Brexit: Uncertainty in every question

Will existing healthcare standards remain or follow those of the USA?

The British decision to leave the European Union was and still is constantly discussed. Thinking about the consequences leaves more open questions than answers. ‘Unsurprisingly, most informed commentators use the word “delusional” rather a lot,’ says Martin McKee, Professor of European Public Health and head of the Department of International Health at Maastricht University. Both agree: In many areas, the NHS European Union was and still is to leave the. The British decision take? McKee added. ‘I’d like to add that the Greenland, with only 50,000 people might exit. We should recall that much lesser extent, Europe, as well as defusing tensions in the South China Sea. Everyone is awaiting outcomes relating to the results of the US Presidential and senate and house elections, McKee added. ‘In the UK, government is largely in a state of paralysis, with most departments being urged to implement Brexit, but no idea about either what it means, except that ‘Brexit means Brexit’, or how to begin. We can anticipate many years

Emerging medical technologies

Artificial intelligence and bio-printing will be the central theme of an ETIM 2017 congress, which will be held at the University Hospital, Essen, Germany, on 10–11 February 2017.

Congress chairman, Professor Michael Forsting, Head of the Department of Radiology and Neuroradiology, and Professor Jochen Werner, Medical Director and Chief Executive Officer, University Hospital of Essen, are inviting clinicians, computer scientists, engineers, researchers, healthcare providers, legislators and other involved disciplines to the first interdisciplinary conference. ‘Further acceleration of medical innovation by upcoming technologies such as artificial intelligence and bio-printing can be safely predicted. Forsting points out. Technologies such as individual genome sequencing, high-performance multiparametric imaging, or wearable medical devices, generate exponentially growing datasets, while contemporary data-mining techniques allow the extraction of large amounts of valuable data from existing archives of unstructured medical data. Of this he is convinced: ‘These offer the chance for highly specific clinical decision-making and personalised precision medicine.’

Details: https://etim.uk-essen.de/

The 1st ETIM Congress – February 2017

What is the next step and challenge?

McKee: ‘There are two major challenges facing the world. The first, and most urgent, is concerted agreement on climate change. We now do have the Paris Agreement on how to proceed. The challenge is to make it happen. The second is to develop concerted plans to implement the Sustainable Development Goals (SDGs). These provide a solid basis for progress for our planet, but will require the world’s nations to match their words with resources. In the rest of the world, there are many important issues to resolve, among them the implementation of the SDGs. They include the need to achieve peace in the Middle East, which would do much to stem the flow of refugees that is placing so much pressure on countries neighbouring Iraq and Syria and, to a much lesser extent, Europe, as well as defusing tensions in the South China Sea.

Everyone is awaiting outcomes relating to the results of the US Presidential and senate and house elections, McKee added. ‘In the UK, government is largely in a state of paralysis, with most departments being urged to implement Brexit, but no idea about either what it means, except that ‘Brexit means Brexit’, or how to begin. We can anticipate many years

Many and various scenarios have been discussed in recent months. Several steps are already undertaken. How much time might Brexit take?

McKee: ‘Much longer than two years to be concluded, if Brexit ever is. The two years specified in Article 50 only cover agreeing how the UK might exit. We should recall that there are fewer British medics working in the EU than EU medics working in the UK. These, however, will be affected. I know a lot of post-graduates who have problems with the renewal of their expiring contracts and who do not know whether they can stay in the UK, or not. I recognise a big uncertainty, both on the official side and in the Healthcare System, at the moment.’
Science can only react

The ‘Transmission, Prevention, and Reporting of Emerging Infectious Diseases’ programme for the International Conference IMED 2016 in Vienna, this November, reflected events in the field of emerging diseases that have occurred over the last two years. Therefore, key congress topics included the Zika virus, the effects of global warming and the unusually high number of hospital-acquired infections (HAIs) caused by MERS-CoV.

‘With all emerging diseases, science can only ever react to them,’ emphasised Austrian virologist Professor Norbert Nowotny, a local scientific organiser and member of the scientific committee at IMED, who spoke with European Hospital at the event.

Infections caused by the Zika virus present a very broad clinical picture. In 2015, when problems in the unborn babies of infected pregnant women were first observed, the cardinal symptom was microcephaly. However, it has since been discovered that the typical cerebellar anomalies (reduced volume, calcifications or malformations of the cortex) can also occur in children whose heads are of normal size.

The clinical picture has also been significantly extended, with an ample range of symptoms, from the beady eyes to the hands and legs now also frequently diagnosed.

Furthermore, there are indications that an infection with the Zika virus can also lead to severe clinical symptoms. ‘The diagnosis of the Zika virus, along with all other types of Flavivirus, is still a big problem,’ Nowotny points out. With Flaviviruses, the time span in which the virus itself, or its molecular footprints (e.g. via polymerase chain reaction) can be detected is relatively short, and the serological tests available (Zika Virus Immunoglobulin-G and M) cause massive cross reactions with several other viruses, such as with the pathogens causing Dengue fever, yellow fever or West Nile fever. Considerable research is still needed, Nowotny explains.

Global warming causes the vectors for emerging diseases to spread further and further North. Although Aedes aegypti is the main vector of Dengue fever and Chikungunya fever, has not yet managed a break-through into the Alps, it is a very real threat. ‘It is an irreducible fact that the virus can function as a transmitter for both these diseases.’

Speaking to infected holidaymakers bitten by this species of mosquito, there has already been a local outbreak of Zika fever in the Dubrovnik, Croatia, and around 200 people developed Chikungunya fever in Ravenna, Italy. These outbreaks were only contained with the help of a massive chemical fight against the transmitters. ‘This shows how important monitoring systems are,’ Nowotny emphasises. ‘For hospitals, MERS-CoV is a big problem; he stresses. There has been an increasing number of hospital infections through this viral agent, which originates in the Arabian Peninsula. Over the last year, 90% of infections have direct contact with dromedaries, which act as vectors for this infection, and the remaining 90% of infections were transmitted from human to human – within the family, in the community and frequently also in hospitals.

The hospital acquired infections were initially limited to Saudi Arabia, but, in mid-2015, at least 186 people became infected in South Korea (of whom 77% were Flavivirus carriers). The patient, who had returned home from a trip to the Arabian Peninsula had sought help in several hospitals. ‘There is not yet sufficient research into the problem of why there are so many hospital-acquired infections,’ MERS-CoV; Nowotny reports. ‘Although travellers have now spread the virus throughout many countries there have not yet been any cases of hospital acquired infections involving the MERS-CoV outside the Arabian Peninsula and Korea.

Brexit: Uncertainty in every question

Continued from page 1

of policy confusion there: One thing is clear: The UK will struggle to play any significant role in these global debates, which is a pity.

Brand: I totally agree. Momentarily, we obviously live in times of so called Post-Truth Politics, where everyone can spread untruths in politics online via social media and offline, and people do believe it. The best example is the claim about these £350 million that were transferred to the NHS, the report outlines key areas of concern, yet also offers recommendations for government action.

It comes as health trusts are facing financial shortfalls as NHS recorded hospital deficits hitting £2.45 billion and as junior doctors have continuous pressure of rising demand and inadequate funding, with resulting workforce pressures threatening patient safety.

Drawing on views ranging from senior consultants to trainee physicians, combined with on-going evidence of the scenario facing the NHS, the report outlines key areas of concern, yet also offers recommendations for government action.

Mackie: ‘It is really impossible to predict. The Scottish First Minister was asked, after she met Theresa May, whether she was undermining the government’s plans. She pointed out that there was nothing to under-

What’s next?

‘I can only conclude that the British government is lost, with no idea where it is, or where it wants to go. There are many options, from no Brexit, through soft Brexit, and hard Brexit. But there is only one reason of another, “impossible.”’ The challenge is to find the least impossible solution, which might be retaining a member of the EU.’

Brand: ‘The most important thing is that there exists a date for the exit. Now, the European Commission has to deal with the question of where the European Institutions will move and what to do next. Several good people are already leaving, returning to their home countries. ‘I personally know neurologists who are concerned about the fact that they might have to leave Horizon 2020, which is not a question of financials in first place, but a question of the existing and established networks. Big projects cannot be stopped solely. If Britain leaves such projects because of Brexit an important partner will be lost. This is definitely something both sides will suffer from.’

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The NHS needs urgent treatment

The RCP is calling for a better-funded NHS that meets the demands of patients, with a budget that meets the demand for health services; sets realistic targets for efficiency savings; protects funds for transformation; and invests in the long-term sustainability of the NHS.

The organisation wants more doctors to be trained to provide enough doctors across all parts of the medical workforce, from GPs to physicians as well as specialists; incentivise doctors to work in the most challenging and in-demand areas of medicine; and address nurse shortages and promote innovative models of staffing, such as physician associates working alongside doctors.

The RCP also wants to see improvements in the working lives of NHS staff. RCP President Professor Jane Dacre said: ‘As a doctor, I realise this is a tough diagnosis for the NHS. However, a diagnosis is the first step towards working with colleagues to find solutions. We are keen to find the best treatment for the NHS over the coming weeks, months and years.’

www.healthcare-in-europe.com
**Big Data, de-privatisation and independence**

Catalonia, Spain’s richest region, is launching one of the largest Big Data healthcare projects in Europe, after scrapping a polemic plan that would have enabled patient data to be shared with private-for-profit companies. As the region confirms its leading role in healthcare technology, it is also de-privatising key hospitals to improve efficiency in a context of low funding, a decision that has received considerable attention abroad. Antoni Comín i Oliveres, the Catalan Health Minister, came back on these highly discussed issues and explained what other challenges lie ahead for his region in our exclusive interview.

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**Report: Mònica Cano Roquer**

The Visc+ project was intended to collect patient data in Catalonia. The Health Minister’s administration dropped this last summer. What will happen now?

Comín i Oliveres: It’s important to remember that Big Data generates a lot of concern, especially regarding data confidentiality and information security. There are also concerns as to which will benefit from that information, i.e. public entities to improve healthcare or private companies for their own interests. Many questions remain open.

Big Data is fundamental to pursue health innovation, so it’s crucial for any project to be consensual both at the political and social level. We couldn’t have such a controversial project to be carried out without a consultative approach. Trusted NEC can recommend the best fit solutions which tech-companies. As the region confirms its leading role in healthcare technology, it is also de-privatising key hospitals to improve efficiency in a context of low funding, a decision that has received considerable attention abroad. Antoni Comín i Oliveres, the Catalan Health Minister, came back on these highly discussed issues and explained what other challenges lie ahead for his region in our exclusive interview.

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**Antoni Comín i Oliveres**

Comín i Oliveres is the Catalan Health Minister under Carles Puigdemont’s administration, composed of Jordi Pujol i Pal (‘Together for Yes’), the pro-independence coalition, led by Convergència (right wing) and Equo Parties. Left-wing in 2015, Comín, a professor of social sciences and a philosopher, became a socialist deputy in June 2004. Proposed by Esquerra Republicana, he was appointed Health Minister.

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**Experts have estimated the purchase would cost us $55 million. It’s actually cheaper to buy the HGC than to build two new hospitals. That’s a lengthy and costly process right now, there’s no money for that.**

‘In addition, we could transfer basic healthcare activities to new public hospitals in Terrassa and Taulí, and let the HGC do all the specialised work. Right now it’s the other way around and basic care hospitals provide specialised care, while the HGC provides primary care. It’s the world upside down.’

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**How will you tackle waiting lists, one of Catalonia’s major problems?**

Last June, there were 163,730 people waiting for surgery, 3.1% more than a year ago. There were also 4.7% less patients waiting for diagnostic examinations. About 100% cancer patients had received surgery in less than 45 days and almost every heart surgery patient had waited less than 90 days.

‘Our plan is to reduce the waiting lists by 30%, and diagnosis by 50%, by improving information access, empowering primary care, increasing the activity of our healthcare system and augmenting activity. We need €300 million to do it. To reduce the waiting lists, we would need €400 million.’

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**How does Catalonia healthcare compare to the rest of Europe?**

‘I’d like to have an OCDE PISA report for Catalonia. We think world rank very high. We have a very good, high quality model, which is very linked to the use of a large diversity of providers.

‘However, we have three major problems: waiting lists, wages and the fact that our foundations haven’t received a cent in years because of the crisis. Some hospitals are also ageing pretty fast. All of these issues are solvable with money and that is why we want to cancel our annual €16,000 million deficit – the biggest in the EU. We’re the only region in the EU with an 8% budget deficit. For us, the only way to do so is to become independent.’

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**From desktop display to large formats, projection and LED modules**

In today’s digitised world, hospitals are responsible for embracing the benefits which technology brings to improve efficiency and reduce costs. Against a backdrop of stretched resources and operational scrutiny, hospital managers are able to address the needs of multiple stakeholders through hospital-wide digitisation. Improving communication using digital signage for way finding, check-in, queue management and info/entertainment helps to enhance the patient and visitor experience and alleviate potential frustration. In clinical practice, collaboration is essential to maximise productivity and ensure quality visual access to patient information to ensure best patient outcomes. To assist in the challenges of hospital-wide digitalisation, NEC is the only manufacturers able to offer such a wide portfolio of display products, including desktop and large format displays and projection, as well as a wide range of LED/LCD modules. This unique position means that NEC can recommend the best fit solution to virtually any application scenario with a customer oriented consultative approach. Trusted NEC quality is the benchmark for performance and longevity with a long heritage serving the special needs of the healthcare sector.

Ready access to up-to-the-minute information will help to improve the patient and visitor experience. Touch screens allow visitors to check-in and receive directions for their own journey through the hospital building. Video walls and large format displays provide a visible public for everybody

Way finding information and content can be updated in real-time to provide relevant and engaging messaging, should the need arise.

Delivering excellence in patient care demands effective multi-discipline collaboration. The Multi-Disciplinary Team (MDT) facility is critical in assembling healthcare practitioners to collaborate with full access to patient data and multiple imaging modalities. The solution can be scaled by large numbers of people, both in one room and via remote conferencing.

NEC’s large screen UHD displays deliver image quality equivalent to SMP presenting unprecedented richness of detail and pixel-free viewing on a huge scale with controlled colour reproduction and consistent images viewable from all angles. Projection solutions also available in 4K resolution provide additional options for break out rooms and training facilities.

Where performance and accuracy are vital, the NEC medical grade DICOM pre-set colour display series exceeds the highest reviewing grades for radiology, nuclear medicine, orthopaedics, pneumology and intensive care. Designed with both reliable quality and affordability in mind, the review displays with unique built-in firmware features can be calibrated to the DICOM Grayscale Display Function using NEC’s GammaCompMD QA software. Besides medical specialty monitors, NEC offers a wide range of commercial and professional desktop displays offering a DICOM pre-set plus large format screens to support surgeons in the OR.

In a caring profession, there is not substitute for the personal touch, but with NEC as your partner, hospitals can benefit from state of the art visual technology to improve patient confidence and deliver an exceptional health care service.

* Source: NEC Display Solutions
The global migration mapping project

Combating internationally infectious diseases

Report: Mark Nicholls
Experts at a university in the United Kingdom have designed a large-scale data and mapping project that they hope will help in the global fight against infectious diseases.

The model, completed by geographers at the University of Southampton as part of the WorldPop project, tracks the flow of internal human migration in low and middle-income countries.

This has, for the first time, mapped estimated internal migration in countries across three(501,665),(744,856)

Against this backdrop, figures from the International Organisation for Migration and The World Bank show that, without accounting for seasonal and temporary migrants, more than one billion people live outside their place of origin. Meanwhile, human mobility is expected to continue to rise, creating a range of impacts, such as invasive species, drug resistance spread and disease pandemics.

It’s crucial we understand human mobility, so that we can quantify the effect it has on our societies and the environment, and provide strong evidence to support the development of policies to address issues such as public health problems,’ he underlined.

The researchers are now integrating the migration estimates with data on malaria prevalence – helping to inform regional elimination and global eradication plans for the disease. ‘In this context, we’ll go within subnational communities of malaria movements and identify sources of transmission,’ he continued.

‘The idea is to combine malaria prevalence data with the estimated migration flows to derive estimates of how well different areas are connected in terms of relative amounts of parasite movement.

The main benefit is using the model to track the spread of infectious disease but also to understand the drivers affecting the distribution of these diseases.

Researchers also have the data could be used to support regional control and elimination strategies for other infectious diseases such as schistosomiasis, river blindness, HIV, dengue and yellow fever. The project could lead to being able to better control and tackle these diseases by focusing resources and allocating them to areas where they are most needed, to inform eradication and elimination planning and tackling these diseases in a more cost-effective way,’ Sorichetta pointed out.

There will also be benefits in helping inform decisions in trade, demography, transportation and economics, he said. However, the study team does acknowledge limitations to the data set because the censuses, nor movement triggered by war and natural disaster.

Professor Andy Tatem, Director of WorldPop, said: ‘Understanding how people are moving around within countries is vital in combating infectious diseases such as malaria. The parasite that causes the disease can be quickly re-introduced to a malaria-free area by highly mobile populations. Having an accurate overview of how different regions of countries are connected by human movement aids effective disease control planning and helps target resources, such as having treated bed nets, or community health workers, in the right places.’

‘Having data for all low and middle-income countries across three continents will greatly aid disease control and elimination planning on a global and regional scales.’

The WorldPop project was initiated in October 2013 and aims to provide an open access archive of detailed spatial demographic datasets for Central and South America, Africa, Asia and Australia to support development and health applications. ■
Diversity is the enemy

x-Health: Demands for real interoperability

Britta Böckmann, Professor for Health Informatics at the Technical University of Dortmund summarises the lack of feeling for terms such as eHealth, mHealth and telehealth with the description xHealth. However, xHealth also stands for Exchange, that is interoperable solutions, meaning actual interoperability and data exchange not seen in previous approaches; Böckmann explains. She views the current direction with scepticism and calls for a consensus-based eHealth strategy for Germany.

A workshop held before this year’s Congress of the German Parliament, medical insurers and health informatics firms, tried to open up an international perspective and answer the question if Germany’s current position regarding xHealth Participants compared patients access to digital services within the health service and access to their own data.

The question: Are patients participants in the digitisation or is it only digital service providers? The country-specific eHealth strategy was also scrutinised. Unfortunately the result shows that Germany is in last position compared to other countries, Böckmann says.

‘A large extent this is due to the number of different players working on the subject of digitisation. However, we believe that it would be possible to implement a centralised system in Germany such as the one introduced in Denmark. ‘Our health system, with its federal structure, cannot support this. Self-organisation, with different associations representing the service providers and funding bodies, makes the implementation impossible, Böckmann explains.

Whilst Austria is automatically introducing the electronic patient file (ePa) for everyone via the e-card, the plan in Germany is that citizens must act. People themselves will have to apply for the use of services such as the ePa per electronic health pass. However, this plan has an inherent danger of a silent, large majority developing who will do nothing and therefore will not have access to these modern, digital services, in the same way as this was discussed around the topic of organ donation. Therefore, the move from analogue to digital for routine processes in doctors’ surgeries, for example, will only happen very slowly. From a systems and health informatics point of view a centrally controlled approach taking interna- tional standards into account and making digitisation part of routine care would obviously be wonderful,’ Böckmann believes.

More focus on the patient

The introduction of an electronic health card would shift the interest of the patient to the fore. The eHealth law states that Gematik (the company in charge of the electronic health card development) will have to develop certain specifications, such as the electronic patient record, by 2018. ‘Unfortunately, the actual plans are oblivious to current technologies and possibilities because they hold on to principles developed at a time when there were neither smartphones nor apps,’ the professor points out.

One example of this is the medication plan. Conceived initially on paper, in the second step it is to be introduced in electronic form and stored on the patient card. ‘However, the patient will have to carry it around as a paper version because they will not be able to access their own data stored on the card beyond the surgery, i.e. without a health professional card (HPC), due to the legally prescribed two- key principle. In my view, this is completely the wrong approach and will reduce public acceptance of this card even further,’ Böckmann states. ‘An increasing number of health insurers now offer their patients apps. There are also numerous telemedicine projects, and the technology is developing at a rapid pace, but the way things are now this could lead to a two-class society. Whether a diabetic patient will have an app financed will depend on their insurer: Whether or not heart failure is treated telemurally, of whether a patient is even told about this option, depends on whether the combination of the doctor in charge of treatment, the location of the patient and who they are insured with, happens to be covered by one of the pilot projects. But surely it shouldn’t be like that,’ she says, displaying anger.

A clear mandate for the future

There was a clear call for a consistent eHealth strategy for Germany that was also discussed during the workshop: ‘The law on eHealth only covers certain aspects and mainly introduces the infrastructure. It consists of a collection of regulations which, although meaningful in parts, does not follow any overall strategy,’ Böckmann complains. ‘The interoperability register is only a collection and evaluation of existing projects which utilise certain standards instead of clear rules as to which standard is to be used in which cases and settings, which would be the only way for manufacturers and users to adhere to them. Diversity is the enemy of interoperability here.’

There is also the financing issue. Böckmann: ‘eHealth services, being inter-sectoral building blocks, often fall into the gap between out- and in-patient treatment, as telematic care concepts often have in-patient as well as out-patient aspects. We’ve been practising telemedicine for 20 years, but there are only two reimbursable items in the billing cata-logue. On the other hand, the post-age for a doctor’s letter is very easy to reimburse.’

However, Böckmann does point to evidence of progress in the medi- cal fraternity. ‘The State Medical Association in Baden-Wurttemberg is now accepting applications for, and evaluations of, telemedical projects involving remote treatment. This means that the ban on remote treatment is finally put under scruti-ny, and it is the first time that things are moving on the part of the medi- cal associations, with other federal German states watching this develop-ment with a lot of curiosity.’

Introducing the DICOM preset monitor

Since JVCKenwood Corp acquired the display manufacturer Totoku three years ago the expected synergies in the field of engineering and the distribution of common solutions and products have been set. According to Marcel Herrmann, Director of Medical Displays at Totoku: ‘We wanted to combine our expertise and technology, and the medical device industry and applications – and we’ve suc-ceeded!’

Their first product was a display for endoscopy. ‘Our mother brought her expertise from the broadcasting sector, and we have the knowl- edge for specific requirements in healthcare facilities,’ he pointed out. During the European Congress of Radiology in March this year, the company first launched its video solution based on a 4K video-capable camera from the broadcasting field.

The next screen, jointly developed by JVCKenwood and Totoku, is the GD-W21SL. This high-resolution 16:9 widescreen LCD / LED monitor with a size of 21.5 inches is reported to be particularly suitable for reviewing. It has a high contrast ratio of 1,000:1 with 1920 x 1080 pixels and, thanks to an anti-reflective screen, a wide viewing angle. For high quality, bright and sharp images, the LED backlight has a brightness of 250cd / m², Herrmann explains.

In this respect, the GD-W21SL offers an integrated power supply, audio inputs for HDMI, DVI and RGB and a multilingual menu that allows operation in German, English, French, Spanish and Japanese, the manufacturer reports. The aspect ratio is adjusted automatically. A DICOM preset ensures realistic reproduction of all xray images.
Hospitals need a holistic approach to cyber security

Hospitals and healthcare providers are being urged to adopt a holistic view of cyber security to help protect critical patient data, Mark Nicholls reports.

A number of organisations within healthcare remain at risk of becoming systems vulnerable by failing to ensure there is a broad range of processes and a system of safeguards in place to safeguard data from hackers or cyber attack.

IT expert Dr John Lockley, Clinical Lead for Informatics with the Bedfordshire Clinical Commissioning Group (CCG) in the UK, also believes healthcare providers need to factor in more elements alongside IT considerations.

In his presentation at the EHR Live event in Birmingham, entitled ‘A holistic view of healthcare cyber security’, he suggested it was wrong to think of IT in isolation:

‘We have to consider what IT interacts with – programmes interacting with patients, the paperwork, protocols, processes and p gravitas, as well.’ Lockley explained. ‘We need also to remember that people are involved and how they and their psychology work.’

This is not just about individuals falling for phishing emails and clicking on unauthorised websites, or hospitals installing advanced virus blockers and other firewall safeguards, but also in ensuring staff are adequately trained in how to respond to such threats.

Additionally, personnel need the time, a robust infrastructure, and the correct hardware and software needed to carry out their roles correctly.

Dr Lockley said that the National Health Service (NHS) often invests heavily in certain parts of the system but fails to guard against ‘back door’ attacks on the more vulnerable aspects of their IT.

He also warned that systems running unsupported software, such as Windows XP, were particularly vulnerable to attack and added: ‘My advice is for hospitals to spread resources carefully and thoughtfully in terms of cyber security and educate and train staff.’

This means having money available to buy in people to do the training and then giving staff the time to receive the training.

Equally, hospitals should not go to the opposite extreme of having so many technical and procedural checks inserted into their systems that it can actually prevent people from working efficiently.

With NHS organisations now working more closely with local authorities, as health and social care come together, the health service needs to ensure it is not left vulnerable when linking with outside bodies that have older, or more vulnerable, IT systems and equipment.

‘Health remains a prime target for hackers and the consequences of not adequately protecting data can be devastating, with patient and clinical information potentially lost, encrypted or even altered by hackers.’

‘The first priority is, take regular backups; the second priority is to ensure that you’ve put in all the latest software patches; and the third element is to train the staff to think carefully about what they are doing and not automatically click on links of open documents just because they are there,’ Dr Lockley advised.

‘Cyber security also needs board level priority and it’s important to have the IT team available 24 hours a day to respond.’

Hospitals and healthcare providers also should be aware that it is not always straightforward to upgrade to the latest versions of software, because that may impact, or not be directly compatible, with other parts of the system.

‘Overall,’ Lockley added, ‘when it comes to cyber security, hospitals should think holistically and not just about the software, or the hardware, but also remember to give ordinary front-line staff enough training in cybercrime awareness - and then give them enough time to put these defensive procedures into action.’

Dr John Lockley is the Clinical Lead for Informatics for Bedfordshire CCG (Clinical Commissioning Group), chair of SystemOne National User Group and a member of the eReferral Service Programme Board and Electronic Referral Advisory Board. He is also Deputy Chair of the Board of Bedfordshires and Hertfordshire LMC Ltd and Chair of Beds and Herts LMC IM&T advisory group.
CT and MRI Imaging have brought increasing expectation of faster access to image data and increased development of intelligent and feasible solutions to meet clinical requirements.

Solution roll-out

Issue of the purchase order kicked off an intensive six-months planning and implementation phase, culminating in the hardware installation: core IT components, local workstations with modern screens and reconfiguring certain modalities. At the same time several workflows were redesigned.

After ten months everything was set up. In June 2010 the count-down arrived: overnight X-ray was switched from analogue to digital. No exception allowed! Only one complete solution breakdown, for example, caused by network or server failure, was considered the only situation when films could be printed out. This tough stance paid off. After only a year film usage had decreased to one percent. ‘For a digitalization project this is an extraordinary result, since it takes us to profitability sooner than we had anticipated,’ Landwehr points out.

Positive feedback all around

Despite the staff’s positive attitude towards the new digital solution, there were traces of scepticism. This is normal when a new technology is introduced that disrupts and forces changes upon well-established processes. ‘But when it ran without a hitch and everybody was comfortable with operating it, the entire team was happy and we received positive feedback, not only here in radiology, but also from the non-radiology clinics we work with,’ Landwehr concludes.

A system scales with the users

Six years have now passed. Quantity and quality of the requirements have been increasing constantly mainly due to the widespread use of CT and MRI, with rising expectations with regard to fast access to the image data.

The internal technology landscapes, as well as the provider’s system, have continuously developed and been expanded. The hardware, the data storage space at hospitals, and the release with new functionality at the provider’s. ‘We are not interested in the derrière of when it comes to our diagnostic platform – what we do expect are intelligent and feasible solutions to optimize our workflow day by day,’ the radiologist emphasizes. So far, the provider has met the expectations with flying colours – a fact that confirms the committee’s initial decision. However, in these rapidly changing times none can rest on laurels.

Current highlights

So far, the provider has provided fully-integrated 3D/MPR/MIP functionality. Other manufacturers can’t offer comparable quality,’ Landwehr believes. He underlines the excellent work-flow support, e.g. in mammography, contrast-enhanced ultrasonic, functional imaging in colour duplex ultrasound and hybrid imaging.

Today the system also offers support by semi-automated assessment of oncological studies. For lesion management and size comparison current and historic images can be viewed side-by-side in MIP or 3D and images acquired in different planes can be automatically correlated in anatomy. ‘That even works across modalities with CT and MRI,’ says Landwehr.

Outlook

In radiology there will be ever more data to be evaluated; ever more high-performing tools are needed to support radiologists due to scarcity of manpower, because it will lead to ‘Apple, Google and other usual suspects knocking on our doors and defining health and disease based on what’s good for them. Collecting data just for the purpose of collecting data does not make sense.’

For rather, Landwehr is convinced, radiology, both in diagnostics and intervention, must be even more innovative, more clinically effective. ‘Technological tools, such as a modern enterprise imaging solution, help us to become just that.’
Long distance ultrasound is not so distant

The future of medicine lies at a distance, underlined in our EH interview with Professor Michel Claudon, head of Radiology at the Regional University Hospital, Nancy, France, whose particular interest is ultrasound. Advances in FT telecommunications have driven expert healthcare provision even into the most remote rural areas – underlined by this notable test in ultrasound

The Melody System is the world's first remote ultrasound imaging system. Produced by French company AdEchoTech, and developed by radiologists for radiologists, the system has evolved to meet the real needs of an ultrasound examination. Recognising that the necessary precision would be impossible using only a voice-controlled robot, the system incorporates the most recent audio-visual teleconference technology with advanced remote robotics similar to those used in space exploration.

The lead radiologist controls the entire examination from a central workstation, where the video link enables the patient, operator and ultrasound images to be seen on high-resolution computer screens throughout the examination. The highly sensitive audio-link also enables the expert radiologist to instruct the operator and discuss with the patient throughout the procedure. However, most importantly, it is the use of a 'dummy' probe by the expert that drives the robot and therefore, ensures exam quality. While watching the images, the expert moves the dummy probe as they would if physically at the patient's side.

Currently used primarily for abdominal ultrasound examinations, the lead radiologist has complete control over the set-up parameters of the images, such as gain control, depth control, frequency change and activation of various ultrasound modes, such as Colour Doppler and Pulse Wave Doppler.

Is the system as good as it seems? Claudon's team organised a test to find out. The Melody system was set-up in the Ileveneux Hospital centre, over 30 km away from the specialist centre in Nancy.

The equipment was very easy to set-up – within a day it was completely operational in the Ileveneux ultrasound room with the secure audio-video link picking-up the images in Nancy.

Over the next three days approximately 30 different abdominal ultrasound examinations were performed with the system. Following instructions from Nancy, the patients placed themselves on the couch and operator positioned the robot over their body and applied gel. The probe on the robot, inclined at 45° then followed the movements of the expert's dummy probe to perform the examination.

The team were quite surprised at how quickly they adapted to using the system, within two-three examinations ‘to use a dummy probe honestly became completely natural.’ Also the images provided are completely compatible with the hospital's PACS, so they could be automatically archived for future reference.

What about the patient? In this series of tests, patients were completely relaxed and compliant and had absolutely no difficulty with the concept of having the specialist at a distance. For them the end result of the examination is the same but without the loss of time and other potential difficulties of having to travel to the specialist centre.

Are there limitations? The system is as good as the internet connection for the specialist to feel that they are present at the examination. It has to be performed in real time, with no pauses and screen break-up.

An examination can be carried out remotely using a dummy probe that drives the robot. The operation, like the one here, said they quickly adapted to using Melody system.
The birth of the amazing organoids

Professor Hans Clevers, researcher and group leader at the Hubrecht Institute in Utrecht, the Netherlands, invented the organoids, a ground-breaking new technique to grow new ‘organs’ and to test medication. This year, his work was rewarded in the form of the prestigious Körber European Science Prize, presented in Hamburg. At the Heineken F C Behr-Symposium he discussed organoids and the individual therapy for colon cancer made possible by this significant development.

For years, Clevers has studied how cancer develops and what goes wrong at the DNA level. ‘Until 2007 it was thought that bowels do not contain stem cells. We discovered that they do, and even more, that they divide themselves every day. To make that visible, we added the DNA of fireflies in the stem cells of mice. And what happens in mice, also works for people. This discovery of stem cells is a real breakthrough and it was a race against time to be the first to come out with this new technique. We worked very fast – week by week. But it was also worth a lot to see that other researchers, who were on the same track, cooed into our research.’

The development of organoids

The discovery of stem cells in the intestines led to further investigation and, within two years, Clevers and team managed to grow a small intestine in a petri dish from a stem cell. The result is a new standard for the unlimited reproduction of adult stem cells, from which organs can grow in mini-size. Moreover, these ‘organoids’ contain all the cells that behave just as they do in the intestines, meaning that medication can be tested in real-life conditions.

What are NMDAR antibodies and how do they trigger these symptoms?

Leypooldt: The NMDAR antibodies are a subspecies of glutamate receptors. Glutamate is a messenger substance in the brain that transmits impulses from receptor to receptor. The antibodies that normally fight growth. This was the starting signal for the discovery of new antibodies, a process that is still not complete.

In Germany the Institute for Clinical Chemistry at the University Hospital Schleswig Holstein is pursuing the diagnosis of, and research into, these antibodies. In our European Hospital interview with Professor Klaus-Peter Wandinger (NMDAR) antibodies in around 100 patients, who all had similar clinical symptoms and responded to immunosuppressive treatment. These were mainly young women aged between 20 and 40, who initially displayed psychiatric symptoms.

The clinical picture usually started with the patients hearing voices or experiencing hallucinations, similar to schizophrenia. They then also suffered from eyesight faults, which were so severe that their breathing was affected to such an extent that they had to receive artificial care. It was a severe clinical picture, which was life threatening in around 20% of patients but which, up to that point, could not be diagnosed.

Indirect immunofluorescence with patient liquor on specially prepared, non-fixed, non-permeabilised, embryonic hippocampal primary culture neurons. The binding of human IgG to the surface is marked in blue. Green dots correspond with synaptic clusters of the target antigen Iglon6. Blue corresponds with DAT1 nuclear staining, 63 x magnification.

What is happening in the brain when misdirected antibodies attack glutamate receptors type AMPA. Areas marked in brown are identified by human IgG from patient serum. The hippocampal formation is visible in the central part.

GENERATE – German Network for Research on Autoimmune Encephalitis

Founded in 2014, the network is entirely initiated by ‘investigators’ and is supported by 63 centres in Germany, aiming to help patients. Next to information from patients and doctors the main objective is to create a register, so far, this contains 570 pseudonymised sets of data. They facilitates internationally comparable research into the disease.

http://www.generate-net.de/

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Personal treatment method

Using organoids also leads to answers to questions such as how do cells work together; what they need from each other; what goes wrong to cause a particular disease; and especially how it can be solved. ‘With these so-called ‘Tumouroid’ studies, research is carried out on the patient's disease. You harvest a few cells from the patient, out of which the organoids can grow. This is far less stressful than several physical examinations. The result is that you can prove which medication will be most effective for this patient in order to provide him with personal treatment.’

Cystic fibrosis variants

Clevers, in close cooperation with Kors van der Ent and Jeffrey Beekman, from the Wilhelmina Children’s Hospital, proved the benefits of this technique. A Dutch patient named Fabian, aged 18 years, suffers a rare form of cystic fibrosis. The medicine Ivacaftor was tested for people with cystic fibrosis who had emerged from the same DNA error. Fabian was not eligible for the drug because it was not tested for the gene that caused this form of CF. With organoids, we showed that Ivacaftor would also work in him. So he was given the medicine ‘after all and is now doing great.’

Dilemma and global training

However, the use of organoids also leads to a dilemma. ‘The cost of medications is high,’ Clevers pointed out. ‘You can still say ‘yes’ if you can prove that medication will indeed help, but we can also predict with certainty when it does not. So do we have to refuse a medication that people are entitled to have?’ Additionally, current regulations state that the authorisation of new drugs are not yet adapted to the recent developments. ‘Therefore, we unfortunately cannot make any statements yet for colon cancer,’ Clevers explained. ‘The regulations also demand testing on animals, whilst the use of organoids can diminish the use of animals in laboratories.’

Clevers is training lab staff worldwide in growing organoids. ‘In Hong Kong, for instance, influenza virus was tested on pieces of lung removed during lung surgery. They needed to work very fast, because those pieces only remain good for four days. We have trained researchers from Hong Kong in our lab in Utrecht and now the technique is being applied there.

The Future

Clevers has not finished his studies. ‘The heart is still a virgin territory when it comes to the question of whether that organ has stem cells. In addition, the research into the application of organoids is still in progress. Yes, we can grow miniature organs and implant them in animals, but is that safe? Suppose you grow mini organ stem cells from a donor bank. Will you give the patient a new liver, but also perhaps a disease? Another step is the development of tailor-made drugs by pharmaceutical companies.’

His big dream, however, is the emergence of a liver bank, containing ‘freezers with pieces of liver
PD Dr Frank Leypoldt is currently training as a specialist in laboratory medicine at the Institute for Clinical Chemistry at UKSH. He also heads the neuromolecular out-patient department at the UKSH Campus Eiv. A qualified neurologist, he gained his doctorate at the University Hospital Hamburg-Eppendorf, where he also completed a postgraduate course in molecular biology. He worked in Hamburg as a post-doc fellow and, between late 2012 and 2014, in Barcelona under Professor Josep Dalmau. He has been employed at the UKSH since 2014 and wrote his habilitation in 2015.

Asa cause neurological diseases

PD Professor Hans Clevers MD gained his medical degree in 1984 and a PhD in 1985 at the University of Utrecht, the Netherlands. He carried on his post-doctoral work (1986-1989) with Dr Cox Terhorst at the Dana-Farber Cancer Institute, Harvard University, Boston. From 1991-2002 Clevers was Professor of Immunology at the University Utrecht and, since 2002, Professor in Molecular Genetics. Between 2002-2012 he directed the Hubrecht Institute in Utrecht. Additionally, between 2012-2015 presided over the Royal Netherlands Academy of Arts and Sciences (KNAW). Since June 2015 he has directed research at the Princess Maxima Centre for paediatric oncology.

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Refined capillary blood collection

The capillary blood collection system not only benefits geriatric patients, or those who need regular blood sampling, but also burns victims.

The MiniCollect capillary blood collection system

No more tubes and funnels

The cumbersome process of transferring the drop of blood using capillary tubes or funnels is in the past, thanks to this system because the blood collection scoop is integrated into the wide tube opening. 'The sample comes into contact with the additive immediately,' the manufacturer reports. 'The caps are completely sealed, meet the highest standards and can easily be sent via pneumatic dispatch or other transport systems without losing any sample material.'

Carrier tubes and combined filling volumes simplify use

'For centrifugation, the MiniCollect tubes can be inserted into a premium carrier tube using a simple rotational movement. When combined, the dimensions correspond to a standard 3 x 75 mm tube format and can easily be placed in a standard rack or standard centrifuge.'

Two easily visible filling marks on the tube provide greater flexibility for use.

The new MiniCollect capillary blood collection system went on show at Medica 2016.

No case for a psychiatrist’s couch

Continued from page 11

identified, many of those by Josep Dalmau, but also by Angela Vincent, in Oxford, who heads up the second largest working group on this topic. Neurologists can indicate a suspected anti-immune disease and also any clinical details on our test request form. We then use the procedures we’ve developed to test for the known neurological antibodies, and also for antibodies as yet unknown, using further tests from our research laboratory that were developed in close cooperation with Professor Dalmau and which are not available to buy.

‘We not only do this for hospitals in all of the German speaking countries but we also work with laboratories in Spain, the USA and Australia. Our dual qualification is unique. I am already a qualified specialist for laboratory medicine and Dr Leybold will soon qualify. When a positive result is confirmed we are well qualified to advise doctors on treatment.

‘The clinical pictures of autoimmune diseases are not well known outside of centres for maximum care, and colleagues are grateful for our guidance.’

 Might more antibodies be discovered?

Leyboldt: It is to be assumed that more will be found as there is a vast number of potential target proteins within the nervous system. Theoretically, each protein can trigger an autoimmune reaction in the body, especially when it’s located on the cell surfaces where antibodies have good access. Some people most probably have a genetic predisposition.

For now, the large groups, the most common autoantibodies, have been described with the laboratory procedures currently available. But the research continues for seronegative, i.e. antibody negative autoimmune encephalitides, for example. If no antibodies can be detected it doesn’t necessarily mean that they don’t exist.

‘One of Dalmau’s most important findings was the development of new laboratory procedures that can be used to identify a whole group of diseases through defined antibodies, i.e. patients who we had previously detected suffering from encephalitis.

‘There are biomarkers for specific groups of diseases that are very similar and treatable. Following this advance into new dimensions it is likely that further steps will be made to identify and treat diseases not yet classified.’
A swift new lab automation system

Every single hour, more than 200,000 people worldwide are being diagnosed or treated with our devices,’ Michael Reitermann, COO of Siemens Healthineers, proudly reports. No reason, however, for Siemens to rest on its laurels. Quite the contrary: the company continues to drive innovation. Case in point is Atellica Solution, the firm’s most recent lab automation system, unveiled at this year’s congress of the American Association for Clinical Chemistry (AACC), in Philadelphia. ‘With Atellica we created something entirely new in the lab world – something we had been working on for quite some time,’ explains Franz Walt, President of Laboratory Diagnostics at Siemens Healthineers.

‘We put a lot of detail work into the Atellica system; it not only contains a high degree of Siemens internal engineering know-how but also many insights culled from comprehensive customer surveys,’ Walt con- firms. For years, the firm has talked with customers, asking precise, con- crete questions in order to collect information that would enable its engineers to tailor a system to customers’ needs.

Completely developed in-house

The result is a solution that features Atellica Magline, a bi-directional, mag- netic sample-transport technology that is ten times faster than conventional technologies, Siemens reports. ‘What’s so incredible about this conveyor is the technology behind it – it is based on magnetic levitation technology with very little mechanical contact which in turn means hardly any wear and tear and extremely low main- tenance,’ Walt explains. But innovative transport is not the only innovation Atellica Solution has to offer, the manufacturer points out. The integrated immunoassay analyser handles over 400 tests per hour. A multi-camera vision system and intelligent sample routing enable independent control over every sample, from routine to STARS.

For comprehensive multidisci- plinary use Atellica can be connected to Aptio Automation. Moreover, the solution can handle more than 30 sample container types, including paediatric and special containers.

Atellica is unique as we gave it a modular design which enables the customer to choose almost any con- ceivable configuration. The entire sys- tem is scalable and offers more than 300 customisable configurations; Walt says, obviously proud of his new lab champion. The solution can be used as a standalone system or connected to automation, including L-shaped, U-shaped or linear formations and up to ten components can be combined.

‘We succeeded in designing an innovation which allows our customers to achieve better clinical as well as more relevant business results without having to spend more time on lab

Pathology does not appear to have much in common with satellites, but the concept that satellites combine spatial resolution and image quality will be the future of disease diagnos- is, according to researchers.

Scientists at Vanderbilt University, Nashville, Tennessee, are combin- ing microscopy and mass spectrom- etry, using mathematical regression analysis to take advantage of each modality’s strengths.

‘In a satellite imaging process a black and white picture of the ground is taken because black and white cameras have high spatial res- olution,’ explains Richard Caprioli, director of the Mass Spectrometry Research Centre at Vanderbilt University School of Medicine. ‘A similar technology has been used under development at the Oak Ridge National Laboratory (ORNL) in Oak Ridge, Tennessee, although there it is used for materials characterisation rather than disease progression. At ORNL, the two imaging modalities are being put together mechanically, while researchers at Vanderbilt are using lasers.

The challenge will come in mak- ing pathologists aware of the new technology when it will be ready to be put to use and engaging them in discussion. ‘Bringing a new technol- ogy over the translation bridge is not as easy as many people think,’ Caprioli comments. The College of American Pathologists has identified study protein, peptide, lipid, small metabolite and drug distributions in tissue.

‘Image fusion enables a new multi- modality paradigm for tissue explo- ration whereby mining relationships between different imaging sensors yields novel imaging modalities that combine and surpass what can be gleaned from the individual tech- nologies alone,’ the authors wrote. A similar technology has been used under development at the Oak Ridge National Laboratory (ORNL) in Oak Ridge, Tennessee, although there it is used for materials characterisation rather than disease progression. Additionally, this will eventually need clearance from the USA’s Food and Drug Administration.

‘I believe that, in the coming years, all diagnoses will be done this way, because it makes sense,’ Caprioli confirms. ‘You’re looking at what is wrong with the patient directly and not just picking out a few surrogate markers for the disease. Pathologists have tools that they use today. We are offering a new set of tools that have high molecular dimensionality.’
Diagnosing Zika virus infection

Commercial blood test proves reliable

The Society for Virology (SVV) which promotes virology through the increase and exchange of research within German speaking countries, as well as via cooperation with other scientific societies, announced this year that a new test can unambiguously confirm the diagnosis of a Zika virus infection – leading to fast diagnosis and identification of an infection. The diagnosis of pregnant travellers worried a Zika infection upon their return home was cited as one example. Waiting for a diagnosis is just a few hours.

Commercial blood test

Researchers at the University Hospital, Freiburg and at the Bernhard Nocht Institute for Tropical Medicine have now substantiated the use of a commercial blood test for antibodies. "This test detects Zika virus antibodies reliably and, unlike other procedures, shows no cross reactivity with other, related viruses," confirmed Dr Daniela Huzly, head of Diagnostics at the Institute of Virology in Freiburg. Professor Thomas Mertens, President of the Society for Virology, added: "The availability of a reliable and fast test for the specific and sensitive detection of Zika virus antibodies is a great relief for those who may be infected as well as for doctors."

A small window of time

In a patient with an acute infection the Zika virus has generally been confirmed via direct virus detection, a so-called PCR test. However, diagnosis is only possible during a small window of time and only works for the first few days of an infection. Most patients therefore require a serological examination, i.e. a test for antibodies.

One problem with this is that the antibodies developed by the body against the Zika virus show a distinct cross-reactivity with antibodies against related viruses in most of the previously used blood tests. Thus a test reacts positive when antibodies against other viruses circulate in the blood, such as those against FSME, Yellow fever or Dengue fever. This is a problem not only for those already infected but also those previously vaccinated against one of these viruses.

Ascertaining whether a patient really is infected with the Zika virus therefore required further, extensive tests that can only be carried out in a few specialist laboratories. The new test, however, does not require extensive diagnostics and can be carried out in any laboratory that routinely tests for antibodies.

Also test men with pregnant wives

The Society for Virology and the Bernhard Nocht Institute for Tropical Medicine recommend confirming a potential Zika virus infection not only for pregnant travellers returning from locations where the Zika virus has spread, but also for men who have spent time in these areas and have pregnant partners. In both cases testing is also recommended when no symptoms or illness are present.

Returning travellers who had symptoms typical of a Zika virus infection, such as fever, headache, lethargy, muscle and joint pains, rash, conjunctivitis, can also be tested to check whether they are infected, even when symptoms may have been mild.


Cancer blood tests might become available in the near future. Last January Illumina, Inc., a USA-based firm, announced the creation of GRAIL, a new firm aiming to enable cancer screening from a simple test measuring nucleic acids circulating in blood.

The earliest cancer detection increases long-term survival. The successful development of a pan-cancer screening test for asymptomatic individuals could, effectively, diminish global cancer mortality.

GRAIL, now a separate company, with majority owned by Illumina, is initially funded by over $100 million from Illumina and ARCH Venture Partners, with participating investments from Bezos Expeditions, Bill Gates and Sutter Hill Ventures. The holy grail in oncology has been the search for biomarkers that could reliably signal the presence of cancer at an early stage, said Richard Klausner MD, formerly Illumina Chief Medical Officer and NCI Director, and a Grail Director. "Illumina’s sequencing technology now allows the detection of circulat- ing nucleic acids originating in the cancer cells themselves, a superior approach that provides a direct rather than surrogate measurement."

GRAIL has secured the counsel of a world-class set of industry and cancer experts for the company’s advisory board, including Klausner, Dr Jose Basgela, Physician In Chief at Memorial Sloan Kettering and President of the American Association of Cancer Research; Dr Brian Drake, Director, OHSU Knight Cancer Institute; Mostafa Ronaghi, Chief Technology Officer at Illumina; Don Berry, Professor at MD Anderson Cancer Center; Timothy Church, Professor at the University of Minnesota School of Public Health and Charles Swanton, Group Leader at the Francis Crick Institute.

The company will initially have a five-member Board of Directors, including Jay Flaherty, William Rastetter (Chairman of Illumina), Richard Klausner, Robert Nelsen, and the CEO – former senior Google executive Jeff Huber. Huber, who has now led GRAIL since last February, said in a US magazine interview for Forbes at the time of his appointment, that he took on this role largely due to the death of his wife, Laura, from colon cancer in late 2015.

Moving through the R&D pipeline

A pan-cancer screening test
complications, but a second infection by the influenza virus that leads to serious co-infection.

In the scope of an interdisciplinary project, the researchers discovered that the overproduction of a certain messenger might facilitate the proliferation of the bacteria in the presence of co-infection.

Up to 20,000 people succumb to the consequences of an influenza disease each year in Germany alone. However, in most cases it is not the influenza virus that leads to serious complications, but a second infection by the influenza virus that leads to serious co-infection.

Using a computer-based simulation approach, the research team of Dunja Bruder, who heads the HZI’s research group ‘Immunology’, and a professor of infection immunology at the OVGU Magdeburg, and Dr Esteban Hernandez-Vargas, who directs the ‘Systematic Medicine of Infectious Diseases’ research group at the HZI, made a major contribution to solving this riddle.

The researchers jointly developed a project plan linking laboratory work with mice, infected concomitantly with the influenza virus and Streptococcus pneumoniae, and computer-based modelling of the infection processes. Usually we simulate biological processes based on previously published data. Since we, as systems biologists at the HZI, work very closely with the infection researchers on-site, we could plan the infection experiments appropriately, so that the collected data would be ideally suited for mathematical modelling of the infection processes,” Esteban Hernandez-Vargas explains. In infection experiments, Bruder and her team were able to show that the number of macrophages – immune cells that eliminate pathogens – drops rapidly as early as 18 hours after co-infection of influenza-infected mice with the bacteria, and that the bacteria proliferate very rapidly.

When the systems biologists modeled the observed increase of the pneumococci and the simultaneous decrease of the immune cells through mathematical functions, they discovered that the two processes do not match exactly. This allowed us to deduce that the strong bacterial proliferation was not only due to the decrease in the number of macrophages. There had to be at least one more factor that played a role in this process,” says Bruder.

The scientists then looked at the release of various messenger substances that have important functions in the defence of bacterial infections. As far as exact time points for the collection of samples were defined in the investigation of these molecules to ensure the collected data would allow for the best possible mathematical simulation of the ongoing processes.

The scientists noted that the amounts of the messenger substances produced by the body in the presence of a co-infection were clearly larger than in the presence of a bacterial infection alone. Hernandez-Vargas’ team again entered the profiles of the numbers of bacteria, numbers of macrophages and the various messenger substances in his mathematical models. The best results were obtained with the measured interferon gamma data – another messenger substance – and a minor influence was also detected for interleukin 6 – both of which are molecules that are usually important for control of the immune defence in an infection.

‘Due to the infection by the influenza viruses, the interferon gamma level is already high. Even more interferon gamma is produced if a second infection by pneumococci occurs. Based on our results, we are presuming that the macrophages can no longer effectively eliminate the bacteria because of this over-reaction of the immune system. It is known that these “elimination function” is impaired by excessive levels of interferon gamma,’ Bruder explains.

‘Additionally, a computer simulation confirms this observation. If one withdraws the interferon gamma from the model, bacterial outgrowth may not be presented. Bruder’s research team now plans to test the results of this simulation in laboratory experiments. If the experimental results are consistent with the results obtained by modeling, the mathematical model would give us insights into the process how to predict the role of certain messenger substances in infection processes,’ Hernandez-Vargas explains. ‘As one of the benefits, laboratory experiments could be planned much better and the number of animal experiments could be reduced. Moreover, in the long term it might be possible to develop a therapy for co-infections that focuses on the interferon.’

Source: The Helmholtz Centre for Infection Research


With ‘Tacta’ the pharmaceutical and laboratory equipment supplier Sartorius has recently launched a new mechanical pipette. Tacta has a perfectly balanced design that is easy, safe and comfortable to use. The pipettes meet the most demanding pipetting requirements, delivering consistent and accurate results time after time. Manufactured from carefully selected materials, each component is designed to meet the highest standards of comfort and reliability. The new pipettes are available in a range of volumes from 0.1 to 10,000 µl in single channel models, and from 0.5 to 500 µl in multichannel models.

The extremely low pipetting and tip ejection forces reduce the risk of Work Related Upper Limb Disorder (WRULD), the firm points out. ‘The unique handle and finger hook design let the pipette rest lightly in the user’s hand, with no need to grip the handle tightly, providing reliable and accurate results during lengthy pipetting sessions.

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The new Sartorius Optipette, lev- ered tip ejection technology, enables controlled and smooth tip ejection with minimum force. The Optiplace feature, with spring-loaded tip cones in both single and multichannel models, ensures tip loading with perfect sealing and minimal force.

The new Optiflask system pro- vides flexible volume adjustment and locking functions, and prevents accidental volume chang- es during pipetting. Sartorius notes. ‘Tacta has a large, clear 4-digit display, which makes the volume easy to read even when the pipette is at an angle. Furthermore, Tacta is very easy to adjust for a variety of liquids, using a sim- ple adjustment key. An integrated adjustment functionality and scale show the degree of adjustment and, by noting this value for a specific liquid, the user can return to that setting any time.’

‘No tools are needed to disassem- ble the three parts, and the pipettes are reported to be particularly quick and easy to clean, and they can be autoclaved without disassembly, with high resistance to UV and chemicals exposure.

Safe-Cone Filters are available for all Tacta models with volumes of more than 10 µl, and the filter eje- c -tor enables easy removal of used or contaminated filters without human contact.

All Tacta pipettes are also fully compatible with original Sartorius Optifill and SafetySpace pipette tips.

More information: www.sartorius.com; www.passionforscience.com

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The dangers of commercial direct-to-consumer tests

**Integration of DTC testing**

Direct-to-consumer testing (DCT), or direct access testing (DAT), are laboratory tests with results that go straight to the end customer or patient, explained Professor Matthias Orth, Medical Director of the Institute of Laboratory Medicine at Marienhospital Stuttgart, discussed 'Direct-to-consumer testing: The business of lifestyle tests' at a September congress in Copenhagen that focused on 'The benefits and challenges of point-of-care testing across the clinical spectrum'.

Copenhagen that focused on 'The benefits and challenges of point-of-care testing across the clinical spectrum'.

**LifeStyle tests that pretend to be medical procedures are inherently direct-to-consumer tests**

New generation of DCT tests has emerged: tests where the customer samples blood or DNA at home, mails the sample to the lab and then calls up results over the internet. According to the test providers, each sample is individually analysed in the lab before it is sent back to the patient, explained Professor Matthias Orth, Medical Director of the Institute of Laboratory Medicine at Marienhospital Stuttgart, discussed 'Direct-to-consumer testing: The business of lifestyle tests' at a September congress in Copenhagen that focused on 'The benefits and challenges of point-of-care testing across the clinical spectrum'.

**Are these tests a problem for lab professionals?**

In most countries the healthcare sector is highly regulated to protect the patient. In the USA, for example, the tests need FDA approval and labs must be certified by the Clinical Laboratory Improvement Amendments (CLIA). In Germany, we have a guideline issued by the German Physicians' Association for Quality Assurance of Lab Medical Procedures, the physicians must offer a medical benefit; moreover only adequately qualified people can perform tests.

There are also many more rules and regulations to protect the patient, such as privacy laws, regulations applying to healthcare professionals, the genetic diagnostics law and rules that govern physicians fees for services.

'All these – undoubtedly necessary and useful – laws and rules do not apply to lifestyle testing. Therefore we must now somehow define when the line between lifestyle and healthcare is crossed and when legal action is required. That is very difficult, as we saw recently when the business model of Theranos, the worldwide largest provider of DCT testing, turned out to be a complete fraud. Scientists and physicians alike had relied on Theranos methods. It was claimed that there is a conflict of interest, because they themselves provide diagnostic services and there were attempts to force them to cease and desist from using the Theranos methods.'

'It is also highly problematic when physicians use results from lifestyle DCT tests since this basically means that lifestyle test results are jacked up to be healthcare diagnostic results – but these lifestyle tests follow no legal and technical standards whatsoever. If the patient suffers damages, the physician who accepted the DCT results is liable even though he probably was not involved in the generation of the results at all.'

Do these tests impact on work in the lab? One important danger I see is the careless handling of medical data in DCT testing. There is high potential for abuse, particularly with molecular exams. It defeats me how people can think that it is possible to keep a genetic testing company with close links to Google, the use of their genetic and other highly sensitive data.

Another problem is the waste of healthcare resources through DTC testing: The business model of DTC testing often entails the fabrication of conspicuous findings in order to sell, for example, dietary supplements, or expensive monitoring services. Thus lifestyle tests often lead to complex diagnostic procedures of a perfectly healthy person – with the general public footing the bill.

'A third issue is the media hype surrounding DTC testing, something we have never seen in evidence-based medicine: DTC testing services are regularly promoted in blogs, user groups and on the social media. The promotional tests, even though they might be labelled as 'advertisement' software, convey images of a certain lifestyle and make claims regarding DTC testing that are in no way supported by evidence. However, we find it impossible to counter these internet trolls with reasoned arguments.**

**Should DTC be more strongly regulated?**

'The definitions of DTC testing are very complex and we do see efforts of DTC testing providers to circumvent the healthcare rules and regulations that are in place and necessary to protect patients and ensure safety. Think of the over-the-counter sale of lab tests in pharmacies, or the call for tenders for genetic testing under section 140a of the German Social Code, book V regarding special service.

Moreover, internet offerings and mail order pharmacies cross national boundaries and thus turn many reasonable regulations into blunter instruments. In addition, DTC testing providers legitimise their services by referring to the EU consumer rights directive 2011/83/EU, which is meant to promote free movement of goods and services. In my opinion that is dangerous and very naive: Today, even small forensic DNA specimens provide information on features as such ethnic background, size, hair colour, etc. It is naive to assume that complete genome sequencing in a lifestyle test done for genealogical purposes does not provide medical data that need to be protected. Consumer protection in DTC testing is needed. The limitations of the methods are hidden in the small print.'

**New and improved equipment strengthens hospital hygiene**

Coatings defeat pathogen

Nosocomial infections are dangerous – sometimes having grave consequences. The German company Schmitz u. Söhne points out that manufacturers of medical equipment and furniture are challenged to keep germs under control and it increasingly focuses on the hygienic aspects of new and further product developments in its closed design of operating tables and antimicrobial coatings.

The firm uses such coatings on all frequently touched surfaces, including side guards and push bars of its shuttle. Patented coating techniques are based on innovative silver ion technology that effectively and permanently fights mildew, fungi and even resistant strains of bacteria. Studies show that 90 percent of harmful bacteria on the coating can be removed in just 15 minutes and even 99 percent of germs are eliminated after two hours, the company reports.

**New cleaning shuttle**

A prime example of a new product exclusively developed for hygiene is the Schmitz u. Söhne cleaning shuttle, which for the first time cleans operating tables easily and thoroughly from the bottom; the firm adds. The shuttle consists of a separate, movable frame into which the operating table is placed at maximum height. The supports of the shuttle are positioned directly under the seat section of the table. Meanwhile, the staff lifts the operating table again. The chassis lifts off the floor, allowing for thorough cleaning of the underside of the table as well.

**Hygiene constantly challenges manufacturers**

We consider hygiene in hospitals to be one of the most pressing current
Emergency POCT

Point-of-care testing can play an influential role in reducing over-crowding in hospital emergency departments, Mark Nicholls observes.

Emergency medicine consultant Ulf Martin Schilling, MD, based in Linköping, Sweden, believes that the strategic use of point-of-care tests (POCT) can improve patient flow through departments and in some cases initially avoid the need for patients to attend.

In a recent symposium, Dr. Schilling posed the question: POCT in the Overcrowded Emergency Department - Can It Make a Difference? during the American Association for Clinical Chemistry (AACC) conference, which was held in Denmark in September this year.

The use of point-of-care tests in various patient care settings was examined, with a focus on clinical decision-making and improved patient outcomes.

Speaking with European Hospital, the event, he said that, although emergency departments (ED) with increasing public demand are becoming ever more overcrowded, on the spot tests can be used to help alleviate this.

Improvements in the survival rate of critically ill patients in the ED are directly related to the advancement of early recognition and treatment through frequent episodes of overcrowding.

With prolonged waiting times forcing EDs to operate beyond their capacity and threaten to impact upon patient care, he suggested point of care testing can be brought into play at every stage. ‘We have good evidence, for example that, if you empower GPs with POCT analysis, the number of unnecessary referrals can be reduced because GPs can reliably rule out disease and do not need to refer some patients,’ he explained. ‘And if you use POCT in the ambulance, you can improve the overall process for the patients because you are winning time within the emergency department.’

Once in the emergency department, POCT can be used at the triage stage to safely identify urgent cases, and save more time as well in the diagnostic and treatment stages. As a result, the process towards one of the main goals of the emergency department will be speeded-up, the decision on whether a patient is admitted, discharged or referred elsewhere.

‘At every different step of the emergency process and on every single patient’s process you can be losing time,’ Schilling emphasised. ‘If this happens for a team caring for 6-8 patients, all the different delays in the patient process will accumulate to a critical level. As a result, your team will not be as effective and you find your department in an over-crowding situation.’

‘Overcrowding is not so much about how much space or how many beds you have but mostly about when emergency department staff cannot work efficiently any more in processing patients. But, if you reduce the delays at the front end, you will have faster processes and you gain time on each patient. Even small earnings in time will give the emergency team the possibility to work efficiently. The key is to have a more efficient process that will reduce the effect of overcrowding and this can be achieved with point of care testing.

‘In recent years, particularly during the last decade, POCT has evolved due to new technology, and the range and accuracy of many tests has become better as well as the quality.’

POCT in the ED can include virtually all relevant testing in emergency, urgent and acute care, he said. ‘To be approved by the authorities, POCTs have to follow the same regulations in the core laboratories, which means the major producers must maintain very high standards of quality,’ he added.

However, in the use of on the spot tests in emergency departments there is inconsistency across Europe in the use of such testing in emergency departments, often due to factors such as the remuneration system, a limited analysis of front-end investment towards cost-return in the overall process, and the policy of the local hospital and trust.

To profit from the potential of point of care testing at the pre-hospital, hospital and post-hospital level, Schilling suggests, a knowledge-based change of culture among local staff and management is essential. Training and knowledge about the possibilities – and limitations – of POCT is crucial for efficient implementation of new systems and tests. ‘If you can process patients in a much smoother way, it improves flow and reduces the crowding problem.

‘Point of care testing,’ Ulf Schilling concluded, ‘can make a difference in the overcrowded emergency department and can contribute to alleviating the effects of overcrowding.’
Dusting out-dated recommendations

Report: Brigitte Dinkloh

Recommendations on the currently valid prevention of intravascular catheter-related infections from the Commission for Hospital Hygiene and Infection Prevention at the Robert Koch-Institute (KRINKO) are now 14 years old and out-dated. Much has happened since their first publication in 2002, making an update essential to include the latest developments in medical sciences. We interviewed Dr Christine Geffers, Consultant at the Institute for Hygiene and Environmental Medicine at the Charité Berlin and co-author of a new recommendation to be issued in the New Year.

‘This recommendation was overdue for revision, and such an important guideline should, in fact, be updated in much shorter intervals of five to six years,’ Geffers points out. ‘This cannot always be assured due to the large number of recommendations that need to be reviewed. Geffers is a colleague of Professor Petra Gasteiner at the National Reference Centre for the Surveillance of Nosocomial Infections, first mentioned data sources. Recommendations currently in place are based on 229 sources, the new recommendations quote more than 600 sources. ‘What was assumed or believed back in 2002 can now be safely confirmed by the number of studies carried out since then.’

Not only the quantity, but also the quality of the underlying data has improved. ‘Studies carried out prior to 2000 are now considered out-dated,’ Geffers confirmed. ‘These days, the expectations of quality with regards to ethics, for instance, are very different to what they were 15 years ago, when everyone had the freedom to carry out studies based on their own ideas. Therefore, the objective now is to draw on more recent studies that comply with current quality standards,’ he adds.

The new recommendations cover non-tunnelled central venous catheters (CVC), peripheral venous catheters and arterial catheters. Port systems, partially implanted intravascular catheters and intravascular catheters for newborns are no longer covered, with the latter being covered by a separate KRINKO recommendation. There is also a lack of recommendations on how to deal with large bore vascular access required for extracorporeal oxygenation or decabonisation (the artificial lung), because there are hardly any studies available on this topic.

As it is not possible to introduce all innovations here, Geffers lists some examples. The preferred access point for a CVC in the subclavian vein is no longer recommended, with no recommendation being made either for or against this access. ‘The only recommendation here is not to use the jugular vein for a CVC with a tracheostomy who need a CVC. It would be too complex to list all the changes in detail,’ says the specialist for Infection Prevention and Control and Environmental Medicine.

Another new recommendation is that peripherally inserted CVCs should no longer be preferred. Regular, daily monitoring and documentation of the diagnosis during ward rounds is an additional step. In 25% of cases a PJI is the reason for treatment. ‘The objective is still to remove it as soon as possible, which is also why daily monitoring is advised, to see if the catheter in place is still valid,’ Geffers explains. ‘There were no maximum limits for treatment of PJI in the two previous recommendations, and there won’t be any in the 2017 recommendations either. Current recommendations advise against chang- ing catheters regularly, and this will continue to apply. The infusions tubes were supposed to be changed every three days, but the new recommenda- tions advise at least four day intervals between changes.’

A large part of the recommenda- tions revolves around staff training. ‘In up to 30% of cases no indication is required. This should ideally be carried out in small groups and should include a lot of practical training. Important preventative measures are to be focused on with the help of specific campaigns. The fitting of peripheral cannulas was discussed in the context of using specialist catheter teams – as is now the case in KRINKO. These recommenda- tions stipulate that it is prefer- able to ensure that all team members are capable of changing catheters, and to check that this is the case. The new recommendation aims to mini- mize the risk of infections further still.’

However, of the numerous new recommendations, up till now, not everything that has been practiced on the wards has, in fact, been wrong; she concedes. ‘The recommendation will certainly contribute towards increased patient safety. The prevention of nosocomial infections by the management of medical institutions as required by para- graph 253(c) of the Law on Infection Prevention and Control is usually ensured through the implementation of new recommendations. As it is not possible to introduce all innovations here, Geffers lists some examples. The recommenda- tions are therefore essentially binding, but are not inflexible and can be changed. In these cases it is important to prove that the recommendations were implemented, or to substantiate why they were not adhered to.’

Changes to intravascular catheter systems in 2017

To prevent intravascular catheter-related infections further, the newly-revised recommendations cover non-tunnelled central venous catheters (CVC), peripheral venous catheters and arterial catheters.

From left: Akos Zahar, Assistant Professor Johannes Holinka and Professor Geog Matziolis

Painful knee prosthesis: loose, infected or both?

Report: Beate Wagner

The implantation of knee and hip joints is considered one of the suc- cess stories of recent years. But periprosthetic joint infections (PJI) are one of the severe complica- tions, with an infection rate of 2%. The probability of revision surgery increases with concomitant diseases such as rheumatoid arthritis, with fracture prosthesis or after previous surgery.

The challenges in diagnosis include low-grade infections, small colony variants, contamination of samples, mixed-species colonisa- tion and increasing development of resistance. Apart from MRSA the other problematic pathogens include gram-negative bacteria (MRGN) and vancomycin-resistant enterococci (VRE).

Treatment is impacted by old age and multimorbidity. ‘Often, high complication rates are the result,’ administered,’ says Professor Georg, Matziolis MD, Senior Consultant at the Charité Berlin and Professor at the Dream Hospital Emergency Surgery at the Eisenberg, Waldkrankenhaus ‘Topical treat- ment with antibiotics is becoming increasingly important.’

‘Firstly, it is important to establish whether a PJI or aseptic loosening is present,’ explains Professor Johannes Holinka MD, from the Medical University of Vienna. In 25% of cases a PJI is the reason for revision and, in 10%, it’s mechani- cal loosening.’ The anamnesis, fol- lowed by radiological and clinical examination along with laboratory diagnosis of blood, synovial fluid, tissue and history provide the indications required.

Microbial detection as the pri- mary objective of the diagnosis of low-grade infections often proves difficult. ‘In up to 50% of cases no micro-organism can be cultivated,’ Holinka points out. The specificity of microbiological cultures increases with the number of samples. ‘Three to six intraoperative samples are ideal, and in cases of low virulence organisms or after previous admin- istration of antibiotics we require up to ten.’

Sonification is more significant than a tissue culture. ‘As a biomark- er, Alpha-defensin facilitates the detection of a PJI because it is not impacted by antibiotics. Quantitative measurements have shown a sensi- tivity and specificity of 96% and 97% respectively the effectiveness of both procedures is very high,’ he explains. ‘For one-stage exchange, recommendations stipulate that the connections, such as the three-way tap, must be dis- fected after antibiotic treatment. However, there is no change to the recommended time in situ for catheters. Infection control still has to be removed as soon as possible, which is also why daily monitoring is advised, to see if the catheter in place is still valid,’ Geffers explains. ‘There were no maximum limits for treatment of PJI in the two previous recommendations, and there won’t be any in the 2017 recommenda- tions either. Current recommenda- tions advise against chang- ing catheters regularly, and this will continue to apply. The infusions tubes were supposed to be changed every three days, but the new recommenda- tions advise at least four day intervals between changes.’

A large part of the recommenda- tions revolves around staff training. ‘This should ideally be carried out in small groups and should include a lot of practical training. Important preventative measures are to be focused on with the help of specific campaigns. The fitting of peripheral cannulas was discussed in the context of using specialist catheter teams – as is now the case in KRINKO. These recommenda- tions stipulate that it is prefer- able to ensure that all team members are capable of changing catheters, and to check that this is the case. The new recommendation aims to mini- mize the risk of infections further still.’

However, of the numerous new recommendations, up till now, not everything that has been practiced on the wards has, in fact, been wrong; she concedes. ‘The recommendation will certainly contribute towards increased patient safety. The prevention of nosocomial infections by the management of medical institutions as required by para- graph 253(c) of the Law on Infection Prevention and Control is usually ensured through the implementation of new recommendations. As it is not possible to introduce all innovations here, Geffers lists some examples. The recommenda- tions are therefore essentially binding, but are not inflexible and can be changed. In these cases it is important to prove that the recommendations were implemented, or to substantiate why they were not adhered to.’

‘This avoids turning the doctor into a manufacturer of medical products,’ the expert underlines. With cement- based one-stage exchange, antibacterial treatment can be cut from several weeks to 14 days.

Two-stage change is the gold standard worldwide. This is indi- cated in cases of negative bacterial culture, drug resistance as well as in the case of soft tissue defects that require a step-by-step approach. Antibiotic-loaded bone cement is used as a spacer during the prosthetic-free interval and for the re-implantation during the sec- ond operation. ‘Dynamic spaces (such as those made from Copal knee moulds) are more effective than static ones,’ Zahar points out.

‘They offer more patient comfort, are easier to re-implant and the functionality is better,’ adds Matziolis.

The abrasion of cement and ceramics particles appears clinically irrelevant. There is currently litt- le evidence available for mobile spacers compared to static spacers. However, the advantages of mobile spacers for dead space manage- ment and local antibiotics treatment prevail. ‘The question is not so much whether to use a mobile spacer, but how, and how much weight one can put on reducing re-infection rates, reducing bone loss and easing re-implantation.’ Matziolis talked about the superi- ority of spacers made from industri- ally manufactured, antibiotic-loaded bone cement compared to alterna-

Care: Brigitte Dinkloh

Recommendations on the current-
Call to re-evaluate sepsis screening tool

Expert declares updated criteria for sepsis identification is not early enough. Méliansade Rouger reports

New criteria used as an initial screening tool in the emergency department need to be re-evaluated, a specialised surgeon will highlight in a dedicated talk during the Spanish national congress of surgery this November.

In Spain sepsis affects 50,000 people and is responsible for 17,000 deaths each year (The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). JAMA 2016 Feb 23;315(8):801-10).

Early detection of infection, before patients must be admitted to intensive care, is essential to trigger appropriate treatment and improve outcome.

A commonly used strategy among doctors to identify a suspected infection and evaluate severity has been to use criteria defined by experts. The Systemic inflammatory response syndrome (SIRS) criteria, which rely on the degree of hyperperfusion and inflammatory response to determine the presence and degree of the infection, have long served as a reference in clinical practice and research. However, many practitioners have insisted the SIRS are not sensitive and specific enough. In fact, the controversy over these old criteria pushed the international consensus responsible for setting sepsis criteria to issue new measures earlier this year.

These experts updated the definitions by putting the focus on low blood pressure, high respiratory rate and altered mentation as means to recognise sepsis and septic shock for patients inside and outside the ICU.

The new criteria have been named the qSOFA (Quick SOFA Score), and many thought they would help gain time in patient management.

However, the authors of a more recent study have concluded that the qSOFA does not help to evaluate patients in the Emergency Department who are not yet in need of critical care (qSOFA, SIRS, and Early Warning Scores for Detecting Clinical Deterioration in Infe....)

Besides finding the appropriate treatment update during the meeting, the into the importance of infections.

involve surgeons in the knowledge and research activities include the study of clinical profiles and risk factors of multi-resistant infections in surgical patients – the subject of her PhD thesis in 2015. She is a member of the board of the Surgical Infections Section in the Spanish Surgical Association (AEECS), and Councillor and Educational Committee member of the Surgical Infection Society - Europe (DS-E), where she strives to involve surgeons in the knowledge and importance of infections.

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Many units themselves need emergency care

Germany’s hospital emergency departments run up a loss of more than one billion euros every year. EH correspondent Ralf Matebski asked Dr Thomas Fleischmann, Medical Director of the Department of Interdisciplinary Emergency Medicine at Westküstenkliniken in Schleswig-Holstein, about the fragile state of the emergency department.

According to Thomas Fleischmann, specialist in the reorganisation of emergency departments, care for emergency patients takes up a loss of about one billion euros every year.

Comparing apples and oranges

‘The loss generated in emergency departments is primarily caused by a significant increase in out-patients – who today account for two thirds of all patients presenting to the emergency room. The major problem is the reimbursement system via the German physicians’ associations, the Kassenärztliche Vereinigung. To be more precise: physicians in the emergency room are reimbursed exactly like office-based physicians. However, the emergency room is open 24/7, 365 days a year, whilst a doctor’s office is open 30 hours a week.’

‘A second difference, Fleischmann points out, ‘Are the provision costs of an emergency department, be it for physicians or nurses, for CT, cardiac cath lab or intensive care. The moment you subtract these reimbursement might be sufficient for a doctor’s office it will never even come close to covering the additional staff and operating costs a hospital’s emergency room incurs with its around-the-clock service.’

Internal considerations

‘When we look at internal factors, our emergency departments don’t look too bad. Overall, we provide good healthcare. However, there is room for improvement. Unlike other industrialised countries, in Germany it’s mostly the junior physicians rather than specialists who staff the emergency room.’

Specialists are in short supply

‘Germany is one of the few countries – not just in Europe, but also among high-income countries worldwide – that does not provide regulated training for emergency room staff. The result is that inexperienced junior physicians, trying not to make mistakes in the emergency room, tend to do too many exams of patients with low-degree conditions and to admit too many people as in-patients. This issue can only be solved with adequate and defined training in clinical emergency medicine.’

Going forward

‘Most importantly, emergency care must be financed; we must not allow it to starve to death. Secondly, the quality of care has to be raised to specialist physician level for each patient to receive exactly the type and level of care he or she needs – not more, not less. ‘Let’s look at the triage categories: red, orange and yellow – these are patients with medium to severe conditions. Green and blue are patients with minor problems and injuries. Patients with medium to severe conditions account for about 60 percent of cases; the remaining 40 percent are greens and blues. It’s the latter category that is rapidly increasing.’

Light at the end of the tunnel

‘The problem of under-financed emergency rooms is not a German problem, but a problem that’s present in many high-income countries, such as the USA. In Germany we cannot – and must not – wait for an international solution; we must find our own direction. To be fair, we are witnessing a historic change: the coalition contract between the German government two parties mentions emergency departments – for the first time ever! Emergency care is one of the four pillars in the hospital structure law. That is new. While modifications to the German government two parties mentions emergency departments – for the first time ever! Emergency care is one of the four pillars in the hospital structure law. That is new. While modifications to the German structure law are insufficient, but are a clear step in the right direction.

Conclusion

‘Beyond the fundamental and politically necessary changes, there are no simple solutions for the individual emergency room. Optimisation of emergency care will not result from one single measure but rather from the result of the package of measures to increase efficiency, lower costs and improve financing. Germany has to overcome two major challenges: The extreme shortage of emergency professionals – both in the medical and in the nursing sector – must be addressed. And secondly, no matter how we look at it, we must not allow emergency care to be atrophied for business reasons.’

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