that exposure of the then pregnant nurses to Entonox (based on laughing gas and oxygen) is the most probable cause of the serioushandicaps.

In October 2004, healthcare inspection authorities ordered that the use of Entonox be minimised. Meanwhile, Levenig Hospital stopped using Entonox, although they advised that there is no relation between Entonox and the defects.

Labour inspectors have decided to investigate all hospitals on the use of the gas in delivery rooms and first aid units. In the next three months, all hospitals will receive a questionnaire on its use, and advice that this gas is dangerous to women in the early stages of pregnancy. At the beginning of 2006 all hospitals will be inspected.

The inspection is an expansion of an investigation on anaesthetic gases and anti-cancer drugs in operating theatres, which had been planned earlier. In that investigation delivery rooms were not included.

Action, lights, camera... First European surgical studio goes live

The operating ‘theatre’ exists no longer. At the Trondheim University Hospital (Trondheim University Hospital, Norway) where Europe’s first operating studio officially opened this May. Now medical stu-
dents no longer crane their necks to study surgical procedures. Thanks to this exciting new audio-visual concept they can see more, hear more and learn more.

In two new, adjacent laparoscopy theatres, endoscopes are mounted, each controlled by a touchpad at the surgical site. From these, audio-visual communications about the surgical procedures tak-
ing place are relayed to medical stu-
dents in the auditorium above. And although the third auditorium is still used for the viewing area, the Trondheim students observe the procedures in a long room that has low windows set above the the-
aure. There they sit, at 20 tables laid with monitors, keyboards and headphones, eyes moving from the monitors before them, to study on three even larger flat screens facing them, the highly refined medical sur-
ic events within the body of the patient below. Certainly the images obtained, without the need for magnification, have remarkable clarity, and the system is set to improve students’ understanding beyond anything they could have learned by hovering in the theatre itself, hoping for a better view of surgery.

Their lecturers, with own PC set-up, teach via VIBES, projector, and plasma monitors with sound, and the room contains another camera for audio-video discussions with the surgical team. RCM, DICOM, VIBES applications are also controlled in this room. Microphones in the ‘studio’ and auditorium are used for questions and answers, as are loudspeakers.

In the auditorium, the complexi-
ty of transmission from surgical teams to students and for the addi-
tional services, such as archiving, are underlined by the banks of computers stacked high in a small room to one side, and the many more tiered in two discrete cabinets.

Between the two theatres below is the ‘studio’ control room, which continued on page 2.
The operating 'studio' continued from page 4 contains video (standard DV Cam and high-definition); Dicom units (burn CD, forward to server, editing pictures); a control screen for surgeons from operating theatre, and printouts for both operating theatres. For a greater range of video conferencing, which could be accessed by some 200 other healthcare institutes, three advanced video conferencing systems (Dii) have been installed in the system. These were set up from the operating theatre (Hollandia and Siemens), using VBES. Surveillance is also included in these systems, surveillance via video over IP; video on a PC or on a handheld unit, and there are options for programmed recording and storage. Thus surgeons, using their hand-held units, can check the level of preparedness in each area and make decisions to attend accordingly. For example, nurses can be seen scrubbing up, the patient seen arriving, the presence of key personnel checked, etc. This was no mean task to accomplish and the results are superb for both teaching and study purposes. ‘It really is like a studio,’ said the internationally renowned surgeon Ronald Marvek, who is Head of Department, at the National Centre for Advanced Laparoscopic Surgeons of the Netherlands University Hospital, who instigated the installation of the system at St Olavs. ‘It’s changed things for me totally. The students are not nearby, so we have more room in the operating theatre, and we can save on three doctors and nurses.’

Explaining the decisions to dramatically update the theatres, said cardio-vascular surgeon Hans O Myhre, Professor of Surgery at St Olavs: ‘We needed to change our way of working. The organisation was traditional - full of rituals. We also had lots of equipment; it was not easy to co-ordinate an environment ergonomically.' There was also the desire to improve education, surgical and technical research, for example navigation techniques, new stents and grafts.’ He also added: ‘We cannot see so well with our eyes, so imaging is increasingly important in this work. We now have the best possible imaging, which helps us as well as the PhD candidates.’

St Olav’s Hospital and the Norwegian University of Science and Technology (NTNU) were responsible for the project. Working with the research foundation SINTEF they had already placed Trondheim on the international medical map, due to a series of medical technology projects that resulted in national centres of competence for 3-D ultrasound and keyhole treatments. From this, the idea emerged to establish a ‘Future Operating Room’, not just to improve surgical procedures, but also to become a laboratory for research, development and educational purposes.

About NOK 40 million funding for the new buildings and equipment needed was supplied by Helge Midt-Norge RHF, Helgebyg Midt-Norge, NTNU and St Olav’s Hospital, from its research funds.

From theatre to studio

Sony provided the network for visible light images based on high definition video and the Dicom-standard as well as storage, display and medical print solutions in the two operating rooms. This opens up new ways of education and integration of high-resolution images, into digital patient records for more efficient workflow.

Olympus provided the endoscopic equipment, which is centrally managed, and can be controlled by a nurse in the non-stereile area, by a surgeon using a touch-panel or via voice control from the sterile area. All lights, room temperature, curtains, phone controls, are controlled via this equipment. (Live standard and high-definition video in/out and recording, audio in/out; videoteleconference and VBES communication; Dicom picture storage via Siemens modality.)

The first, and presently the only other of this kind of surgical ‘studio’ was set up at a New York hospital, said Vidar Liverod, Nordic Business Manager, Healthcare Professional Services (Siemens). ‘It’s a unique combination of video-end and operating theatre, a multi-layer IT DICOM using high-definition for the first time in the operating theatre - and St Olavs is the first in Europe to install such a system. 50-60% of Sony’s equipment used for the visual imaging at the laparoscopy operating suite is used in broadcast, because there is a similarity between the video-operating situations in which Sony is active: broadcast and healthcare. This evolved from stand-alone to more use in a network environment - to get out of the operating theatre into a network environment.’

Using direct voice transmission the students question the surgeons about the procedure, and he replies as he works, instructing a theatre nurse to close in on the accuracy – or out for a broader view - using the touchpad to control the camera.

During my visit, we watched a two-and-a-half operation carried out by Dr Marvek on an accident victim, needing a colostomy performed by laparoscopy. In the operating room below we watched the patient’s detached abdomen, spiked with laparoscopic video equipment being controlled by the small surgical team.

On the screen in front of me the immaculate theatre walls were visible and even see fine wraths of vapour created by the warmth of the endoscope moving against my eye as the team operated, from the colon. ‘What’s that,’ I asked through the microphone. The answer came promptly from the surgeon holding the scalpel. ‘Well I wouldn’t even have seen it, conventionally.’
Patients’ satisfaction

Brussels - The Netherlands has topped the league in The Euro Health Consumer Index, officially launched in June, at the Health Consumer Summit, organised by Health Consumer Powerhouse (www.healthpowerhouse.com). The Index aims to empower users of Europe’s healthcare systems, by comparing the extent to which various national healthcare systems are designed to meet patients’ demands.

Organisation (WHO) had rated France the world’s top-performing healthcare system, the country came seventh in this study, which concluded that France is ‘slightly authoritarian and not fantastic outcome quality’. Both France and Germany were said to be suffering from an ‘expert-driven attitude’ to healthcare, where information is available only from doctors.

Britain, which has poured enormous efforts into improving its National Health Service (NHS) in recent years, ranked ninth out of the 12. The NHS was highly rated on heart attack mortality, prescription renewals without having to see a GP, and NHS Direct, which provides 24-hour information online or by phone. However, although the NHS was described in general as a ‘Star performer on healthcare information’, and ‘good on heart problems’, it was deemed poor on direct access to consultants; the right to a second opinion; no-fault insurance, waiting times for joint replacements, cancer and heart bypass treatments, breast and colon cancer mortality and MRSA. The bottom line was ‘Mediocre overall performer.’ Countries with the gatekeeper systems, meaning that access to a specialist is only through a general practitioner (GP), appeared to have long waiting lists. Countries where patients are allowed direct access to specialists do not,’ the report points out.

* The Health Consumer Powerhouse is an associate member of IAPO.

Netherlands, Switzerland, Germany lead EU healthcare league

A dozen European countries (see box) were surveyed, and points were given based on 20 criteria. These included access to information; degree of choice; waiting times; care outcomes, access to new therapies, and consumer friendliness. The survey is expected to add a new approach, empowering the consumer to take action. The HCP President, Johan Hjertqvist, said the annual Euro Health Consumer Index provides a new perspective by showing how well Europe’s health systems perform from the patient’s point of view. But, this first effort at producing the index could be improved. Nonetheless, the findings are interesting - and some surprising. Although the World Health Organisation (WHO) had rated France the world’s top-performing healthcare system, the country came seventh in this study, which concluded that France is ‘slightly authoritarian and not fantastic outcome quality’. Both France and Germany were said to be suffering from an ‘expert-driven attitude’ to healthcare, where information is available only from doctors.

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T he Valencia Community Government, applying actual Spanish legislation, has pro-
moted an innovative healthcare model -based on private management of a public hospital.
The model, which began in the Ribera Hospital, in Alzira, has been extended to the Torrevieja and Denia hospitals, and is being implemented in other areas of Spain and Europe. However, not all experts agree with the concept. Alyson M Pollock, Jean Shasool, and Neil Vickers (2002) public-
ished an article against the private finance initiative (PFI) system in the UK, concluding:
● The private finance initiative (PFI) brings no new capital investment into public services and is a debt that has to be serviced by future generations.
● The government's case for using PFI rests on a value for money assessment skewed in favour of private finance.
● The higher costs of PFI are due to financing costs, which would not be incurred under public financing.
● Many hospital PFI schemes show value for money only after risk transfer, but the large risks said to be transferred are not justified.
● PFI more than doubles the cost of capital as a percentage of a trust's annual operating income.

To discuss this, I met with Luis Barcia Albacar, Executive Director of the Torrevieja Hospital in the coastal town of the same name, in the South of Alicante province, and the Vega Baja district. He explained that the hospital, being built on public grounds by a Private Finance Initiative (PFI), which will also pro-
vide healthcare services to the area for 15 years. However, after five years, according to an administrative concession, the hospital will be owned by the Health Department of the Valencia Community Government, so then the PFI will be
and, in return, receives a fixed capi-
tation fee for a 15-year period. PFI needs to make the right decisions, to avoid being penalised by its own patients going elsewhere. The Valencia health department allows the PFI to manage a public hospital during a period of time but, at the same time, ensures that patients in the area receive universal, equal and high quality healthcare like other cit-
izens.
The new public hospital, serving a population of 110,000 residents in 11 municipalities from the Vega Baja, will be the second to be built in the town following San Jaime pri-
vate clinic. It will cost around €80 million and will have 210 rooms, 12 operating theatres and a specific theatre for the intensive care unit.

By Dr Eduardo de la Sota, our correspondent in Spain

The massive increase of interest in patient safety and the limitation of the number of adverse events, which may be the biggest single factor with regard to improving the quality of treatment of patients, has spread throughout most European countries in recent years. This has created a need to exchange experiences and more systematic sharing of knowl-
edge gained in national healthcare services.

At the first EU conference to focus on this subject (Patient Safety - Making it happen. 4-5 April 2005), sponsored by the European Union (EU) Presidency and the European Commission (EC), the adoption of the Luxembourg declaration has made patient safety an important item on the European agenda. Participants at the EC-funded con-
ference were representatives of the medical professions, patients, the healthcare industry, the EU institu-
tions and national authorities.

By adopting the declaration, a starting point has been set to establish a number of permanent forums for patient safety at a European level. The EU is encouraged to establish a permanent forum at a political level and dis-
cuss European and national activities in connection with patient safety. Furthermore, it is encouraged, together with World Health Organisation (WHO)
● to establish a common under-
standing on patient safety issues and to establish an EU ‘solution bank’ with best practice examples and standards
● to include patient safety in the programme of DG Health and Consumer Protection in order to cre-
ate the possibility of support mecha-
nisms for national initiatives
● to ensure that ‘12’ recommendations with regard to medicine and medical equipment are designed with patient safety in mind
● to enhance the development of international standards for the safety

We are pursuing excel-
lence,' Luis Barcia explained. 'We will implement high technolo-
y needs and a modern manage-
ment system, to provide quality of care and generate patient sat-
isfaction. Equity is a key value for us. We will stress the importance of a global information system. We also
need to work hard on efficacy and efficiency. In our model the general practitioner will be an essential element of the system and, using evidence-based

Luxembourg declaration on patient safety

By Dr Jesper Poulsen, Vice President of the Comité Permanent Des Médecins Européens*

The Luxembourg declaration provides a number of recommendations to national health authorities - e.g. that the ‘informed patient’ becomes univer-
sal; that countries consider imple-
menting consumer reporting sys-
tems similar to the Danish system; that risk management becomes stan-
dard, as well as electronic patient records; that national societies for patient safety are established; that the safety level for health profes-
sionals generally is improved; that patients’ safety is included in the standard training of health profes-
sionals, and that national health authorities focus on creating a cul-
ture that focuses on learning from near misses and adverse events instead of concentrating on ‘Blame and shame’ and subsequent punish-
ment.

Finally, the declaration recom-
mands that the European health care approach aimed at enhancing patient safety, and focus on patient safety in the clinic. It also recom-
mands the creation of an open cul-
ture regarding near misses and adverse events, and the initiation of co-
operation between patients/rela-
tives and healthcare professionals, so
that patient/relatives are aware of
near misses and adverse events.

By adopting the declaration the Luxembourg presidency has created its platform for patient safety. The future British presidency has stated that they will follow-up on this important issue.

* Standing Committee of European Doctors (www.cpme.be)
Greece - At the Central and Eastern European In Vitro Diagnostics Forum (IVD), held in June and organised by Roche Diagnostics, a division of the Swiss healthcare firm F. Hoffmann-La Roche, Michael Heuer, Head of Central and Eastern Europe, Roche Diagnostics GmbH, Germany, said: “This is the very first international and interdisciplinary meeting of this kind - covering diagnostics and focusing on central and eastern European countries. Europe and the EU open up many opportunities - as much for business as for scientific co-operation.”

Highlighting areas of Roche’s R&D, Georg Kurz, of Roche Diagnostics GmbH, Germany, described two initiatives: the development of new markers for cardiovascular diseases and oncology, and cobas, the system platform built on three clinical chemistry and two immunochemistry modules.

Michael Heuer, described in his presentation the development of DNA chips that makes new paths accessible in molecular diagnostics: “The AmpliChip CYP450 is an in vitro test based on Affymetrix’s DNA chip technology [a small glass plate the size of a thumbnail on which tens of thousands of DNA fragments are arranged] combined with Roche’s polymerase chain reaction (PCR). With the introduction of the AmpliChip EU in December 2004, the first gene chip with CE-IVD approval for clinical routine diagnostics, the efficacy and tolerance of various pharmaceuticals will be measurable for the first time.

Genetic factors are becoming the basis of future therapies, this leads to personalised medicine.”

Echoing this, Michael S Pepper, of the NetCare Molecular Medicine Institute, Unitas Hospital, Pretoria, South Africa, spoke of the potential of information from the human genome for individualizing medical treatments: “There are important inter-individual differences in response to drugs, both with respect to efficacy and toxicity... pre-treatment assessment of polymorphisms may allow for therapy to be maximally efficacious and well tolerated.” At the end of his speech he stated: ‘given the knowledge we have, and the relative ease with which this knowledge can be accessed, failure to genotype before treatment may one day be considered unethical.’

Apart from the purely scientific exchange, one objective of the conference was to help improve the quality and adherence to the European IVD Directive in laboratories. Tom-ö Zima, of the Institute of Clinical Chemistry and Laboratory Diagnostics, Charles University, in the Czech Republic, discussed the EU IVD directive and its impact on QM systems: “Laboratory medicine, including in vitro diagnostics (IVD), is the backbone in the medical treatment, diagnostics or prevention,” he said. “Laboratory diagnostics influences 70-85% of hospital healthcare decisions and costs between 3-5% of total healthcare costs.” According to Dr Zima, trends indicate that there are expectations for biochemistry, haematology, microbiology, and immunology to grow in a range of 1-5%, whereas in point of care testing (POCT), including glucometers (approx. 10% growth), and in molecular biology, an annual growth of around 25% is expected.

Many of the countries involved in the Forum are either new members of the EU, or not yet members. The speakers, from eight countries, hold posts in hospitals, universities, companies, laboratories or institutions, which guaranteed very different views and interesting national perspectives on the subject.

‘One day, the failure to genotype before treatment may be considered unethical’

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A large PACS system that sends (pre-)exams to various centrally-placed workstations on wards or in the radiology units.

Radiologists have also acknowledged that modern computing systems, such as workstations, PCs and laptops are not suitable for the nomadic and collaborative working styles of clinicians and radiologists.

Imagine a clinician standing beside a patient on a ward and evaluating the patient’s 300 slice CT scan interactively while providing a wireless personal digital assistant (PDA). A fantasy, right? But why should it be so difficult to view radiological images throughout a hospital, or even outside the facility? The Challenge and the Vision – For years this scenario has been the dream of radiologists at Aalborg University Hospital, Denmark.

Aalborg is a multi-site research and teaching hospital. With 900 beds it produces 130,000 radiological examinations annually. A main challenge for the radiology department has been managing data from the four radiology units that are scattered within a radius of 30 km. Even with high-speed and high-bandwidth networks, it is troublesome to view and evaluate large exams, particularly from multi-slice CT scanners. One solution has been to distribute image data via a web-based system, which is a slow process and often results in considerable image degradation due to lossy compression methods.

Another solution has been to install a PACS system that sends (pre-)exams to various centrally-placed workstations on wards or in the radiology units. Radiologists have also acknowledged that modern computing systems, such as workstations, PCs and laptops are not suitable for the nomadic and collaborative working styles of clinicians and radiologists.

Dr. Thomas Wangemann, assistant medical director of Panorama Fachklinik/Scheidegg, explained, ‘Radiologists are often on the move, and need access to medical data at all times. Radiologic images are presented with intensity, contrast and focus, but today it is difficult to distribute information to the PDA in real-time. This is where PACS comes in. It is a powerful tool for radiologists to access medical data anywhere at any time, even outside the facility.

radiology
France - 10 hospitals have installed a Tandberg-based videoconferencing network that links their emergency rooms to the Centre Lusail Hospital in Bichat, Paris. By the end of the year, the 12,000 other PACS systems across the whole country will be connected to this network, which will receive the images from these hospitals.

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France - Coronis Systems reports that its new, tiny OEM wireless card is the first ultra low-power solution to provide a ready-to-use RF chipset (front-end) in which the controlling protocol software runs on a target device’s separate existing micro-controller. The two are linked via simple serial-type connections.

The Wavefront is a front-end radio board designed to provide data communications in ultra low-power products. ‘With this new product, a target device’s existing micro-controller runs its own firmware applications as well as the Wavenis protocol stack to control the Wavefront add-on.’ Costs are kept down because only a single micro-controller is needed, and the industrial quality RF card is controlled by a simple serial bus. The firm also says that the card is ideal for integrators with product volumes up to around 50,000 units. The kit’s software programming tool helps to interface customer applications with the Wavenis communication protocol’s software layers. Customising communication features for specific needs is also said to be easy.

Wavenis is frequently used in heterogeneous networks alongside Bluetooth and Wi-Fi protocols and, in its Wavenis Embedded Technology line, fully integrated modems, and technology licensing are provided.

The Wavenis platform includes the ultra low power RF transceiver and complete wireless protocol stack. Sophisticated mechanisms, such as Frequency Hopping Spread Spectrum (FHSS), data interleaving, and Forward Error Correction (FEC) combat interference (with no increase in power consumption), allowing for simultaneous use with other RF technologies.

Wavenis technology may be used with any standalone device that requires wireless connection within ISM (Industry-Scientific-Medical) frequencies (868 MHz in Europe) and has the functions to create wireless mesh networks with point-to-point, broadcast, polling, and repeater functions.

Details: www.coronis-systems.com
Daniela Lichtenberg MTRA

The 1,100-bed Klinikum Krefeld, is a maximum care institution with 21 clinical departments. In 1995 ours was also the first hospital to go digital and, frankly, at that point I had no clue about what a fully digital hospital would be like - or how it would work.

Here I will mention a few basic facts that need to be considered when you talk about radiology technology being digitised:

- To avoid fear and rumours the employees have to be informed about restructuring from Day 1.
- Each step requires careful planning and a lot of communication.

The more staff is involved the better the new equipment and structures will be. At the end of the day, the older colleagues need to be scared of so much new technology. When they are given sufficient and adequate information early on - or even better - can visit a department where digitisation has already been implemented, they will understand that everyone can learn.

When we started with the introduction of a RIS/PACS our department was not only outdated and thus was entirely refurbished. To install the cabling for the new system we had to open up patient files already in the process and where used to be closed. The more staff is involved the better the new equipment and structures will be. At the end of the day, the older colleagues need to be scared of so much new technology. When they are given sufficient and adequate information early on - or even better - can visit a department where digitisation has already been implemented, they will understand that everyone can learn.

In our April issue, radiographer Helga Fischer described experiences with a new PACS at the University Hospital for Radiodiagnosics, Allgemeines Krankenhaus, Vienna, Austria (EH issue 2/05, P17: ‘PACS: The never-ending story’). In response, Daniela Lichtenberg, medical technological radiologist assistant (MTRA) at Klinikum Krefeld, Germany and F Thanhofer*

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Appendicitis complicated by chickenpox

In our research at the Tooshino City Hospital for Children, in Moscow, we studied cases from 1999 to 2003. 18 cases (3.3 % of all operations for appendicitis combined with infection) were children with destructive appendicitis and chickenpox. Their age ranged between 3.5 to 13 years. Antibiotic-sensitivity was defined by Kirbi-Bauer’s disk-diffusion method.

Two patients had microflora growth in the abdomen - a massive growth of Escherichia coli. In first case Escherichia coli was sensitive to: Ampicillin/Sulbactam, Aztreonam, Cephazolin, Cefotetanum, Cefazidime, Ceftriaxion, Cefuroxum, Cefalotinum, Ciprofloxacinum, Gentamycin, Imipenem, Mezlocillin, Piperacillin, Tobramycinum; it was also stable with Co-Trimoxazole.

In the second case Escherichia coli was sensitive to: Amikacin, Aztreonam, Cefotaxim, Cefotetanum, Cefazidime, Cefuroxum, Ciprofloxacinum, Gentamycin, Imipenem, Ofloxacinum, Tobramycinum, and stable with Ampicillin/Sulbactam, Ampicillin, Cephalotinum, Mezlocillin, Piperacillin.

After surgery, antibacterial therapy was carried out on 14 patients. Penicillins were used to treat 11 patients. Aminoglycosides was used to treat 17 patients. Cephalosporins were used to treat nine patients. Third generation Cephalosporins were used for seven patients. Metronidazole was used in eight cases. Fluoroquinolones were used to treat two patients. The highly effective combination of cephalosporin, aminoglycoside and metronidazole was applied in three cases. It should be noted that three patients received two consecutive antibacterial therapies.

The period in which patients returned to normal temperature after surgery for destructive appendicitis decreased from 8 to one day (average: 3.5 to 1.8 days). For patients operated on for destructive forms of appendicitis, the change decreased from 21 to seven days (average: 11.2 to 3.4 days).

We concluded that for patients with appendicitis and chickenpox combined, the most effective and safe preparation is the third generation cephalosporin Ceftriaxon, which, if necessary, can be combined with aminoglycosides and metronidazole (depending on the severity of the condition).

The preparation is administered once a day, intravenously or intra-muscularly (if there are no pain symptoms). Considering skin abrasions associated with chickenpox and pain symptoms, administration is best via a peripheral or central venous catheter, and care is important - a good measure is to soak the catheter in an antibiotic for 40 minutes before beginning the intervention.

Contact details: S V Stonogin, svat70@mail.ru; D E Viktorovich, phone 949-03-04; V A Chaplin, phone 949-35-68.

For Laryngectomy and tracheotomy patients

Germany - The VoiceMaster, a voice prosthesis launched by Tracoe medical, features a special ball valve system for ultra-low airflow resistance. The device is front-loading for anterograde insertion. Using the loading device with colour indicators, insertion and removal can be carried out under local anaesthetic in an outpatient setting, the firm reports, adding that the Voice Master has a titanium sleeve, with Candida resistant characteristics, which ensures a prolonged lifetime, thus reducing the number of early replacements.

Tracoe’s VoiceMaster Primo - a silicone prosthesis with ball valve made of Candida resistant PTFE material - is for use in primary and secondary retrograde insertion. A large range of accessories is available for both devices.
The effectiveness of cardiac stem cell therapy for myocardial infarction is limited by the ability of the stem cells to differentiate into functional cardiomyocytes. However, recent studies have shown that certain non-muscle cell types, such as fibroblasts, can also be induced to differentiate into cardiomyocytes. This opens up new possibilities for the use of stem cells in the treatment of heart disease.

The use of stem cells in cardiac repair is not without controversy. Some researchers are concerned about the potential for stem cell therapy to cause harm or to lead to adverse effects. However, the potential benefits of stem cell therapy for myocardial infarction are significant, and further research is needed to fully understand the potential of this approach.

Overall, the use of stem cells in cardiac repair offers hope for the treatment of heart disease. Further research is needed to fully understand the potential of this approach, and to develop safe and effective regenerative medicine strategies for the treatment of heart disease.
**MINIMAL INVASIVE PROCEDURE BLOCKS BLOOD FLOW INTO AN ANEURYSM**

Until a few years ago, surgery on intracranial aneurysms was a high-risk intervention. The cranium was opened and the aneurysm was separated from the blood flow by a technique called clipping. However, today, many patients can be treated with a minimally invasive procedure called coiling. In general, the intervention takes only one to two hours. Professor Forsting of the Department for Neuro-Radiology at the University Hospital Essen is one of the coiling specialists in Germany. ‘And it carries far less risk, because the cranium doesn’t have to be opened. Consequently, the patient recovers much faster.’

The surgeon inserts a microcatheter into the femoral artery and navigates it through the vascular system into the head where the aneurysm is located. Soft platinum coils are threaded through the catheter and deployed in the aneurysm. The spirals uncoil in the aneurysm and fill it up entirely, thus blocking blood flow and preventing rupture. If the aneurysm has a wide base, a stent is put in place, which prevents the coil from moving (see illustration).

Clinical trials - both short- and long-term - have proven the effectiveness and the safety of coiling (ISAT study*). Clinical trials - both short- and long-term - have proven the effectiveness and the safety of coiling (ISAT study*).

In economic terms, coiling is cheaper than clipping, because the length of the hospital stay, particularly in the expensive ICU, is reduced significantly.

Technology conversion: Integrating systems into one unit

used clinically in a wide variety of settings. The Clinical Care System aims to combine several of these technology components because, Omar Ishrak explained, ‘Our customers need to use multiple technologies in one product, and we foresee a growing technology conversion, as well as a clinical conversion.’ Eventually, he said, even ultrasound will be integrated in the system, but that will come later.

‘Combining these technologies, then working with airline pilots to enhance the user interface to make a very complicated set of parameters into a very simple set, is really what’s unique - it’s one of GE’s imaginative breakthroughs. An earlier one was Vivid E, a miniaturised ultrasound product. Due to miniaturisation it is possible to integrate Vivid I into the rest of the Care Station products*, which is what I mean by technology conversion - different types of products, previously used separately, can be integrated in one offering. Once you have the technology you can ensure that those products can be used seamlessly - that’s where the airline pilots come in, because, over the past 20 years in the airline industry, more complex instruments and displays have been integrated for easier use.’ Medical device manufacturers have used the aviation industry for some time as an analogy for anaesthesia, explained Hannu Syrjälä: ‘In anaesthesia, first you induce a patient to sleep - a very critical phase, when the anaesthesiologist is very vigilant, just like a pilot during takeoff. When the patient has fallen asleep, the anaesthesiologist keeps him or her safe. When the patient has woken again, the anaesthesiologist becomes very active to ensure everything happens safely - it’s like landing, hence the comparison with flying. So, when building the system, we said: Hey, why not talk to pilots? The Care Station is primarily being developed in Helsinki, where GE acquired Instrumentarium in 2003. So we contacted Finnair, and pilots are helping us to understand critical phases in flying. Pilots receive a lot of critical data. Similarly, in anaesthesia you have maybe ten or fifteen devices, or in a complex operation maybe 20-25 devices showing data. So we want to collect data and present it in a meaningful way to clinicians. ‘Anaesthesiologists use different drugs to obtain the stable conditions for the surgeon, but the drugs affect one another,’ he continued. ‘And, up to now, clinicians had to calculate the effects of those drugs, either on paper or in their heads - typically in their heads. What this model does is simulate the synergy of the drugs. It also looks at events that are going to happen. So, the anaesthesiologist can see when the surgeon needs, say, only five more minutes to stitch the patient up, and he can start lowering the anaesthesia. By metabolising the drugs, taking the dosage down, the patient recovers quicker - that’s very valuable for clinicians and patients, and it reduces drug costs and length of stay. It optimises anaesthesia.

By the end of this year, the new Care Station should be ready for the European market. ‘Germany will be a key market for us,’ said Omar Ishrak. ‘Then Central European and Scandinavian countries and, when we have the capacity, we will spread all over Europe.’

* Full integration of Ultrasound will probably be integrated with Care Station probably in a year or so.

Simple, novel anaeasthetic device still saving 3rd World lives

UK - The Glostavent, an anaesthetic machine designed by Dr Roger Eltringham, consultant anaesthetist at Gloucestershire Royal Hospital, works on or off mains electricity. If the power fails, medics simply switch to reserve oxygen cylinders - which takes about five seconds - even in the dark. In addition, because oxygen concentrate is used the supply lasts up to 14 hours, whilst more traditional machines run out in about 100 minutes. Maintenance and repair are also easier than for more sophisticated machines, which means a running cost saving of about £57 per month. The Glostavent’s purchase price is also under half that of more sophisticated Western machines (euros 22,000 v. euros 90,000). When working in the developing world, Dr Eltringham, who is also a lecturer and member of the World Federation of Societies Anaesthesiology, had found donated equipment from other countries often arrived without operating manuals, or did not work, or needed sophisticated maintenance to keep going. ‘There’s a graveyard of old anaesthetic machines littering countries like Africa,’ he added. The result was a considerable work in his spare time to develop equipment that would work and be cheap to run. Initially helped by Dr Roger Manley, who invented the ‘Manley ventilator technology’ in the 60s, the Glostavent prototype resulted, using that technology to supply anaesthetic. Today about 50 machines, made up of four components commonly used in anaesthesia (the draw-over anaesthesia system, Manley multiventilator, oxygen concentrator and air compressor) are in use in at least 12 countries, in Asia, Africa and parts of Eastern Europe - as well as in the UK. Dr Eltringham said he regularly uses a Glostavent for his own patients. In Shanghai, Republic of China, Dr Quivei Fan who to-date had used the equipment in anaesthesi for over 500 patients, undergoing a wide variety of surgical procedures, said: ‘I found it satisfactory in every case’.

Technology conversion: Integrating systems into one unit

Omar Ishrak, President and CEO of GE Healthcare’s Clinical Systems division, and Hannu Syrjälä, Product Manager at Clinical Systems, describe R&D for the firm’s Clinical Care Systems, in which the experience of airline pilots is being utilised to present data to anaesthesiologists in a more meaningful way. Interview: Daniela Zimmermann, Managing Director of European Hospital.

The Clinical Care System produces point of care devices, including life support systems (anaesthesia), monitoring, ultrasound and diagnostic cardiology, which are

Acute lung injury

World’s leading experts in ventilation research to speak at September’s symposium

The Acute Lung Injury Symposium - from basic science to bedside application, set for September in Strasbourg, has attracted an impressive line-up of international speakers from the USA, Germany, Italy and Spain. The event will be chaired by Professor Arthur Slutsky, Professor of Medicine, Surgery and Biomedical Engineering, University of Toronto, and Professor of Research, Hospital de la Candeleria, Carretas del Rosario, Santa Cruz de Tenerife, Canary Islands; Rolf D Hubmayr, Professor of Anestesia e Rianimazione, Ospedale Maggiore Policlinico, Universita di Roma, Italy; Prof. Stefan Uhlig, Director of European Hospital.

The array of international speakers will focus on mechanisms and therapies related to ventilation induced lung injury and discuss topics ranging from lung recruitment strategies, to cellular and related to ventilator-induced lung injury, will focus on mechanisms and therapies related to ventilation induced lung injury and discuss topics ranging from lung recruitment strategies, to cellular and related to ventilator-induced lung injury, will focus on mechanisms and therapies related to ventilation induced lung injury and discuss topics ranging from lung recruitment strategies, to cellular and related to ventilator-induced lung injury, will focus on mechanisms and therapies related to ventilation induced lung injury and discuss topics ranging from lung recruitment strategies, to cellular and related to ventilator-induced lung injury, will focus on mechanisms and therapies related to ventilation induced lung injury and discuss topics ranging from lung recruitment strategies, to cellular and
**TAP WATER**

an underestimated source of infection

Hospital acquired infections affect about half a million people annually, and water is a serious source of infection – a fact recognised in the *World Health Organisation* (WHO). However, although particularly dangerous micro-organisms, such as Legionella and Pseudomonas aeruginosa, can multiply in a water pipe system, the fact that ‘clean’ water from a tap might present such dangers is frequently ignored.

According to Professor Martin Exner, Director of the Institute for Hygiene, Bonn University: ‘Up to now, between 10,000 and 12,000 Legionella infections have been said to occur in Germany every year. However, recent studies suggest that this number is significantly higher. The incidence of Legionella infections in Germany can be estimated at 25,000 to 30,000 per year. Today we know that at least 40 percent of all Pseudomonas infections, for example in intensive care units, can be traced back to the water pipe system,’ he added.

Experts also indicate that these infections are of significance in the domestic environment, especially for immuno-compromised people. Whilst water companies provide clean water, complex water installation systems provide excellent growth conditions for bacteria and ideal temperatures from 20-50 degrees Celsius. They can multiply in the biofilm, the slimy layer inside pipes, and are protected from disinfection and high temperatures. The organisms can then be transmitted during showers or face and hand washing. If Legionella or Pseudomonas are detected in water, counter measures must be taken by an operator. In hospitals, for example, disposable point-of-use filters, installed on showerheads or water taps, clean water by using high-tech membranes, and these are reported to be efficient.

Details: info@pro-wasser.de

**Antimicrobial dressings**

Novel antimicrobial gels have been added to the range of hydrogel products for moist wound care produced by First Water (www.first-water.com) the UK-based firm that specialises in R&D and mass-scale manufacture of sheet hydrogel products.

The company reports that the dressings are designed to absorb, contain and kill any bacteria that come into contact with the gel or are contained with the exudate. Eliminating the need for preservatives, or antimicrobial agents such as silver, the firm says the gels provide a skin-friendly environment that is antimicrobial to a broad spectrum of species: ‘When independently challenged with C. albicans, A. niger, P. aeruginosa, S. aureus and E. coli, the gels demonstrate their effectiveness by killing these species on contact. As well as reducing the incidence of infection, the gel systems help promote an optimal moist healing environment, for wounds ranging from cuts and grazes to major lesions.’

The wound dressings are backed with a breathable polyurethane bacterial barrier in adhesive-bordered and non-bordered versions. Range size: 75 x 45mm up to 200 x 200mm.

Other products: Hydrogel Skin Adhesives for wound care, ostomy and medical device fixation; Hydrogel Roll Stock for biomedical electrode manufacturers; Delivery of Actives to/through the skin.
**HYGIENE**

**Top class treatment for utensils**

TopLine, the latest range of cleaning and disinfection equipment made by Meiko, of Offenburg, provides high-tech washing, rinsing and disinfection for care utensils such as bed-pans, urine bottles, commode buckets. These machines ‘...revolutionise everything that has gone before and everything currently offered in the market,’ Meiko reports.

As in previous models, to suit structural or space requirements TopLine can be supplied for wall-mounting, free-standing or to be built-in. Complete care units can also be supplied. On delivery, all they need is the power supply connection.

Both standing and cabinet models have manual door operation or, optionally, AT models can have automatic door opening.

The new line is particularly easy to load, Meiko reports. ‘Utensils are positioned in brackets on the appliance’s open door, outside the wash-chamber. When the door closes, the utensils are emptied automatically in the sealed compartment, avoiding the spread of unpleasant odours.’ And, at the end of a programme, a sensor’s open door, outside the wash-chamber, sound-proofed wash-chamber, sound-proofed operation and absolute certainty of achieving a perfect quality of cleanliness and hygiene every time the machine is used. Everything combines to guarantee the best possible cleaning quality and the most effective standard of disinfection possible.

Microprocessor controls, with optimal fine-tuning to meet hygiene requirements, allow the machines to be individually adjusted according to specific needs. Then short, normal or intensive programmes, selected via a touch button on the new switch display, start automatically.

‘The machine’s appearance, its impressive power-cleaning system with lifting jets, its ultra-efficient disinfection technology, its drying system, the innovative MIKE 2 controls using infra-red technology, and much more, are all new,’ the maker reports, adding: ‘Further advantages include a self-cleaning wash-chamber, sound-proofed operation and absolute certainty of achieving a perfect quality of cleanliness and hygiene every time the machine is used. Everything combines to guarantee the best possible cleaning quality and the most effective standard of disinfection possible.’

**Borrelia burgdorferi sensu lato! Real-time PCR rapid detection**

Pathogens transmitted by ticks are a particular hazard during warm summer months, and the most common tick borne disease in Europe is Lyme Borreliosis, a multi-systemic infection often indicated by a local skin rash (Erythema migrans). The causative agent of Lyme Borreliosis is Borrelia burgdorferi sensu lato, which comprises several pathogenic Borrelia species. Infection with B. burgdorferi sensu lato is localized in the early stage and characterized by flu-like symptoms. The untreated infection can develop into a disseminated disease that spreads to many of the major organ systems. In the late stage a persistent infection may develop that causes serious symptoms like chronic arthritis or chronic encephalomyelitis.

Due to the variety of symptoms, clinical manifestation of Lyme Borreliosis is often unclear. The Hamburg-based biotech firm artus GmbH, which manufactures the RealArt Borrelia LC PCR Kit, reports that it offers an optimised ready-to-use system for the specific detection of Borrelia DNA by Real-Time Polymerase Chain Reaction (Real-Time PCR). The method is based on the simultaneous amplification and detection of a specific region of the Borrelia genome, which guarantees high levels of specificity, sensitivity and reproducibility.

The kit also contains an internal control to exclude false-negative results. To ensure optimal sensitivity, it has been optimised to detect low pathogen copy numbers. Various sample materials can be used including ticks, cerebrospinal fluid, synovial fluid, skin biopsies, blood, and culture, artus points out.

www.artus-biotech.com

**Flowers**

**Good for patients - or bad?**

The myth that flowers kept near patients’ beds are not good for their health was examined by the Robert Koch Institute (Berlin) and Drs Klaus Weist and Tim Eckmann at the Charité Hospital, Berlin. The researchers concluded that, on general wards, freshly cut flowers or potted plants, with either traditional compost or hydroponics, cause no harm. Nonetheless, they must be well maintained, to prevent the development of airborne bacteria. Additionally, dried plants should be avoided because they can contain fungi that are airborne. Potted plants should not be kept in ICUs and on wards with immunosuppressed (oncology, transplants) and surgery patients, because the plants could spread aspergillus and other potentially harmful fungi. Here the emphasis is on ‘could’. There is no evidence on actual hygiene-related medical conditions that plants may have caused, and no links between infectious diseases and plants suggested in scientific literature. If the thousands of bouquets in 2,230 German hospitals had any statistically relevant impact on nosocomial infections, the Robert Koch Institute assured European Hospitals, by now we would have known it.

**Conclusion:** Apart from some exceptions from the point of view of hygiene, there is no reason to ban flowers and potted plants from general wards (although visitors and less incapacitated patients should handle their care, to ensure already stretched nurses are not left with yet another task).

*Report: Heidi Henhold*

**NEW Combating latex allergy**

UK - Biogel Eclipse is said to be the first powder-free, De-Proteinised Natural Rubber Latex (DPNRL) surgical glove that can help reduce the risk of developing latex allergy, due to a deproteinsing process involving an enzyme. Regent Medical, which specialises in R&D and production of surgical glove technology and glove barrier protection, produces the Biogel range, and reports: ‘Eclipse is 20% thinner than standard Biogel, 30% softer than Biogel SuperSensitive and still has 30% greater tensile strength than a leading competitor. In a UK trial 80% of users preferred Eclipse over their current glove. Eclipse is also less expensive than non-latex gloves.’

Whilst Eclipse has a low potential for the development of latex allergy and allergic contact dermatitis, Regent Medical cautions that latex-sensitive people should not use the glove.
HPV bio-decontamination

UK - A process that uses hydrogen peroxide vapour to bio-decontaminate dangerous and deadly micro-organisms, has been successfully used in hospitals in Britain (34), Greece (1), France (41), the USA (5), and Singapore (3). The hydrogen peroxide vapour is applied using unique, patented Clarus Technology, developed by Bioquell PLC, based in Andover, Hampshire. The system has been developed throughout the early to mid nineties, predominantly for use in the pharmaceutical industry where it is used in place of formaldehyde, a known carcinogen. Bioquell has developed a number of applications utilising the same technology on different scales, for example, for the decontamination of items of equipment to the decontamination of buildings.

The process involves a team headed by an Engineer. They plan and carry out the decontamination process, which involves isolation of areas to be treated (relocation of patients), transporting the portable equipment and running the cycle, which is controlled via a laptop computer from outside the decontamination zone,” explained Mike Cann, Bioquell’s Business Development Manager.

Following the bio-decontamination process, hydrogen peroxide is catalytically converted to water and oxygen - so that the technology is ‘residue-free’. In addition, he added: ‘The process has no detrimental effect on either the building or equipment within it, including sensitive electronics, such as computers and medical systems. Depending upon the volume of the area to be decontaminated the process is complete within, typically, 6-8 hours, including the removal of the hydrogen peroxide from the room. There is no residue and the room can immediately be returned to use.’ Bioquell teams work all hours to reduce disruption of healthcare.

With hospitals throughout the world battling outbreaks of dangerous or deadly pathogens, this technology has proved effective against MRSA, VRE, Acinetobacter, klebsiella, Clostridium difficile and Serratia, the firm reports. In addition, when used for bio-terrorism ‘cleaning’ the system is reported to be effective against anthrax.

The company offers a Room Bio-Decontamination Service (RBDS) and an Equipment Bio-Decontamination Service (EBDS). Full after-sales service, including preventative maintenance contracts and bio-decontamination, is provided on all the equipment sold in the UK via a team of 40 specialists.

The company also has sales offices in France and the USA. Recently, in the US, an RBDS team was called in to tackle Clostridium difficile, the bacterium that causes diarrhoea and more serious intestinal conditions such as colitis. As a nosocomial threat, this pathogen is increasing at an alarming rate. Latest UK figures reveal that it caused 934 deaths in 2003, a 38% rise in two years. In 2004, there were 43,672 cases. In recent years, Bioquell has worked to provide a unique service to that country’s National Health Service (NHS), to eradicate nosocomial pathogens from hospitals, and the Department of Health HPA’s Rapid Review Panel recently noted that the sporidical nature of the firm’s technology might be of use in relation to Clostridium infection.

Clostridium produces hardy spores that are resistant to normal methods of cleaning and can persist on hands, clothes, bedding and furniture, transmitting the infection to new patients. Alcohol gels used by medical staff to clean their hands between patients, in an attempt to combat MRSA, are ineffective against the spores of Clostridium.

The recent emergence of a more virulent strain of Clostridium in Canada has already infiltrated the USA, and Bioquell was called in. This new strain has caused a particular threat to hospitals because of its virulence and toxicity. Press reports in the UK confirmed that an outbreak of this worrying strain has infected around 100 patients in an Oxfordshire hospital, in the last 18 months. Currently, this is the only hospital in Britain where large numbers of cases of the new strain have been recorded. Bioquell was called in.

Apart from the firm’s bio-decontamination presence in the UK, its first deployment in Europe occurred in 1996, with installations in France and the USA. The firm is in discussion about licensing the RBDS internationally - and it also sells and manufactures Clarus bio-decontamination equipment.

PCR-based sepsis detection test

The culprits: Aspergillus fumigatus, Pseudomonas aeruginosa, Streptococcus pneumoniae

The first clinical trials of a new quick test to detect pathogens, responsible for about 90% of all cases of sepsis, and take about 4-12 hours to run (current methods can take up to 3-5 days). Unlike conventional tests that work with microbiological cultures and identify one pathogen at a time, the new test is said to detect several pathogens at once from a single, whole blood sample.

The manufacturer, Roche, reports that a technically outstanding feature is the MGRADE quality of the reagents used, which are ‘... practically free of microbial generic material that would impair the quality of the results obtained adding that the test ‘opens up new horizons in sepsis diagnosis’.

The firm predicts that this will be ready for the market from the start of 2006.
When it was suggested, during our interview with Professor Erich Reinhard of the Clinic and Radiological Institute, Friedrich-Alexander University Hospital, Erlangen, that SPECT-CT is the little sister of PET-CT, and that he might have preferred to install the 'big brother', Dr Kowert pointed out the greater cost of PET, explaining: ‘The isotopes are more expensive than substances generally used for SPECT – at least in Europe. For example, the substance injected for a PET scan of the glucose metabolism costs around 300 euros. The substance used for bone scintigraphy is between 10 and 30 euros. Correspondingly, SPECT is a workhorse for nuclear medicine departments. For example, in Erlangen we perform 10 times more SPECT than PET examinations. At the university hospital we have a stand-alone PET and we want a PET-CT. But it is difficult to raise the funds. However, I’m sure we’ll have such a camera in the near future, because our clinic will soon have a new building and the budget includes equipment.

For basic research, PET is the more flexible tool, because innovative tracers are more easily synthesized for PET than for SPECT. In addition, the spatial resolution of PET is better than that of SPECT. This is due to the physical nature of nuclear decay of positrons. Scatter radiation can be calculated better and is less compared with SPECT. This is what happens: During the annihilation of the positron, two gamma rays are emitted that move at a 180° angle from each other, whilst with SPECT only one gamma ray is emitted. Consequently, with SPECT the scatter radiation is more difficult to reduce than in PET. This is just one difference. In general, one can say that the diagnostic precision of SPECT is not as good as that of PET. But it is also true that PET requires more radiation doses than SPECT. That means, in the end, SPECT is, as I said, the workhorse. Maybe in the future we’ll see that PET is the case, but today there are far less PET than SPECT scans.

In nuclear medicine, CT with SPECT or PET. The cameras’ CT component also differs, particularly in the number of CT detectors. How many slices should such a hybrid system have? ‘I think every user would answer that question individually, in terms of the particular needs of his or her department. A general answer cannot be given. In cardiology, for example, you need a 16 or 64 slice CT for coronary imaging; in oncology the local standard would be a two-slice, but probably a six-slice would be better. If you use the CT component of PET for diagnostic or correction and rough localisation of SPECT-positive lesions, a one-slice CT is sufficient.’

By what criteria do you decide whether a patient should undergo a SPECT or a PET scan? ‘There is no general answer, because, to a great extent, this depends on the medical indication. One can perform a SPECT following any nuclear medicine exam, but there are special PET indications on oncology. For example, with PET you can perform lymph node staging of a bronchogenic carcinoma, which you can’t do with SPECT. That’s a classic example, since SPECT cannot process the radioactively marked glucose solution used as a radionuclide. Nuclear medicine means that a radiopharmaceutical is injected and there are many of these substances for a wide range of purposes. The diagnostic precision depends on the individual patient and his condition and the situation, and then which camera systems are available. Is that an empirically validated selection? ‘Yes, a further reason is that radio- pharmaceuticals are specifically developed just like any other pharmaceutical. This means that the initial discussion is about which metabolic process would be interesting to image, then radiopharmaceuticals are developed that can “infiltrate” that process. Currently, for research into psychiatric illnesses, the dopamine transporter is used, for example, or a receptor, and we are trying to develop intelligent fusion algorithms to use these receptors - the so-called radioligands. One problem with psychiatric diseases is that, in most cases, there are no animal models. There is no such thing as a schizophrenia mouse. Therefore, we have to use human beings and examine the brain of a schizophrenic patient. To do this we need, above all, imaging technologies that can visualize metabolic processes, and that means nuclear medical imaging: PET or SPECT. The diagnostic value of such scans depends on the radiochemicals used. The brain has many interesting metabolic aspects: receptors, transmitter metabolism, etc. The researchers’ task is to provide substances with which the metabolic steps in question can be visualized in a living person. Hyperactivity disorder is a good example. We know that it probably is caused by a lack of dopamine and that it can be treated - at least sometimes - with dopaminergic medication. But we don’t know much about the receptor systems that are relevant in this context. Their function in the human brain as a whole is only marginally known, because it is difficult to research. It has to be done on the living person, it can’t be done only with a brain slice.’

What is the Working Group on Correlative Imaging? ‘In general, correlative imaging means that one tries to establish a relationship between different data. So, correlative imaging means that you try to establish a relationship between different imaging modalities. In the case of the brain, PET and SPECT are usually combined with MRI but, on the other hand, this is usually done retrospectively - retrospective fusion - because currently hybrid cameras combining these modalities are not available. Why can’t the SPECT problem be solved with fusion? ‘That’s a very good question, and one we’ve been thinking about for a long time. We initiated a research project with Professor Horninger at the Technical University, who aims at developing intelligent fusion algorithms. The problem is that we have to compare data, for example, the positions of a patient in the different camera systems. This is done by non-linear transformations, but calculating them correctly is a major problem. For us, the Working Group on Correlative Imaging does not mean that we have a piece of equipment that we install and that, but that we look at all existing research approaches. This is comparative imaging with the objective to - to generate an image of a patient that has three-dimensional features that are matched with envisaged. The matching procedure could be done with a hybrid camera or with a good non-linear transformation, but that doesn’t exist yet. What is SPECT’s molecular task? ‘SPECT is a form of molecular imaging. Today, molecular imaging is a buzzword. As soon as you visualise a metabolic process in a living human being, that’s molecular imaging. The term has recently been a little overused in marketing efforts for the PET-CT. Molecular imaging is the old term has recently been a little overused in marketing efforts for the PET-CT. Molecular imaging is the old term, but today it is used only in nuclear medicine. For us, the Nobel Prize in 1943 for his discovery that metabolic processes can be studied with radioactive substances. So that’s particularly new. In what situations would PET-MRI be particularly useful? ‘There is an old saying that MRI and CT are complementary. If you combine that with a PET scan, differentiation of liver tumours might be easier. With these findings, PET-MRI would indeed be useful. Basically, MRI is more extensive for brain and musculoskeletal imaging. Furthermore, MRI would add that, due to the fact that the brain does not change much much between the PET scans, the result would be an image fusion will do. The brain undergoes major changes in position and form, no matter how the patient is positioned. But if there were MRI hybrids it would be more interesting to use them, to look at areas outside the brain. It seems that they are still rare, because problems PET-MRI detectors and magnetic fields don’t like each other. But I am sure the PET hybrid system will be used. I am sure the PET hybrid system will be useful and maybe the PET-MRI could be extended to the PET-MRI would indeed be useful.'
Defying physics

**MRI-PET COULD ARRIVE IN 3-4 YEARS**

The MRI-PET will have and we collect cases that show findings that a PET-CT would not detect. For example, we detected a breast carcinoma in a 73-year-old woman, which a CT could not have detected with such clarity. One objective of our clinical co-operation is finding cases that prove that indeed there is an added clinical value and that there are patient groups who would profit from MRI-PET. We must also ask ourselves whether this additional market not only exists but whether it is big enough to warrant the expense. Those are the first steps, and then...? 'Then we will reach the really innovative part. We still have a long way to go and many colleagues will put their shoulder to the wheel. We will celebrate progress and suffer setbacks until we finally have a product.

Now that the veil has been lifted on this project, aren’t you afraid that competitors will jump on the bandwagon? 'We have a head start in terms of knowledge. It will be difficult for the others to catch up. Look at the synergies: Typically engineers who deal with PET haven’t a clue about MRI. In this we are quite a bit ahead, because we have all the experts sitting around one table: colleagues who have worked on semiconductor detectors for years, as well as excellent MRI physicists. Getting these experts together - that’s the real work of art. The results so far are definitely exhilarating and this motivates the team - and enthusiasm creates wings. Once you have wings, you fly.'

Siemens Medical Solutions, described, in an interview with Daniela Zimmermann of European Hospital, the limitations of physics and the potential clinical benefits of hybrid technology - and a hitherto hush-hush MRI-PET project

**A Giant Leap for Molecular Imaging**

We are moving toward a new generation of clinical applications – our contribution to a new standard of care.

**Proven Outcomes in Translational Research.** Siemens’ unique strength is its innovative drive. Our latest Molecular Imaging efforts, for pre-clinical research, have propelled the company into the forefront of future technology. Siemens is rapidly becoming a trendsetter in molecular imaging and in integration of imaging with proteomic and genomic data.

Siemens Medical Solutions that help
Bracco, the international diagnostic imaging and pharmaceutical company, has described molecular medicine as ‘arriving as a blizzard of new genes and their proteins’. Fulvio Uggeri, Director of the Bracco Imaging Research Centre, Milan, outlines ways in which the company is facing the challenges presented by this far-reaching development medical imaging.

The need for medicine are growing and diagnostics has always been the eye onto pathologies. Understanding in good time what will be required of us in the medium to long term, is therefore crucial for planning research and development activities in a company such as Bracco. The consolidated chemistry of recent years, targeted at contrast agents for X-rays, is gradually giving way to an understanding of medicine as a kind of chemistry that is more in keeping with the emerging means of diagnosis. Iodine chemistry is substituting itself with agents that are made of proteins, and is approaching the boundaries of biochemistry and the chemistry of formulation.

Tools that are increasingly effective in the fight against disease and improving the quality of life are being perfected thanks to the parallel growth in molecular imaging and molecular medicine. But what exactly do we mean when we talk about molecular imaging? In short, it is the visualisation in vivo of biological processes at a cellular and molecular level, i.e. an investigation into the infinitesimally small. Diagnostic imaging originated as a collection of techniques to view the organism and the morphological changes associated with disease. From aspects relating to forming, the potential of contrast agents has gradually expanded to functional elements and it is in this aspect that imaging today shows its greatest potential. However, until recently it was necessary to limit the investigation to complex structures, such as the heart, lung, liver, brain. Today molecular imaging has moved towards the sub-structures and are facing pathological changes in their early development. Identifying what is still in its initial stage, i.e. when it can be handled more effectively, is one of the new frontiers of medicine. Prevention is the key to defeating numerous diseases. Up to now the most important molecular diagnosticians have been seen in nuclear imaging, the example is PET, using $^{18}$F, i.e. a glucose molecule containing radioactive fluorine. With cell-therapy the direct detection of DNA and RNA without amplifications, caused by insufficient lab systems is contained only amplifications, caused by insufficient lab systems is contained only interpretations. Lab-on-a-chip technology re-introduces lab-on-a-chip technology re-introduces array technology that facilitates the use of DNA and RNA without amplifications, caused by insufficient lab systems is contained only amplifications, caused by insufficient lab systems is contained only array technology were presented by Dr Mathias Prady (Almeyres GmbH, Langenau), who explained that molecular causes of diseases such as diabetes, or autoimmune, could be quickly and accurately identified due to enormous progress in researc...
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Digital dictation devices are demonstrating their worth by speeding up medical reporting. They can read a patient’s data, automatically assign information to the relevant report as well as interpret human speech into a text version. In the United Kingdom Philips SpeechMagic won the E-Health Innovation Awards, in the category ‘Best use of e-health to improve efficiency’.

Similarly, the system was chosen in the Text (speech-to-text) technology ideas of 2004 by the economies magazine Actualidad Economica. Reina Sofia University Hospital, in Cordoba, one of the first to adopt speech recognition in Spain, began using SpeechMagic in its radiology department a year ago. The benefits - plus a successful pilot project with the MultiMed hospital in Seville - were the trigger to improve vocal recognition vocabulary covering over 90% of medical disciplines), formed the basis of the second generation SpeechMagic recogniser and speech recognition beyond radiology. According to the hospital’s general director, José Luis Díaz, SpeechMagic has proven its positive effects, such as an increase in medical record keeping and availability.

In addition, he said: ‘The software provides features specifically tailored for the creation of medical reports, which stands in contrast to other systems we’ve tried before.’ SpeechMagic largely automates processes and its high recognition accuracy improves the quality of reports and minimizes the risk of errors. Mr Díaz said the resulting improved workflow, with immediate availability of medical reports, has saved time and improved patient service because treatment can be started immediately after the examination.

The hospital has currently expanded the system to various specialties including internal medicine, endocrinology, digestive surgery and rehabilitation. Other hospitals in the region and 300 physicians are equipped with speech recognition. Philips reports that over 25% of Spain’s radiologists are already working with SpeechMagic, making it the country’s market-leading medical speech recognition software. Globally the firm’s share of the dictation market is also 25%.

MEDICALLY SPEAKING...

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Would-be users of new electronic devices are often concerned about the time it will take to figure out all the functions they offer. The Olympus DS-4000 digital voice recorder, with full metal body and slide-switch control (running on rubber rollers to reduce click noise), has an LCD menu available in English, French and German and, says Christopher Seyffert, of Voice Processing Products, Olympus Europa, the firm’s authorised dealers can help new users to programme the device to suit their specific needs. The recorder contains new DSS Player Pro software for archiving, editing and later processing of recordings and documents. Additional comments can be insert-ed into existing files, folders are individually named, and ID and work type settings are also an option.

The Olympus AS-4000 Transcription Kit, with footswitch and headset, contains a small data size that makes saving to the network and emailing simple. Based on the recognition engine Dragon NaturallySpeaking, and exclusively designed for healthcare and medical professionals, the software for voice/medication digital speech processing can be adapted to various working patterns and diverse needs. The manufactur-er reports that the specialised vocabulary ensures productivity gains, so a return of investment can be reached in 6-12 months. ‘Diagnostic reports are easily created and more quickly available, while quality increas-es, administration is simplified and waiting times for patients and refer-ring doctors are reduced. Seamless integration into Hospital information Systems (HIS), e.g. iSoft, Siemens Medical Solutions, SAP-based systems, also optimises documentation work-flow in clinics.’

Details: www.4voice.de
Doctors’ digital dictation direct to a PC

For over half a century Grundig has been a leading name in recording systems. Today, with over 4 million dictation systems sold, Grundig Business Systems has reported that it is the market and technology leader in professional dictating systems. Discussing the firm’s constant progress with the times, Grundig said: ‘While the trade name Stenorette is the standard for reliable analogue dictation on cassettes, the trade name Digta stands for innovation in digital dictation.’

Grundig’s digital dictation systems can be easily integrated in existing IT-structures. Dictations can either be recorded with a portable dictation machine, such as the Digta 4015 or new stationary microphone DigtaProMic 840 USB. Using these, dictations can be made directly on to a PC, and they are stored in DSS-format, the international speech-recording standard, which ensures high audio quality for spoken language. DSS also allows a high compression rate, making it easy to manage audio files in the workflow system and to exchange them by e-mail.

Intuitive, add-on modules and software ensure easy operation; secure documentation and perfect storage, Grundig pointed out.

Intelligent speech processing systems

The new DigtaRFID 414 RFID reader (RFID = radio frequency identification device) and the DigtaScan 404 barcode reader are plug-in modules that provide ‘reading in’ a patient’s number, for example, via transponder or barcode technology, and using this function to assign dictated patient’s notes to a file, document or procedure.

Kristina.hoffmann@grundig-gbs.com.
Integration in 3 stages

Centralised information benefits all users

By Elian Winstanley

One of the biggest challenges facing today's laboratories is that of convert- ing the mass of data generated into useful information, then disseminating that information throughout the whole organisation. This leverages operational excellence by facilitating rapid and accurate decisions, driving up efficiency whilst reducing costs. Traditionally, laboratory information management systems (LIMS) have often been isolated, accessible only to laboratory personnel. New technologies, such as the Station Coordinator, have facilitated the automation of LIMS outside traditional laboratory confinements, providing deployment options that are scalable from satellite laboratories, field workers and other remote data clients. The advent of web-enabled applications has provided a paradigm shift in technology, for instance enabling the interconnection and integration of previously disparate business applications using Web Services, allowing functionality to be shared across systems. Today, LIMS can be the foundation for an enterprise-level business system, with the capability to be deployed globally.

Regulatory requirements for electronic record management specify the need for archiving not only traditional database information but also all related information. The modern LIMS now offers secure storage of a wide range of textual and graphical documents, such as instrument-generated reports or graphs, digital photograms, standard operating procedures, analyst certifications, material safety data sheets, electronic training materials etc. This additional information is not only simply stored and retrieved; technology exists to enable meaningful extraction of data, setting the stage for powerful querying and analysis facilities. LIMS offers laboratory document and scientific data management in one, easy to use, compliant platform.

Time and resource savings are key benefits obtained from maintaining a central point for the collection of laboratory information. Operational excellence can be leveraged by increasing efficiency, automating existing business processes and reducing operating costs. Validated methodologies, logistical and data management support, robust and flexible reporting systems, and online quality control are crucial to meeting the requirements of both modern organisations and regulatory agencies.

The Starlims Corporation delivers a LIMS solution to a wide range of laboratories in both the public health and industrial sectors. The multi-lingual solution provides complete traceability, facilitates regulatory compliance and supports versatile processes and is designed for easy upgrading, effectively future-proofing investments in internal know-how. It is specifically designed to fully integrate the daily functions of a multi-disciplinary public health laboratory and manage analytical data covering a variety of diverse healthcare programs. The system offers comprehensive public health reporting, surveillance and networking capabilities compatible with national and international standards.

IN COMMAND

When a sample tests normal or acceptable, Remisol with Command Central, automatically releases the result to the laboratory information system (LIS), which forwards it to the hospital information system (HIS) for entry on the electronic patient record (EPR). 'The technician does not have to do anything about those cases,' Al Akiyama explained. 'However, if a test is critical or demonstrates that a patient needs immediate attention, the Remisol and Command Central alert the operator - the key here is that patients are being analysed and monitored. This means we are helping to improve patient care. The operator is alerted automatically to critical results, which then must be validated, to ensure that they are in fact critical, then the physician is alerted.'

If there's a warning that an instrument has a problem, the technician simply clicks on the icon for that instrument, which gains direct access to it via the Command Central workstation. Additionally, Beckman Coulter services its own equipment. 'If there's an issue with the Command with the customer. Stages of automation that form the backbone of this service:

1. Support for manual workflows
2. Task Targeted Automation (TTA) i.e. part automation, automation of certain operations
3. Total Lab Automation (TLA) These stages are served via equipment platforms. On the basis of the laboratory types prevailing in the market, Roche Diagnostics developed nine concepts that aim to take those laboratory types to a higher level of efficiency. Each concept is adapted individually to the specific laboratory situation, so that almost all our clients' needs are satisfied with relatively low complexity. The automation solutions cover the whole workflow, from centrifugation, via decapping, sample sorting, aliquoting, recapping to archiving. In providing support in the form of advice and implementation, Roche can rely on a solid base of experience: All of the relevant processes have already proved effective in practice.

By Dr Burkhard Ziebolz of Roche Diagnostics GmbH

With its web-based tools for the paperless generation of laboratory orders and for test result information management MCS has been providing tools for processing laboratory information for over five years. Today more than 40 hospitals, of all sizes, use MCS solutions to communicate between departments and laboratories. These tools - accessed via the web browser - are easy to operate and thus ensure smooth data flow even when different people use one workstation. The LINUX server takes care of the entire order administration and sender-specific configuration.

Order entry - MCS-Isyaftrag, an unattended order screen, guides the user through the order entry process. The digital lab receipt can be tailored to each order type and sender. Additional context-specific information for individual tests can be provided. Diagnoses and comments can also be entered. The order entry system can define individual profiles based on the electronic list of services, i.e. the whole lab process can be generated with one mouse click. Data can be accessed either via a pick

Hospitals increasingly co-operate with other establishments, and networking is becoming a way of life. Such change is also occurring in many hospital laboratories. By cooperating with other hospital labs and laboratory institutes, hospital labs try to improve their financial situation. Some tests, due to the small numbers involved, are uneconomical to implement, and often can be provided more cost-effectively by other remote data clients. The advent of web-enabled applications has provided a paradigm shift in technology, for instance enabling the interconnection and integration of previously disparate business applications using Web Services, allowing functionality to be shared across systems. Today, LIMS can be the foundation for an enterprise-level business system, with the capability to be deployed globally.

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series haematology analysers as well as our automation systems can all be hooked up to Command Central. Many labs already have the LHs or our chemistry analysers, so they could start with systems they already have, and as they start the transition out of the non-Beckman analysers to our systems they can start hooking up to the Command Central.'

'Currently the firm only connects with its own-brand analysers. Presently, in a laboratory that has perhaps seven or eight instruments in an automation line somebody there is trying to monitor every event, he pointed out. In this scenario Command Central is a real advantage: ‘Because everything that’s going on the automation line can be seen and accessed from one workstation.’

The workstation does not have to be situated next to an instrument, but can be placed in a separate office - or anywhere else in the lab - and it can coordinate and monitor the functions of up to 12 instrument systems - including chemistry, immunoassay, haematology and automation platforms. Command Central automatically displays alerts for conditions such as instrument troubleshooting, calibration status, reagent status, and quality control (QC) status, as if the instruments were monitored separately.

Non-automated laboratories could also use the new system. ‘Laboratories don’t have to buy new instruments,’ Al Akiyama pointed out. ‘Our new UniCel DxI 600 and 800 Synchron chemistry systems, the DxI 800 immunoassay system, and the COULTER LH

Access and monitoring of multiple lab instruments from a centralised location

By Annette Suttarp,
Managing Director of
FMCS Labordatensysteme
GmbH & Co and MCS
Board Member

of all Critical Events

As a supplier of innovative products and services for the early detection, prevention, diagnosis and treatment of disease, the Roche Group contributes to a broad range of fronts to improve people’s health and quality of life.

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There is an increasing awareness of the need for total quality management. A quality system is required to be compiled, describing the laboratory's organisation, including functions and positions. Operating procedures should describe pre-analytical, analytical and post-analytical activities. In data transmission, physicians request laboratory tests to assist in diagnosis, monitor a patient and to suggest or change a treatment. Activities need to be standardised to harmonise test results, and a set of guidelines set to aid prevention, diagnosis and therapy monitoring of various diseases. In the implementation of knowledge-based systems to improve medical knowledge it is evident that such developments are also connected with several analytical and interpretative problems for the laboratory scientific consultant as well as the clinician. Laboratory results might be out of the normal range. All analytes are entered into lists that are converted internally to those in the knowledge base. Both the original and converted units are listed in the report. Variations may be caused, for example, by race, diet, age, sex, menstrual cycle, degree of physical activity, problems with collection and handling of the specimen, non-prescription/prescription drugs, alcohol intake and a number of non-illness-related factors. Any unusual or abnormal results are discussed with the physician. It is not possible to diagnose or treat something when the original test is a blood test alone. An abnormal test does not mean that something is wrong, but may imply that there is a relationship between laboratory staff and clinicians plays a crucial role in the use of knowledge-based systems in laboratory medicine. The basis of interpretation of the test results is compared with the reference ranges. The final report consists of laboratory findings, with partly age and sex-dependent reference ranges in a table, and the knowledge-based recommendations from selected test items. The interpretative test covers not only underlying disorders but also comments on pre-analytical and analytical problems - measures needed to improve comparability of test results in the disease state. A laboratory result is only as good as the understanding of its meaning and the action taken upon its receipt. As more and more diagnostic tests become available, the laboratory's role is becoming a provider of knowledge (and interpretation) rather than a mere reporting of data. Therefore, QC is needed to maintain them within acceptable limits in the laboratory. Technicians are often using flexible automation systems. The system records main events requiring changes in operative intervention is possible if events interrupting lab workflow. So personal identification codes and select the security level. Users' knowledge is the degree of congruence between expectation and valuation. The basic aim of QA is to generate the confidence of the user in the final report. The Central Clinical Laboratory in Colentina has a well-defined and constant workload. Each specialty and department independently. The team faced the testing of a series of challenges and opportunities. For example, could the workflow be simplified, potentially reducing lab administration as well as patient trauma? What are the procedures in the case of sample handlingrobotics and the reduction of sample splitting? Before this can be achieved, a major change, detailed analysis of process, workflow and technical analysis in each area has been necessary. Key decisions for the team included whether or not to move to using a single system. The new system is: it is a chemical and immunoassay. The laboratory operates 24/7 and all other requirements have been achieved. The centralised laboratory improves service to our clients and creates a more stimulating environment for everyone in the department. We have seen, careful process analysis can lead to the development of radical solutions. Using flexible automation automation of processes, process improvements and workflow enhancements can be organised. Organisational changes are nowhere near complete. An additional consideration is the role of the emergency doctor. The physician must be available to clinicians in a lucidly expressable format. In preparation for EU entry, Romania's laboratories are in the process of raising standards. Last year ROMAR Medical-Colentina Clinical Laboratory, ROMAR Medical, based in Bucharest, received accreditation from the Romanian Accreditation Association (RENA). Manole Cojocaru MD PhD, scientific consultant at Colentina Central Clinical Laboratory, reports.

Upgrading the laboratory's role in clinical medicine

The DNILab System has a high security level.determines the functions are configurable for every installation, for which the user selects the security level. Users' personal identification codes and passwords can be modified periodically. Automation - its introduction implies laboratory re-organisation because it affects the preliminary phase of a primary laboratory system in which case it is only feasible to change. Significant benefits, the pre-analytical quality is integrated with the rest of the laboratory. The laboratory information system (LIS) which unifies and integrates pre-analytical, analysis execution, workflow control and organisational systems, permits the co-existence of analysers from different manufacturers by passing necessary data to different areas. The system can provide an open solution for these and enables management of different pre-analytical machines by using qualified checking procedures. The architecture is based on the standard (Open Database Connectivity/SQL structured query language), and Open-architecture systems. The architecture allows independence from the database and makes integration with the hospital information system (HIS) and national healthcare system (CUP). The architecture is universal. Various integrations are possible, if isolation of the lab system from the HIS is available.

With this system in a web environment, integration with the laboratory is possible using a compatible communication system. This software is not needed on the PC that sends or requests data to/from the lab.

Unreliable laboratory results may have serious consequences for the patient.Acute and chronic damage to the community. The initial concept of quality control (QC) was con- centralised organisation of the eval- uation of analytical performance, as well as their reporting and interpretation. It is also essential to interpret results in the light of the patient's history and in the clinical context. The main objective of QA is to provide reliable laboratory data and to ensure intra-laboratory comparability of results, to improve the accuracy of diagnostic procedures, and to control costs (via avoidance of repeat tests). Total quality management (TQM) means that every variable that can possibly affect the quality of the test results has been controlled. TQM of laboratory services requires a comprehensive system of quality surveillance that inte-grates quality development, mainten ance and improvement. Accuracy was defined quite simply as the relationship between the actual, observed result and the true result of an analysis. Precision is the reproducibility of a given degree of analytical deviation. Both require reliability in QC to maintain them within acceptable limits in the laboratory. Technicians or computer scientists are used in all branches of pathology. To be successful, QC must be inde-pendently applied to commercial materials and the work of laborato ries themselves. An effective QA programme covers all aspects of the clinical laboratory. QC begins at the time of specimen collection from a patient, not afterwards. In the lab, the aim for QC is to be achieved. The centralised laboratory improves service to our clinicians and creates a more stimulating environment for everyone in the department. The trend for laboratory organisa-tion has led to the need to effective-ly process a large numbers of tests rapidly and effectively. We can introduce emergency samples at any time, without interrupting routine workflow. The central laboratory is changing. We have seen an increase in emergency needs and provides a turn-around of 30-40 minutes for all tests. Every report is final. The physician has to control the ability and correct errors, namely before sending. The results are immediately discussed with the physician by phone.

In addition, controls and calibrators should be listed along with direc-tions for their use, expected results, and instructions for corrective mea-sures if the expected results are not achieved. Guidelines for the collection and transportation of specimens should be available to clinicians in a lucidly presentable format. This not only gives the access to data from many points of view, but also provides seamless delivery in sharing or laboratory/hospital installations.

In the case of Colentina has a well-defined and constant workload. Each specialty and department independently. The team faced the testing of a series of challenges and opportunities. For example, could the workflow be simplified, potentially reducing lab administration as well as patient trauma? What are the procedures in the case of sample handlingrobotics and the reduction of sample splitting? Before this can be achieved, a major change, detailed analysis of process, workflow and technical analysis in each area has been necessary. Key decisions for the team included whether or not to move to using a single system. The new system is: it is a chemical and immunoassay. The laboratory operates 24/7 and all other requirements have been achieved. The centralised laboratory improves service to our clients and creates a more stimulating environment for everyone in the department. The trend for laboratory organisa-tion has led to the need to effective-ly process a large numbers of tests rapidly and effectively. We can introduce emergency samples at any time, without interrupting routine workflow. The central laboratory is changing. We have seen an increase in emergency needs and provides a turn-around of 30-40 minutes for all tests. Every report is final. The physician has to control the ability and correct errors, namely before sending. The results are immediately discussed with the physician by phone.

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Drug spending out-paces total health expenditure
32% average increase in 5 years

Spendings on prescription and non-prescription drugs rose by an average of 32%, reaching over US$450 billion in 2003, according to a study of the five-year period 1998-2003, by the Organisation for Economic Co-operation and Development (OECD). This is an underestimate, because drugs given to patients in hospitals were not included in this analysis, but the rate was more moderate in Japan, Italy and Switzerland.

In 2003, in OECD countries, drug spending averaged about 18% of total health costs. The high percentages (c. 30%) arose in the Slovak Republic, Korea and Hungary, the low ones (around 10%) were recorded in Denmark and Norway. In 2003, total drug expenditure per person was 80% higher in the United States than in Japan.

In many OECD countries, drug spending is taking an increasing share of health costs, and its growth has out-paced total health expenditure over the past five years in most OECD countries (see chart). Spending on drugs grew more than twice as fast as total health expenditure in the USA and Australia between 1998 and 2003, but the rate was more moderate in Japan, Italy and Switzerland.

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Europe will see a drastic increase in the proportion of people over age 65 (from 35% in 2050 to 20% in 2000). The aging process is a complex system, and the biology of aging, says Dr Andreas Simm, biologist and lecturer affiliated with the Martin Luther University Halle-Wittenberg Medical faculty and the German Society for Thoracic and Cardiovascular Surgery’s Working Group for The Elderly Patient in Heart Surgery.

“In a 100 years average life expectancy has more than doubled globally (men: from 25-65 years, women up to 70 years), mostly due to an increase in life expectancy, also need to understand the biology of aging,” says Dr Andreas Simm. “Aging is a biological process resulting in the gradual decline of biological functions.”

Aging involves a decrease in the capacity of homoeostasis, i.e. the body’s ability to maintain a stable internal environment. The age of the human body reaches 120 years, but actual life expectancy is determined. Depending on how and where we live, life expectancy also improved particularly for the elderly.

We can conclude that our maximum age appears to be genetically predetermined. For example, the oldest person to walk the earth is James Colliander. At the age of 1875, he reached 111-year-old (1745-1857). So, despite the average life expectancy of 70 years and the new developments in the treatment of diseases, a person may dieing aged 122-year-old (1997-2019). This is only the distance between the beginning and end. By contrast, a human should reach reproductive age (aim), then live on, aging only from his reserve. This analogy is not absolutely wrong; we see that very old animals are not usually found in the wild, but are in a protected environment, e.g. the zoo. Similarly, for a long time the average life expectancy of humans was around 25 years. There are indications that the same mechanism and/or gene functions that provide the biological advantage in the period from birth to reproduction also actively contribute in great age to common age disorders. This is described as pleiotropic antago-pack - one of the evolution-based theories of aging.

Aging can be defined as the loss of the capacity of homeostasis, i.e. an increasing incapacity to adapt to an increasing incapacity to adapt to an additional component of research. In the first half of the 19th century, the age of the body was divided into 5 stages: childhood, youth, adulthood, senescence, and death. By contrast, a human should reach reproductive age and live on only from his reserve. This age is determined both genetically and environmentally. For example, the oldest person to walk the earth is James Colliander. At the age of 1875, he reached 111-year-old (1745-1857). So, despite the average life expectancy of 70 years and the new developments in the treatment of diseases, a person may dieing aged 122-year-old (1997-2019). This is only the distance between the beginning and end. By contrast, a human should reach reproductive age (aim), then live on, aging only from his reserve. This analogy is not absolutely wrong; we see that very old animals are not usually found in the wild, but are in a protected environment, e.g. the zoo. Similarly, for a long time the average life expectancy of humans was around 25 years. There are indications that the same mechanism and/or gene functions that provide the biological advantage in the period from birth to reproduction also actively contribute in great age to common age disorders. This is described as pleiotropic anti-pack - one of the evolution-based theories of aging.

Aging and death

A medical failure or biological necessity?

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