The mHealth challenge

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Why the chronic shortage of anesthesiologists?

We are all aware that there is a dearth of physicians both in primary healthcare and several hospital specialities in the West, an escalating problem that is particularly acute in the case of anesthesiologists. In some European countries this situation is at least partially the result of poor planning and under-investment in medical education, coupled with aggressive attempts to recruit medical professionals overseas, but there are other factors involved that must be addressed before we can hope to consider approaches that could alleviate the problem.

A major contributing factor is that today’s anesthesiologists are not only active in the operating theatre: their expertise is required during patient evaluation prior to surgery, and in critical care and pain management post-surgery. And not only has medical research augmented the number of surgical procedures that are now possible, but Europe’s increasing numbers of senior citizens, who are the most likely to suffer from non-communicable and chronic diseases, are the main beneficiaries of these innovative approaches. Inevitably this results in the demand for anesthesiologists exceeding the supply.

Another factor is that the generation of predominantly male anesthesiologists who focussed on their careers and were prepared to work in the evenings, at night and during weekends and holidays, severely limiting the time they could spend with their families, are retiring and being replaced by younger specialists who are legally entitled to work fewer hours per week and are also aware that social changes in recent decades, allowing both genders to enjoy satisfactory careers, require them to contribute practically (as well as financially) at home.

There is also a shortage of surgeons in Europe but this problem is not so acute as with anesthesiologists. Sadly this may well be because of the greater prestige enjoyed by practitioners of the former specialization, a situation which should surely be an anachronism. It is to be hoped that the primary goal of all medical professionals is to help their patients but until all specialisms are equally valued and respected for their essential contribution to patient care, some will continue to attract fewer recruits than others. There could even be a long-term solution to the problem if physicians themselves, including anesthesiologists, would value and respect non-medical healthcare professionals as they deserve. Surely the ever evolving technologies available in critical care settings and the relevant training offered could allow specialized anesthesia nurses to be trusted to administer anesthesia for certain procedures and patients, as well as sedation and pain relief, without requiring direct supervision from on high?
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A “fuzzy” method for interpreting fMRI recordings

A method for data analysis used in medical diagnostics has been tested for the first time on resting state functional magnetic resonance imaging (fMRI) data. The method, which relies on “fuzziness”, proved to be as robust as the well-known and regularly used sample entropy (SampEn) method but with the advantage of offering greater detail than sample entropy.

Do not be misled by the word “fuzzy”: Fuzzy Approximate Entropy (fApEn) is a method that offers better sensitivity for understanding the complexity of noisy images produced by functional magnetic resonance imaging (fMRI). fMRI is a medical imaging technique which, when applied to the brain allows non-invasive observation of neural activity associated with specific human behaviour. However, just “looking” at these images is not enough to understand what is going on, and different methods exist that analyse, filter and reconstruct the signals to enable scientists to understand the brain’s complex activity.

fApEn has been used to analyse electrocardiograms, electroencephalograms and electromyograms, but this is the first time it is used with fMRI because 3D fMRI computation is complex. “Until now scientists have preferred to use a reliable method, Sample Entropy (SampEn), which, however, suffers several limitations”, explains Moses Sokunbi, research scientist at the International School for Advanced Studies (SISSA) in Trieste and first author of the study.

“In this paper we demonstrated not only that fApEn can indeed be used but that compared with SampEn analysis on the same recordings, it gave superior results which were not detected by SampEn”, explains Sokunbi. “The advantage of fApEn is that it’s a non-linear method”, Sokunbi points out. “All too often, in fact, data from the brain are analysed using linear methods, but the brain is a complex system that produces signals that are non-linear and dynamic in nature and analysing with these linear methods results in loss of information.”

The non-linear fApEn method was used to test a hypothesis regarding brain activity. “We tested the fMRI data of 86 healthy individuals with age ranging between 19 and 85 years”, explains Sokunbi. “The complexity of brain activity is thought to decrease over the years: a young adult brain is more complex than an older adult brain. This hypothesis is supported by several observations so we decided to test it by scanning the brains of individuals of varying age with functional magnetic resonance imaging and analysing the data both with fApEn and SampEn.”

fApEn showed better signal detection in comparison to SampEn. With sampEn there was a tendency in the direction predicted by the hypothesis, but this was not significant. In contrast, fApEn analysis on the same data provided a clear and significant tendency in the expected direction.”

SISSA
http://tinyurl.com/zua4jyh

Treating aortic aneurysms through virtual reality

Virtual models can be created in the angiography room thanks to an approach developed by researchers at the University of Montreal Hospital Research Centre (CRCHUM) and the university’s departments of radiology, radiation oncology, and nuclear medicine.

The latest advances were presented by Dr. Gilles Soulez at the Cardiovascular and Interventional Radiology Society of Europe (CIRSE).

For 25 years, Dr. Soulez has been involved in developing medical imaging technologies to prevent complication for, operate on, and monitor patients with abdominal aortic aneurysms. The main problem has been the ability to properly visualize the area to be treated. “Remarkable advances in imagery have improved surgery and helped to develop less invasive interventions. But the images are still far from being perfect. We want to develop new software to maximize the use of images generated with current ultrasound, scanning, and magnetic resonance imaging (MRI) technologies to ultimately provide more personalized treatments,” he explained.

On the screen is a coloured image of an abdominal aorta. But there’s something wrong with the photo: an enlarged area that looks like a small balloon. It’s an abdominal aortic aneurysm, a disease caused by weakening of the vessel wall. Linked to atherosclerosis risk factors such as hypertension and smoking, the disease is the 13th cause of death in North America. It especially affects men. “If you have a ruptured aneurism, you have a one in two chance of dying,” Dr. Soulez said.

Currently, a simple abdominal ultrasound or measurement of the aorta with a scanner can detect patients at risk of aneurysm rupture. Beyond 5 cm for women and 5.5 cm for men, surgery is usually recommended. But operations have their own risks, so researchers want to refine screening to provide the most appropriate treatments for patients who really need surgery.

To avoid rupturing the small balloon formed by the abdominal aortic aneurysm, two treatment options exist: open surgery to replace the diseased section or endovascular grafting, in which a catheter is inserted in the groin to deliver a stent-graft through the blood vessels to the aneurysm. This option is less invasive, but in some patients, the morphology of the aneurysm is not suited to this kind of treatment. Using scanner images, Soulez’s research provides three-dimensional images of all components of the aneurysm, i.e., the light, the thrombus or clot, the wall, and the calcification. “The grid is used to establish growth profiles of the aneurysm. We are now working to create simulations to better predict the risk of rupture, adding biomechanical properties such as tissue elasticity and connectivity at each pixel of the grid,” he explained.

Currently, the operation is performed using static images taken by a scanner before the procedure. The procedure itself is done under fluoroscopy by injecting dye into the vessels to be treated. “The image produced by X-ray shows the dye in the vessels and the stent being inserted, but not the wall. This approach requires a lot of dye, which can be toxic for the patient if used in excessive amounts,” said the radiologist.

It’s thanks to a grant from the Canadian Institutes of Health Research (CIHR), in partnership with Siemens, that Dr. Soulez’s laboratory has been able to develop this approach that combines all available data. “We superimpose the images, and this helps to visualize the area to be treated. But in reality, the tools we introduce into the body during the procedure deform the organs. We are testing at the CHUM and in Halifax right now a new approach that uses a computer to automatically recognize the tools introduced into the body and correct the deformities they cause,” he said. “We hope this simulation-operation model will improve the accuracy of the procedure.”

University of Montreal Hospital Research Centre
http://tinyurl.com/gmo8p4w
Pumpkin-shaped molecule enables 100-fold improved MRI contrast

Assuming that we could visualize pathological processes such as cancer at a very early stage and additionally distinguish the various different cell types, this would represent a giant step for personalized medicine. Xenon magnetic resonance imaging has the potential to fulfil this promise – if suitable contrast media are found that react sensitively enough to the “exposure”. Researchers at the Leibniz-Institut für Molekulare Pharmakologie in Berlin have now found that a class of pumpkin-shaped molecules called cucurbiturils together with the inert gas xenon, enables particularly good image contrast – namely around 100 times better than has been possible up to now. This finding points the way to the tailoring of new contrast agents to different cell types and has the potential to enable molecular diagnostics even without tissue samples in the future.

Personalized medicine instead of one treatment for all – especially in cancer medicine, this approach has led to a paradigm shift. Molecular diagnostics is the key that will give patients access to tailor-made therapy. However, if tumours are located in poorly accessible areas of the body or several tumour foci are already present, this often fails due to a lack of sufficient sensitivity of the diagnostic imaging. But such sensitivity is needed to determine the different cell types, which differ considerably even within a tumour. Although even the smallest of tumour foci and other pathological changes can be detected using PET-CT, a differentiation according to cell type is usually not possible.

Scientists from the FMP are therefore focusing on xenon magnetic resonance imaging: The further development of standard magnetic resonance imaging makes use of the “illuminating power” of the inert gas xenon, which can provide a 10,000-fold enhanced signal in the MRI. To do this, it must be temporarily captured by so-called “cage molecules” in the diseased tissue. This has been more or less successful with the molecules used to date, but the experimental approach is still far from a medical application. The research group led by Dr. Leif Schröder at the Leibniz-Institut für Molekulare Pharmakologie (FMP) has now discovered a molecule class for this purpose that eclipses all of the molecules used to date. Cucurbituril exchanges around 100 times more xenon per unit of time than its fellow molecules, which leads to a much better image contrast. “It very quickly became clear that cucurbituril might be suitable as a contrast medium,” reports Leif Schröder. “However, it was surprising that areas marked with it were imaged with a much better contrast than previously.” The explanation is to be found in the speed. Upon exposure, so to speak, cucurbituril generates contrast more rapidly than all molecules used to date, as it only binds the xenon very briefly and thus transmits the radio waves to detect the inert gas to very many xenon atoms within a fraction of a second. In this way, the inert gas is passed through the molecule much more efficiently.

In the study the world’s first MRI images with cucurbituril have been achieved. With the aid of a powerful laser and a vaporized alkali metal, the researchers initially greatly strengthened the magnetic properties of normal xenon. The hyperpolarized gas was then introduced into a test solution with the cage molecules. A subsequent MRI image showed the distribution of the xenon in the object. In a second image, the cucurbituril together with radio waves destroyed the magnetization of the xenon, leading to dark spots on the images.

“Comparison of the two images demonstrates that only the xenon in the cages has the right resonance frequency to produce a dark area,” explains Schröder. “This blackening is possible to a much better degree with cucurbituril than with previous cage molecules, for it works like a very light-sensitive photographic paper. The contrast is around 100 times stronger.”

Initial tests were performed with cell material in which cucurbituril is also able to detect a certain enzyme that commonly occurs in cancer cells. On the basis of the enzyme reaction, it is possible to conclude the malignancy of the cells. What is special about this is that relatively little cell material is then sufficient to image the tumour cells in the MRI. The researchers believe that it may be possible to detect even very small tumour foci using this new method in the future. However, there is still a long way to go. To begin with, animal studies must be conducted to determine whether it is possible to transfer the test results obtained to date to the living organism. If so, they can be used to develop highly sensitive contrast media that are able to mark further enzymes and thus a range of different cell types.

Leibniz-Institut für Molekulare Pharmakologie
http://tinyurl.com/h2bn6go

Radiological method identifies hip patients who may need to be re-operated

Between 5 and 30 per cent of those who receive a new hip prosthesis will require a re-operation during their lifetime. New research shows that a high-resolution X-ray method can predict which patients have the greatest risk of re-operation.

In Sweden, around 16,000 hip prosthesis operations are done annually, and about an additional 1,100 re-operations are done where part or all of the prosthetic must be replaced or removed.

The risk of re-operation varies with the patient’s age: around 30 per cent of patients under 50 undergo a re-operation within 15 years, while the corresponding percentage for patients older than 75 is 5–10 per cent.

The risk of re-operations also increases after each new operation on the hip joint.

Over 30 years, researchers at Sahlgrenska Academy at the University of Gothenburg have developed a special examination method that makes it possible to measure the prosthesis movement relative to the bone using high-resolution X-rays (called radiostereometry). The method, which has now been evaluated in a doctoral thesis, can be used to predict which patients are at risk of re-operation.

“With the radiostereometric method, we can discover movements in the artificial joint socket. Since these movements increase the risk that the prosthesis will loosen on the long term, the information can be used to predict re-operation,” says Maziar Mohaddes, who is presenting the studies in his doctoral thesis.

According to the researchers, the radiostereometric method can predict at an early stage if new prosthetic models and surgical techniques are safe, and if they can be expected to improve the outcome in patients.

The technique in question is so specialized that it is primarily used in research. According to Maziar Mohaddes, broader clinical use could both identify and to some extent reduce the scope of complications in hip operations.

University of Gothenburg
http://tinyurl.com/hx4pngf
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New neuroimaging method better identifies epileptic lesions

Epilepsy affects more than 65 million people worldwide. One-third of these patients have seizures that are not controlled by medications. In addition, one-third have brain lesions, the hallmark of the disease, which cannot be located by conventional imaging methods. Researchers at the Perelman School of Medicine at the University of Pennsylvania have piloted a new method using advanced non-invasive neuroimaging to recognize the neurotransmitter glutamate, thought to be the culprit in the most common form of medication-resistant epilepsy.

Glutamate is an amino acid which transmits signals from neuron to neuron, telling them when to fire. Glutamate normally fires and is swiftly cleared. In patients with epilepsy, stroke and possibly ALS, the glutamate is not cleared, leaving the neuron overwhelmed with messages and in a toxic state of prolonged excitation.

In localization-related epilepsy, the most common form of medication-resistant epilepsy, seizures are generated in a focused section of the brain; in 65 percent of patients, this occurs in the temporal lobe. Removal of the seizure-generating region of the temporal lobe, guided by preoperative MRI, can offer a cure. However, a third of these patients have no identified abnormality on conventional imaging studies and, therefore, more limited surgical options.

“Identification of the brain region generating seizures in location-related epilepsy is associated with significantly increased chance of seizure freedom after surgery,” said the new study’s lead author, Kathryn Davis, MD, MSTR, an assistant professor of Neurology at Penn. “The aim of the study was to investigate whether a novel imaging method, developed at Penn, could use glutamate to localize and identify the epileptic lesions and map epileptic networks in these most challenging patients.”

“We theorized that if we could develop a technique which allows us to track the path of and make non-invasive measurements of glutamate in the brain, we would be able to better identify the brain lesions and epileptic foci that current methods miss,” said senior author Ravinder Reddy, PhD, a professor of Radiology and director of Penn’s Center for Magnetic Resonance and Optical Imaging.

Reddy’s lab developed the glutamate chemical exchange saturation transfer (GluCEST) imaging method, a very high resolution magnetic resonance imaging contrast method not available before now, to measure how much glutamate was in different regions of the brain including the hippocampi, two structures within the left and right temporal lobes responsible for short- and long-term memory and spatial navigation and the most frequent seizure onset region in adult epilepsy patients.

The study tested four patients with medication-resistant epilepsy and 11 controls. In all four patients, concentrations of glutamate were found to be higher in one of the hippocampi, and confirmatory methods (electroencephalography and magnetic resonance spectra) verified independently that the hippocampus with the elevated glutamate was located in the same hemisphere as the epileptic focus/lesion. Consistent lateralization to one side was not seen in the control group.

Penn Medicine
http://tinyurl.com/jbr5se

Will imaging replace biopsies in cases of suspected breast cancer?

Statistically, about one in 20 women who undergo mammography screening can expect a suspicious finding. If further tests indicate a possibility of cancer, the screening physician recommends taking a tissue sample, or biopsy. Nearly 35,000 women every year face this situation. “However, in only about 17,000 of these cases is a malignant tumour actually found,” says Dr. Sebastian Bickelhaupt, a radiologist at the DKFZ who has been investigating the use of advanced MR imaging in diagnosing breast cancer.

“We have been looking at advanced imaging technologies as a potential way of reducing the number of invasive tissue examinations.”

In a mammogram, which examines the breast using X-rays, it is often impossible to distinguish benign from malignant abnormalities in tissues and thus exclude the existence of a malignant tumour to the physician’s satisfaction. If the situation can’t be clarified by further testing, such as an ultrasound examination, an invasive biopsy must be performed.

The DKFZ radiologists have optimized a method called diffusion-weighted magnetic resonance imaging (MRI) specifically for use in these cases. “Diffusion-weighted MRI is a special technique that allows us to see the movement of water molecules in tissues,” explains Professor Heinz-Peter Schlemmer, head of Radiology at the DKFZ. “Since tumours strongly reduce the movement of these molecules, we decided to examine the potential of our optimized breast MRI for deeper investigations of suspicious findings, in hopes of avoiding an unnecessary biopsy.”

This idea led the DKFZ researchers to plan a study in close collaboration with the office-based physicians in Dr. Wolfgang Lederer’s team at Heidelberg ATOS Klinik and Dr. Heidi Daniel’s team at the Radiology Centre Mannheim, who routinely conduct mammography screenings. If a mammography shows a suspicious lesion, the patient is invited to the Radiology Centre Mannheim for further testing and, as a rule, also for biopsies.

“For our study, we asked affected women if they were prepared to have an optimized breast MRI prior to the biopsy,” Daniel explained. “We were surprised to get such a high rate of participation that we could proceed with the study quickly,” Lederer adds. “We owe our thanks to the many participants,” Lederer adds.

The DKFZ radiologists compared the MRI images with results from the biopsies. “Within the first 50 cases we investigated, we were already thrilled,” says Bickelhaupt. “Adding the step of optimized breast MRI enabled us to classify over 90 percent of the suspicious findings correctly. That’s an enormous improvement over the 50-percent rate achieved by a combination of mammography and a subsequent ultrasound examination.”

In Schlemmer’s opinion, this does not mean that breast MRI is ready to replace screening mammography. “The positive results of our study are based on using MRI in combination with other tests. X-ray mammography also detects minute microcalcifications that indicate non-invasive breast cancer (DCIS), which do not appear in MRI.” According to Schlemmer, optimized breast MRI is most suitable for clarifying a suspicious finding. A biopsy would only be required if the MRI indicates a high likelihood for a positive finding.

The German Cancer Research Centre
http://tinyurl.com/hh7zsnl
Personalized heart models for surgical planning

Researchers at MIT and Boston Children's Hospital have developed a system that can take MRI scans of a patient’s heart and, in a matter of hours, convert them into a tangible, physical model that surgeons can use to plan surgery. The models could provide a more intuitive way for surgeons to assess and prepare for the anatomical idiosyncrasies of individual patients. “Our collaborators are convinced that this will make a difference,” says Polina Golland, a professor of electrical engineering and computer science at MIT, who led the project. “The phrase I heard is that surgeons see with their hands; that the perception is in the touch.”

This fall, seven cardiac surgeons at Boston Children’s Hospital will participate in a study intended to evaluate the models’ usefulness. Danielle Pace, an MIT graduate student in electrical engineering and computer science, is first author on the paper and spearheaded the development of the software that analyses the MRI scans. Mehdi Moghari, a physicist at Boston Children’s Hospital, developed new procedures that increase the precision of MRI scans tenfold, and Andrew Powell, a cardiologist at the hospital, leads the project’s clinical work.

MRI data consist of a series of cross sections of a three-dimensional object. Like a black-and-white photograph, each cross section has regions of dark and light, and the boundaries between those regions may indicate the edges of anatomical structures. Then again, they may not. Determining the boundaries between distinct objects in an image is one of the central problems in computer vision, known as “image segmentation.” But general-purpose image-segmentation algorithms aren’t reliable enough to produce the very precise models that surgical planning requires.

Typically, the way to make an image-segmentation algorithm more precise is to augment it with a generic model of the object to be segmented. Human hearts, for instance, have chambers and blood vessels that are usually in roughly the same places relative to each other. That anatomical consistency could give a segmentation algorithm a way to weed out improbable conclusions about object boundaries. The problem with that approach is that many of the cardiac patients at Boston Children’s Hospital require surgery precisely because the anatomy of their hearts is irregular. Inferences from a generic model could obscure the very features that matter most to the surgeon.

In the past, researchers have produced printable models of the heart by manually indicating boundaries in MRI scans. But with the 200 or so cross sections in one of Moghari’s high-precision scans, that process can take eight to 10 hours. “They want to bring the kids in for scanning and spend probably a day or two doing planning of how exactly they’re going to operate,” Golland says. “If it takes another day just to process the images, it becomes unwieldy.”

Pace and Golland’s solution was to ask a human expert to identify boundaries in a few of the cross sections and allow algorithms to take over from there. Their strongest results came when they asked the expert to segment only a small patch—one-ninth of the total area—of each cross section.

In that case, segmenting just 14 patches and letting the algorithm infer the rest yielded 90 percent agreement with expert segmentation of the entire collection of 200 cross sections. Human segmentation of just three patches yielded 80 percent agreement.

“I think that if somebody told me that I could segment the whole heart from eight slices out of 200, I would not have believed them,” Golland says. “It was a surprise to us.”

Together, human segmentation of sample patches and the algorithmic generation of a digital, 3-D heart model takes about an hour. The 3-D-printing process takes a couple of hours more.

Currently, the algorithm examines patches of unsegmented cross sections and looks for similar features in the nearest segmented cross sections. But Golland believes that its performance might be improved if it also examined patches that ran obliquely across several cross sections. This and other variations on the algorithm are the subject of ongoing research.

MIT
http://tinyurl.com/pz4su4s

World’s first total-body PET scanner

Scientists from the Department of Energy’s Lawrence Berkeley National Laboratory (Berkeley Lab) have set out to help build the world’s first total-body positron emission tomography (PET) scanner, a medical imaging device that could change the way cancers and other diseases are diagnosed and treated. The project is a consortium led by a UC Davis research team and includes scientists from Berkeley Lab and the University of Pennsylvania. It’s supported by a recently announced five-year, $15.5 million (€13 million) Transformative Research Award from the National Institutes of Health. The consortium’s goal is to build a PET scanner that images the entire human body simultaneously, a big jump from today’s PET scanners that only scan 20-cm segments at a time. In addition to being able to diagnose and track the trajectory of a disease in a way not possible today, a total-body PET scanner would reduce a patient’s radiation dose by a factor of 40, or decrease scanning time from 20 minutes to just 30 seconds.

Berkeley Lab’s contribution, led by William Moses of the Molecular Biophysics and Integrated Bioimaging Division, is to develop electronics that send data collected by the scanner’s detectors to a computer, which converts the data into a three-dimensional image of the patient. The new scanner will have half a million detectors, and the data from each detector must be electronically transmitted to a computer, so the task is incredibly complex. “We’re developing the electronic interface between the detectors and the computer algorithm—and the electronics for this scanner is an order of magnitude more complicated than what’s been done before,” says Moses. “But Berkeley Lab has a long history developing instrumentation for nuclear medical imaging, including PET scanners, and this project is another milestone in our research.”

The total-body PET scanner is the latest project in Berkeley Lab’s PET-related research, coming at a time when technology has advanced to the point that it’s possible to efficiently process the data generated from the scanner’s half a million detectors.

Lawrence Berkeley National Laboratory
http://tinyurl.com/zyqhukj
Scientists pave way for diamonds to trace early cancers

Physicists from the University of Sydney have devised a way to use diamonds to identify cancerous tumours before they become life threatening.

Their reveal how a nano-scale, synthetic version of the precious gem can light up early-stage cancers in non-toxic, non-invasive Magnetic Resonance Imaging (MRI) scans.

Targeting cancers with tailored chemicals is not new but scientists struggle to detect where these chemicals go since, short of a biopsy, there are few ways to see if a treatment has been taken up by a cancer. Led by Professor David Reilly from the School of Physics, researchers from the University investigated how nanoscale diamonds could help identify cancers in their earliest stages.

“We knew nano diamonds were of interest for delivering drugs during chemotherapy because they are largely non-toxic and non-reactive,” says Professor Reilly.

“We thought we could build on these non-toxic properties realizing that diamonds have magnetic characteristics enabling them to act as beacons in MRIs. We effectively turned a pharmaceutical problem into a physics problem.”

Professor Reilly’s team turned its attention to hyperpolarizing nano-diamonds, a process of aligning atoms inside a diamond so they create a signal detectable by an MRI scanner.

“By attaching hyperpolarized diamonds to molecules targeting cancers the technique can allow tracking of the molecules’ movement in the body,” says Ewa Rej, the paper’s lead author.

“This is a great example of how quantum physics research tackles real-world problems, in this case opening the way for us to image and target cancers long before they become life-threatening,” says Professor Reilly.

The next stage of the team’s work involves working with medical researchers to test the new technology on animals. Also on the horizon is research using scorpion venom to target brain tumours with MRI scanning.

University of Sydney
http://tinyurl.com/h8qj2ah

Cardiac experts find novel approach to treat heart failure

A teenage girl faced with sudden rapid heart deterioration, a man in the prime years of his life suffering from debilitating heart failure and a former NFL athlete crippled by end-stage heart failure were all successfully treated with a surgical approach pioneered by cardiac experts at University of California, San Diego School of Medicine.

The work demonstrated significant benefits of implanting a left ventricular assist device (LVAD) in the right atrium to provide better blood flow through the lungs, giving complete biventricular circulatory support and fully replacing the heart’s function.

An LVAD is a small mechanical pump traditionally placed inside the left ventricle – one of four chambers of the heart, located in the lower left of the organ – to help restore blood flow throughout the body. Unlike an artificial heart, the LVAD doesn’t replace the heart, but it can mean the difference between life and death for a person waiting for a transplant or suffering from advanced heart failure.

“An LVAD relieves symptoms, such as being constantly tired or short of breath in patients with advanced heart disease,” said Victor Pretorius, MBchB, lead author of the report and surgical director of cardiac transplant and mechanical circulatory support at UC San Diego Health.

“The caveat is that the LVAD still depends on the right side of the patient’s heart to function optimally, and right ventricle failure is a common condition after an LVAD implantation, leaving some patients only partially treated. It is difficult to predict and increases mortality.”

Pretorius said biventricular support is required for up to 30 percent of LVAD recipients. Currently, no durable, long-term right ventricular assist device (RVAD) has received Food and Drug Administration approval, and placing an LVAD in the right ventricle, for which it was not designed, may jeopardize the device and heart function.

“An alternative strategy would be to remove the heart completely and replace it with a total artificial heart, but this strategy does not allow for the failing heart to potentially recover, and there is the risk of the device malfunctioning,” said Pretorius. “All three patients involved in the study were in desperate need of right-sided circulatory support. Our team placed an additional HeartWare HVAD, the smallest available LVAD, in the right atrium, the upper chamber of the heart, to provide right heart support.”

The right atrium is considered a more ideal chamber for placing a mechanical pump to support right-sided circulation. The absence of valve structures ensures unobstructed blood flow into the pump, and the location next to the right lung makes accommodation for the pump’s motor in the chest cavity more feasible.

An LVAD is composed of a computer controller, a power pack and a reserve power pack that remain outside the body and are recharged at night. Patients with the innovative BiVAD approach have to carry a duplicate set for each pump, but Pretorius said this is generally well tolerated.

Two of three patients in the study received successful heart transplants after receiving right-sided circulatory support, and the third patient remains in good condition with both LVADs still implanted.

University San Diego Health
http://tinyurl.com/zsjjwuh

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The wide guide of the silicon lid allows easy insertion of the telescope.
The removable silicon disc on the container bottom prevents damage.
n’GHOTO can be sterilized in steam autoclave at 134°C.
Dehydration in older people could be accurately identified

Older people are particularly at risk of water-loss dehydration – which is caused by not drinking enough fluid. It can lead to poor health outcomes such as disability and even death.

The best test for diagnosing dehydration, known as a serum osmolality test, is expensive and not currently viable for wide-scale NHS screening. But new research published recently reveals how routine blood tests for sodium, potassium, urea and glucose could be used to screen for dehydration.

By putting the results of these tests through an ‘osmolarity equation’, health professionals can tell whether an older person is drinking enough fluid.

Lead researcher Dr Lee Hooper from UEA’s Norwich Medical School said: “Around 20 per cent of older people living in residential care are dehydrated, and that figure rises to around 40 per cent among those admitted to hospital.

“Older people often drink less than younger people for a variety of reasons. Loss of routine and fewer social contacts can reduce drinking. In some cases older people choose to drink less as getting to the toilet can be more difficult and take longer. It can be physically difficult to make, carry and drink a cup of tea when you get older – especially if you need a zimmer frame to walk about. And older people tend not to feel thirsty when they drink too little so their bodies don’t warn them to start drinking.

“On top of all that - as our kidneys get older we are less able to concentrate our urine to preserve fluid, so the body’s ability to regulate its fluid balance slowly reduces.

“Dehydration often goes unnoticed by carers, but it can lead to increased risk of hospital admission, urinary tract infections, disability and even death.

“A serum osmolality test measures the freezing point of blood serum to show how concentrated a sample of blood is. People’s blood becomes more concentrated as they become dehydrated.

“But it is an expensive and time consuming procedure – and clinical laboratories would not be able to handle routine screening. Simpler tests such as urine measurements, which appear to work well in children and young adults, do not work in older adults.

“When our blood becomes more concentrated, as we become dehydrated, concentrations of serum sodium, potassium, urea and glucose rise. Many blood tests routinely measured in older people already check for all of these, and assess them independently.

“We wanted to test whether results from routine tests for sodium, potassium, urea and glucose could be used together to accurately screen for dehydration by using a simple mathematical equation.

“There are a number of different equations already being used, but they vary considerably from each other, and it wasn’t known which were most useful for elderly people. We wanted to find a universal equation which would be accurate for a broad range of elderly people including people with conditions such as diabetes.”

The research team studied 595 people over age 65 - including those who were healthy and lived independently, frail people living in residential care, and those in hospital. The group also spanned several European countries and took into account those with poor renal function and diabetes.

They assessed the diagnostic accuracy of 39 different equations, and compared the results to directly measured serum osmolality.

They found that an osmolarity equation described by Khajuria and Krahn had greatest universal accuracy - across healthy and frail older people, those in and out of hospital, with and without diabetes, with and without poor renal function, at all levels of dehydration and in men and women.

Dr Hooper said: “We propose that clinical laboratories use this equation to report on hydration status of older people when reporting blood test results that include sodium, potassium, urea and glucose. We hope our findings will lead to pragmatic screening in older people to allow early identification of dehydration. This would help doctors, nurses and carers support older people to increase their fluid intake.”

University of East Anglia
http://tinyurl.com/hmeofj

New care approach to liver operations speeds patient recovery

Patients undergoing oncologic liver operations who participated in an enhanced recovery programme returned sooner to their normal life function and adjuvant cancer therapies than patients who were treated with a traditional approach to perioperative care, according to a new study.

“What really matters is life function. Until now, we have been...
trying to add up a patient's pain, nausea, and fatigue, but what we really needed to look at is how those symptoms actually impact a patient's life function, because as it turns out, each patient experiences symptoms differently," said lead investigator Thomas A. Aloia, MD, FACS, associate professor, department of surgical oncology, The University of Texas MD Anderson Cancer Center, Houston.

“We found that you could have very symptomatic people who were quite functional, and you could have mildly symptomatic people who were completely disabled.” This single-centre study involved 118 patients undergoing both open and laparoscopic hepatectomy (surgical resection of the liver). In addition to traditional quality metrics like complications and length of stay, researchers collected data from a patient-reported outcomes tool called the MD Anderson Symptom Inventory (MDASI). All patients rated symptom severity and life interference using this validated survey, first preoperatively and again at every outpatient visit until 31 days after their operations.

Typically, surgeons counsel patients that they are not going to feel better for a month after the operation, and that their full recovery will take about six to eight weeks. “Enhanced recovery,” however, is a multicomponent perioperative care protocol created to speed patients’ recovery and return to normal life functions such as working and driving. This type of fast-track care plan involves preoperative patient education, fewer narcotic painkillers used during and after an operation (which have side effects that can lengthen the hospital stay), and a quicker return to eating and walking as soon as possible after the operation.

In this study, 75 patients in the enhanced recovery group were compared with 43 patients in the traditional care group. All preoperative and postoperative care was the same for both groups, except the enhanced recovery part of it. The aim was to compare the difference between patients’ functional outcomes.

The researchers found that patients treated in the enhanced recovery group were 2.6 times more likely to achieve their baseline functional status within 31 days than those who were treated with the traditional protocol.

“The only independent factor that correlated to faster return to baseline functional status, both in terms of absolute value and short time to recovery, was being on an enhanced recovery protocol,” Dr. Aloia said. “It wasn’t the size of the liver resection, the approach [laparoscopic versus open operation], or whether we used an epidural catheter for pain control or not.”

In this study, enhanced recovery patients reported lower postoperative pain scores and experienced fewer complications and decreased length of stay. The breakthrough from this study is that most enhanced recovery studies stop measuring their outcome at length of hospital stay, with the sole purpose of shortening the hospital visit. “At a cancer centre, length of stay is pretty low on our list of importance; our true metric of success is getting people after cancer surgery back to cancer therapy,” Dr. Aloia said. The researchers also found that patients in the enhanced recovery group were more likely to return to chemotherapy (a measure researchers at this centre created and call Return to Intended Oncologic Therapy or RIOT), (95 percent vs. 87 percent), and at a shorter time interval compared with patients in the traditional group (44.7 days vs. 60.2 days). Because some of the patients were not indicated to receive further cancer treatment in this part of the analysis, these results aren’t statistically significant. Still, the researchers have no doubt that the trend is clear. “With this study, we may have got one step closer to a scientific definition of recovery that could be used in other disease sites,” Dr. Aloia said. “As enhanced recovery strategies evolve we may now have a tool to compare one approach with another to find out which one is better.”

American College of Surgeons
http://tinyurl.com/h9yz499

Nutrients and imaging are evolving to protect women against age-related disorders

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Nutrients and imaging are evolving to protect women against age-related disorders

Market opportunities in the women’s healthcare imaging and nutrition segment are ripe, especially in developing nations where awareness of preventive medicine is rising. Issues afflicting women include breast cancer, urinary tract infections, anemia, cardiovascular diseases and osteoporosis. In response, the healthcare industry is progressively employing early diagnosis through screening and prescribing preventive solutions in the form of nutrients supplemented through diet.

Analysis from Frost & Sullivan, Technology Trends in Women’s Health, explores developments in the fields of health nutrients and health imaging for women. Manufacturers are trying to customize nutrients according to a woman’s lifecycle since the needs of prenatal, postnatal and menopausal women are different. The main health nutrients women consume are calcium, iron and vitamin D.

In imaging, technological advancements will focus on platforms that:
- Reduce the ionizing radiation dose;
- Provide physiological image data to highlight cellular activities indicative of cancer, rather than only using anatomical data;
- Allow image acquisition and viewing in more than two spatial dimensions;

“Customized innovation is essential in the women’s health sector,” said TechniCal Insights Industry Analyst Darshana De. “In addition to age-related nutritional requirements, a woman’s health needs vary according to geographic and consumer preferences. Demand is high for natural supplements, strong scientific evidence of health claims and minimal side effects. For instance, the constipation and gastrointestinal symptoms caused by available calcium tablets are driving innovations within the industry to provide a more natural form of calcium.”

In the women’s imaging segment, digitization is a sweeping trend. Hospitals and screening centres worldwide are digitizing systems to optimize workflows and enhance image clarity. Government initiatives are pushing several advances. A U.S. federal bill (HR 3102) mandates breast density reporting on a national level to generate interest in newer technologies improving image screening accuracy. “Tomosynthesis will become the primary screening modality; it offers the ability to view slices of the breast to better differentiate actual lesions from areas of overlapping dense tissue,” noted De.

Similarly, government-initiated screening programs, designed to diagnose osteoporosis in developed countries, are encouraging bone density scans and boosting the sales of densitometry systems. However, the high initial investment for scanning systems and reimbursement issues can bring challenges to the market.

Frost & Sullivan
http://tinyurl.com/kgj7xz
Mobile health - a potentially disruptive technology?

Mobile health or mHealth has recently become one of the fastest growing and potentially disruptive segments of healthcare technology. Some typical mHealth segments include medication reminders, remote patient monitoring and wellness management. Key challenges faced by mHealth include data storage and management, network availability and maintenance, compatibility and interoperability. The single biggest issue however is considered to be security and privacy - in terms of access control, infrastructure integrity and data anonymity.

M&A, drug costs and mHealth shake up US healthcare

In December 2015, consultants Price-waterhouseCoopers (PwC) said that mHealth ranked just behind mergers & acquisitions (M&A) and the escalating costs of prescription drugs as a key factor shaking up US healthcare.

PwC noted that one reason for such an impact was mHealth's status as a late starter. Smartphones and apps have been relatively underutilized by the healthcare industry, and playing catch-up has catalysed an ultra-fast pace of growth. The consulting firm noted that 71% of US adults now own a web-enabled smartphone or wireless device and users with health or fitness apps doubled from 16% to 32% in 2015 compared to the year before.

Other figures endorse the enthusiasm about mHealth.

93% of US clinicians now believe that mHealth apps can improve patient's health, according to a GreatCall survey on their rising popularity. This is well above a level of just 52% in 2013, according to a survey cited by US telecoms carrier Qualcomm. That report also noted that another 16% percent also noted “that the use of mobile technology will dramatically change the way that healthcare is delivered in the future.”

Europe and mHealth

The picture is more nuanced in other parts of the world.

In Europe, for example, Pew Research figures show smartphone penetration is roughly equal to US levels in northern countries such as Sweden, Denmark and the Netherlands, as well as on the other side, in Spain. The levels are 60-70% in Germany and the UK and 50% in France. These three, together, account for 45% share of the European mHealth market.

There also are some major differences between European countries in the mHealth climate, as another recent report, by Germany's r2G, shows. As a result, usage of ePrescription varies dramatically, from 0 all the way to 100%.

In Europe, regulatory differences can indeed have profound implications for mHealth. For example, “remote treatment of patients is prohibited” in Germany, whereas in Spain telemedicine is encouraged.

In spite of being Europe's largest economy, Germany remains a major challenge. According to a report from FTI Consulting, "only 28% of German hospitals have a clear strategy on digital healthcare. In effect, Europe has some way to go before it approaches mHealth benchmarks in the US, where doctors in several states can “bill health insurance companies for the costs of email-based consultations,” according to a survey by A.T Kearney.

India among most mHealth-ready

Overall, revenues in the global mHealth market are expected to rise annually at a rate of 33.5% between 2015 and 2020, based on forecasts in an Allied Market Research report. Leading the pack will be the Asia-Pacific, with a growth rate estimated by Allied at more than 35%.

India is a special case for several reasons. Although Pew reports penetration of just 17% in the country in 2015, India recently overtook the US to become the second largest market for smartphones, after China (where penetration is much higher, at 58%).

India is in fact considered as one of the most mHealth-ready markets, in spite of a per capita income which is still among the world's lowest.

India is in fact considered as one of the most mHealth-ready markets, in spite of a per capita income which is still among the world's lowest. A survey in 2012 by PwC and the Economist Intelligence Unit (EIU) explained the reasons for the paradox: “In developed markets, mHealth is perceived as disrupting the status quo, whereas in emerging countries it is seen as creating a new market, full of opportunities
and growth potential... Consumers are more likely to use mobile devices and mHealth applications, and more payers are willing to cover the cost of mHealth services." The report notes that the pace of adoption of mHealth "will likely be led by emerging markets that rank highest among ten countries on a score of mHealth maturity."

**Demand driven by both business and consumers**
The Indian case in the PwC/EIU survey illustrates one of the salient features for mHealth, everywhere. mHealth technology is both B2B (business-to-business) as well as B2C (business-to-consumer). Indeed, it is consumers who are pulling mHealth, in both developing and industrialized countries. This is probably less for cost than for reasons of access ('anywhere, anytime' diagnosis, monitoring and treatment). The title of the PwC/EIU report underscores such an observation: "Consumers, it says, 'are ready to adopt mobile health faster than the health industry is prepared to adapt.'

**4 million downloads a day**
Overall, the near-frenzied enthusiasm for mHealth is illustrated by figures from German consultant R2G. Even in 2014, it says there were over four million downloads of mHealth apps every day. The number is expected to keep growing. By 2017, it's predicted that 50% of smartphone users will have downloaded mobile health apps.

**Hospitals and mHealth**
In spite of the incipient mHealth consumer boom, heavy-hitters in industry are also marshalling their mHealth strategies. Hospitals and health plans see mHealth as a tool to contain costs and enhance efficiency, and enhance healthcare safety and quality too. A growing number of top hospitals have begun to incorporate mHealth — the use of mobile technology devices and smartphones for healthcare purposes — to connect patients and clinicians, improve care coordination and reduce avoidable, costly hospital readmissions.

In the US, one driving force for mHealth consists of reforms imposing penalties on hospitals for avoidable readmissions. Although hospital readmissions fell from 19% in 2011 to 17.5% in 2013, more can clearly be done. According to 'Kaiser Health News', 2,225 hospitals paid 227 million dollars in penalties during 2013 for high hospital readmission rates. The reforms have provided strong incentives to implement mHealth systems - for example, to track cardiac rhythms, glucose levels and vital signs, and to identify health issues in time so as to prevent repeat trips. Evidence for this kind of direct benefit from mHealth is provided by the prestigious Mayo Clinic, who report that use of a smartphone app during cardiac rehabilitation can reduce hospital readmissions by a factor of three. Mayo researchers found that only 20 percent of cardiac patients who used the app visited the emergency department or were readmitted to the hospital within 90 days, compared with 60 percent of those who did not use it.

The role of mHealth in increasing efficiency is apparent from Canada’s Ottawa Hospital. The Hospital and IBM have launched a mobile-enabled platform to streamline workflow and create a 'circle of care' around patients. Care providers have 24/7 access to patient information, collaboration tools and available hospital resources via a custom mobile app, which has enhanced process efficiency, leading to more accurate discharge scheduling and reducing over-occupancy rates from levels of 110 percent.

European hospitals are also enthused about mHealth. In Britain, the National Health Service is encouraging remote medical monitoring and mobile health access as part of the country's digital healthcare revolution, according to a report in 'The Telegraph'. The programme, which focuses on greater efficiency in providing medical services, includes use of wearables, video link consultations, e-prescription and connected clothing. Its objective is to make virtual healthcare ubiquitous within five years and save the NHS up to 5 billion pounds over a decade.

**The pharmaceutical industry and mHealth**
The pharmaceutical industry, too, has got into mHealth, with hundreds of mobile apps providing information on drugs, drug interactions and enabling patients to track usage. A study by Avella Specialty Pharmacy found apps focusing on HIV medication significantly boosted adherence. Despite this, it has "lagged in mHealth app development and adoption," due to concerns about liability and the need to follow strict regulatory compliance. There are three other reasons for the lack of success. Pharma company app portfolios are not globally available. It is also built around their core products, rather than market demand. In addition, there is no cross-referencing, or a common and recognizable design providing a corporate identity.

**Profiling mHealth apps**
At present, some sources estimate that there are over 100,000 mobile health apps that have been developed. 85% of the apps are for wellness, while the remaining 15% (or 15,000) are directed at medical purposes. Even though a late starter, as many as 42% of mHealth apps available in major stores have a paid business model.

Nevertheless, the bulk of mHealth apps are forced to struggle. A November 2015 survey of the global market by R2G found that 62% of app vendors attained less than 5,000 downloads per year for their entire mHealth app portfolio. 11% percent reached over 100,000 downloads. Just 2% had 1 million-plus downloads. Of the latter, about half had been in the business before 2010. R2G said that as many as 60% of developers of mHealth apps were dissatisfied with the market reception for their apps. Many also found that the performance of the apps fell short of their goals. The survey also reported that over half mHealth app developers were technology companies, and they viewed the presence of medical professionals on their team as a priority. In terms of targeted customers, patients with chronic conditions were most common, accounting for 48% of apps. Hospitals are the second biggest target, with 32% of developers focusing on them.

Another finding of interest was the fact that the most successful vendors were more likely to develop apps for hospitals as opposed to patients. This may be one of the strongest indicators that the mHealth apps industry still has to mature, and that there is much more to come. During the same month as the R2G survey, New York University School of Medicine released another mHealth report. The study found that though consumers frequently downloaded mHealth apps they “don’t necessarily use them a lot.” For consumers at least, there is much more to explore in mHealth.
Information overload and CDS
In a recent publication, Ken Ong, Chief Medical Informatics Officer of New York’s Queens Hospital, discusses the importance of CDS tools and processes to modern medical practice. He cites the quadrupling in medical journal articles from 200,000 in 1970 to over 800,000 in 2010, and calculates that given the current rate of publication in medical literature, a medical school graduate reading two articles every day “would be 1,225 years behind at the end of the first year.” Another interesting figure concerns national clinical care guidelines for preventive services and chronic disease management. Ong writes that were physicians to follow all these, alongside doing their routine tasks for a typical patient panel, they would need a workday of 21.7 hours. His conclusion is simple: “Information overload coupled with a paucity of time suggest the value of CDS and greater team-based care.”

Reduction of inappropriate imaging
In its radiology incarnation, a CDS platform provides evidence-based information and patient-tailored tools to make imaging decisions at the point of care. The system is optimized within clinical workflow and allows a physician to quickly determine what type of imaging exam is needed for a patient with specific symptoms, effectively steering choices away from low-yield exams. This ensures the appropriate use of radiation, while avoiding unnecessary exposure. It also evidently save costs.

In practical terms, radiology CDS is provided as an interface to a computerized physician order entry (CPOE) system. In February 2012, ‘The Journal of the American College of Radiology’ published results of a pilot study at Boston’s Brigham and Women’s Hospital on a web-enabled (CPOE) system with embedded imaging decision support. The project was run between 2000 and 2010 across the hospital’s outpatient, emergency and inpatient departments and established significant increases in meaningful use for electronically created studies (from 0.4 percent to 61.9 percent) and for electronically signed studies (from 0.4 percent to 92.2 percent). Also in 2012, the American College of Cardiology announced the results of a two-year old initiative known as ‘Imaging in FOCUS,’ which aimed at reducing inappropriate use through CDS software. The initiative had considerable success, with participating practices reporting a sharp reduction in inappropriate ordering, by close to 50% in one year (from 12 to 7 percent).

Laggard in healthcare IT
In spite of this, CDS has until recently been limited to prescriptions, laboratory tests and treatment protocols, with imaging described as “a laggard on the health IT technology adoption curve.”

In the US health IT investments of higher priority to hospitals—certified electronic health record (CEHRT) technology needed to comply with the federal meaningful use (MU) programme, better security systems, and ICD-10 conversion software—have superseded investments in radiology CDS.

A boost from PAMA
However, radiological CDS systems received a boost in the US after passage of the Protecting Access to Medicare Act (PAMA) in April 2014. Although much of its focus is on physician reimbursement, PAMA also provides incentives to change physician behaviour with regard to imaging. The key clause in PAMA is Section 218 which encourages the development and use of clinical practice guidelines for ordering imaging tests. These guidelines, in turn, form the core of radiology decision support tools.

PAMA closes a gap in the meaningful use clauses of the EHR Incentive Reimbursement Program, which has been targeted at the electronic health record. EHR design does not accommodate radiology workflow and processes - and therefore had little relevance for radiologists so
far. This is what PAMA seeks to address. The impact of PAMA on CDS is likely to be major, after it takes effect. The deadline was originally set for January 1 next year, but has since been shifted to "approximately the summer of 2017," in order to give more time to healthcare providers to get used.

After PAMA is in force, physicians in their office, in the hospital outpatient or emergency department settings will have to consult appropriate use criteria (AUC) when ordering CT, MRI and nuclear medicine-based imaging such as PET (X-ray, fluoroscopy, and ultrasound exams are excluded). PAMA explicitly states that physicians offering diagnostic interpretation will be reimbursed by Medicare only for claims which confirm that a certified CDS system was used.

**ACR Select: appropriate use for imaging**

Although there are several initiatives, the radiological CDS system which seems most likely to become a global reference is ACR Select. This system, which debuted at the Radiological Society of North America (RSNA) Annual Meeting in 2012, was developed jointly by the American College of Radiology (ACR) and National Decision Support Company (NDSC). ACR Select is designed to “reduce inappropriate use of diagnostic imaging” by using CDS software to track AUC criteria.

ACR Select offers a database with more than 130 topics and 614 variant conditions that provide evidence-based guidance for the appropriate use of all imaging procedures. More than 300 volunteer physicians, representing more than 20 radiology and non-radiology specialty organizations, participate on the ACR expert panels to continuously update these guidelines. An ACR Select interface is provided for computerized physician order entry (CPOE) applications. The interface pops up when a physician requests an imaging exam for a patient. The physician is required to input information on the latter’s clinical condition, along with the imaging exam sought. ACR Select then provides appropriateness score, accompanied by a colour code - green, yellow, or red which instructs whether a study is clinically indicated based on the ACR’s appropriateness criteria.

**Europe sees no need to reinvent the wheel**

Developments in the US have spilled over into Europe. In autumn 2013, Hospital Clinic of Barcelona started to test ACR Select, with the aim of adapting its appropriateness criteria to European standards of practice. Shortly afterwards, a team of senior radiologists began work developing Europe-specific and evidence-based imaging referral guidelines. These were based not only on translating the US criteria into Spanish, but also adapting them to local clinical situations, diagnostic codes, and country-specific practices. The target was “to cover around 80 percent of requests in daily practice by reviewing the clinical scenarios, indications and recommendations” for a large range of topic groups.

The embryonic system was subsequently tested at 80 general practitioners in Hospital Clinic Barcelona’s network. The GPs were provided feedback on how their requests for imaging exams matched appropriateness criteria. The tests were then rolled out to other specialists, including emergency physicians.

At the European Congress of Radiology (ECR) in Vienna in March 2014, Dr. Lluís Donoso Bach, director of the diagnostic imaging centre at Hospital Clinic Barcelona’s network, pointed out that the economic crisis had led radiologists looking for innovative ways "to do more with less." Europe, he said, could benefit by adopting ACR Select to its needs, and avoid going through an exhaustive process of creating its own criteria for appropriate imaging.

In the months to come, some ten pilot projects to adapt ACR Select to Europe were launched in various other European countries, including the United Kingdom, Germany, Italy, Spain, Portugal, and Sweden.

**Conflicts in European models, global ambitions**

In retrospect, one of the most persuasive arguments swinging the choice of radiology CDS towards ACR Select consisted of conflicts between emerging European CDS models. The ESR had first sought to develop a CDS system based on guidelines from the French and British radiological societies. However, preliminary work soon identified considerable discrepancies between the two sets of rules and this led the ESR to turn to ACR Select.

Yet another advantage of a joint Euro-American approach is acknowledged by the ESR. It gives “a global dimension for the ACR and ESR’s common vision of establishing a global set of imaging referral guidelines in the future.” As ‘Pharma Times’ noted, the collaboration is “a decisive first step towards harmonizing AUC for imaging at a global level”. It added that interest in the system from Australia and Asia suggests “that the radiology field is indeed headed towards a globalization of ordering guidelines.”

In March 2016, National Decision Support Company (NDSC) established a European subsidiary in Vienna, home of the ESR. Outside Europe, one of its first targets is the Middle East.

**ESR launches Europeanised prototype**

In March 2015, the European Society of Radiology (ESR) formally launched a prototype of the adapted US CDS system, which it called iGuide. The launch took place at the ECR in Vienna. During the occasion, Dr. Lluís Donoso Bach also took over as ESR President, with his term lasting until 2016.

During the launch, Erika Denton, National Clinical Director for Diagnostics with NHS England, discussed some figures regarding the localization and adapting of ACRSelect into the ESR iGuide. There were 16% rating changes – that is, changes in the ratings attributed to an orderable imaging exam; 9% category changes – that is, changes in the imaging modality being recommended in a given clinical scenario.

**iGuide**

iGuide makes evidence-based, imaging referral guidelines available and easy to use across Europe. It is designed as a user-friendly system available at the point of care, and can be stand-alone or integrated with ordering systems and linked to electronic health records. As with ACR Select, it aims to ensure “a simpler, faster and reliable clinical workflow.”

iGuide also retains an element of flexibility. Users can localize recommendations according to their needs starting from the evidence-based core. In addition, the ESR iGuide can be adapted to users’ needs and institutional settings, for example by taking into account the availability of certain types of imaging equipment. This is not only relevant for Europe, but across other heterogeneous global markets, and will be crucial to eventually make the Euro-American effort an international success.

The ESR plans to continuously update iGuide to provide users with the latest evidence, instead of publishing a complete overhaul every few years.
Study assesses performance of direct-to-consumer teledermatology services

A study that used fake patients to assess the performance of direct-to-consumer teledermatology websites suggests that incorrect diagnoses were made, treatment recommendations sometimes contradicted guidelines, and prescriptions frequently lacked disclosure about possible adverse effects and pregnancy risks, according to an article.

In the US, direct-to-consumer teledermatology (DTC) is rapidly expanding and large DTC services are contracting with major health plans to provide telecare. However, relatively little is known about the quality of these services.

Jack S. Resneck, Jr., M.D., of the University of California, San Francisco, and co-authors used study personnel posing as patients to submit six dermatologic cases with photographs, including neoplastic, inflammatory and infectious conditions, to regional and national DTC telemedicine websites and smartphone apps offering services to California residents. The photographs were mostly obtained from publicly available online image search engines. Study patients claimed to be uninsured and paid fees using Visa gift debit cards; no study personnel provided any false government-issued identification cards or numbers.

The authors received responses from 16 DTC websites for 62 clinical encounters over about a month from February to March 2016.

The authors report:
None of the websites asked for identification or raised concern about pseudonym use or falsified photographs.
During 68 percent of encounters, patients were assigned a clinician without any choice; 26 percent disclosed information about clinician licensure; and some used internationally based physicians without California licenses; 23 percent collected the name of an existing primary care physician and 10 percent offered to send records.
A diagnosis or a likely diagnosis was given in 77 percent of cases; prescriptions were ordered in 65 percent of these cases; and relevant adverse effects or pregnancy risks were disclosed in a minority of those.

The websites made several correct diagnoses in cases where photographs alone were adequate but when additional history was needed they often failed to ask simple, relevant questions.

Major diagnoses were missed including secondary syphilis, eczema herpeticum, gram-negative folliculitis and polycystic ovarian syndrome.
Treatments prescribed were sometimes at odds with guidelines.
A significant limitation to this study is that the authors were unable to assess whether clinicians seeing these patients in traditional in-person encounters would have performed any better.

The authors offer a series of recommended practices for DTC telemedicine websites, including obtaining proof of patient identity, collecting relevant medical history, seeking laboratory tests when an in-person physician would have relied on that information, having relationships with local physicians in all the areas where they treat patients, and creating quality assurance programmes.

JAMA
http://tinyurl.com/hctx715

A quarter of USA healthcare providers make strides in telemedicine/telehealth:

About a quarter of healthcare providers said their virtual care programmes – telemedicine and telehealth – are financially sustainable and are improving efficiency, patient volumes and loyalty by filling gaps in medical specialties or helping chronically ill patients, according to a poll conducted by KPMG LLP, the U.S. audit, tax and advisory firm.
Telehealth, which uses technology to connect clinicians with patients, is gaining credibility in urgent care settings from mobile devices, “primary care plus” from retail clinics or for psychiatric assessments in an emergency department. Telemedicine – clinician-to-clinician consults – has a long history in radiology and for remote, underserved patient populations where specialists are needed for their clinical expertise, but it is gaining greater use. For example, telemedicine is used for neurology consults for stroke patients and also for referring nursing home patients to hospitals if they need more acute care.

“Healthcare providers need to think of virtual care as a means to improve patient access and provider efficiency, especially as value-based contracts and other reimbursement incentives gain a greater share of revenue, while meeting patient care needs by filling gaps for key medical specialties,” said Dr. Richard Bakalar, managing director at KPMG and a member of the firm’s Global Healthcare Center of Excellence.

“Telehealth is rapidly evolving beyond urgent care and is increasingly used for follow up visits and helping chronically ill patients connect with their doctor online. Health plans and government payers are seeing the value from the technology and enhancing reimbursement for virtual care.”

Yet, approximately 35 percent of respondents in the poll said they have not yet started a programme incorporating virtual care, and the remaining 40 percent are in early stages.

KPMG’s poll found that the biggest drivers for expediting adoption of virtual care were:
• Increase patient volumes and loyalty (29 percent)
• Care coordination of high risk patients (17 percent)
• Reduce costs for access to medical specialists (17 percent)
• Meaningful use and payer incentives for adoption (13 percent)
• Patient requests/consumer demand (13 percent).

Implementing a virtual care programme is not without challenges, however. Healthcare providers cited several, including:
• Too many other technological priorities (19 percent)
• Maintaining a sustainable business model (18 percent)
• Organizational readiness to implement new services/technology (18 percent)
• Regulatory compliance and risk concerns (15 percent).

OB Nest’: a novel approach to prenatal care

“OB Nest”: Just the name may bring warm feelings to parents and prospective parents.

However, at Mayo Clinic, it’s much more than a name. It’s a new way that Mayo Clinic is providing prenatal care. And, families say they are thrilled with the process.
Current prenatal care for a pregnancy consists of 12-14 visits with an obstetrician. However, often these visits are just brief check-ins
to make sure a pregnancy is progressing well. Previous research has looked at ways to give providers more time for high-risk patients, and save time and office visits for women with low-risk pregnancies. While these studies have shown that fewer visits are safe, patients reported less satisfaction overall. Seeking to identify ways to improve patient experience and perceived value, Mayo Clinic researchers decided to test a new way of providing prenatal care, dubbed “OB Nest.”

With the changes to the care experience provided within OB Nest, the researchers found that not only did patient satisfaction improve, but also this improved satisfaction came with fewer office visits.

“Traditionally, pregnancy is treated as a sickness,” says Yvonne Butler Tobah, M.D., a Mayo Clinic obstetrician and lead author of this study. “We wanted our care to reflect the normal, life-bringing event that it is, and [we] looked for a way to transform prenatal care into a wellness, patient-oriented experience.”

The Department of Obstetrics and Gynecology, in collaboration with the Center for Innovation, worked with patients and staff to collect and prioritize ideas to improve the way pregnant women and their families experience prenatal care. Along with the department, the Care Experience Program, which is part of the Mayo Clinic Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery, took this information and these ideas and designed evidence-based practice improvements for prenatal care.

OB Nest study participants – all of whom were experiencing low-risk pregnancies – entered the programme with a specific nurse identified as their lead contact. They received eight scheduled office visits (More were optional.) and home monitoring equipment for fetal heart rate and maternal blood pressure. In addition, they could take part in an online care community with other OB Nest participants and nurses from the OB Nest care team.

“My schedule is very hectic,” says Seri Carney, M.D., a mom who participated in the OB Nest study during pregnancy with her second child. “It was really nice to only have to go in for my appointments every other month. My husband and I didn’t have to worry as often about arranging our work schedules for the appointments.”

“We could listen to the heartbeat whenever we wanted,” says Dr. Carney. “Our daughter was 4 at the time, and doing it at home meant that she could get involved, too. That was really fun. It also felt like it made me more aware of the movements and heartbeat of my baby.”

In her third trimester, when Dr. Carney noticed her baby’s heartbeat was a little low, she was able to email her care team. They reacted right away and got Carney in for a stress test. All was fine, and within a few weeks, she and her family welcomed baby Luisa Jane.

The OB Nest research project is part of Mayo Clinic’s healthcare delivery research efforts, and aligns with the Institute for Healthcare Improvement Triple Aim.

“This fulfills the holy grail of what patients expect today,” says Abimbola Famuyide, M.B.B.S., chair of the Department of Obstetrics and Gynecology, and study principal investigator. “How can we continue to improve patient experience and clinical outcomes, while, at the same time, keep costs down?”

“Improving the patient experience, in the case of OB Nest, includes empowering expectant women to truly engage in, and take control of, their care,” says Dr. Famuyide. He and his team learned that having one nurse as the centre point for each woman’s care and concerns provided them the comfort of easy connection. Concurrently, fewer office visits saved healthcare provider resources, while reducing patient burden. This practice transforming research is leading to permanent changes in the way women receive prenatal care across Mayo Clinic. It is part of the goal of the Mayo Model of Community Care, to deliver wellness-focused, high-value healthcare – improving access, convenience and patient satisfaction, while lowering costs.

**Effectiveness of text message-based remote monitoring for postpartum hypertension**

Preeclampsia – the onset of high blood pressure resulting from pregnancy – is a leading cause of death and complications for women in the days following childbirth and discharge from the hospital. The sooner the doctors can determine the condition getting worse after delivery, the greater the chance there is of successful treatment with medication. However, since there is currently no effective way of predicting who is at-risk for increasing blood pressure, by the time worsening conditions are identified, patients often require more intensive care.

Recent ACOG guidelines recommend blood pressure monitoring via routine follow-up office visits within 72 hours of discharge and again at seven to ten days after childbirth. However, as many as 70 percent of patients do not attend these first follow-up appointments. With this in mind, and based on data showing that young women have high rates of cell phone use and text messaging, the Penn team hoped to determine whether implementing a remote blood pressure monitoring system for patients diagnosed with preeclampsia would allow them to identify advanced cases and intervene before hospital readmission is necessary.

“Platforms that take advantage of telemedicine technology allow clinical care teams to evaluate, diagnose and treat patients remotely, and have been well established as an effective means of delivering care across a variety of specialties,” said lead author Adi Hirshberg, MD, a fellow in the department of Obstetrics and Gynecology at the Hospital of the University of Pennsylvania. “By monitoring blood pressure levels for our postpartum patients who are at home with new babies and can’t always get to office visits, we can provide a convenient and effective way of identifying those who are at risk for complications and may require follow-up care before the situation becomes critical.”

In the study, 32 patients previously diagnosed with preeclampsia were given blood pressure cuffs when discharged from the hospital after childbirth. For seven days following discharge, text messages were sent reminding patients to take a daily blood pressure reading and send the results to their care provider. Patients whose blood pressure was high were then asked to take additional readings. Eighty-four percent of participants reported a blood pressure reading within 24 or 48 hours of discharge, and 65 percent continued reporting test results for at least five of the seven days. As a result of the reports, two patients were identified as having elevated blood pressure and were put on oral medications, but none of the participants required readmission to the hospital.

“Our results show that remote blood pressure monitoring via text messaging is an effective, convenient and patient-centred way of identifying patients who could be at risk of developing potentially life-threatening complications related to the condition,” said senior author Sindhu Srinivas, MD, MSCE, director of Obstetrical Services at the Hospital of the University of Pennsylvania.

Perelman School of Medicine

http://tinyurl.com/jsjgz2t

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Best practices in patient ventilation

Accelerating demand from ICUs has been driving the use of mechanical ventilation (MV). This is due to demographic changes triggering growth in elderly patient numbers, as well as advances in the ability to delay or prevent mortality. Nevertheless, there are also significant differences in the management of ventilated patients, and no necessary correlation in outcomes. Given the relatively high costs of mechanical ventilation, experts are seeking ways to develop and share best practices.

Growth in ICU drives demand

The Society for Critical Care Medicine (SCCM) estimates 20-30% of patients admitted to an intensive care unit (ICU) require MV. The scale of the challenge is underlined by the fact that about one-fifth of all acute care admissions in the US and 58% of emergency department admissions are made to an ICU.

The above facts are somewhat ironical. The mechanical ventilator is one of the most powerful symbols of modern medical technology and progress in intensive care technologies has allowed more patients to survive acute critical illness than ever before. However, the very same advances have created what one study describes as “a large and growing population of patients with prolonged dependence on mechanical ventilation and other intensive care therapies.”

The roots of such developments go back decades. In 1985, two North American clinicians coined the term ‘chronically critically ill’ in an article about the ICU titled “To Save or Let Die”? It is estimated that between 5 and 10% of patients who require mechanical ventilation for acute conditions develop chronic critical illness. Many of these result in death.

Other sources endorse these findings. In 2004, a study on patients with tracheostomy for respiratory failure found that the mortality of ventilator-dependent patients was as high as 57%.

Europe and the US

The situation is challenging in Europe, too, in spite of differences vis-a-vis the US. For instance, although the UK has a seven-fold lower level of ICU beds per capita than the US, 68% of UK patients are mechanically ventilated within 24 hours after ICU admission, well over twice the 20-30% level estimated by the SCCM in the US. In spite of this, there are no differences in mortality for mechanically ventilated patients admitted from the ER.

The impact of these spill over into other areas. Although strictly comparable figures are not available, differences in the ICU environment between one European country and another would clearly have an impact. The per capita density of adult ICU beds varies seven-fold from 3.3/100,000 population in the United Kingdom to 24.0/100,000 in Germany.

Prolonged mechanical ventilation

One of the most pressing challenges, with respect to divergent practices, is the duration of ventilation. Prolonged mechanical ventilation (PMV) is now generally accepted to be ventilation that lasts for 21 or more days. There are few studies of PMV incidence, and even these are accompanied by variations in definitions.

Nevertheless, a Canadian workshop cites two studies, to estimate that on an ‘international’ basis, patients requiring PMV account for up to 10% of all mechanically ventilated patients, 40% of ICU bed days, and 50% of ICU costs. These figures may be slightly over-estimated. One US study, for example, finds PMV accounting for 7.7% of ventilated ICU admissions.

In Europe, the proportion of PMV is clearly lower than 10% of ventilated patients. In Scotland, for example, the University of Edinburgh’s Old Medical School reports the incidence of PMV to be 4.4% of ICU admissions and 6.3% of ventilated ICU admissions.

The challenges of PMV growth

The rate of PMV has been growing, rapidly, both due to an ageing population and technological advances which allow delaying or preventing mortality in the ICU. In the US, data show patients requiring prolonged mechanical ventilation to be steadily rising. One study covering the period 1993 to 2002 found the incidence of tracheostomy for prolonged mechanical ventilation growing by about 200%, and surpassing changes in the overall incidence of respiratory failure by a factor of three.
The resource load on PMV patients is clearly higher. Up to 40% of ICU resources may be spent on them, even though they represent only 10–15% of the ICU population. The University of Edinburgh study mentioned above found that PMV patients used 29.1% of all ICU bed days. In spite of this, the majority of PMV patients die within six months.

**The costs of ventilation**
Overall, the sharp growth in demand for mechanical ventilation and the frequent lack of correlation with outcomes is a major strain on financial and human resources, making it necessary to optimize ventilator use by developing best practices. The cost of mechanical ventilation has been estimated at $1,522 US dollars per day (about $1,345 euros) in the US, and $2,110 euros per day in a recent European evaluation. The US figures are adjusted for patient and hospital characteristics, while the European figures are unadjusted. Nevertheless, it appears that intensive care unit costs are highest during the first two days of admission, stabilizing at a lower level thereafter. Still, the burden of PMV is clearly enormous. In the US, estimated costs per one-year survivor are as high as $423,596 US dollars ($371,500 euros).

Costs are also non-financial. These include long-term physical and psychological consequences which impact upon quality of life and often impose substantial symptom burden. One study of 23 hospitals in the US pointed to the risks of “prolonged ventilator dependence, reduced mobility, as well as anxiety and depression.” The study also called for an interdisciplinary, rehabilitative approach in the ICU. This trend correlates with wider lessons acquired over half-a-century of ICU care. Future innovations in ventilation are likely to be focused “on reducing the need for user input, automating multi-element protocols, and carefully monitoring the patient for progress and complications.”

**Delivery models: the role of home ventilation**
Differences between the US and Europe in delivery models also influence the development of best practices. The preferred models of care in the US include “delivery of protocolized rehabilitation-based care either within the acute ICU or specialized post-ICU venues.” Patients are generally transferred to respiratory units within an acute hospital or to a long-term acute care hospital, physically located within the former or set up as free-standing institutions.

One crucial factor in the US is the lack of home ventilation, due to current funding models. In Europe, home ventilation is generally present or attaining an increasing profile. Nevertheless, there is still significant variability in practices across countries. The prevalence of home ventilation per 100,000 population averages 6.6 in Europe, but ranges from 17 in France to 0.1 in Poland.

**Divergence in care practices and cognitive bias**
Heterogeneity of care is probably one of the strongest indicators of the need for best practices. In the context of MV, the need for the latter is underlined by a finding that ICU clinicians are prone to cognitive biases and this may lead to systematic and predictable errors.

The most prominent divergences in practice seem to lie in sedation management and weaning.

**Sedation management**
Sedation management has been the subject of interest for decades, but is still marked by a lack of consensus. In 2000, “The New England Journal of Medicine” published results of a study by the University of Chicago study on the benefit of administering sedatives to MV patients by continuous infusion, against daily interruption which allowed patients to ‘wake up’ and be assessed by clinicians. The latter practice was found to reduce the duration of mechanical ventilation as well as the length of stay in the ICU, and sedative dosage.

In 2008, a study in “The Lancet” by the Vanderbilt School of Medicine in the US proposed that a protocol pairing daily interruption of sedatives (spontaneous awakening) with daily spontaneous breathing resulted in better outcomes for MV patients and should become routine practice.

In 2010, a team at the Odense Hospital in Denmark compared interrupted sedation of MV patients versus patients who received no sedation at all. Their findings, also published in “The Lancet”, indicated that patients receiving no sedation had significantly more days without ventilation and a shorter ICU stay, with no difference in accidental extubations, need for CT or MRI brain scans or ventilator-associated pneumonia. The researchers called for a study “to establish whether this effect can be reproduced in other facilities.”

One ambitious recent effort to study differences in sedation management involved a multicentre study of 40 ICUs in France and Switzerland. The researchers found that a quarter of the participating units did not even have a sedation-management protocol in place. This, they speculated, might be due to a lack of awareness about protocols, or because of limited resources. Another possibility was that physicians tend to resist ‘cookbook recipes’ and limitations to their autonomy. In other words, they observed, the presence of a written procedure “does not mean that physicians will follow it.” Even in ICUs with sedation management protocols, “approximately 20% of the physicians were unaware about their existence.”

**Weaning**
Another priority for protocols concerns weaning MV patients in the ICU. Studies have shown that 20% of MV patients fail to wean in the ICU and become dependent on mechanical ventilation. In 2005, as a first step, an international consensus panel proposed classifying weaning into three types, based on difficulty and duration. These consisted of ‘simple’ weaning (successful extubation on a first attempt), ‘difficult’ weaning (patients who require up to three spontaneous breathing trials/SBT, or 7 days) and ‘prolonged’ weaning (patients failing at least three SBT attempts or requiring over 7 days after the first attempt).

The classification was, however, the subject of a major attack in 2011 by Dean Hess, the Assistant Director of Respiratory Care at Massachusetts General Hospital and Neil MacIntyre, a Professor of Pulmonary Medicine at Duke University Medical Center. Writing in ‘The American Journal of Respiratory and Critical Care Medicine’, the two took the international panel to task for using the term ‘weaning’ interchangeably with ‘discontinuation’ of mechanical ventilation. They also attacked the very concept of weaning, suggesting that little evidence supported a gradual reduction of respiratory support. They urged clinicians to focus on treatment of the underlying disease process rather than manipulating the ventilator settings.

Indeed, the linkage between sedation management and weaning, and the lack of hard data and conclusions on either, was highlighted in a 2014 commentary by Italian, French and German ICU clinicians titled “Sedation and weaning from mechanical ventilation: time for ‘best practice’ to catch up with new realities?” The article, published in ‘Multidisciplinary Respiratory Medicine’, argues that “delivery of sedation in anticipation of weaning of adult patients from prolonged mechanical ventilation is an arena of critical care medicine where opinion-based practice is currently hard to avoid because robust evidence is lacking.”
Mobility assessment tool may help predict early postoperative outcomes for older adults

A quick, reliable and cost-effective mobility assessment tool may help to identify elderly patients at risk for adverse post-surgery outcomes, according to Wake Forest Baptist Medical Center researchers.

In their study of 197 men and woman over age 69 who underwent elective, non-cardiac, inpatient surgery at Wake Forest Baptist over a 20-month period, the researchers found that the participants’ preoperative scores on the Mobility Assessment Tool: Short Form (MAT-sf) were predictive of early postoperative complications, longer hospital stays and discharges to nursing homes.

“Preoperative assessment of patient characteristics that may lead to adverse postoperative outcomes is important to patients, their families and their surgeons, especially with older adults, in whom complications are more likely,” said Leanne Groban, M.D., professor of anesthesiology at Wake Forest Baptist.

“Mobility is a powerful indicator of overall health in the elderly, and our results indicate that self-reported mobility, as measured by the MAT-sf, can complement existing assessment tools in determining which patients are at risk of adverse postoperative outcomes.”

The MAT-sf features animated video clips of 10 common physical activities, each followed by questions about the participant’s ability to perform the particular task. In addition to the MAT-sf, participants in the study also underwent four other commonly employed preoperative risk assessments. After controlling for factors such as the participants’ age, sex and body mass index and their scores on the other tests, the researchers found that low (poor) scores on the MAT-sf were associated with short-term complications, later time to discharge and increased nursing home placement to a greater degree than any of the other indicators.

“The traditional risk assessments may be too comprehensive, too focused on single organ systems or too impractical to be effective in this setting,” Groban said.

The next steps, she said, are to validate these findings in a larger, multi-centre study and to test whether preoperative strength and balance training might limit undesirable postoperative outcomes in older adults with mobility limitations.

Wake Forest Baptist Medical Center
http://tinyurl.com/jxd3bsp

A ‘communication breakdown’ during general anesthesia

When ketamine is used for general anesthesia, two connected parts of the cortex turn to “isolated cognitive islands.” It’s a topic that has long captivated doctors, scientists and the public — what exactly happens in your brain when you’re oblivious on the operating table? Some anesthesia drugs work in a straightforward manner by dampening down neurons in the brain. The mechanism of one anesthetic, however, has proved elusive: ketamine.

Certain doses of ketamine induce general anesthesia, though brain activity can still be robust, says Cynthia Chestek, Ph.D., co-senior author of a new study in neuroimage. Ketamine is used often in patient care and in laboratory settings. The new paper examines the neurological mechanisms at work during ketamine anesthesia.

Co-senior authors Chestek and anesthesiologist George Mashour, M.D., Ph.D., led the research team, which took precise measurements down to the level of neurons in animal models.

“We found that general anesthesia reflects a communication breakdown in the cortex, even though sensory information is getting processed,” Mashour says. “But the processing appears to occur in isolated cognitive islands.”

Two adjacent parts of the brain that work together in the waking state simply stop talking to each other under general anesthesia. When awake, communication between the primary somatosensory cortex and the primary motor cortex is critical to normal function.

“This supports the idea that what anesthesia does to cause unconsciousness is interrupt communication between brain areas, stopping the processing of higher-level information,” says first author Karen Schroeder, a doctoral candidate in the U-M Department of Biomedical Engineering. “This was the first time anyone directly observed the interruption between the two areas using individual neurons.”

Chestek’s biomedical engineering lab focuses on brain machine interfaces, recording activity of neurons and reading motor commands and sensory information in real time.
Non-narcotic nerve block controls children’s pain

A congenital condition called pectus excavatum, in which a child’s breastbone is sunken into the chest, can be corrected through minimally invasive surgery, but pain control after the operation can be a challenge. A Mayo Clinic study has found an effective way to control pain and reduce opioid painkiller use after surgery: sending children home with catheters that infuse a non-narcotic nerve-blocking drug called a paravertebral blockade. Use of the blocks shortens hospital stays and reduces opioid use after surgery, the researchers discovered.

The study focused on pain control after children receive a Nuss procedure, in which small incisions are made and a stainless steel or titanium bar is placed under the sternum to reshape the chest wall. Researchers looked at the cases of 132 children who had Nuss surgery from 2010 through 2015. Of those, 114 received paravertebral catheters and continued receiving the infusions for two to five days after returning home. Eighteen were instead given an epidural. Use of paravertebral catheters cut the median hospital stay by roughly a day and a half from 120 hours to 80 hours, the researchers found. Opioid painkiller consumption also decreased. Opioids can have significant side effects that slow recovery after surgery, including drowsiness, light-headedness, nausea, constipation and risk of falls.

“Our operation is minimally invasive, but it produces major changes in the chest wall. Pain was an issue for our patients, but this new technique has solved the problem. It’s better than an epidural, because it’s reliable, and kids can go home with it. For the first time, we consistently deliver on our promise to minimize pain,” says co-author Christopher Moir, M.D., a pediatric and thoracic surgeon in the Mayo Clinic Children’s Center. Chest wall deformities are fairly common. Pectus excavatum, also called funnel chest, is the most frequent. The sunken breastbone is noticeable when a child is born and typically worsens during the adolescent growth spurt. Even mild cases can cause children to feel self-conscious. Severe cases can interfere with heart and lung function.

Epidurals have been a standard method to manage pain after pectus excavatum surgery, but they are stopped before children leave the hospital, and severe pain may persist after that. Many hospitals, including Mayo Clinic, have been using other options, such as nerve blocks, patient-controlled painkiller delivery and non-narcotic painkiller injections. There has been little consistent data on pain outcomes.

“This study puts solid data to what we see each day in the hospital and what families tell us. Paravertebral catheters work,” Dr. Moir says. Mayo Clinic

Novel non-invasive monitor accurately assesses patients’ response to painful stimulation during surgery

A novel measure for assessing the body’s response to surgery may allow for better anesthesia management in the O.R., less pain when regaining consciousness from anesthesia and better postoperative outcomes, according to a study. The measure, called the nociception (pain) level index, allowed physicians to more accurately evaluate responses to painful stimulation in patients under general anesthesia, compared to traditional measures.

“There’s currently no standardized, objective method for physicians to monitor the effectiveness of pain-relieving drugs being administered during surgery,” said Ruth Edry, M.D., lead study author and senior physician anesthesiologist at Rambam Medical Centre in Haifa, Israel. “Not effectively monitoring bodily responses to painful stimulation can lead to insufficient amounts of pain medication being administered, which can result in the patient having severe pain upon regaining consciousness from anesthesia, while too much medication may cause other side effects such as nausea and vomiting or respiratory complications.”

Under general anesthesia, patients are unconscious, but their body still shows reflex responses to the surgical procedure, including changes in heart rate, blood pressure, eyes tearing or sweating. These unwanted reflexes can in some cases be dangerous, and anesthesiologists adjust the amount of anesthesia and pain medication when they occur. The nociception (pain) level index, which uses an algorithmic combination to process multiple hormonal and neurological reactions, aims to provide a better, earlier measure of the body’s reflex response to painful stimulation during surgery, compared to the traditional monitoring of individual factors such as changes in heart rate or blood pressure.

In the study, 58 patients who had general anesthesia for a variety of different surgical procedures were examined. Routine anesthesia monitoring was supplemented with a pain monitoring device (PMD-100; Medasense Biometrics; Ramat-Gan, Israel), which generated the nociception (pain) index. The patients’ index was compared to individual, more traditional measures, including heart rate and blood pressure. This index was assessed at several stages including intubation and skin incision, which were designated “noxious” stimuli that would be painful in the conscious person, and where then compared to other non-painful periods. Compared to other accepted monitors for measuring the body’s response to painful stimulation during surgery, the nociception (pain) index better discriminated presumed pain-causing stimuli from non-pain-causing stimuli. The index also accurately quantified the body’s response to increasingly more painful stimulation, with high sensitivity and specificity, as well as showed a decrease when pain medication was administered.

“Our results demonstrate the superiority of combining multiple physiologic measures over any individual parameter in the evaluation of the body’s response to pain during surgery,” said Dr. Edry. “The article presents an effective index for trending the body’s response to painful stimulation in the anesthetized patient. Once in clinical practice, we can conduct large-scale studies to better assess the influence of this monitor on patient outcomes.”

The American Society of Anesthesiologist

http://tinyurl.com/johadqm

So her team got on board to measure both areas of the brain, which kept firing during anesthesia.

“As soon as we injected ketamine, the sensory information disappeared from the motor cortex. Normally these areas are tightly connected.”

The group plans to continue this work, turning next to investigate the level of anesthesia at which these changes in communication start to occur. They’re also looking into what the groups of neurons are doing under anesthesia when they are still active but no longer communicating with each other.

“These insights could potentially improve our ability to monitor patients’ level of consciousness,” Schroeder says.

University of Michigan

http://tinyurl.com/z96b64d

http://tinyurl.com/zqbbaz5

http://tinyurl.com/johadqm

http://tinyurl.com/znbbaz5

http://tinyurl.com/johadqm
YACHIYO HOSPITAL; Center of SUPER CARE MIX – Comprehensive Care from Emergency

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BOARD MEMBER OF JAPANESE HOSPITAL ASSOCIATION GENERAL SURGEON

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ABSTRACT: Anjo City has two general hospitals. Kosei Hospital, a central medical center for advanced care, and our Yachiyo Hospital for regional care. Recently, Kosei Hospital faced over-capacity problem because of over-flow in emergency visits and congested wards due to shortage of postacute beds. We planned a project to ease the congestion of the central hospital and manage post-acute patients.

Construction and Application of a Refined Hospital Management Chain

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WUXI NO. 2 PEOPLE’S HOSPITAL, CHINA

ABSTRACT: Large scale development was quite common in the later period of hospital industrialization in China. Today, Chinese hospital management faces such problems as service inefficiency, high human resources cost, and low rate of capital use. This study analyzes the refined management chain of Wuxi No.2 People’s Hospital. This consists of six gears namely, “organizational structure, clinical practice, outpatient service, medical technology, and nursing care and logistics.” The gears are based on “flow at management system targets, chief of medical staff, centralized outpatient service, intensified medical examinations, vertical nursing management and socialized logistics.” The core concepts of refined hospital management are optimizing flow process, reducing waste, improving efficiency, saving costs, and taking good care of patient as most important.

Quality, Safety and Patient Centered Care – A Dream Come True in the Mountains of Northern Pakistan.
An Award winning project of “2015 Quality, Safety & Patient Centered Care Award” at Chicago USA

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ABSTRACT: Northern Pakistan remains very challenging terrain due to harsh weather all year round presenting an infrastructural, human resource and supply chain challenge of its own. Many times the facility had to move to different locations on emergency and ad hoc basis due to landslides, earthquakes affecting continuity of care. Providing quality healthcare to often resource constrained hard-to-reach areas has always been AKHS,P’s unique forte. Breaking barriers for catchment population to access quality healthcare, AKHS,P embarked on an initiative of implementing, achieving and sustaining ISO 9001:2008 Quality Management System international standards certification. This article shares the unique experience of AKHS,P in achieving and sustaining ISO 9001:2008 International Quality Management System Certification. After untiring efforts and the hard work of ground staff; AKHS,P achieved ISO 9001:2008 International Quality Management System Certification as well as 1st Surveillance Audit which itself proved that AKHS,P sustained quality systems and ensured continuous quality improvement in the Mountains of Northern Pakistan.

St. Luke’s Medical Center Global City – Global Trigger Tool (GTT) Project

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ABSTRACT: The Global Trigger Tool (GTT) was developed by the Institute of Healthcare Improvement (IHI), to identify and measure the rate of adverse events over time in a healthcare facility. It is a sampling methodology that utilizes “triggers” in the detection of random adverse events and harms and it also measures the adverse events over time. The Quality and Patient Safety Group of St. Luke’s Medical Center- Global City Initiated the implementation of the Global Trigger Tool as a proactive solution using retrospective information gathered to address the growing challenge that adverse events and harms impose in the institution with the ultimate goal of improving patient safety. St. Luke’s Medical Center Global City is the first and only hospital in the Philippines to implement and utilize the Global Trigger Tool.

Paradigm of Professional Integration for Disabled People in Fundació Integralia Vallès:

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ABSTRACT: Fundació Integralia Vallès is a pioneer contact center in Europe that has involved the creation of a healthcare reference center managed exclusively by people with disabilities and degenerative diseases to enable their professional development and ultimately integrate into the labour market. The environment created under this project enables effective training and building of skills, capacity and work experience as well as promoting social responsibility among a population group that is at risk of exclusion. The major differentiating factor in Fundació Integralia Vallès is the quality of service provided by its staff, who are particularly sensitive to the issues of health, and who provide professional and human dimension in every attention.

Cognitive Training for Dementia Patients in the Community & Art Therapy Programs of ‘Goyang Centenarian’s Good Memory School’

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Myong Ji Hospital

If you are interested in this journal, visit http://www.ihf-fih.org/ World Hospitals and Health Services Vol 52 No.1
ABSTRACT: Myong Ji Hospital has launched the ‘public health service project team’ for the first time in Korea as a private institution to carry forward and administer public health projects and services in a more structured way. Notably, Goyang Centenarian’s Good Memory School has deliberately provided various art therapy programs to those who have a high risk of dementia in pursuit of promoting dementia prevention, and maintaining a positive mind and healthy body for any required daily activities for senior living. Participating patients have expressed remarkable satisfaction, and the art therapy programs have not only shown the effectiveness of strengthening the mental status of the cognitively-impaired patients but have also proposed a feasible non-pharmacological therapy option, which promotes the quality of their daily living and lowers the burden for their caregivers.

Why Hospitals and Payers are Recommending Home Care Upon Discharge Instead of SNF or Traditional Home Health Services- Alternative Payment Model Hospital Incentives Aligning with Patient Choice-

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PREVENTION: SOLUTIONS ACROSS

ABSTRACT: The French Cancer Centers (FCC) have a threefold mission, care research and education. Their specificity is multidisciplinary and comprehensive patient support at all stages of cancer. Innovation and research are at the heart of FCC action, but the care of patients in the palliative phase is a major and long-term concern. In each center there is an autonomous or integrated structure of palliative care in a service or Interdisciplinary Department of Support Care for the patient in Oncology. These include, besides the hospice activity, chronic pain, psychooncology, social support, nutrition, functional rehabilitation, etc. Furthermore, the FCC have, in accordance with a secondary regulatory text to National Plans for palliative care, identified beds of palliative care (IBPC) in oncology day hospitals and in palliative care. In 2006 a Unicancer/FCC group was established. One of the group’s goals is to promote “early palliative care” together with other FCC teams. A common research dynamic has been implemented, ensuring the development of organizations and palliative care.


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ABSTRACT: The World Health Organization has acknowledged Patient Safety while receiving hospital care as a serious global public health issue, with patient empowerment and community engagement key to continuously improving safety and quality of care for the best possible clinical and patient outcomes. In Australia, the introduction of ten mandatory National Safety and Quality Health Service Standards in 2011 provided the catalyst for all Australian health facilities to review their systems. Standard 2: Partnering with Consumers required health facilities across Australia to assess commitment to, and capacity for consumer and community engagement and participation. At this time, the Royal Brisbane and Women’s Hospital did not have a strategic perspective and understanding, or an organizational structure for engaging with consumers (patients, families, care givers and community members). The concept required a new model to replace the clinician-led model of healthcare historically featured in Australia, with a change in culture and core business processes to partner with consumers at all levels of the system, from individual patient care through to participating in policy development, health service planning and delivery, and evaluation and measurement processes. The challenge for the hospital was to build a sustainable framework of engagement for a genuine patient-centered model.

Decreasing Interferences and Time Spent on Transferring Information on Changing Nursing Shifts

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ABSTRACT: The exchange of clinical information on patients is a common component in nursing shift changes where professionals have limited time to transfer this information. There is no standardized or structured methodology for transferring information, which requires increased time to complete. Also, during the exchange, some interruptions can disrupt the communication among professionals, which can affect the patient’s safety. A descriptive study

Improvement Initiatives of Resuscitation Service in a Regional Rehabilitation Hospital in Hong Kong

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ABSTRACT: Limited accessibility to resuscitation equipment and non-standardized instrument layout in trolleys would cause difficulty for the team members to access appropriate emergency equipment for delivering prompt resuscitation service in Tung Wah Eastern Hospital (TWEH). Improvement initiatives were implemented in September 2012 after endorsement by the resuscitation subcommittee: (i) standardization and installation of resuscitation equipment including resuscitation trolleys, emergency drug kits, automatic emergency defibrillators, designated response team (DRT) kit; (ii) guidelines revision involves the workflow, staff deployment, and designated areas for resuscitation during different service hours and (iii) staff training by workshop and video. Periodic resuscitation drill was held to monitor staff performance after training and the debriefing provided a chance for discussion and feedback from frontline staff. The compliance audit result for this exercise and the staff performance in the drills were improved, showing that the initiatives were successful.

Improving the Success of Strategic Management Using Big Data

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ABSTRACT: Strategic management involves determining organizational goals, implementing a strategic plan, and properly allocating resources. Poor access to pertinent and timely data misidentifies clinical goals, prevents effective resource allocation, and generates waste from inaccurate forecasting. Loss of operational efficacy diminishes the value stream, adversely impacts the quality of patient care, and hampers effective strategic management. We have pioneered an approach using big data to create competitive advantage by identifying trends in clinical practice, accurately anticipating future needs, and strategically allocating resources for maximum impact. As developed for the past 12 months, the information transfer arrangement among nurses was changed in order to determine which intervention increased the time spent on shift change and, therefore, decreased the safety of pediatric patients. The results obtained on the type of intervention caused us to rethink the organization that includes pediatric patient care.

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World Hospitals and Health Services Vol 52 No.1
The gamma knife - a new tool against epilepsy?

The gamma knife is the best known system for radio surgery (RS). It allows non-invasive brain surgery to be performed in one session, with extreme precision. Based on preoperative radiological examinations, such as CT or MR scans and angiography, the gamma knife provides highly accurate irradiation of deep-seated targets in the brain, using a multitude of collimated beams of ionizing radiation with scalpel-like precision.

No surgical incision, no anesthesia
The uniqueness of the gamma knife (and RS surgery in general) is that no surgical incision is required. This serves to minimize risk to adjoining tissue, reduce the risk of surgical complications. It also eliminates the side effects and dangers of general anesthesia, which would be indispensable for the type of medical conditions it is used to target.

A gamma knife typically contains 201 cobalt-60 sources. Each is mounted in a circular array within a shielded system. The device aims gamma rays via a specialized helmet surgically fixed to the patient’s skull to a target point in the brain. The “blades” of the gamma knife are the beams of gamma radiation programmed to target the lesion at the point where they intersect. In a single treatment session, beams of gamma radiation focus precisely on the lesion. Over time, most lesions slowly decrease in size and dissolve. The exposure is brief and only the tissue being treated receives a significant radiation dose, while the surrounding tissue remains unharmed.

Revolution for brain surgery
The gamma knife has revolutionized brain surgery. Over the last three decades, it has changed the landscape of neurosurgery - treating a range of conditions from brain tumours to vascular malformations with an unmatched level of accuracy. The gamma knife enables patients to undergo a non-invasive form of brain surgery without surgical risks, a long hospital stay or subsequent rehabilitation.

The gamma knife was officially named the Leksell gamma knife, after its lead inventor Lars Leksell, who developed the system in 1967 at the Karolinska Institute in Stockholm. Other key team members included Ladislau Steiner, a Romanian-born neurosurgeon and Börje Larsson, a radiobiologist from Sweden’s Uppsala University.

The CyberKnife
1990 saw the launch of another form of radio-surgical system based on linear accelerators. The best known of these is the CyberKnife, invented in the US by John R. Adler, a Stanford University Professor of Neurosurgery and Radiation Oncology. Unlike the gamma knife, the CyberKnife does not use radioisotopes. Instead, it uses a linear accelerator mounted on a moving arm to deliver x-rays, once again, to a very precise area. The CyberKnife does not use a frame to secure the patient. Instead, a computer monitors a patient’s position during treatment, using fluoroscopy. In other words, the CyberKnife allows for tracking a tumour, rather than fixing the patient. As it does away with a frame, its targets go beyond the brain.

Gamma knife and CyberKnife: Indications
Typically, a gamma knife is used to treat cancer that has metastasized to the brain from another part of the body, acoustic neuroma (a slow-growing tumour of the nerve connecting the ear and brain), pituitary tumours and non-cancerous brain tumours. Its application has also been extended to include certain blood vessel malformations, and fistulas, neuralgia and tremors due to Parkinson’s disease.

On its part, the different design of the CyberKnife allows it to also treat a host of other cancers (breast, kidney, liver, lung, pancreas, prostate and certain skin cancers. The CyberKnife is however, generally not used to treat non-cancerous brain tumours such as chordoma and meningioma.
Eight specialised tracks offer new insights into venous interventions, embolotherapy, interventional oncology and more.

The preliminary programme, congress highlights and travel discounts can all be found on www.cirse.org/cirse2016

Cardiovascular and Interventional Radiological Society of Europe
Gamma knife and epilepsy: a European initiative

In recent years, the gamma knife has drawn attention due to its showing “some promise” for treating certain types of epilepsy. Attention to such possibilities however date back to 1993, when the first gamma knife treatment for temporal lobe epilepsy was performed at the Hospital Timone in Marseille, France. Just over 5 years later, Na Homolce Hospital in Prague followed with a four-year evaluation on the use of gamma knife in 14 mesial temporal lobe epilepsy (MTLE) patients.

Encouraging results from first study

A pioneering study on gamma knife and epilepsy at France’s Hôpital Timone was published in 2000. It covered 25 patients with drug-resistant MTLE with 16 followed up for a period of over 24 months. Thirteen (81%) were seizure free, with two improved. The median latent interval from the gamma knife intervention to seizure cessation was 10.5 months (varying from 6 to 21 months), with two patients immediately becoming seizure free. No cases of permanent neurological deficit (except three cases of non-symptomatic visual field deficit), or morbidity, or mortality were observed. Although the authors concluded that the “optimal parameters for treatment” remain to be defined, as do studies on “dose-related efficacy, effectiveness over longer follow-up periods, and neuropsychological effects”, gamma knife interventions could be “a reasonable option,” and its introduction into epilepsy treatment can reduce the invasiveness and morbidity.

First and second follow ups to French study

The first five-year follow up to the above released its findings from France in 2004. It found a reduction in median seizure frequency, from 6.16 the month before treatment to 0.33 at 2 years after treatment. In two years, as many as 65% of patients (13 of 20) were seizure free. Five patients reported transient depression, headache, nausea, vomiting, and imbalance. There was “no permanent neurological deficit reported except nine visual field deficits.” Finally, no neuropsychological deterioration was observed two years after treatment and the “quality of life was significantly better than that before surgery.” A second follow-up, in 2008, noted that the gamma knife was “an effective and safe treatment for mesial temporal lobe epilepsy.” Results, it found were “maintained over time with no additional side effects. Long-term results compare well with those of conventional surgery.” The findings remained encouraging, with the mean delay for appearance of the first neuroradiological changes at 12 months. However, all patients who had been initially seizure free experienced a relapse of isolated aura or complex partial seizures during the crucial tapering of the antiepileptic drug. Restoration of medication resulted in good control of seizures.

Efforts in the US: focus on caution

In 2009, one of the first major multicentric US studies on the gamma knife and epilepsy, led by a team from the University of California, San Francisco, reported three-year outcomes using radiosurgery (RS) for unilateral MTLE. The authors found seizure remission rates comparable with those reported for open surgery. There were also “no major safety concerns with high-dose RS compared with low-dose RS.” However, they called for additional research to determine whether RS “may be a treatment option for some patients with mesial temporal lobe epilepsy.” Caution was again urged the next year when the US research group noted that RS was a promising treatment for intractable MTLE. However, they also observed “that the basis of its efficacy is not well understood...” The researchers, however, minced no words in their observation that “Temporal lobe stereotactic radiosurgery resulted in significant seizure reduction in a delayed fashion which appeared to be well-correlated with structural and biochemical alterations observed on neuroimaging. Early detected changes may offer prognostic information for guiding management.”

Growing interest and availability in US

Nevertheless, there is growing interest across the US in using the gamma knife for epilepsy. Its potential is highlighted (albeit, to varying degrees) by top facilities such as the Mayo Clinic and other leading hospitals like the University of California at San Francisco. On the other side, the University of Pittsburgh Medical Center explicitly specifies the gamma knife for treatment-resistant epilepsy. An active programme of use is also announced by St. Louis Children’s Hospital, for “certain epileptogenic lesions, corpus callosotomies as well as hypothalamic hamartomas - a benign plume-like malformation that causes a syndrome characterized by treatment-resistant epilepsy. Some smaller centres in the US are also describing the Gamma Knife as “giving patients with epilepsy another option for treatment.”

Europe seemingly lags US

Although France pioneered studies into the use of the gamma knife in epilepsy, interest in Europe still lags that being shown in the US. One reason may also be that other efforts in Europe have been evidently unsuccessful. For example, a four-year study in the late 1990s in the Czech Republic on using the gamma knife in epileptic patients concluded: “Radiosurgery with 25, 20, or 18-Gy marginal dose levels did not lead to seizure control in our patient series, although subsequent epilepsy surgery could stop seizures.” On the other hand, higher doses were associated with the risk of brain edema, intracranial hypertension, and a temporary increase in seizure frequency.

The ROSE study

Both in the US and Europe, the outlook on using Gamma Knife in MTLE is clearly one of cautious optimism. Trials conducted to date seem to show mixed results, or do not provide researchers enough conviction, as yet. For the moment, attention remains focused on an ongoing multi-centre trial called ROSE (Radiosurgery or Open Surgery for Epilepsy). The randomized, double blind trial is funded by the US National Institutes of Health, and is being conducted at 13 centres in the US and the prestigious All India Institute of Medical Sciences in New Delhi.

The trial takes up the hypothesis “that radiosurgery is as safe and effective as temporal lobectomy in treating patients with seizures arising from the medial temporal lobe.” It randomizes patients to either technique and is due to compare seizure remission, cognitive outcomes, and cost. The trial will not only measure outcomes (determined during the course of the final year of a 3-year follow-up period). It will also pay attention to interim measures concerning patient safety, quality of life etc., and compare these between the two groups. The eventual aim is to guide physicians to direct patients between traditional and RS techniques matched to patient characteristics.
KIMES 2016: foreign visitor surge reflects growing interest in Korean medical market

The 32nd Korea International Medical & Hospital Equipment Show held in Seoul from 17 to 20 March showcased Korea’s important medical equipment industry.

Over the years, KIMES has grown into one of the major trade shows in Asia. This year, the event gathered more than 73,000 visitors over 38,808 square meters of exhibition space. One of its main advantages is that it acts as a showcase for Korea’s particularly strong medical equipment industry. Indeed, out of the 1,152 companies from 37 countries who were exhibiting this year, 548 were Korean manufacturers and the show provided an ideal setting for highlighting the increasingly important role played by leading Korean companies such as Samsung, Listem, JW Medical, DK Medical, BIT Computer and Alpinion to name but a few.

As a platform enabling Korea’s medical device industry to show its latest equipment and technology alongside leading global players like GE, Fuji, Shimadzu and Hitachi, KIMES has succeeded in attracting numerous contingents of foreign visitors especially from the Asia region who have a strong purchasing power, including officials in medical institutions and hospitals, radiologists, medical laboratory specialists, pharmacists and emergency medical personnel. The number of foreign visitors has increased significantly this year, reaching 3563 medical professionals from 86 countries, a growth of 17.2% versus 2015. Over the last 5 years, the total of foreign visitors has grown by 184% compared with 19% for domestic visitors. Unsurprisingly, China is top of the list accounting for more than 30% of the total of foreign visitors, followed by South East Asia with nearly 20% and Japan (see table).

A post show survey of exhibitors conducted by the organizers showed a majority of them satisfied with the results of their participation and over 70% committing to exhibit again in 2017.

www.kimes.kr

MEDICAL FAIR ASIA 2016 preview

Singapore will once again play host to MEDICAL FAIR ASIA as it makes a much-anticipated return from 31 August to 2 September 2016 at a new venue – the Marina Bay Sands Singapore.

The 11th edition of the international exhibition on Hospital, Diagnostic, Pharmaceutical, Medical & Rehabilitation Equipment & Supplies continues its tradition of show-on-show growth since its inception in 1997, with an anticipated participation of 1,000 exhibitors from 45 countries, 20 national pavilions and country groups from Austria, Canada, China, France, Hungary, Malaysia, Singapore, Taiwan and many more.

The 2016 event will debut many new highlights, including a new Saudi Arabia national pavilion, special digital healthcare and rehabilitative care platforms and the inaugural staging of the MEDICAL FAIR ASIA MEDICINE + SPORTS CONFERENCE. New disruptive digital healthcare solutions such as remote and wireless healthcare, IT platforms, wearable devices, smarter medicine and healthcare analytics are also expected to be displayed by participating exhibitors. Focused on equipment and supplies for the hospital, diagnostic, pharmaceutical, medical and rehabilitation areas, the event continues to raise the overall capabilities and spur the growth of the region’s medical and healthcare sectors to meet the changing demands in both the public and private sectors, driving the next wave of healthcare modernization.

With a greater focus on innovations in sports medicine for the Southeast Asia region, the MEDICAL FAIR ASIA MEDICINE + SPORTS CONFERENCE will bring together sports medicine experts, healthcare providers, physicians, fitness trainers and industry players to foster new exchange formats, discuss innovations in sports medicine and pertinent healthcare challenges in the region. The conference will feature topics on the role of physical activity in healthcare, vital data performance monitoring, wearable devices and more.

www.medicalfair-asia.com
**President of Health & Medical Equipment in women's health, “said Dongsoo Jun,**

“O ur experience with Crystal Vue over the past few months, specifically imaging of the bone and soft tissue interface, leads us to believe that it may offer new opportunities for prenatal imaging, particularly for the skeletal system, but also in facial and brain imaging,” Professor Lees stated in his study. “We were able to obtain highly detailed images that give particular information on the contour of the ribs and allow inference on mineralization.”

**Carestream joins Intel® Storage Builders programme**

**Driven by explosive growth in medical imaging and other data,** healthcare providers are eager to explore the advantages offered by moving image data storage and management to the cloud. As a leading supplier of secure cloud services for hospitals and other healthcare facilities, Carestream Health is the only healthcare company involved in the Intel® Storage Builders programme and currently manages more than 15 billion images in 13 public and private cloud data centers across the globe. Carestream and Intel are collaborating to ensure practical, high-performance solutions for enterprise imaging and information platforms that can be deployed in secure clouds or on-site data centers. A recent white paper from Intel and Carestream explains the advantages healthcare providers can gain from adopting the latest cloud technology.

The new Intel Storage Builders programme aims to accelerate the use of cloud-ready, next-generation storage options by fostering greater innovation in the cloud ecosystem.

“Carestream demonstrated that use of Intel’s new solid-state drive (SSD) data center family of technologies tripled the speed of data throughput for a critical portion of our image-intensive workflow,” said Ishai Tal, Carestream’s Head of Platform Architecture. “We offer secure cloud solutions that include the latest technology innovations while reducing operating costs.”

This new cloud architecture can help healthcare providers securely manage data growth while preparing for new advances in medical imaging data analytics. “Deploying our cloud technology also increases throughput, which provides faster access to data and greater productivity for clinicians,” Tal reports.

Carestream’s Vue for Cloud-Based Services is a fully managed IT solution for medical image sharing and archiving, and its secure cloud infrastructure is monitored and supported by the company’s top IT experts. Healthcare providers receive proactive reporting of usage and activity and Carestream’s cloud-based services offer the ability to avoid capital investment and reduce total cost of ownership by as much as 30 percent with predictable, pay-as-you-go operating costs.

**www.carestream.com**

**Siemens Healthcare becomes Siemens Healthineers**

In early May Siemens Healthcare unveiled its new brand name Siemens Healthineers. The new brand underlines Siemens Healthcare’s pioneering spirit and its engineering expertise in the healthcare industry. It is meant to describe the healthcare organization and its people – the people accompanying, serving and inspiring customers – the people behind outstanding products and solutions.

“We have an exceptional track record of engineering and scientific excellence and are consistently at the forefront of developing innovative clinical solutions that enable providers to offer efficient, high quality patient care. Going forward as Siemens Healthineers, we will leverage this expertise to provide a wider range of customized clinical solutions that support our customers’ business holistically. We are confident in our capability to become their inspiring partner on our customers’ journey to success,” explained Bernd Montag, CEO of the company. “Our new brand is a bold signal for our ambition and expresses our identity as a people company – 45,000 employees worldwide who are passionate about empowering healthcare providers to optimally serve their patients.”

As part of its Vision 2020 strategy Siemens AG announced nearly two years ago that its healthcare business would be separately managed as a company within the company with a new organizational setup. Siemens Healthineers will continue to strengthen its leading portfolio across the medical imaging and laboratory diagnostics business while adding new offerings such as managed services, consulting and digital services as well as further technologies in the growing market for therapeutic and molecular diagnostics.
**Premium ultrasound system**

The Resona 7 ultrasound system is powered by the innovative ZONE Sonography Technology, which transforms ultrasound metrics from the conventional signal processing technique of beamforming to channel data based processing. The ZST+ platform incorporates multiple imaging advances: Advanced Acoustic Acquisition, Dynamic Pixel Focusing, Sound Speed Compensation, Advanced Image Processing, and Total Recall Imaging. These features help elevate Resona 7’s ultrasound image quality to a new level. With the powerful ZST+ platform, Resona 7 is able to deliver more valuable tools for clinical research. One of these tools is V Flow (Vector Flow), which offers vivid, accurate, and angle-independent visualization of complex vascular hemodynamics profiles at the speed of up to 600 frames per second. With the comprehensive data it provides, V Flow will become a valuable tool for vascular clinical research. Resona 7 also elevates clinical intelligence to a new level with smart acquisition and calculation. Smart Planes, for example, allows fully automatic and accurate detection of the most significant planes and frequently used measurements of the fetal central nervous system. This tool can improve diagnostic throughput as well as reduce user dependency. Designed for clinical professionals, Resona 7’s gesture-based operation opens up a new trend in cart-based ultrasound, providing a smart and intuitive user experience. A six-direction floating control panel with electronic height adjustment allows users to scan with comfort and ease.

**Highly flexible diagnostic ultrasound systems**

Hitachi Aloka has developed two different styles of diagnostic ultrasound systems to meet these needs. ARIETTA Precision supports surgical treatment and acute healthcare, while ARIETTA Prologue has been designed especially for the POC (Point of Care) ultrasound market where often new users are looking for ultrasound to provide better chronic and community healthcare. ARIETTA Precision has a slim profile with a large 21.5” touch monitor fixed to an arm that can provide effortless manoeuvrability in the operating room. Additionally, with wireless communication, the monitor and base units can be separated. The dedicated remote control replicates the same touch panel operation and real-time ultrasound image display as on the monitor and so enables a flexible working layout in surgical rooms with limited space. All parts of the unit are fully compatible with commonly-used disinfectant procedures, for safe use in the clean environment of the operating room. ARIETTA Prologue supports a broad range of examinations and, with its compact hand-carry design, can be used in a variety of different settings. Operators will not need to compromise their natural posture even in the smallest examination or treatment room. The ARIETTA Prologue offers superior imaging quality and is equipped with functions that improve efficiency and support rapid, accurate diagnosis when and where it is needed: in the consultation or treatment room, at the patient’s bedside, in the emergency room, on home visits, etc. The monitor of ARIETTA Precision and ARIETTA Prologue offers a full touch panel for more intuitive and user-friendly operation. Additionally, a full screen display mode is supported. The enlarged image enables detailed observation and viewing from a distance. Advanced image processing technologies and functions normally reserved for high-end systems offer images with superior clarity. Silky Image Processing helps to reduce artefacts that could diminish the diagnostic quality of the image, improving contrast resolution and the display of tissue borders. eFlow provides a clearer delineation between tissue and blood flow, so even low velocity flow can be imaged with higher sensitivity.

**Thermal container prevents telescope lens fogging**

n’GHOTO is a totally reusable, easy-to-use thermal container that maintains the solution hot during laparoscopic and thoracoscopic procedures to clean and warm the telescope, improving visibility and reducing operating time. n’GHOTO can be fully sterilized in a steam autoclave at 134°C. The stainless steel container is double-walled to preserve liquid temperature. Lid with plug and holder are made in autoclavable silicon. The lid’s wide opening allows comfortable insertion of the telescope in the container and the plug is easily set and removed. The large silicon support base grants optimal stability. A removable/interchangeable silicon disc is placed on the bottom of the container to prevent accidental telescope breakage during insertion.

**Ultrasound mountable system**

Developed for regional anesthesia, vascular access and trauma applications, the SII mountable ultrasound system features a simple, yet smart user interface that adapts to the user’s imaging needs. The system is portable and can be used across multiple hospital environments, including a zero footprint option for space-constrained rooms. For regional anesthesiologists, enhancing patient throughput is a critical need, especially as they perform an increasing number of ultrasound-guided procedures on a daily basis. The SII features a new touchscreen user interface with a clinician-driven menu logic that adaptively adjusts to the user case. An embedded dual transducer connector also allows quick switching between transducers with two simple taps of the screen, ensuring that the right transducer is always readily available. To further accelerate end-to-end workflow, the SII comes with a new stand, offering elevated transducer holders and additional storage, all while minimizing footprint. For trauma patients, the speed and ease of image acquisition is vital, as a few minutes can alter a patient’s care path. The SII features DirectClear technology, a novel, patient-pending process that is available on select transducers. DirectClear elevates transducer performance by increasing penetration and contrast resolution.

**FUJIFILM SONOSITE**

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**S.C.S. INTERNATIONAL**

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**Flat panel-based imaging solution for surgical C-arms**

The Pixium Surgical Imaging Suite brings together the flat panel detectors and Imaging Chain Solution (ICS) for Surgical C-Arms. With this introduction Thales incorporates detectors and imaging solutions to create a sharper image in a more compact system.

This greatly enhances the surgeons’ view of the patient during a procedure. The Pixium Surgical Imaging Suite combines the high performance Pixium Surgical 2121S-A or 3030S-A detectors with cutting-edge ICS software, to provide fully processed high resolution images in real time. This cost effective solution which is compatible with low power generators creates an image size of 21cm² or 30cm² equivalent to XRII. The embedded high performance ICS software provides complete Thales image processing, ensuring real-time operation of the system and reduced time to market for the integrator. The Pixium 2121S-A or 3030S-A features an innovative pixel design to guarantee unrivalled image quality at a low dose. The detector operates in different modes to support all surgical applications, such as orthopedic and cardiovascular operations. The GigE vision link to the system ensures high frame rate and reliable integration.

**THALES ELECTRON DEVICES**

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**Data management system**

For many years already, SCHILLER has been working on optimizing the integration and display of resting ECG data in PACS systems. To achieve this goal, the company makes its data available in DICOM format, a standard acknowledged worldwide for medical imaging. Up to now, only resting ECG raw data could be exported, with exercise ECG and resting rhythm data only being available in PDF format. Now, however, with the redeveloped SEMA3 data management system, it is possible to exchange even such recordings as raw data. This export in an open format allows the data to be edited, measured and reviewed in different locations, while offering more flexibility and greater independence from a given provider. SCHILLER is the first manufacturer to offer detailed exercise ECG and resting rhythm raw data, following the trend for open data. This achievement could be realized thanks to successful technology partnerships with several PACS manufacturers. Comprehensive integration of spirometry data is also possible as GANSHORN’s latest development, the LFX software, is integrated in SEMA3 and can be incorporated in existing infrastructures without any additional effort. This means that LFX has unrestricted access to HL7 and DICOM interfaces, which in turn enables the exchange of patient data and reports with external systems. SEMA3 is workflow-driven and supports different operating systems, database management systems and multiple languages.

**SCHILLER**

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**Holter ECG sensors**

Mega Electronics has launched an updated version of their “all-in-one” ECG sensor lineup, the Faros ECG sensors. The update includes heavily reduced power consumption and a totally new Li-ion battery, with up to 7 days of ECG recording time without recharging and up to 30 days of ECG recording capacity. The Finland-based company has designed the sensors in a way which supports multiple applications: apart from being capable of recording Holter ECG, the sensors can also be used as cardiac event monitors or mobile cardiac telemetry devices with specific mobile phone apps. The newest feature is a completely new cardiac rehab solution, which is a real-time, wireless ECG group monitoring system for 1-16 patients with easy-to-read reporting.

**MEGA ELECTRONICS**

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**FRONT COVER PRODUCT**

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Physicians can switch seamlessly in real time amongst HD+ white light and three i-scan modes which includes i-scan OE to view multiple aspects of tissue structure. In addition to improved diagnosis, OPTIVISTA is a powerful teaching platform. TwinMode is useful in teaching the appropriate interpretation of image enhanced endoscopy, providing simultaneous comparison of side by side endoscopic images. The simultaneous comparison of enhanced clinical images is particularly useful in demonstrating the appropriate characterization of lesions. Also included with the OPTIVISTA is the ability to perform video recording, enabling the capture of HD+ video files onto a USB storage device. Audio recording for video is captured through an external microphone. The new, intuitive touch screen controls allow for simple and efficient operation. For optimum image collection, the OPTIVISTA incorporates freeze scan technology which automatically selects the sharpest picture for users' records. By integrating the video and audio capture functionality there is no requirement for further recording devices or software.

PENTAX MEDICAL
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Thanks to its internal power supply, the POC-WP242 24” Medical Touch PC eliminates the external adaptor and is ideal for critical environments and efficient equipment use. The internal power supply avoids stowing away the block, facilitates mounting and reduces dust risk thus improving hygiene. The system is fanless for quiet operation and energy efficiency. It delivers high-performance with a 4th generation, Intel Core i7 processor. With an IPS (In-Plane Switching) display, users will experience stunning, vivid images from any angle. Even with a 24” display, the entire unit weighs less than 8kg and has a narrow profile depth of only 7cm. The POC-W242 has an IP54-rated enclosure providing control against bacteria. The point-of-care terminal has a rich connectivity profile which supports four USB ports, one VGA and one HDMI connector. It’s also equipped with two mini PCIe slots and one PCIe x4 slot for expansion cards. The unit is suitable for any image-intense, life-critical medical application.

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THE RAYSAFE X2 OFFERS

- State-of-the-art sensor technology combined with a new user interface that is so simple to use
- Precise scatter/leakage measurements in the X-ray energy range with the new X2 survey sensor
- Full range of measurements for R/F, MAM, CT, Light, Survey and mAs applications

OUR BREADTH OF PRODUCTS

We manufacture products and solutions that help our customers avoid unnecessary radiation. Solutions include quality assurance devices for X-ray equipment, a real-time dose monitoring system for medical staff, as well as scatter measuring survey meters and phantoms.

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