What is Savana?

‘As doctors, we have been gathering information from our patients’ clinical records for many years. This information has great value, but until now it hasn’t really been exploited, because we write our reports in natural language, or free speech. We write in complex semantics and narratives, rather than in a structured way. For some years we have been using natural language and linguistics computational processing, so that computers can decode human language. That’s the technology used by Google, for instance.

Savana is the first company that has been able to sub-specialise this AI technology to convert free speech contained in clinical records in a database, and to mine this data.’

What inspired this business idea initially?

‘In our society, we have access to large databases all the time, whether for music, banking, etc. In healthcare, very large quantities of data are being generated, most of which are digital, however, we did not reuse it – which is possible with technology and a bit of organisation. So that’s what we did.’

Is Savana unique?

‘There are many innovative companies in Spain; social entrepreneurship is growing steadily. Technology is a great way to improve people’s lives. Savana handles very big amounts of medical information, which very few private or public projects do. We manage tens of millions of clinical episodes and this makes it so very unique.’

How is big data developing in Spain?

‘Unlike Germany, the UK and the US, Spain did not pave the way for big data use. We need to get on board now and use big data in healthcare. Just as e-banking is becoming banking, e-health is becoming health. The Spanish healthcare system is very strong, but things may change within 10 years if we don’t realise that health is becoming digital.’

Are doctors or healthcare people resisting this?

‘Innovation means realising that you need to get it wrong three or four times before it works. This is very hard to accept in healthcare. Mistakes are badly tolerated, so it’s harder for innovation to go further in this sector. That’s why big data and digitisation have advanced in other areas, such as banking.

Nevertheless, no human production generates as much data as a hospital. So big data has an important role to play in healthcare too; and it already does, at the level of drugs and diagnostic or therapeutic algorithms, which improve human capacities.

It’s true that doctors tend to have a conservative attitude, especially regarding their role in society. But, when one realises that powerful algorithms that can improve diagnosis and treatment can be obtained through managing large amounts of data, then everything will fall into place, because patient care improves. If a machine gives what’s best to the patient, doctors will follow. And that’s not the future: that’s right now.’

Currently, how many hospitals use Savana?

‘We provide services to around 40 hospitals, so that would be a six million population. We definitely should have more by the end of the year. The more clinical information we have, the better it will be for everyone.

Outside Spain, we have information from Chile, and contacts with the United Kingdom, the United

Savana goes data mining
The potential insights are invaluable; we should not waste this source.

Medical data mining

The treasure trove of healthcare data waiting to be explored in German hospitals is immense and could provide invaluable insights. However, what about data security and privacy? Andreas Klüter, CTO of Empolis Information Management GmbH, a new business entry in healthcare IT, spoke with European Hospital about medical text mining and the need for ethics discussion.

Thirty years ago Empolis Information Management GmbH began its role in smart data processing and service optimisation. Giving the example of involvement with call centres, Andreas Klüter, CTO of Empolis said: ‘We developed software that provides decision trees for call centre staff to help them get straight to the customer’s problem and its solution. Our vision is that “no one must ever make wrong decisions again” and our new mission is derived from this vision: “utilise all information to provide the right recommendations.”’

‘Text mining and linguistics are the tools of our trade, also in healthcare. We developed a solution that retrospectively analyses free text medical reports, using a number of criteria. We do this with the help of mature artificial intelligence technologies, such as deep learning or case-based reasoning.’

‘Our partner Smart Reporting contributes the clinical process know-how. We fused their know-how and our text analysis into their prototype module called Smart Radiology.

‘Now we can partially structure unstructured data. So far this works with existing reports that we analyse retrospectively. However, we are in the process of developing a prototype that hits at which type of data might be missing, in order to arrive at a complete or guideline-compliant diagnosis of a certain pathology during the process of gathering findings. This might help to achieve a much higher degree of standardisation in findings and clinical reports.

‘Our analysis is based on approx. 150,000 anonymised reports, focusing on the 40,000 brain CT’s included in these reports. Our aim was to determine the level of quality of the findings, to figure out whether certain trends are discernible and whether the different hospitals have different referral and requirement patterns for imaging procedures. However, we do not intend to conduct further studies.’

‘While we initially focused on brain CT’s to create a knowledge model that allows us to analyse the data, we do plan to cover all anatomies, step by step. In addition we want to analyse the results of other imaging modalities such as MR scans.’

‘Data security and privacy are immensely important issues. Therefore only the study principals receive the results and they decide how the data will be used,’ he explained. ‘We can show trends, but it is not for us to decide whether a trend indicates a problem. We need this debate on artificial intelligence from the very beginning. However, in my opinion the computer cannot do everything better and it won’t be able to do everything better, even though it can perform increasingly complex tasks.’

‘There was a very telling experiment recently where artificial intelligence was used to “train” a computer in Shakespearean language and then the computer was asked to write a book. The result: The machine’s choice of words was indeed rather “Shakespearean” but the test was completely devoid of meaning. That clearly shows the current state of AI.

‘Having said that, there are advances, and we need to discuss how we are going to deal with the new insights and which approach we will choose. It’s a long process for a society to agree on a path, but this consensus is necessary and we have to embark on this journey now. To do nothing, I’m sure, is the wrong decision.

‘The archives of German hospitals are full of text and image data waiting to be used, data that might really advance clinical research. The technological obstacles are surmountable today, the potential insights are invaluable. We should not waste this source.’

Launching: A vibrant colour monitor

The 27-inch medical trade 4K-monitor

A major addition to Ikegami’s range of surgical monitors is being launched at Medica this year. The new MLW-2750UHD is a 27-inch UHD display panel, set in hygienic silver-grey housing in a shallow-profile configuration, fully optimised for use in operating rooms, the manufacturer reports. ‘With its 800 cd/m² high brightness IPS 8 megapixel display panel, this new monitor improves the efficiency of medical teams by enabling precise observation of picture detail and allowing high quality picture-in-picture image presentation.’

‘The IPS panel provides accurate colour reproduction across the full colour spectrum with smooth image graduation well into the deep red. Weighing only 7.7kg, the MLW-2750UHD makes the system usable with medical transport carts, and more.

‘The MLW-2750UHD is ideal for use with Ikegami MKC series cameras, providing optimal picture quality with the 4K UHD MKC-750UHD and Full HD models. Auto brightness/contrast stabilisation functions are included to ensure the most accurate and consistent shading possible for medical imaging. Gamma options and DICOM Part 14 standard configuration can also be selected when required. A user pre-set function allows easy adjustment and storage of the display mode and image setup parameters.

‘Additional technical parameters include 10-bit colour display, 1000:1 contrast ratio, 14 ms response time and fan-less cooling. With its IPS panel providing accurate colour reproduction across the full colour spectrum with smooth image graduation well into the deep red.

‘A wide range of interface facilities are provided, including full compatibility with 4K UHD HDMI 2.0 and DisplayPort (Ver.1.2) for UHD resolution (3840 x 2160) at 50/60Hz refresh rate,’ the maker continues. ‘HD resolution 3G-SDI and DVI-D are also supported. An RS-232C remote control port is provided plus a USB port for hardware configuration.’

‘The MLW-2750UHD is being demonstrated at Medica 2017 as part of a complete system, including Ikegami’s latest generation 4K UHD medical cameras.

High frequency plastic welding

The British high frequency welding firm Speed Plastics offers its expert engineers to design and develop from concept to finished commercial product. The company partners a number of medical manufacturers, working as an extension to their in-house capabilities. The range of manufacturing techniques includes ultrasonic welding, CNC machine cutting, tool making, sewing and screen-printing – and, the firm reports the team ‘ensures lead times are short and products are made to the highest quality.

‘Operations Director Jane Collyer, said: ‘Healthcare is a key market for us and Medica is a great platform to showcase the bespoke engineering solutions we have to offer.’
The power of mobile intelligent information systems

Structuring data collection and diagnosis

Today’s healthcare IT market offers myriad of so-called comprehensive solutions to digitise administrative processes. However, in real life, long and verbose diagnoses and medical findings - and even paper-based documentation - are still widespread.

To meet regulations, generating written findings and reports account for over half of a hospital’s daily work. Radiologists need greater efficiency due to increasing costs and competition. To that end, mobile IT specialist cobago has developed cobago SIX, to provide instant structured reporting and workflow management.

‘The “classical way” is not only time-consuming but highly error-prone,’ the firm points out. ‘Reports also consist of multiple media types, such as texts, DICOM images and other data. This complicates central archiving and re-use in subsequent processes: It’s high time to use the power of mobile and intelligent information systems to increase the efficiency of medical staff and increase overall documentation quality.’

cobago SIX turns tablet computers into mobile digital assistants for documentation and valuation of medical facts on-site and in a doctor’s office. ‘Due to its architecture and function, SIX is optimal for structured data collection and diagnosis in radiology and other medical faculties. At first SIX offers structured scheme based fact collection, image adding, signature and auto-forwarding – this all based on intelligent case-dependent (case-aware) self-modifying checklists.

Based on this, SIX automatically creates uniformly structured documents and, in parallel, digital data for subsequent analytics, comparative evaluation and handover to third party medical information systems.’

As an example, cobago reports, a SIX checklist documents a CT or MRT of the thorax with suspected carcinoma. The radiologist - using his tablet - completes a predefined thorax carcinoma checklist with the respective parameters. These may include written or spoken text, numbers, checkboxes and dropdown text selectors, as well as signatures, files and images. Important key indicators are calculated and plausibilities are checked straightaway. Non conformities and errors are automatically identified and can be corrected at once.

Automated collection, valuation, analytics and retrieval

In the subsequent workflow, the signed document is transferred to a central location. Here a complete, semantically correct and ready to print report of text elements plus embedded photos and signatures is automatically generated. ‘All data are additionally stored in a database and can be analysed one by one or as a whole,’ the company confirms.

cobago SIX is an open, highly flexible, customisable ecosystem. ‘It can be easily adapted to different medical use cases and requirements, starting with the definition of checklists and ending with gateways to third party information systems and subsequent processes, on-site or at other sector locations,’ cobago points out. ‘For this reason the SIX ecosystem can not only be adjusted to different content and processual requirements but also seamlessly integrated into virtually any hospital IT infrastructure.’

Thus diagnosis quality is optimised, results categorised and standardised, and findings become comparable and digitally searchable - without any further action of a physician, the report points out.

Obvious advantages

Productivity increases for a given staff, process cost decreases through reduction of data collection errors and more so through growing transparency of the whole radiologic examination process, cobago adds. ‘Team members are able to focus even more on the patient and their own core competencies, rather than fighting the perfidy of different tools and own core competencies, rather than fighting the perfidy of different tools for texting, layout and data storage. Central organisation and IT benefit from unified digital formats, reliable and precise examination documentations, from automatic compliance to regulations and standards - and from complete accounting information records.’

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AI could enhance or disrupt healthcare

Report: Mark Nicholas

Artificial Intelligence (AI) has enormous potential to revolutionise the delivery of healthcare, being able to remove the drudgery of routine tasks, join up fragmented care records, trigger alerts when abnormal results occur, speed-up the process of identifying clusters of patients by digging deep into electronic health records, and increase efficiency of healthcare staff resources.

Yet to achieve its potential, there needs to be greater cohesion between digital technology companies, clinicians and hospitals if AI can enhance rather than disrupt healthcare in this early phase of its establishment, according to consultant cardiologist Dr Ameet Bakhai, deputy director of research at the Royal Free London NHS Foundation Trust.

Speaking with European Hospital prior to his presentation ‘AI in healthcare – delivery in diagnosis’ at the UK Digital Healthcare Transformation Summit 2017 in London on 12-13 December, Bakhai explained that hospitals are at different stages of evolution in working with SMEs and large corporations in embracing digital technology and AI. Some are making small incremental changes, others are some years ahead and being innovative, while some are still in the traditional healthcare setting of the 1990s, he pointed out. There are clinicians now willing to engage in trying out or helping to integrate a new technology, at the Royal Free Hospital we are blessed with key clinicians open to the role of digital technology and AI. ‘Some are large corporations in embracing digital technology and AI. ‘Some are still being innovative, while some are still active in clinical practice working more cohesively and for clinicians – while still active in clinical practice working alongside digital technologies to conduct research and create an evidence base on the value of AI interventions.

‘The way we measure AI value in healthcare is also going to be crucial,’ he emphasised. ‘Often, for digital technologies, we commission or introduce something with anecdot al or superficial evidence, hoping it will have some benefit, but we haven’t really put them through the rigour that we’d use with any other intervention in healthcare.’

The all-in-one portable telemedicine small, smart and mobile

‘Visiomed, a French leader in medical grade connected devices and services that advocate patient engagement as a primary component to maintaining good health, is proud to launch VisioCheck BW-XD7HD – the first scalable and connected mobile and evolving telemedicine station that weighs under 10.5 ounces,’ the company reports.

‘Developed on the Android platform, VisioCheck Mobile Telemedicine Station, class II medical device, CE marked and pending FDA approval, is an all-in-one portable solution to enhance the usability of telemedicine and connected health.

‘The device is a connected mobile station that facilitates all aspects of telemedicine for patients, hospital and general healthcare professionals. VisioCheck provides a solution to support all aspects of telemedicine in terms of teleexpertise between healthcare professionals, tele-consultation between patients and healthcare professionals and tele-monitoring between patients and medical personnel.

Use like a smartphone

The device is like a smartphone in features and size: it has a 10.6 cm colour LCD touchscreen, a high-def

Konica Minolta introduces the Sonimage HS1 Lite. The new “Smart & Portable” Ultrasound System, which comprises the most important aspects for ultrasound users:

- Diagnostic Confidence
- Ease of Use
- Reliability

Whether it is for Thyroid, Vascular, MSK or Abdominal exams, the Sonimage HS1 Lite is an economically attractive alternative for some, more bulky, cart-based systems.

Based on its powerful fully digital platform and Konica Minolta’s in-house designed and manufactured transducers, Sonimage HS1 Lite delivers a real high image quality, in all of its imaging modes.

Please visit us at Medica Hall 9 – Booth D68, to see a demo! Konica Minolta Business Solutions Europe GmbH / medica.konicanolta.eu

He concludes that if healthcare can work cohesively with technology firms and that they look ahead together regarding AI, he believes money will be saved and duplication reduced of competing companies in the same space.

It could also help companies design and better evaluate the technology they offer and allow clinicians and hospitals to then be proactive, rather than reactive, in changing patient pathways.

Bakhai warned that the lack of a unified information share or strategy approach to how digital technologies as a group work with the NHS is an issue.

Whereas the pharmaceutical sector has a strategy, with manufacturers aware of each other’s technologies, and registering and publishing in advance their on-going clinical trials and seeking peer review early, digital technology companies tend to crowd in trying out or helping to integrate AI, which comprises the most important aspects for ultrasound users:

- Diagnostic Confidence
- Ease of Use
- Reliability

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Some innovations support multidisciplinary teams across different centres to co-ordinate data and decisions and ensure these are relayed back to each hospital or centre, patients, GPs and social care teams.

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Machines are learning fast

Language recognition on the smartphone, spam filters in the e-mail programme, personalised product recommendations by Amazon or Netflix – all share one feature: they are based on an algorithm that recognises patterns in a set of data. This artificial generation of knowledge is called machine learning.

Consultant cardiologist Ameet Bakhai MD is deputy director of research at the British Royal Free London NHS Foundation Trust, and is himself a cardiac researcher. He undertakes the design and management of clinical trials, health economic modelling and patient pathway innovations. He is also a scientific advisor to NICE, health technology appraisal, pharma and device manufacturers and clinical trials organisations.

The underlying principle of neural networks is the idea of a neuronal network, which is a collection of simple elements that are able to perform specific tasks. The basic unit of a neural network is the neuron, which can be thought of as a simple computer that receives input from other neurons, processes it, and then sends output to other neurons. The output is typically a decision or prediction, such as whether an image contains a face or not, or whether a patient has a particular disease.

The process of training a neural network involves feeding it a large number of examples, each with a corresponding label. The network then adjusts its parameters to minimise the difference between its predictions and the true labels. This process is repeated many times, with the network gradually improving its predictions.

In recent years, deep learning, which is a subset of machine learning, has become very popular. Deep learning algorithms are capable of learning very complex patterns in data, and have been used in a wide range of applications, from image and speech recognition to natural language processing.

The ability of neural networks to learn from data and adapt to new situations has led to a number of important applications in medicine. For example, they are being used to identify cancerous lesions in medical images, predict the risk of diseases such as osteoporosis, and even to assist in the diagnosis of conditions such as diabetes.

All-in-one

Developed by physicians using patient-orientated technologies, BewellConnect is the only extensive ecosystem to create an all-in-one telemedicine station for medical monitoring at home. Easy to use, all data recorded is uploaded to the patient’s chart automatically.

Get in touch with the future

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Big Data is an ethical decision!

With all the advantages of big data we need to proactively reflect on the use of the data, warns Professor Reinhard Riedl, Head of the Department of Economics at Bern University of Applied Sciences in Switzerland. This turns Big Data into a primarily ethical challenge. Riedl prompts a discussion that has not yet been given enough thought.

In all the discussions about big data the focus around the dangers involved tends to be on data security, says Professor Reinhard Riedl, who heads the economics department at Bern University of Applied Sciences. ‘Although this is a very important aspect, other issues also need to be addressed.’

The use of big data for research and medical practice is vital as the benefits are great. However, unprofessional use of big data can quickly turn into a nightmare – not only because of potential privacy viola-
tions but also because of the situa-
tions and issues that can suddenly confront people. ‘Making a system as secure as possible is not really a challenge these days but more an issue of cost. This is also the reason why the topics of data retention and data security are frequently not given enough consideration. Sometimes there simply aren’t the financial means available,’ Riedl admits. ‘But the much more important question is of a more philosophical nature: What is the right way of dealing with the data and the predictions it facilitates?’

This aspect has not yet attracted much public attention, given that the use of big data and the resulting opportunities for predictions raises issues of a psychological and emotional nature and increasingly forces doctors to take on the role of psychologists.

The patient becomes more independent

‘Doctors are turning more and more into counsellors who provide emo-
tional and psychological support for patients with their decision-making,’ Riedl explains to clarify this sensitive topic. The fact that patients are generally given more decision-making pow-
ers is only one part of the story. The fact that they must not be left alone with this process is a very different part. ‘Explanating data to patients will ultimately always be a case-
by-case decision for the doctor. At the moment, doctors are deliberately deciding what to tell patients – or not. Sometimes it can be more emo-
tionally damaging to burden patients with knowledge than to withhold it,’ Riedl explains.

But what happens when big data makes it possible to make predictions for the next 20 years? ‘Suddenly, much better information becomes available,’ says Riedl.

‘We collect a lot of stochastic knowledge, and in many spheres of life we will need regulations as to how we should handle this knowl-
gedge. The insurance market is a classic example, with personal data already being used to calculate indivi-
dual risks and tariffs for customers,’ Riedl clarifies. ‘This means that I can make my data avail-
able on a platform which facilitates its utilisation for medical research under controlled conditions,’ Riedl explains. ‘But the problem is that we need to develop governance guide-
lines which also take into account future risks and consequences. At the moment, the ideas around digital transformation are still very conven-
tional. What makes the issue so dif-
cult though is that big data methods, such as machine learning, can be incredibly effective.

Not using big data is not an option, because it would be unethi-

cal,’ he emphasises. Data evaluation has too many important advantages for medicine and people.

But it would also be unethical to use big data without thinking about the consequences. And: ‘As data providers we face the social question about the extent to which we worry about our security, and whether this concern makes us refuse to let our data be used. We can, of course, benefit from other people’s data without letting them benefit from ours, but when too many people act like this nobody will benefit. Big data raises important ethical issues for all of us. Everything depends on our overall approach!’

Dedicating time to patient care not paper work

‘Intelligent IT solutions’ are key in meeting today’s and tomorrow’s challenges in healthcare manage-
ment. Ensuring patients get the atten-
tion and individual care they need in time – in light of growing budget constraints and ever-increasing regu-
lations, this is one of the key resource
struggles healthcare organisations face today. Healthcare personnel only have as much time on their hands as they do. Therefore, the only way forward can be to unburden them from administrative tasks and enable them to focus on what they do best: caring for patients. This needs to be achieved through intelligent IT that doesn’t just do more of what it already does, but also enables healthcare organisations to optimise processes.

This is what Konica Minolta is aim-
ing for when offering solutions for IT workflows that automate document-
related processes such as electronic health records (EHR), hospital infor-
mation systems (HIS), digital ad-
mision and discharge processes as well as invoicing and archiving solutions. This means less manual labour, faster information access and exchange while lowering costs.

With Konica Minolta’s POD (Print DICOM Booklet) solution, radiology results can be printed in a specially designed booklet for reference pur-
poses, encompassing the DICOM images and examination reports that can be shared with any physi-

cian. The integrated software and hardware solution meets the highest requirements, while print-
ing on paper to reduce costs. The booklet also allows further informa-
tion such as access plan, schedules or annotations of the medical imaging centre to be included.

The digitisation of information flows can even help to save lives: the automation of ambulance and emergency processes enables direct transmission of patient information by an ambulance team. Ambulance and emergency forms are sent direct-
ly to an ambulance team’s tablet. Once the hospital receives the data, medical staff prepares to receive the patient and provide timely treatment.

Processes can also be improved by setting up optimal solutions for meeting accessibility requirements: since touch displays common in printing solutions are particularly dif-

cult for visually impaired people to operate, Konica Minolta offers a plastic, electrostatic film with braille which can be stuck onto the control panel of their printers. The braille contains the most frequent functions such as black/White or colour printing and paper tray choice.

Overall, one of the biggest obsta-
cles for optimised workflows in a hospital is the proliferation of sys-
tems: regardless of which proce-
dures are involved, Konica Minolta has the expertise and experience to introduce automated workflows that bring substantial bottom-line benefits. Konica Minolta is looking forward to meeting their existing and potential clients at Medica 2017.”
Spanish researchers successfully create skin

3-D bio-printed organ is ‘just like the real thing’

An impressive prototype 3-D bio printer developed by a team of Spanish scientists in collaboration with the Bioban group can create human skin almost as good as new.

In an article published in Biofabrication earlier this year, scientists from Carlos III University (UC3M), the Center for Energy, Environmental and Technological Research (CIEMAT) and Gregorio Marañón General Hospital confirmed the long held suspicion that 3-D printing can reproduce perfectly functional human organs and tissues.

We have shown that this process is possible. 3-D printing of tissues and organs has been a largely commented on field over the past few years and we have demonstrated that 3-D technology can generate perfectly functional tissue, which has all the functional characteristics of the human skin,’ José Luis Jorcano Noval, one of the study authors, explained to European Hospital.

Jorcano, a professor at UC3M’s departments of Bioengineering and Aerospace Engineering and head of the Mixed Unit CIEMAT/UC3M in Biomedical Engineering, is a recognised expert in developing human skin in a lab.

He explained the skin he obtained on the prototype is one of the first layering human organs ever created using bio printing. It replicates the natural structure of the skin, i.e. the epidermis with its stratum corneum, which acts as protection against the external environment, and the dermis, a thicker layer that produces collagen, the protein that gives elasticity and mechanical strength to the skin.

Faster to produce

Jorcano deemed the 3-D printed skin adequate for transplants, for instance in patients with major burns or serious skin diseases, or for use in research, or testing of chemical, cosmetic and pharmaceutical products.

A major benefit of 3-D bio printing technology is that it fastens the production of new skin compared to manual methods used for the past eight years in clinical practice, Jorcano explained. ‘It used to take us three to four weeks to produce a layer of 1mm of human skin from a 1 or 2 cm biopsy. Now, with 3-D, this process is much faster, because we have automated and standardised the whole process. It’s also less expensive than manual production,’ he pointed out.
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Continuous measurement monitoring
Drones take laboratory logistics to a new level

A Swiss hospital group is using drones to fly medical laboratory specimens between its key centres, Mark Nicholls reports

In what is believed to be a world first, the eight-hospital Ticino EOC organisation has partnered with Swiss hospital group Mater- niat to spearhead faster, more efficient specimens transport.

The trial is being held for flights covering the 1.3 km between two of its Lugano hospitals, the Ospedale Civico and Ospedale Italiano.

While each hospital has its own emergency room and laboratory, the laboratory at Ospedale Italiano, in the city centre, closes at 5pm and at weekends. ‘Presently the blood samples are transported between the two hospitals by local taxis,’ explained hospital director Luca Jelmoni. ‘This is, of course, subject to the availability and to traffic condi-
tions. Therefore, to ensure transport that’s always available and economi-
cally more interesting, we decided to apply the new technologies and use drones to transport specimens between our hospitals, or even to transport speci-
mles in some cases when one of the laboratories is closed.’

There are already clear benefits from using drones in this way: the transport time does not depend on traffic conditions, nor is it affected by road driving more difficult, drones can fly over hills and mountains, and are cheaper than by taxi, and the drone service meets all paramedics’ needs.

In addition, when snow makes road driving more difficult, drones will still operate and avoid delays in delivering specimens and test results. Whilst the distance between the hos-
pitals is relatively small, Jelmoni told European Hospital that the drone can actually fly as far as 20 km, which means Ticino EOC is already consid-
ering a future possibility of transport-
ing laboratory samples from other hospitals even further away.

The first phase of the initiative involved proving the technical feasibil-
ity and acquiring official licenses and permits for the autonomous flight over populated areas, and this has been completed. With the approval of the Federal Office for Civil Aviation (FOCA), the trial will now move to the second phase later this year, which will see drone-trans-
port integrated into the hospital pro-
cesses.

‘That will be to test the integra-
tion of drone transport with the emergency room and laboratory pro-
cesses,’ Jelmoni explained. ‘This will be supported by a specific device, being developed by the supplier, which will autonomously load and unload the drone and charge the batteries.’

Phase three will see day-to-day usage of drones to transport blood samples between the hospitals, with hospital staff launching the drone via a smartphone application. The drone will then fly autonomously along the pre-defined route to its destination, where another staff member will receive the box.

Some observers have raised con-
cerns that the acceleration and movement of drones might affect the quality and integrity of blood samples but, in a separate study con-
ducted at John Hopkins University in Baltimore, researchers have shown this is not the case.

Luca Jelmoni became CEO of the two public 300-bed hospitals in Lugano, Switzerland (Ospedale regionale di Lugano) in 2012. He graduated from the ETH Zurich (Swiss Federal Institute of Technology) in 1992 and gained his MBA from Kellogg University in Chicago, USA. Initially he worked in the pharma-
cutical industry, then in retail, business development and corporate finance. In 2007 he became CEO of a leading Swiss clinic specialised in reproductive medicine.

The Laboratory Anywhere program

Report: Mark Nicholls

Point-of-care testing is being used to successfully deliver diagnostics to hard-
to-access patients in a community in north-west England.

The ‘Laboratory Anywhere’ pro-
gramme initially targeted the Gujarati community to aid them with timely diagnosis for diabetes and cardiovascu-
lar disease, but it is now being extend-
ed to people with mental health issues and learning disabilities, and also to offer additional tests.

Led by Dr Martin Myers, Associate Divisional Medical Director for Pathology for Lancashire Teaching Hospitals, he explained that the Laboratory Anywhere program is a value-oriented approach to delivering diagnostics which is the need for a patient or a clinician to make decisions.

Whilst clinical laboratories may offer economies of scale and special-
ist testing, he suggests they can be remote from the patient pathway. The Laboratory Anywhere initiative bridges this gap. This is delivered via a multi-
disciplinary team, with the Associate Divisional Medical Director of Pathology supported by healthcare scientists for the choice and verification of the diag-
nostic devices, training, delivery, and informatics. The program also involves close liaison with clinical support staff and patients to ensure that the service is relevant and appropriate.

Myers first set up the Point of Care Testing (POCT) Committee more than 20 years ago at Lancashire Teaching Hospitals and successfully implemented it in local hos-
pitals and the community before the focus shifted, in 2001, towards deliv-
ering diagnostics to ‘hard-to-access’ patients, such as the Gujarati commu-
nity, which was seen as at high risk for diabetes and cardiovascular disease but were not always accessing the tra-
tional patient pathways.

‘Our principle was simple: we would take healthcare to the people rather than expect the people to follow our patient pathways,’ he explained.

With Professors Romesh Gupta and Satyan Rajbhandari and others, the Lancashire Gujarat Health Users’ Forum was set up and Health Melas (health festivals) established to deliver health checks including glucose, cholesterol (performed by Healthcare Scientists) and psychological checks (performed by medical students from Manchester University) to identify at-risk patients.

Now in its 15th year, the Health Mela has been extended to all mem-
biers of society, with 4-6 events annu-
ally.

Learning and mental health issues

From the initial tests for the Gujarati groups, Laboratory Anywhere now reaches patients with learning disabili-
ies and will be rolled out to patients with mental health issues.

‘Both these groups are at risk of diabetes and cardiovascular disease and are dying 10-20 years earlier than expected due to physical disease because of lack of access to simple diagnostic tests, or being needle pho-
bic,’ Myers said. ‘This is unacceptable and the value-orientated Laboratory Anywhere model is designed to bring diagnosis to these patients.’

A Clinical Advisor to the Chief Scientific Officer of NHS England, Myers is leading a national pilot for the National Health Service (NHS) to deliver the Laboratory Anywhere model to these patient groups, with HB1c, Total Cholesterol and HDL cholesterol measured.

The hope is that the Laboratory Anywhere technology can be adopted throughout the UK and beyond, to diagnose and monitor diabetes and cardiovascular disease in hard-to-access groups in developing countries, where socio-economic and political issues have resulted in a lack of laboratory ser-
ices, Myers added.

Laboratory Anywhere uses portable Lab-in-a-bag or Lab-in-a-Box technol-
ogy to take to the patient. The devices vary depending on the purpose; for dia-
betes and cardiovascular disease, sim-
ple devices to measure HB1c, glucose, cholesterol and HDL cholesterol on a finger prick blood sample are used, whilst for more complicated questions, such as assessing renal function, blood gases, and calcium, cartridge-based devices can measure up to 20 analytes at the same time from one blood sample.

In a Health Mela, his team screens more than 200 people in six hours. However, he acknowledges that whilst measuring HB1c and lipids in 4-8 minutes is good and glucose meters take seconds, he is keen to see devel-
opments where the analytical time can come down to less than a minute for some tests.

Into outreach services

The Laboratory Anywhere model is also being used by outreach services (Sepos and Acute Kidney Injury teams) with Myers’ team now about to implement the Lab atary Anywhere for frailty units, care homes, urgent care centres and GP surgeries, with results captured on the patient record.

Overall, the impact of Laboratory Anywhere has been ‘remarkable’, Myers said.

‘Patients enjoy the concept, and support what we are doing. As well as delivering together, we are determining to elevate patients and diagnose and monitor diabetes and elevated lipids, many patients are identified at risk and therefore we can intervene before disease develops.

‘Advances in technology,’ he con-
cluded, ‘mean healthcare scientists can bring the laboratory wherever it is need-
and no longer can lack of access be used as an excuse for not reaching out to patients.’
**International experts highlight gaps in pandemic planning**

**The world is underprepared for infectious diseases**

**Report: Mark Nicholls**

A team of international experts has highlighted how the world remains ‘grossly underprepared’ for infectious disease outbreaks, which are likely to become more frequent in future decades.

Dr Suezie Moon is Director of Research at the Global Health Centre, Graduate Institute of International and Development Studies in Geneva, and adjunct lecturer on Global Health at the Harvard T. Chan School of Public Health. She was also a study director of the Harvard-Lancet Independent Panel on the Global Response to Ebola and has advised the UK’s Litigation Authority, its new dedicated team which is focused on global governance and the political economy of global health, focusing on areas such as outbreak preparedness and response.

In terms of next steps to avert crisis, Moon acknowledges that there has been significant progress since the 2014 Ebola outbreak. ‘But the glass is still half-empty, maybe even less than half,’ she warned. ‘Many different organisations need to take action to improve preparedness – local and national governments, international organisations, companies, NGOs, academic institutions, and others.’

She said three ingredients are especially crucial now: political leadership to keep the issue on the global agenda, focusing on rich and poorer countries alike, and a system to monitor what is and isn’t being done in order to achieve mutual accountability.’

The researchers urge the global community ‘to mobilise greater resources and put in place monitoring and accountability mechanisms to ensure we are better prepared for the next pandemic’.

Failure to do so, they concluded, could mean that the world will emerge even less prepared for the next outbreak.

England’s first dedicated emergency unit Sepsis Team

**Report: Mark Nicholls**

The UK’s first dedicated emergency department sepsis team has been set up in one of the country’s leading hospitals.

Leicester Hospital’s created the team to recognise and manage sepsis, whose key aim is to strengthen the response, in a timely manner, to sepsis cases admitted to the emergency department or to identify rapidly any patients who deteriorate within the unit.

The team of medical professionals from various backgrounds includes personnel from intensive and critical care, emergency medicine and operating theatres and is headed by consultant anesthetist Dr John Parker, lead consultant for Leicester’s Hospital. Parker explained that the initiative follows ‘Time to Act’, the Parliamentary and Health Service Ombudsman report of 2013, which observed patient deaths in the NHS after failure to diagnose and rapidly treat severe sepsis.

The document focused on 10 cases in which patients did not receive urgently needed treatment.

The care failings appeared to occur mainly in the first few hours, when rapid diagnosis and simple treatment is critical for patient survival.

From that, Leicester Hospital’s began a project in early 2014 and formed a ‘Sepsis Awareness’ group, bringing together the mentioned healthcare professionals, led by Dr Parker and Sepsis Lead Specialist Nurse Sarah Odams.

A sepsis improvement project was put in place to raise staff awareness of sepsis, recognising that this is a life-threatening condition that arises when the body’s response to an infection injures its own tissues and organs and leads to shock, multiple organ failure and death if not recognised early and treated promptly.

The trust also implemented measures at that time to improve the management of septic patients across the Trust’s hospitals.

Since then, the response to sepsis has evolved in a number of ways.

The care team has worked hard to ensure the team is safe, and has developed a number of tools to improve care and outcomes.

The Trust has written a bespoke ‘Sepsis Adult Screening & Immediate Action’ pathway, which has been shared with staff across hospitals in line with NICE (National Institute for Health and Care Excellence) and the UK Sepsis Trust protocols.

We have developed a range of training for our staff, primarily face-to-face, Parker explained. ‘We will also soon have an e-learning package available. Sepsis Awareness training is now mandatory for our staff. We have also carried out regular surveillance audits to make sure that staff are compliant with the care pathway.’

This has seen an improvement in the number of patients being given IV antibiotics and fluids within an hour, as recommended by NHS England, and recognition of sepsis across the Trust is now at 95-100%.

With funding from the NHS Litigation Authority, our new dedicated Sepsis Team will be in our Emergency Department, where two thirds of our patients present with the symptoms of sepsis, Parker pointed out. ‘On an average day there could be between five and 10 people coming into the Emergency Department with potentially life threatening sepsis.’

The team will support the emergency doctors to recognise and immediately treat anyone who we suspect has sepsis. They will then help to make sure that patient gets the right care from emergency surgery to intensive care support.’

Rapid sepsis recognition saves lives

The world is underprepared for infectious diseases
Given the aim to provide ‘affordable care’, the economical organisation of operating theatres is critical. Surgical procedures also contribute as much as 60-70% of hospital revenues. Thus surgical efficiency and flexibility are paramount in surgical departments. However, the huge amount of medical devices combined with constantly evolving imaging technologies can make changes between different surgical procedures and preferences time-consuming and possibly risky.

Healthcare imaging specialist Barco has developed a surgical solutions portfolio to enable more efficient and effective use of an operating room.

Safe image-guided surgery
Barco reports that it ‘surgical solutions work seamlessly together to provide precise images to any integrated, hybrid or interventional operating room. The wide range of surgical displays, combined with Nexxis for advanced video integration, fuels the quick adoption and pixel-perfect representation of current and new imaging technologies. So surgical staff can concentrate on patient care instead of spending critical time on fiddling with screens and devices.

‘This is quite crucial because, in image-guided surgery, the displays are the eyes of the surgeon. Barco’s Full HD and 4K surgical displays provide the right depth and colour perception to offer the best visual guidance for surgeons. Every image is calibrated, rendered quickly, and displayed precisely, for perfect hand-eye coordination. In addition, a unique automated failover feature guarantees a backup signal at all times to ensure safe surgery.’

Maximum use of the operating room
‘Though the quality of surgical images may be impeccable, smooth display of those images during image-guided surgery can be problematic,’ Barco points out. ‘In fact, it’s considered one of the biggest challenges by OR staff (according to a MarkeTechGroup 2016 survey), which is why Barco developed Nexxis for video integration. It’s the most flexible, scalable and reliable solution for managing images and video during surgical procedures. Thanks to its intuitive plug and play approach (just plug the source into the system, and Nexxis will display it anywhere inside or outside the operating room), Nexxis enables faster turnovers in the operating room and increases uptime. Because of the high flexibility of the system, you can keep pace with emerging technologies, so the OR is 100% future-proof.

‘In a time when healthcare efficiency is under scrutiny, it’s exactly these kind of solutions that will help healthcare professionals do more and perform better, with less.’

Barco’s complete line of surgical solutions is on show at this year’s fair in Dusseldorf.

A pioneering single-use Diathermy Abbey Needle with suction that helps surgeons improve performance and outcomes during a range of procedures is on show at this year’s Medica. Developed by Single Use Surgical, the firm reports that the device improves visibility at the surgical site during submucosal diathermy (SMD), turbinectomy and breast surgery. ‘It offers a unique combination of precise cautery and targeted suction helping to remove surgical smoke and reduce the risks associated with reprocessing a reusable monopolar device,’ the firm explains. Single Use Surgical was established in 2001 as a direct response to UK hospitals’ concerns over the cleaning practices involving fine lumen instruments, and how it posed a high risk of cross-contamination between patients, the company points out. Since then, we have developed the widest range of high quality and specialist single-use suctions capturing the same look, feel and functionality as the reusable equivalents.’

The manufacturer makes products with stainless steel tubes rather than aluminium, which, it reports, has helped it to become a leading single-use medical device specialist.

‘The single-use Diathermy Abbey Needle improves visibility at the surgical site during submucosal diathermy (SMD), turbinectomy and breast surgery.

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Each demand is individual to fit an individual

Printing 3-D human parts

Everyone is unique – and so is human anatomy. Thus orthopaedics or implantology call for medical products that provide a perfect fit and demand is high for one-off components, or small production runs. At the same time, the materials used and manufacturing standards applied must fulfill extremely stringent quality control. This also holds for specialized surgical instruments and medical devices, which must be produced quickly and cost-effectively. ‘EOS, the world’s leading technology supplier in the field of industrial 3-D printing of metals and polymers, enables exactly this,’ the company reports. Based on 3-D CAD data, parts are built layer by layer, by depositing powder material instead of, for example, milling a workpiece from solid block by removing material.

Enabling design-driven manufacturing

‘Where conventional manufacturing reaches its limits, industrial 3-D printing permits a design-driven manufacturing process allowing products to come up with faster, more flexible and cost-effective development and production methods. Unlike conventional manufacturing methods, 3-D printing as such allows for maximum design flexibility and functional integration. Thus, test series, prototypes, patient-specific one-off parts and small production runs can be manufactured at a profit. The medical sector recognized this and has been among the early adopting industries. Industrial 3-D printing is meeting their requirements, supporting both surgeons and patients. Different patient populations around the world require different parameters for surgical equipment and medical implants. With additive manufacturing, patient-specific designs are possible, paving the way for an improved and “custom serial production” medical care.

Orthopaedics adopted the approach very early on. So let’s take the example of a professional rock climber who experienced a complex fracture in his ankle that couldn’t be repaired. ‘Through medical scans, an exact replica of the climber’s ankle was reconstructed in a program that communicated a specific design to the EOS system. The 3-D printing technology was able to create a part that closely matched his anatomy and, once implanted, the climber’s recovery was quick because he had a more specific joint replacement rather than an ankle fusion or trauma plates that may not have allowed him to return to climbing. Beyond patient specificity, industrial 3-D printing also enables a greater complexity in surgical equipment design. EOS customer DePuy Spine had worked and partnered with leading clinicians and researchers for over 20 years to advance knowledge of both professionals and patients in addressing spinal pathologies and to develop products to treat spine disorders. Getting the right instruments to a surgeon who needs them can be an arduous process. Prototyping, revisions, materials selection, cadaver testing and manufacturing can create total wait times of many months. DePuy Spine was able to cut those lead times dramatically by employing the EOS technology.

Enable design-driven manufacturing

‘DePuy Spine was able to introduce a paradigm shift in part design, as such not designing for manufacturability anymore, but for functionality’ the company points out. ‘The consulting doctors now can be very exact about their requirements for tools such as blades, racks, tweezers, and callipers. CAD designs can be adjusted more easily and another duplication of a tool can be made – instead of just one – to give doctors more choice and greater flexibility. Some opportunities the technology can offer are top in mind today: e.g. creating a point of care application, which is one of the many holy grails within the medical industry. Imagine being able to go to any hospital and have whatever ailment you had treated on the spot,’ the manufacturer adds. ‘There’s still a long way ahead but it’s becoming more feasible while we continue to focus on material advancements and the continuing improvement of the technology.’

* Further case studies: https://www.eos.info/case-studies/category=Medizin

Climber and amputee C J Howard moves with his 3-D printed titanium climbing prosthesis, at Luther Spires in the South Lake Tahoe, CA area

Prototype of a Plate Bendix, used to contour plates for spinal surgery

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Launching: the portable medical imaging workstation

Danish firm Plum Medical Solutions is launching its 2nd generation MEDTAB, reported to be the world’s first portable medical imaging workstation. ‘It’s the only standards compliant portable device available for use in radiology and medical image analysis,’ the manufacturer explains.

Designed, developed and refined over a five-year period by a radiologist, Dr Arpad Bischofe and team, the portable medical applications system is packed with functions dedicated to healthcare imaging. Dr Bischofe explains that the system enables safe, secure reporting anywhere, anytime. ‘I’m no longer anchored to the reading room. I can work around the hospital and close up to patients as I see fit, or remotely, like when I’m on-call, at home or anywhere else. It’s giving me so much flexibility. I never thought radiology could be like this.’

Made to work with its own Port-Ray software as an integrated part of the PACS or with almost all zero-footprint universal viewers from leading PACS companies, the system’s unique features include:
- DICOM grayscale and colour operation via one-touch button
- DICOM hardware calibration
- Ambient light sensor and conditions indicator
- Large 13.3” touch-screen display
- Integrated precision measurement pen
- Integrated dual-purpose carry case/non-slip display stand
- Automatic portrait and landscape orientations
- Certified medical device

‘Plum is a daughter company of the London-based PACS vendor Image Information Systems,’ the Danish firm reports. ‘It is the only company in the world dedicated to portable diagnostic imaging and cloud-based medical communication systems.’

Contact free formaldehyde dilution

Formaldehyde is used as preservative for biological samples (particularly in human and veterinary medicine) making this one of the most frequently used chemicals in pathologies. However, with every breath, laboratory staff takes up the harmful vapours of this carcinogenic chemical. ‘We have developed a fully automated formalin mixing and dispensing system for contact-free formalin mixing to reduce the contact between laboratory staff and formalin contamination in laboratories,’ manufacturer Kugel Medical reports. Due to its compact design, the Formamix is also suitable for small laboratories, the company adds. ‘All operations, such as preparing a 3.7% standard formalin solution for tissue sample fixation, or a customised solution with variable quantities of formaldehyde, water and a buffer solution, are controlled through the new touch display.’

‘The integrated microprocessor allows you to save and recall your settings for later use. The prepared mixture can be drained directly from a tap at the device, or transferred to multiple remote stations that can be up to 200 metres away – a particularly interesting feature for laboratories with working stations in different rooms. The integrated pump enables you to dispense the exact quantity of the prepared formalin solution without dripping or leaking,’ Kugel points out, adding: ‘On the technical side, exhaust and ventilation technology has never been more important than now, especially energy recovery and filtration of pollutants play a main role in pathologies. This is why the Formamix can be easily connected to the on-site ventilation system, or operated through eco-friendly activated carbon filters to ensure that all vapours are vacuumed away safely and efficiently. Electronic and mechanical safety precautions keep liquids from overflowing to guarantee the utmost safety while Formamix is in use.’

The pioneering mattress

To coincide with Pressure Injury Prevention Day on 16 November, United Kingdom manufacturer Rober Ltd is again at Medica highlighting how advanced technology can help ‘stop the pressure.’

The company’s intensive care pressure ulcer mattress is designed to offer pressure ulcer relief to immobile and critically ill patients. ‘The Wizard combines Rober’s signature alternating pressure cell design with an impressive tilt facility,’ the maker explains. ‘This action gently turns the patient onto their side, comfortably and correctly. The mattress replicates the body’s natural movements by responding to a patient’s weight, spontaneous movement pattern and body position. It also provides enhanced comfort and complete pressure elimination at regular intervals.’

The technology prevents pressure injuries from developing and also includes therapeutic properties that promote the healing of established ulcers.

A fully automated mixing and dispensing station

A world without pressure

Europe’s most advanced cybercure solution for image guided surgery is... Cyberbloc-FP. The flat panel Surgical C-arm from Primax and AFDMS-1000. Always on the forefront of innovation.
BBI Solutions (BBI), immunoassay developer and reagent supplier, acquired Maine Biotechnology Services Inc. (MBS) in July 2017, adding antibody development to the firm’s end to end assay development services. This also strengthens BBI’s reagents antibodies portfolio, providing a wide range of high quality biomarkers for infectious disease.

MBS, based in Portland, Maine (USA), has been a leader in custom antibody development services for over 27 years. The firm’s technical team brings unique hybridoma screening and characterisation protocols to BBI clients. ‘Through this acquisition, BBI Solutions now has the opportunity to partner with IVD development customers earlier in their R&D process, delivering antibodies screened and selected specifically for their end use applications,’ BBI reports.

Customer support will also be available through antigen review, cGMP antibody production, purification, and characterisation. ‘Availability of in-house antibody capabilities will be particularly advantageous to lateral flow development customers who can now work with BBI from planning a reagent strategy, through to final diagnostic production,’ the firm adds.

‘Having one comprehensive provider will allow customers to seamlessly identify and prevent antibody performance risks, both during development and over the lifetime of the immunoassay kit manufactur- ing.’ Products added to BBI Solutions from MBS include antibodies recognising myeloperoxidase, cortisol, osteopontin, PEG, Ig controls, His-tag, norovirus, rotavirus, adenovirus, chikungunya virus, zika virus, and dengue fever.

Go to: www.bbisolutions.com, or visit www.mainebiotechnology.com to read more about BBI antibody development services.

BBI is at Medica Hall 3A / Stand 3AB02-1

Augmenting antibody services and assay development

Acquisition: BBI gains MBS

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New, sterile and single-use tools

The House Curette and Rosen Needle

Award-winning UK manufacturer of sterile single-use surgical instruments, DTR Medical is showcasing their new House Curette and Rosen Needle at Medica this year. ‘The House Curette includes sharp, dual action tips that scrape and scoop tough cortical bone during middle ear procedures,’ the firm explains. ‘The double-ended stainless steel instrument has clearly labelled 2.0 and 3.0mm ends, giving the surgeon the flexibility they need.

‘To enhance control, the Curette is engineered with flat, serrated 180mm handles to increase functionality, enabling ease of entry within the ear cavity.’

Also in DTR’s expanded ENT range is the launch of a Dermatology range which includes a selection of instruments.
HD-500
High Definition Video Endoscopy System

Caring for Life through Innovation