A 4G symbol next to the signal strength bar on a smartphone assures fast data transmission. 5G, the next generation of technology, is waiting in the wings and could herald a new era for tele-surgery, according to Dr Michael Kranzfelder. First, however, a few obstacles must be overcome. The surgeon also sees the potential of this technology for training: Real-time overlay of helpful markers during an intervention could focus the surgeon’s attention towards important structures. To test the opportunities and limitations of the new technology, researchers at the Technical University of Munich have equipped a test operating theatre with prototypes of 5G-capable access points and terminals. Using this set-up, they checked whether control commands can be transmitted to robots and processed fast and reliably, and whether endoscopic image data can be viewed without delay.

Kranzfelder believes that results obtained so far are encouraging: ‘5G is a trend-setting technology which will play an important role in surgery. However, whether or not it will make the wireless operating theatre a reality remains to be seen.’

Also not yet clear is whether vulnerability to failure during large-scale use is likely to increase. The objective should therefore be to become actively involved in shaping the standardisation process to ensure that the data standard meets the requirements of surgery upon its introduction to the market. ‘This is a very critical area of application,’ Kranzfelder emphasises. ‘It is likely to be regarded with the same critical eye as autonomous driving is at the moment,’ emphasises the expert.

PD Dr. Michael Kranzfelder is a specialist for general surgery at the Rechts der Isar Hospital, Technical University of Munich in Germany. There, he is part of the research group for minimally-invasive therapeutic interventions (MITI). His research focuses on the implementation of intelligent, cooperative OR systems, sensor-based real-time workflow analysis and prediction, radio-frequency identification (RFID) and navigated diagnostics in ultrasound and endoscopy.

Report: Wolfgang Behrends

4G has data transfer speeds of up to 100 Mbit/s. 5G will increase this to 10Gbit/s, i.e. a hundredfold, explained Michael Kranzfelder, Senior Physician of the Clinic and Polyclinic for Surgery at the Rechts der Isar Hospital, Technical University of Munich. Speaking at this year’s Congress of the German Society of Surgery in Berlin, he explained: ‘It will open up many new areas of application for which the previous mobile data transmission standard was simply not fast enough.’ This is important for the development of virtual and augmented reality as much as for autonomous driving, the use of professional drones and robots as well as for tele-surgery.

Although 4G should be sufficient for real-time transmission of high-resolution video images (such as HDTV) under ideal conditions, in reality, the data transfer speed is often lower or limited by latency. The latter phenomenon has been a particular problem for the use of mobile data connections in surgery because each delay represents a risk to the patient. The 5G standard, due to be introduced in 2019/2020, promises a reduction of latency by a factor of 10, to around one millisecond – bringing use in the operating theatre within tangible reach. ‘For the first time, the speed and latency of 5G are now meeting the requirements of tele-presence and even tele-surgery,’ Kranzfelder explains. In contrast to passive tele-consultation, the surgeon can actively intervene in the treatment. ‘One example is remote control of a camera guide arm which moves the laparoscope during minimally-invasive interventions.’ This needs real-time transfer not only for remote control but also for the video signal, so that the surgeon is immediately aware of the effects of his actions without delay and can react at once. The model would also be suitable for the substantial improvement of surgical care in remote locations as specialists from anywhere could be involved in almost all locations worldwide.

The fast mobile data standard also opens up new opportunities for process optimisation in the operating theatre: ‘5G could facilitate intelligent, real-time tracking of people and objects – the so-called track & trace,’ says Kranzfelder. The evaluation of such data can lead to improvements of the operative workflow, helping to avoid for example unnecessary work and moves in the operating theatre.

Right: Second generation camera control system SoloAssist (AKTRomed, Barbing, Germany). Centre: OP-Phantom ELITE (CLA Coburg, Germany). Left: Visualisation unit Gastropack (K. Storz, Tuttingen, Germany).
Japanese and German surgeons seek answers

Smiles solidify a surgical team

Surgeons are growing older and the lack of junior surgeons is widespread – a situation acknowledged by most experts at the annual congress of the German Society of Surgery (DGCH) in Berlin, who debated whether the need is greater to increase specialists or, on the other hand, generalists. Both sides produced convincing arguments, but a third group took an entirely different tack.

In the session ‘Generalists vs. Specialists’ Surgeons from Germany and Tokyo, Nagoya and Kumamoto, explored why medical students appeared to shun their fields. ‘High risk, comparatively low pay,’ said Benedikt Braun from Saarland University Hospital in Homburg, Germany. However, the first year as physicians is often a reality check – hardly any team spirit, poor work-life balance and little appreciation. No wonder young surgeons, when reduced to nameless instrument holders, re-evaluate their career options. ‘Junior physicians are turned off by a gruff atmosphere. They are growing older and the lack of junior surgeons is widespread – a situation acknowledged by Japanese and German surgeons seek answers to,’ he said. Benedikt Braun from Saarland University Hospital in Homburg, Germany.

An important factor is that negatively affects students as well as the reputation of the hospital.’ Surgeon shortages are a big problem, Professor Yasuhiro Kodera agrees. ‘The number of certified surgeons, be it general or specialised surgery, is a direct quality indicator for a hospital,’ the Head of Surgery at Nagoya University pointed out. As a rule of thumb, the higher the number of surgeons, the lower patient mortality. In this situation the fact that fewer and fewer medical students opt for a career in surgery, a trend in Japan as well as in Germany, is cause for concern.

Enthused in theory, disappointed in practice

‘Strangely enough, many junior students do want to become surgeons,’ said Benedict Braun from Saarland University Hospital in Homburg, Germany. However, the first year as physicians is often a reality check – hardly any team spirit, poor work-life balance and little appreciation. No wonder young surgeons, when reduced to nameless instrument holders, re-evaluate their career options. ‘Therefore we have to make the discipline as such more attractive for junior physicians,’ Jähne advises. ‘I will smile at each and every one’ Better working hours, higher salaries – these are not necessarily the prime drivers for young surgeons, according to Professor Dr Takao Ohki. ‘The most important issue is job satisfaction,’ he believes. As Head of Visceral Surgery at Jikei University School of Medicine in Tokyo, he squarely puts the blame on the working conditions. ‘Discipline as such more attractive for female medical students. After their first practical experiences only seven percent of medical students would consider working as surgeons, after their first practical experiences only seven percent still do so. ’ The discipline per se is well positioned and attractive but the working conditions are abominable,’ Braun confirmed. Moreover, this assistant physician pointed out that few hospitals have a strategy to attract and retain young surgeons. He is optimistic that ‘as soon as this changes, the problem can be solved’

Dr Joachim Jähne observed a different problem: imbalance to the detriment of general surgery. ‘There’s a strong trend towards specialisation,’ said the Medical Director of the Department of General and Visceral Surgery at Diakonie Henriettensstift in Hanover. ‘This specialisation is more attractive for young doctors – often better work hours and you are not involved in stressful clinic routine anymore,’ he explained.

While this development is characteristic for industrialised countries such as Germany or Japan, these countries also need physicians who are more broadly trained and experienced, be it in trauma surgery or to provide healthcare in rural areas.

Illuminating medical care

Cold light, long life and low energy consumption – these assets are offered by the Starled NX lamp from Italian firm ACEM, for many uses including surgery. The homogenous and shadow-less light is due to special LED optics created by the firm, which directs light beams according to need. ‘The visual area is perfectly illuminated assuring both excellent visual comfort and working conditions,’ said the Head of Gastrointestinal Department of General and Visceral Surgery at Diakonie Henriettensstift in Hanover. ‘This specialisation is more attractive for young doctors – often better work hours and you are not involved in stressful clinic routine anymore,’ he explained.

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Seeking

Cyberbloc, the large C-arm range manufactured by Primax International, results from the firm’s 30-year track record in medical imaging. Today, along with the C-arm range, the firm produces mobile radiography machines, remote controlled RF tables, conventional and digital radiography and urology equipment, and X-ray generators. Primax reports that the easy-to-position C-arms, with special wheels layout to ease approach to the operating table, have a far larger field of view than seen before, and produce ‘unprecedented image quality’. Additionally, the chassis, of aluminium alloy, is lightweight.

Other aspects: 4 kW fixed anode or 5 kW rotating anode single tank generator, enhanced orbital rotation and C-arm depth, triple field I. I. (9 or 12 inch) 625 lines or 1024x1024 CCD camera, and an orientable touch-screen operator console.
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Seeking more young surgeons

Technology and team spirit are the lure

Over the past decade surgical interventions in Germany increased by around 30%. However, it would be wrong to talk of a heyday – mainly due to a lack of young talent, according to Professor Jörg Fuchs. The president of the German Society of Surgery (DGCH) and director of the Clinic and Polyclinic for Paediatric Surgery and Paediatric Urology at Tübingen University Hospital, spoke with our correspondent Wolfgang Behrends about challenges in his field. These include the increasing importance of robotics and AI tools.

‘According to current statistics, around 11,000 surgeons, currently working, will reach retirement age by 2020, representing Fifty-percent of surgeons in private practice and around twenty percent of hospital surgeons,’ said Professor Jörg Fuchs, President of the German Society of Surgery. ‘This increases the existing lack of specialist medical staff, which in the field of surgery is deemed to be between twenty and thirty percent. In other words, we have a significant problem.’

A team member, not a gopher

The discipline is desperately seeking young doctors who can take over the baton and meet the growing demands of surgery. ‘We require an innovative approach,’ Fuchs believes. ‘The focus of these efforts is the recruitment of students who are completing their Practical Year (PJ) as they are most likely to consider choosing surgery. We must therefore do a lot more for students, rather than merely treating them as menial assistants,’ he said. Junior staff should be made to feel part of the team and the growing demands of surgery. ‘We require an innovative approach,’ Fuchs believes. ‘The focus of these efforts is the recruitment of students who are completing their Practical Year (PJ) as they are most likely to consider choosing surgery. We must therefore do a lot more for students, rather than merely treating them as menial assistants.’

Support from artificial intelligence (AI) will be increasingly important for surgeons, which can also be an enticement for junior staff, along with the improved training facilities needed to televise surgical procedures both for routine operations and for student training purposes. ‘Standing at the operating table for several hours is not for everyone,’ Fuchs pointed out. ‘Standing at the operating table for several hours is not for everyone,’ Fuchs pointed out. ‘Surgical training is not the employer gives a financial contribution is regulated in very different ways – frequently, residents are left to their own devices with this problem and end up paying for it out of their own pockets.’

Consecutive fixed-term contracts are another common problem because they make career planning for surgeons very difficult. The paediatric surgeon feels that the combination of these factors is fatal. If a young resident funds the required courses not knowing whether this will lead to long-term employment, this will put them off. ‘It’s not only hospital operators who need to act here, but also politicians,’ the DGCH-President advised.

This also applies to research – important for many young surgeons: ‘In many hospitals staffing levels are so tight that research is something which has to be carried out after hours and at weekends - as in days gone by.’ However, in view of annual deficits running to several millions in many university hospitals it is unlikely that more resources will be freed up for academic work. Last but not least, this is incompatible with the concept of a work-life balance, which is very important to junior staff. ‘You cannot expect someone who would like a career in surgery to carry out research in the laboratory after 14 hours in the hospital. These days this would not be possible also from a legal perspective.’

The alternative would be finance models that include dedicated peri-ods for research and qualifications alongside clinical work. Compared to other disciplines, such as genet-ics or internal medicine, surgery is under-represented in the allocation of research grants, Fuchs criticised.

Structural decisions are needed

Globalisation is a further chal-lenge and a two-edged sword for this field: Although many foreign patients choose high quality sur-gery in Germany, many surgeons trained in Germany leave the country, because the working conditions and earning potential are better in coun-tries such as Norway or Switzerland. ‘This is another area of tension which will ultimately need a political solu-tion,’ Fuchs observed. The DRG sys-tem, which classifies hospital cases...
into groups for payment purposes, is one key problem that increases cost- and working pressure for hospital staff. ‘Compared to many other countries, German hospital doctors and nurses clearly must look after more patients. Solving the problem by increasing salaries would be mere window dressing,’ the DGGH president said. ‘Instead, workloads must be reduced, through better staffing ratios, for instance’.

At the German Medical Assembly 2017, in Freiburg, the controversial DRG system was criticised as being counterproductive and obsolete from an ethical perspective. ‘We should ask ourselves if politicians should be reduced, through better staffing ratios, for instance’.

Professor Jörg Fuchs MD is president of the German Society of Surgery (DGCH) and Director of the Clinic and Polyclinic for Paediatric Surgery and Paediatric Urology at Tübingen University Hospital, Germany. Between 1983-1989 he studied medicine at the Humboldt University in Berlin. In 1997, he became a specialist for paediatric surgery at the Medical Academy Carl Gustav Carus in Dresden, becoming Senior Consultant in 1998. From 2010-2013 Fuchs presided over the German Association of Paediatric Surgeons (DGKKCH). His research includes cancer and minimally invasive surgery, as well as research into solid tumours in children.

Virtual Reality (VR) technology is asking trainee surgeons to practice complex procedures in a simulated setting, rather than learning skills on real patients. VR is also helping to demystify neurosurgery in that it enables medical students and patients to ‘enter’ and experience a neurosurgical operating theatre. Alex Alamri, a trainee neurosurgeon at Barts Health NHS Trust in London, UK, said hands-on experience of brain surgery in an operating theatre is not always straightforward for medical students. The Barts Health Trust surgeons have been working on the project with Fundamental VR, a London-based firm that has developed a VR system to allow trainees to conduct virtual surgeries. Head-mounted VR, which recreates the sense of touch to the user, provides real-time responses to what surgeons feel during procedures.

We have been helping to develop Hololens-based applications so that neurosurgery trainees can attempt procedures safely, pre-operatively,’ Alamri said. ‘It means that the first time you try to perform a complex procedure it is simulated, and not on a real patient. When performing procedures in real life there is a certain anxiety that goes with the high stakes, which can definitely affect performance.

‘If you can practice a high-fidelity simulation over and over again before you even set foot in an operating theatre, your procedural fluency and confidence undoubtedly will be better than without these tools.

Sharing experiences

Surgeons are also using the initiative to encourage patients who have undergone neurosurgery to share their experiences to help other patients and their families, as well as healthcare professionals, understand neurosurgical decision-making processes. Mr Alamri said that advent of VR and hardware solutions such as Google cardboard mean that medical students no longer need to ‘sit at the back of the operating theatre’ and not get a clear view of what is going on.

The Barts team used a number of GoPro Hero 4 cameras strapped the heads of surgeons to film the 360VR sequences that formed the basis of the neurosurgery training solution and steps towards wider public engagement in the specialty. Alamri, along with surgical colleague Chris Uff, and others at The Royal London Hospital, conducted one of the first brain surgery procedures on an aneurysm to be recorded in VR. At around the same time, a team from Helsinki used the Nokia OZO system to stream augmented neurosurgery to Royal London Hospital, the UK’s busiest neurosurgical major trauma centre, with particular highlights of the activities of the multidisciplinary team.

Brainbook places emphasis on using lay terms and providing definitions for terminology to allow everyone to participate in discussions,’ Alamri explained. ‘Social media conversations are pitched at levels appropriate for everyone from members of the public to neurosurgeons around the world. The initiative encourages patients who have previously undergone a neurosurgical procedure to share their experiences.’

The Brainbook team has collaborated with medical illustrators Dr Ciléin Kearns (Antibiotics.com) and Dr Luis Domitrovic (Ladvic.com) to provide high-quality medical art and animation to help better illustrate concepts that participants may find more difficult to grasp.

‘High-quality videos are produced to explain common pathologies and procedures, and each of these are embedded within a case based on a real patient story,’ he continued. ‘The videos are uploaded to YouTube, without restriction, allowing universal access. The aim is to help patients and their families, as well as allied healthcare professionals, understand neurosurgical decision-making processes and what to expect if they need to undergo neurosurgical treatment. The videos also act as a primer for junior neurosurgeons with limited access to resources.’

The development of haptic, or kinesthetic, communication, is the key to advancing the concept, though development costs remain a challenge, Alamri said: ‘Better haptics means better fidelity.’
Exoskeleton technology

In 2011 Tian-Zong injured his spine in a car accident. He could neither feel his legs nor stand and walk. His visual height to 110 cm when sitting in his wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair. When the accident happened, he was 36 years old. His wheelchair.

Tian-Zong now stands and walks. The exoskeleton was designed for people with lower limb paraplegia. The anthropomorphic apparatus mimics natural human gait. With user-oriented technology and intelligent control, it recognises the user’s intention to walk or stop by detecting postural changes, the manufacturer explains. With normal upper limb function, users can strap into and out of the device independently.

Free Bionics is at Medica Hall 15 / Stand A23

Free Bionics is at Medica Hall 15 / Stand A23

Free Walk provides power at the hip and knee joints that greatly reduces the energy necessary for paraplegics to sit, stand, and walk, the firm adds. When paraplegics can walk independently, it provides not only psychological effect, but also improves their physical conditions,’ Tian-Zong spoke of his feelings when he could walk again for the first time since the accident. ‘The thought that I could finally interact with others at the same level instead of always looking upwards; the joy brought tears to my eyes,’ Tian-Zong at last walked down the wheelchair. ‘He is much stronger than I imagined him to be,’ Tian-Zong’s father observed. ‘I’m happy that, in my lifetime, I can see him stand up again.’

Walking – upward on onward

Safe and comfortably seated

United Kingdom manufacturer Paraid is demonstrating its latest version of the IBEX ambulance chair, used by ambulances throughout the UK. This easy-to-use patient transport chair is designed for use across all terrains including restricted, spiral and narrow staircases, the manufacturer reports. ‘The innovative product features a plastic seat and backrest with harness, which allows patients to be easily manoeuvred. It also minimises the operator’s exposure to the weight capacity of the chair.’

For thirty years, Paraid has specialised in bespoke transportation equipment for hospitals and road ambulances. During this time, it has become known for identifying prominent issues within the neonatal and paediatric sectors. It has pioneered a variety of innovative transport solutions for road ambulance, pre-hospital care, neonatal and paediatric sectors. We are committed to investing in high quality manufacturin, design and engineering in the UK and can assist customers nationally and worldwide.’ To book an appointment with Lee Safe, e-mail lee@paraid.com

Paraid is at Medica Hall 11 / Stand G46

Paraid is at Medica Hall 11 / Stand G46

More than just MRI accessories

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Rober Ltd’s mattresses and over-bases have been developed to replicate the body’s natural movements by responding to a patient’s weight, spontaneous movement and body position,’ explained. ‘They provide enhanced comfort and complete pressure elimination at regular intervals.’

Pressure mattresses to avoid

A UK company that specialises in the development and manufacture of ‘zero pressure’ technology is showing a full range of mattress solutions at Medica this year.

Over the last few years, Rober Ltd of Chesterfield, has invested heavily in R&D to develop a complete range of pressure ulcer mattresses that cater for a variety of needs, including patients who are immobile, bariatric or have existing pressure injuries. Developed in conjunction with clinicians, the mattresses feature clinically proven technology that prevents pressure injuries from developing.

They also have therapeutic properties to promote the healing of established ulcers.

The mattresses are fully automatic, and patients nursed on them require less frequent manual repositioning, thus relieving the pressure on busy nurses. The mattresses can be used in everyday nursing environments, as well as acute care facilities. ‘Designed and manufactured in the UK, Rober’s mattresses and overlays have been developed to replicate the body’s natural movements by

Rober is at Medica Hall 16 / Stand F18-8

Rober is at Medica Hall 16 / Stand F18-8

The powered robotic exoskeleton/seat aims to aid those patients with lower limb damage

Exoskeleton technology

Tian-Zong, wearing the exoskeleton, can now take walks alongside his wife and toddler

United Kingdom manufacturer Paraid is demonstrating its latest version of the IBEX ambulance chair, used by ambulances throughout the UK. This easy-to-use patient transport chair is designed for use across all terrains including restricted, spiral and narrow staircases, the manufacturer reports. ‘The innovative product features a plastic seat and backrest with harness, which allows patients to be easily manoeuvred. It also minimises the operator’s exposure to the weight capacity of the chair.’

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In future, healthcare intelligent IoT solutions for real-time and location-based management of assets, employees and patients will be integral. Medicosolution is working on holistic digital concepts for the healthcare sector and offers a platform for integration for existing solutions, the IT firm reports. ‘All processes can be tracked in real time,’ Max Schröfelbauer, its CEO, explains. ‘This creates process transparency, increases effectiveness and reduces costs – for the good of patients and medical staff.’

A high-precision indoor localisation infrastructure that transforms physical spaces into interactive, measurable environments forms the basis for solutions for asset monitoring, patient safety, indoor navigation, staff and patient flow. A precise and unique database is generated, which can be transferred to the respective HIS system, the firm’s report continues. ‘The system is designed so that medical solutions and devices of any kind can be integrated via Bluetooth Low Energy (BLE) – for relevant information at the right place and time.’

Medicosolution lists the following benefits:

- **Asset monitoring** – helps to locate and protect portable assets from loss, as well as optimise provisioning.
- **Patient safety** – Monitors, in real-time, with careful respect for privacy, a patient’s position. When risk is automatically detected the nearest staff member is alerted.
- **Staff workflow** – Monitors processes and procedures by tracking hospital workflows. Enhance staff coordination and improve efficiency of operations. Monitor deviations and automate reporting. Manage notifications and reminders.
- **Patient flow** – tracks patients throughout their care. The system also highlights bottlenecks and eliminates waiting times and inefficiencies. Optimises the use of facilities and assets. Enhances the quality of care and patients’ satisfaction.

Medicosolution is at Medica
In Start-Up Park
Hall 15 / Stand 15 B57-14

Discreet staff, patient and asset monitoring

Patient safety – Monitors, in real-time, with careful respect for privacy, a patient’s position. When risk is automatically detected the nearest staff member is alerted.

Staff workflow – Monitors processes and procedures by tracking hospital workflows. Enhance staff coordination and improve efficiency of operations. Monitor deviations and automate reporting. Manage notifications and reminders.

Patient flow – tracks patients throughout their care. The system also highlights bottlenecks and eliminates waiting times and inefficiencies. Optimises the use of facilities and assets. Enhances the quality of care and patients’ satisfaction. The system can be experienced live at this year’s show.

**Meyer-Haake GmbH** is at Medica
Hall 5 / Stand P21

Among these, EPIGLU is an especially fast polymerising product, an Ethyl-2-cyanoacrylate with good closure properties even for injuries that are under tension, Meyer-Haake GmbH Medical Innovations reports: ‘The product, which has been on the market more than 20 years, can be easily applied, does not require anaesthesia and allows fast patient care. Thanks to its tear resistance and adhesive power, this tissue adhesive can also be used for long wounds.’

It is especially suitable for cuts, lacerations, surgical wounds and skin lesions, the firm adds. ‘The wounds should not bleed anymore, may not be infected and should not be older than six hours. By eliminating stitch channels and tension, the patient benefits from a higher level of treatment comfort, associated with less pain and faster healing without complications.’

EpiGlù is available as single-dose with 0.3ml and 0.5ml contents, or in a 3g vial for multiple use. ‘The application of the adhesive with single-use fine dispensing pipettes prevents germ development and the wound is protected against infections. The efficient content of the vials makes the product a very economic treatment option which is, even under financial aspects, a major competitor to traditional sutures.’

Gluing outdoes stitching

Results after suturing are not always aesthetic. Wound treatment with tissue adhesives offers a quick healing process, good tolerance and low scarring.

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Regional efforts set the tone of Spanish e-health strategy

Spain has powerful regional e-health projects, but implementing a national strategy remains a complicated task. Lack of interoperability and low resources slow down data sharing across 17 autonomous communities, and sometimes even within the same region, key experts in the field explain.

Although Spain transfers skills to its communities, everyone can benefit from emergency and primary care wherever they are in the country. Thus the electronic patient record (EPR) was launched to grant Spanish physicians, nurses and patients access to relevant patient information, by connecting some of the data acquired in local primary, emergency and nursing care into one national repository.

Having a platform regrouping patient data all across the country has the potential to improve access or share the EPR on a national level, because each region uses a different system.

Although the EPR currently stores the data of 78% of the population, many communities have not connected all relevant patient information to the EPR and, according to Caballero, some still don’t have access to the platform. Healthcare authorities have not invested enough money into the EPR because they have other priorities, the physician argued. ‘They know what the necessities are, but they are short-sighted. They’d rather invest in reducing waiting times in primary care. They don’t have a vision for the future.’

In 2006, Javier Quiles Del Río, ehealth Programme Manager in the Galician healthcare service SERGAS, helped design the EPR alongside other ‘commonly representative’ physicians and experts. He believes the tool already brings value, just by looking at usage data. Every month in Galicia we issue 500 electronic records for patients who have their information in other communities, and answer 5,000 requests from other communities to access our clinical information.’

The new yet powerful initiative of making the electronic prescription available across the area is bringing results. ‘The project is showing great promise and will be a major advance for patients travelling across the country.’

The service, now available in six communities, means patients can go to a pharmacy and pick up medication prescribed by a physician in another community, but the deal should be available in the whole country within the next two years, Quiles argued.

A Spanish agenda on digital affairs does exist, but only to issue recommendations. It is up to the regions to organise themselves and develop common strategies regarding e-health – which they do, at different speeds.

Interoperability is also a local issue. Systems are often incompatible within the same community, which impacts negatively on healthcare.

The process of promoting the electronic patient record nationwide has staked on the different systems used across the country are simply not interoperable.

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France simplifies healthcare

Successful pilot scheme means Terr e-Santé will be rolled out for the whole of the Ile-de-France.

The French have a reputation as early adopters of telemedicine driven by the desire to modernise healthcare by the judicious use of the latest technology. The first ‘carte vitale’ (national health card) with a microchip was introduced in 1998. Since 2011, the information stored on the cards has evolved to provide a secure internet server to transfer treatment codes and payment of healthcare professionals and patients via the social security system NOEMIE, a system of open exchange between patients and external providers. Functional throughout most of France this is used by everyone over 16 years old covered by the social security system. It ensures reimbursement by the social security and private insurance is fluid and timely. While a welcome advance on the complex paper procedures required in the past it is still reliant on the vagaries of the internet and can cause severe problems for doctors and pharmacists alike if the system goes down. Only approved social security engineers can access and repair the encrypted system for data exchange and delays can be costly and result in administrative backlogs and potential mistakes.

Although arrive at this point has often been painful and subject to delays, successive governments have seen digitisation as a way to streamline healthcare administration and eventually save money. Additionally, and perhaps even more importantly, for the economy’s future, healthcare digitisation and connectivity is seen as growth market for nascent biotechnology companies with exciting and novel ideas to transform traditional healthcare by going patients control over their medical destiny.

From conception the carte vitale was considered for storing medical data that could be shared between healthcare professionals. Indeed, today a mini-medical dossier is embedded in the chip, providing information on the patient, their named family doctor (GP) or hospital where the dossier is initiated; results of prescribed tests, e.g. laboratory analyses and radiology; prescriptions; appointments; on-line payment of professionals and pre-admission administration, to facilitate hospital stays.

Pilot system tested in Paris

Five different healthcare situations are covered; diabetes, cancer; cardiovascular disease, out-of-hours healthcare and perinatal care. However, for the moment only diabetes, perinatal care and cardiovascular options are operational. Terr-eSanté services are provided free, but require an online account.

There are two points of access one for healthcare professionals and the other for patients. The pilot system was tested over a defined territory of the Paris area that included a dense urban population of 370 000 inhabitants with general poor health indicators. The pilot scheme ran until the end of 2017 and will now be rolled out over the whole of Parisian region from this year.

Because of its server-based nature, Terr-eSanté is compatible with all the different IT systems in use by healthcare professionals, does not require any further investment in IT equipment and can be accessed remotely. Unlike the carte vitale, all the information is accessible to the patient.

The patient chooses which healthcare professionals may access their medical dossier, although the doctor initiates a dossier for a patient. Only registered professionals can access the site, likewise a patient’s identity needs to be confirmed by a doctor. Patients retain the right to remove a healthcare professional’s access to their dossier, if for whatever reason. Elderly or infirm patients can name a representative to manage their dossier for them.

An exciting concept that is patient-centric will probably override initial fears of public sharing of sensitive data, especially in peoples’ minds considering the on-going Facebook allegations. If these can be overcome, the potential for the system looks very promising, new telemedicine tools or apps can be added to the patient’s dossier.

For instance, ‘Ortif Cardio’ for patients with cardiovascular problems enables them to upload their blood pressure readings, weight etc. directly to their doctor. The range of ORTF home monitoring systems is already extensive and very popular among doctors and patients who like to feel in control of their health via their smart phones.

So, perhaps the wider service offered by Terr-eSanté will become popular, particularly for patients suffering chronic illnesses that cross different medical specialties.

Further information


Sharing of data via a secure internet server

However, due to technical difficulties of compatibility between the varied IT systems used by doctors, radiologists and pharmacists, and also concerns about data security, the original idea has altered. A new system based on the sharing via a secure internet server, controlled under the data protection act, Terr-eSanté was launched in 2017.

The idea behind Terr-eSanté is to facilitate healthcare of certain patient groups by coordinating the exchange of information between the different healthcare professionals involved in their treatment and, of course, the patient themselves.

Centred on the patients’ healthcare journey, six different steps are included, the first visit, either to the GP or hospital where the dossier is initiated; results of prescribed tests, e.g. laboratory analyses and radiology; prescriptions; appointments; on-line payment of professionals and pre-admission administration, to facilitate hospital stays.

The pilot system was tested in Paris

Three different healthcare situations are covered; diabetes, cancer; cardiovascular disease, out-of-hours healthcare and perinatal care. However, for the moment only diabetes, perinatal care and cardiovascular options are operational. Terr-eSanté services are provided free, but require an online account.

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Further information


E-health in Denmark

The basis for the success in Denmark is a culture rooted in trust and the open access to personal data. It’s important to emphasise the advantages of the Danish model and available data for patients and medical staff to achieve acceptance of the portal, Petersen pointed out. There are only about ‘three to five cases of misuse a year’ involving unauthorised access to patient files.

Is a portal like this also viable in Germany?

Citizens can access sundhed.dk to access their personal data and for an overview of their current and updated healthcare information. Users need not worry about data protection. ‘Patients can see which employees of the healthcare system have accessed their personal data,’ Petersen said. There are only about ‘three to five cases of misuse a year’ involving unauthorised access to patient files.

Petersen says Denmark, whilst Germans have a choice of 120 different providers. However, Petersen can imagine such a portal being successful in Germany. He advises that those in charge should make German citizens more aware of the advantages of an electronic patient file. The public Danish platform shows how well such a system works and to what extent it is accepted, giving citizens access to their own data.

Petersen views the healthcare digitisation as an opportunity to safeguard the personal responsibility of patients and make citizens equal partners in their interactions with healthcare workers. This should be achieved step by step, ‘so that citizens feel safe and experience the advantages of data exchange and transparency,’ he suggested. The technical solution is likely to be the easiest part of digitisation.

E-health in Denmark

The Danes have shown for some time how e-health can work successfully on a national level. The health portal sundhed.dk (+ Health), initiated in 2001 and launched in 2003, is part of the public healthcare system. As of January 2018, the Danish national strategy describes sundhed.dk as a national access point for personal health-related data for hospitals, general practitioners and communities, said Morten Elsbek Petersen. As Director of the Danish health portal he describes the portal’s functions during the ‘Emerging Technologies in Medicine’ (ETIM 2018) conference, in Essen this February.

For Petersen, the digitisation of the healthcare system is, above all, an opportunity to safeguard patients’ personal responsibility and to turn citizens into equal partners when dealing with healthcare employees.

The idea behind sundhed.dk is not only to advance the networking of doctors and patients, but also to advance the networking for all doctors, as well as information about the quality and price of treatments and medical prevention. They also can view their bills, make appointments with GPs, enter their own vital signs, renew medication prescriptions and enter advance healthcare directives. The portal also offers free healthcare programmes for chronic disease treatments such as diabetes, cancer, osteoporosis as well as advice on weight loss, pregnancy and birth.

The effort required for patients to access the system is minimal. All birth, all Danes are issued with an identification number which they can use to register with the portal at any time – via their desktop PC, smartphone or tablet, Petersen explained. The login facilitates access to a personal page where the individual medical history, examination results and medication, going back to 1977, can be viewed.

The portal collates medical information and data of all Danish citizens aged 15 years and over, and serves as a central access point for doctors and patients to view results, medication, treatment plans and bills. Doctors can issue e-receipts and can also use the system to send letters to medical specialists. Doctors can access images and laboratory data as well as results from specialists, hospitals, care homes, home carers, psychologists and physiotherapists.

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Doctors and patients can access the data

The European Society of Medical Imaging Informatics (EuSOMII) developed. Explaining the society’s current strong focus on AI, Dr Erik Ranschaert, an expert in IT, AI and a range of teleradiology applications, and Vice-President of EuSOMII, said: ‘What we are trying to do, is be a society not only for radiologists but also for clinical physicists and professionals of imaging informatics and other specialties and experts, so that we can join forces and communicate on how we can collaborate.

This is about sharing information on the one side and, on the other, informing radiologists and other specialties about changes. In an educational way, we want to give them a better view or insight into what is going on related to digitisation of our profession.’

EuSOMII is affiliated to the European Society of Radiology (ESR) and has links with other sub-speciality societies with experts available to collaborate with the ESR on production of publications and White Papers on subjects such as AI.

Ranschaert is keen to point out that AI is rapidly becoming a very broad subject, for example moving beyond automated analysis of images and categorisation to detect whether a lesion is benign or malignant.

This has evolved into segmentation: AI can automatically segment and differentiate areas of an organ; detection, such as identifying whether there is a tumour or not, and skeletal imagery to analyse bone type and size, for example to automatically calculate the age of a child.

‘All these are simple, narrow types of AI tasks, but another way we can use AI is to manage and detect the patients in a more effective way,’ Ranschaert said.

‘AI can automatically assign specific determinations to specific doctors or radiologists, or also be used to reduce waiting lists.’

‘A very good example of this is in using electronic patient records. When a patient needs a CT scan, the scanner will be automatically programmed to choose the right scanning protocol depending on size, age, weight of patient and questions asked.’

That can be extended to managing radiation dose based on scanning protocols and the nature of the scan needed for a specific patient, a move he suggests will lead to fewer errors. However, there remains one critical area that has yet to be resolved, that of standardisation.

‘There is no standardisation yet and this is one of the topics that needs to be discussed and addressed,’ Ranschaert pointed out.

‘Optimal interoperability between all e-systems involved in this process is primordial, facilitating the exchange of all necessary data.’

The American College of Radiologists (ACR DS) is actively considering how to address this. As regards development of AI globally – not just in healthcare – he said the USA is a clear leader, followed by China and India, but Europe is lagging behind, though the UK is a leader in the field along with Germany, France and the Netherlands, with Israel also being quite active.

However, he stressed that, Europe is a frontrunner in terms of protection and regulation of patient data when using AI, notably with the implementation of the GDPR (General Data Protection Regulation). On the other hand this could also bear the risk of a conflict between the legal protection of health data for privacy reasons and the growing demand for such data to the benefit of improving healthcare services for the European population, which might be a sub-

Aiding radiologists to stride forward

Growth! New hardware, new software, richer imaging, enhanced communication and image transfer plus artificial intelligence (AI) are all pushing the pace that medical organisations, radiologists and device manufacturers run must run to keep up. Daniela Zimmermann spoke with Dr Erik Ranschaert, Vice-President of EuSOMII, about today’s changing face of radiology.

Alongside exceptional advances affecting radiologists, the European Society of Medical Imaging Informatics (EuSOMII) developed. Explaining the society’s current strong focus on AI, Dr Erik Ranschaert, an expert in IT, AI and a range of teleradiology applications, and Vice-President of EuSOMII, said: ‘What we are trying to do, is be a society not only for radiologists but also for clinical physicists and professionals of imaging informatics and other specialties and experts, so that we can join forces and communicate on how we can collaborate.

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Digitisation in three stages

Healthcare information and communication technology has become an everyday companion for physicians and serves as a strategic tool for change. Jarmo Reponen, Professor of Health Information Systems at the Faculty of Medicine, University of Oulu, Finland, focuses his research on the effects of digitisation in healthcare in Nordic countries, with target areas of availability, use and usability of the information system. ‘The digital transformation process,’ he explains, ‘can be described in three waves of digitisation.’

The first digitisation wave supplied healthcare systems with electronic medical records (EMR), digital image archives (PACS) and networks in imaging and the laboratory. All the medical data is transformed into and available in a digital format in hospitals and primary care institutions.

In Finland and other Nordic countries those tools reached practically 100% availability ten years ago in public and private care. ‘However, this basic infrastructure is not enough to carry out eHealth successfully. The national strategies in various countries emphasise a citizen-centred care that can also be used in an appropriate way for healthcare professionals,’ Reponen explained.

This is why, and when, we entered the second digitisation wave, which has given professionals more connectivity through national health information exchanges (HIE) and tools for improving their patients’ outcomes. ‘The core of the second wave is patient empowerment. It’s essential for any healthcare reform to have freedom of choice and patient mobility,’ Reponen explained and pointed out that the Nordic countries were at the forefront of using nationwide e-prescription.

Whilst the second wave continues, the first steps have been taken into the third digitisation wave. This will add artificial intelligence to the professional tools, for example, machine learning. ‘The third wave has already improved the intelligence within the digital systems, e.g. speech recognition is used more than before and also automated warnings of medical interactions are now commonplace.’ And, Reponen added, ‘Decision support tools have become more integrated into the EMRs and care process management is also taking its first steps.’

The age of decision support tools

The transition into the third digitalisation wave will transform the workflow of diagnostics and therapy. ‘It will give professionals even more connectivity and more in nursing practice with the patients,’ the specialist said. With the availability of the archives of previous data and patient data from other areas of health information platforms physicians can make better diagnoses, which can result in more precise diagnoses and more accurate decisions on patient treatment.

However, that a system stores and delivers medical data to support the efficiency of medical treatment is not enough for Reponen. ‘We need more workflow orientated software for professionals that will give us guidance in our work. So that, if we have a certain kind of patient in our consultation, the software automatically lists the tools we need to diagnose and treat this specific patient.’

For those tools, Reponen has specific requirements in mind. ‘We need more standardisation in various softwares. They need to have application programming interfaces (API) and connectivity in their add-on tools because there will always be new kinds of invention,’ Reponen said adding a prediction: ‘Those vendors who can rapidly react to those innovations have a chance.’

Impact on education and citizens

Of course, using these decision support tools will have implications for the education and teaching of physicians and nurses. ‘Most younger professionals use social media channels such as YouTube and Facebook in their personal life. But that doesn’t help them with regards to the professional usage of those new software tools. So we really need a change in the curriculum in medical and nursing schools, to better save patients in the future.’

The patients’ own role in their healthcare, he concludes, will increase with the new eHealth and mHealth tools. ‘It will,’ he said, ‘empower the patients and citizens even more.’

Nordic countries like Finland are at the forefront of using nationwide e-prescription. Every nurse is an e-nurse

‘It will be interesting to hear what the most important elements for nurses and midwives so that we can look to taking the most important steps to support improved nursing practice. If we listen carefully we are much more likely to do the right things,’ Cooper adds. ‘If we gain nurses and midwives the best tools to do their work and pay attention to their education needs, we will be moving towards the best modern nursing practice using technology and data. Whilst Cooper acknowledges the importance of technology, she stresses this is only a tool to deliver data and information. ‘Nurses and midwives will also need to become data savvy to ensure we make the best use of the new information that technology will provide.’

Increasing medical precision

‘For example, if we can bring information and knowledge nearer to where nurses and midwives make decisions then this can support nurses to deliver the best outcomes, efficiently.’

In terms of technology specialists shadowing nursing tools she emphasises, ‘Observing actual practice is critical to ensuring technology solutions meet the needs of staff. Unless we understand the complexity of nursing we are likely to provide imperfect tools.’

Results from this technology initiative – part of the ‘every nurse an e-nurse’ campaign of the Royal College of Nurses (RCN) are expected this May at the 2018 RCN Congress.
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