Best practices in resuscitation

Also in this issue

Shear wave elastography
DBT: evidence of superiority vs mammography

Connectivity now available on POC HbA1c analysers
by EKF  Page 31

Ventilator performance tester
by Rigel  Page 32

Redesigned premium ultrasound platform
by Toshiba Medical Systems  Page 33

News updates on www.ihe-online.com
With comprehensive product lines in Patient Monitoring & Life Support, In-Vitro Diagnostics, and Medical Imaging System, Mindray is a world leading total solution provider with robust innovation capabilities. While improving the quality of care, we strive to make it more accessible to a larger part of humanity. Today, Mindray’s products and services can be found in healthcare facilities in over 190 countries and regions.
Globally HPV is still the most frequent sexually transmitted virus. Certain genotypes cause virtually all cases of cervical cancer, a disease which kills over a quarter of a million women per annum, as well as causing morbidity and mortality from anogenital and oropharyngeal disease in both genders. However back in October 2005 it was reported that Phase III trials, involving twelve thousand women in thirteen countries, had demonstrated that Merck’s quadrivalent HPV vaccine, Gardisil, was 100% effective in preventing pre-malignant cervical lesions. This vaccine, genetically engineered in Brisbane and first licenced for use in public health programmes in Australia, the US, Mexico, Gabon and Europe a decade ago, targets HPV genotypes 6/11 as well as HPV16/18. The former low-risk genotypes cause 90% of anogenital wart infections; it is estimated that the latter high-risk genotypes are responsible for 70% of cervical cancers and 80% to 90% of other HPV-related neoplasms including anal, penile and oropharyngeal cancers. Other vaccines, all of which target the high-risk genotypes HPV 16/18, are now in use. The most recently approved also includes the less common oncogenic genotypes 31/33/45/52/58.

HPV vaccine is now approved for use in 129 countries. So after a decade what has been the impact on health from the more than 205 million doses of HPV vaccine that have been distributed worldwide? The beneficial effect is particularly apparent in countries where there is a high uptake of girls who are vaccinated before they become sexually active. Both infections with HPV and genital warts have plummeted by 90%, with a reduction of 85% in high-grade cervical abnormalities. Data reporting lower numbers of cervical cancer cases post-vaccine will surely follow. The bad news is that the full potential of the vaccine has yet to be realized. Only 64 countries actually include HPV vaccination in their national immunization schedules, and the less developed nations are less likely than the West to have effective programmes that require three timed inoculations and high population coverage. In developed countries such as the US imprudent parents still refuse the vaccine because of possible safety concerns or more bizarrely because they think it will encourage sexual promiscuity in their offspring. However the good news is that in China, which has 28% of the global cervical cancer cases but a particularly cumbersome drug approval process, HPV vaccine has finally been approved and will be available in 2017. Surely a fitting memorial to the late Chinese co-inventor of the initial vaccine, Dr Jian Zhou!
FEATURES

[5 - 7] EMERGENCY MEDICINE
Best practices in resuscitation - interim updates for 5-year ILCOR recommendations

[8 - 11] INTENSIVE CARE
[8 - 9] International differences in end-of-life issues in the ICU
[10 - 11] Intensive Care News

[12 - 15] DIAGNOSTIC ULTRASOUND
[12 - 13] Shear wave elastography - reducing need for invasive biopsy
[14 - 15] Ultrasound Imaging News

[16 - 18] BREAST TOMOSYNTHESIS
Digital breast tomosynthesis - evidence of superiority versus mammography, but more research needed

[19 - 22] LEARNING FROM AFRICAN INNOVATIONS IN HEALTH SERVICES
Abstracts of papers published in the 3rd 2016 issue of World Hospitals and Health Services, the official journal of the International Hospital Federation

REGULARS

[3] Editor’s letter
[23-28] News in brief
[29-30] Industry news
[31-34] Product news
[34] Calendar
Local practices continue to drive growth of best practice in resuscitation. However, there is also substantial cooperation at the global level. The International Liaison Committee on Resuscitation (ILCOR) was founded in 1993 and currently includes representatives from the American Heart Association, the Heart and Stroke Foundation of Canada, the European Resuscitation Council, the Australian and New Zealand Committee on Resuscitation, the Resuscitation Council of Asia, the Resuscitation Council of Southern Africa and the InterAmerican Heart Foundation. ILCOR members seek to both optimize and minimize international differences in resuscitation practices, but also leave space for geographic, economic, and other real-world differences in practice and the availability of medical devices and drugs.

In 1999, the American Heart Association (AHA) hosted the first ILCOR conference to evaluate best practices and chart resuscitation guidelines. The ILCOR recommendations, formally known as International Consensus on CPR and ECC Science With Treatment Recommendations (CoSTR), were published in 2000. Over the years, ILCOR task forces have evaluated and published CoSTR recommendations in 5-year cycles.

The most recent ILCOR Consensus Conference was held in Dallas in February 2015, and attended by over 230 participants from some 40 countries. Almost two-thirds of participants came from outside the US - giving weight to ILCOR's position as a global group. The Conference focused, as before, on CPR and ECC, but also covered first aid topics.

One good recent example of the pace of evolution in resuscitation practices is ILCOR's observation that five years (the task force recommendation cycle) was far too long a period to inform healthcare professionals of therapeutic advances in the field. As a result, it plans to systematically review new science and publish interim advisories on treatment guidelines. The aim is to give resuscitation practitioners access to providing state-of-the-art patient care.

ILCOR's 2015 CoSTR consensus statements summarize the results of task forces in several areas:
- BLS or basic life support (covers quality of CPR and the use of an automated external defibrillator),
- ALS or advanced life support (post-cardiac arrest care),
- ACS or acute coronary syndromes, along with education, implementation and teams (EIT), and, for the first time, first aid.

Although dedicated specific task forces cover pediatric BLS and ALS as well as neonatal resuscitation, this review of the 2015 ILCOR guidelines is restricted to adults.

ILCOR task forces perform detailed systematic reviews, evaluate evidence and make recommendations. Task forces identify and prioritize questions using the PICO (population, intervention, comparator, outcome) format, accompanied by a call for public comments. This is followed by a search (with detailed...
inclusion/exclusion and screening) of relevant articles in three major online databases (PubMed, Embase and the Cochrane Library).

The quality of evidence is tabulated as high, moderate, low, or very low, based on five core domains of risk of bias, inconsistency, indirectness, imprecision, and publication bias (and occasionally other considerations). Together, they follow the so-called GRADE (Grading of Recommendations, Assessment, Development, and Evaluation) methodology for drafting guidelines. The final wording ranges from “we suggest...” for weak recommendations to “we recommend...” for the strong ones...”

One of ILCOR’s major goals is continuously-updated and high-quality research into CPR and ECC. An online platform known as SEERS (Scientific Evaluation and Evidence Review System) guides task forces and their individual reviewers, as well as public comments and suggestions. (https://volunteer.heart.org/apps/pico/Pages/default.aspx).

On the other hand, ILCOR also avoids giving attention to areas where there is little development in technology or evidence on practices.

Developments in resuscitation (2010–2015)
The 2015 CoSTR notes that post-OHCA (out-of-hospital cardiac arrest) survival rates are rising, especially when the first monitored rhythm is ‘shockable’ - that is, associated with ventricular fibrillation (VF) or pulseless ventricular tachycardia (pVT). However, survival rates from non-shockable rhythms are also improving. These developments directly correlate with an increased emphasis on improving basic life support (BLS) and advanced life support (ALS).

Given below is a summary of evidence-based recommendations by ILCOR task forces, covering developments since 2010.

Basic life support
EMS dispatchers play the critical role in identifying cardiac arrest, providing CPR instructions to the caller, and activating emergency response. In drowning, it appears that submersion time is a key prognostic factor for outcomes. However, fundamental metrics of high-quality CPR remain the same, with an emphasis on compressions of adequate rate and depth, allowing full chest recoil after each compression, minimizing pauses in compressions, and avoiding excessive ventilation. It is also noted that public access programmes which provide early defibrillation can save many more lives if the programmes are carefully planned and coordinated.

Advanced life support
Post-cardiac arrest care is probably the resuscitation segment undergoing the greatest evolution since 2010, with substantial potential to improve survival from cardiac arrest. Key recent developments in ALS include results from three major trials on mechanical CPR devices, drug therapy, and insertion of advanced airway devices. In addition, the ALS task force evaluated several studies regarding post-cardiac arrest care and the use of targeted temperature management (TTM).

Mechanical devices
The three mechanical compression device trials enrolled over 7,500 patients. However, it yielded outcomes similar to those from manual compressions. ILCOR concludes that mechanical CPR devices should not be seen as replacements, but may play a role in conditions where high-quality manual compressions are not feasible.

Drug therapy
The 2010 CoSTR had pointed to insufficient evidence about drug administration improving survival from cardiac arrest. In 2015, a systematic review identified large observational studies that also challenged routine use of advanced airways and the use of epinephrine for ALS. Since observational studies are known to carry a risk of bias, the findings did not result in a recommendation to change practice. However, they do indicate a need for large randomized controlled trials to assess whether epinephrine and advanced airways are helpful during CPR.

Targeted Temperature Management
Recent developments in ALS also include greater delineation of the timing and effects of TTM and the need to take account of controlling oxygenation/ventilation and optimizing cardiovascular function. Nevertheless, one high-quality TTM trial could not demonstrate an advantage to a temperature goal of either 33°C or 36°C, while five other trials failed to identify benefits from pre-hospital hypothermia initiation via cold intravenous fluids. Though none of the trials dispelled with the view that post-cardiac arrest patients need a care plan taking account of TTM, there is still little consensus about optimal target temperature and its duration.

Acute coronary syndromes
There are several evidence-based recommendations for ACS since 2010.

Catheterization, ADP and UFH, troponins
Firstly, pre-hospital ST-segment elevation myocardial infarction (STEMI) activation of a catheterization laboratory treatment delays and improves outcomes. Secondly, adenosine diphosphate (ADP) receptor antagonists, along with unfractionated heparin (UFH) can be part of a planned percutaneous coronary intervention (PCI) approach and be administered either pre-hospital or in-hospital for suspected STEMI patients. In the pre-hospital setting, enoxaparin is an alternative to UFH. This is not the case with bivalirudin, for which there is insufficient evidence.

Thirdly, the 2015 CoSTR discourages the use of troponins at zero and 2 hours as a standalone measure to exclude ACS diagnosis. Instead, it suggests that negative high-sensitivity troponin I (hs-cTnI) at zero and 2 hours may be used together with low-risk stratification or negative cardiac troponin I (cTnI) or cardiac troponin T (cTnT) measured at zero and 3–6 hours to identify patients at low risk of a major adverse high-sensitivity cardiac troponin I (hs-cTnI) cardiac event (MACE).

PCI and STEMI
ILCOR’s 2015 CoSTR also has several comments on PCI and STEMI. Its find primary PCI to be generally preferable to fibrinolysis for STEMI reperfusion. However, such decisions must be ‘individualized’ based on time from symptom onset, anticipated delay to PCI, relative contraindications to fibrinolysis, and other patient factors.

Patients with STEMI in the emergency department (ED) of a non-PCI-capable hospital should either be transported rapidly for primary PCI (without fibrinolysis) or be administered fibrinolysis and transported for routine angiography in the first 3–6 hours.

Education, implementation, and teams
One of the most noteworthy areas of attention by ILCOR since 2010 concerns training and continuous quality improvement.
Training cycles
ILCOR states that, although more evidence is needed, it is “now recognized” that training should be more frequent and less time consuming to prevent skill degradation. On the other hand, retraining cycles of 1-2 years are inadequate to maintain competence in resuscitation skills. Though “optimal retraining intervals” remain to be defined, it is clear that more frequent training may help providers likely to encounter a cardiac arrest.

Hi-Fi manikins
ILCOR also suggests replacing standard manikins with high-fidelity manikins at training centres with the infrastructure and resources to maintain the programme.

Performance and quality metrics, social media
Another challenge is that though the role of performance measurement and feedback in cardiac arrest response systems (both in-hospital and out-of-hospital) is recognized, supporting data is of low quality. Closely coupled to improvements in the performance of resuscitation teams is the need for data-driven, performance-focused debriefing. Finally, ILCOR also notes the rapidly-growing role of social media for notifying suspected OHCA to hospitals and for sourcing bystanders with CPR skills.

First aid
The First Aid Task Force considered stroke assessment, hypoglycemia treatment in diabetics, as well as treatment of open chest wounds and severe bleeding and the identification of concussion.

. Stroke assessment
Observers consider one of the most important recommendations from the First Aid task force is to use stroke assessment systems to improve early identification of possible stroke and enable subsequent referral for definitive treatment. Specific recommendations are made on the FAST (Face, Arm, Speech, Time) tool as well as the Cincinnati Prehospital Stroke Scale, alongside an important observation, that blood glucose measurement could improve the specificity of recognition.

. Hypoglycemia
ILCOR’s 2015 CoSTR observes that first aid providers often face symptoms of hypoglycemia, and a failure to identify and treat it can lead to loss of consciousness and seizures. It recommends administration of glucose tablets for conscious individuals who can swallow, or substitute forms of dietary sugars should glucose tablets not be immediately available.

. Open chest wounds, bleeding, concussion
The 2015 CoSTR recommends that occlusive dressings or devices, or those which might become occlusive, be avoided in the case of open chest wounds in order to avoid engendering a tension pneumothorax. Recommendations for severe bleeding include using direct pressure, hemostatic dressings and tourniquets - after formal training to ensure effective application and use. The 2015 First Aid Task Force also recommends developing a simple validated concussion scoring system to accurately identify and manage concussion (minor traumatic brain injury or TBI), which is a condition often encountered by prehospital first-aid providers.
International differences in end-of-life issues in the ICU

Medicine is in a state of continual progression as new therapies and interventions are developed and technological advances facilitate resuscitation and prolonged organ support. In addition, patients are living longer with increased numbers of comorbidities and complex disease processes. As one result of these demographic changes and medical advances, intensive care units (ICUs) are admitting more patients with a high risk of death, patients who would previously have died before reaching the ICU. As a consequence, the need for end-of-life decisions has become more common than in the past. There has also been a move from an emphasis on survival at all costs to a recognition that the quality of life of survivors must also be taken into account, as well as the quality of dying for those who will not survive.

by Prof Jean-Louis Vincent

With patients who are not considered to have any reasonable chance of benefiting from new or continued intensive care treatments, physicians are faced with four possible options, ranging from continuing with full treatment to support life through to increasing the doses of sedatives to hasten the dying process (Table). In some patients, where withdrawing therapy is permitted, an ‘ICU trial’ can be considered, giving the patient the chance to benefit from a possible intervention. The target of such a test and the time-limit must be set in advance and adhered to; good communication with the family is essential to ensure that these factors are clear. It should be remembered that in some patients, death is actually in their best interest, preventing unnecessary and prolonged suffering.

Recent data suggest that some 40% of ICU non-survivors will have a decision to withhold/withdraw life-sustaining therapy during their ICU stay. Perhaps not surprisingly, there are marked differences in end-of-life decisions and the decision-making practice around the globe. For example, data show that patients are more likely to receive a decision to withhold or withdraw life-sustaining therapy in Oceania, North America, and northern Europe and less commonly in the Middle East, Asia, southern Europe and South America. Although withdrawing and withholding are seen as ethically equivalent in many countries, in others, withholding life-sustaining therapy is considered acceptable but not withdrawing. In Israel, because withdrawal of life-support measures is forbidden, the authorities even passed a law whereby timers can be put on respirators, which then stop by themselves after a preprogrammed time period. The use of sedatives/analgesia at the end-of-life to shorten the dying process also varies considerably among countries and individuals. Some people justify the administration of large doses of sedatives/analgesics in this situation by calling on the ‘double effect’ principle, wherein giving analgesic agents for comfort has the unavoidable effect of hastening death, but this view is rather hypocritical. There is little official guidance available for intensivists regarding this issue and it is perhaps the area of end-of-life management that creates the greatest concern among physicians with fear of possible litigation. The Belgian
Society of Intensive Care recently published a statement that “Shortening the dying process with use of medication, such as analgesics/sedatives, may sometimes be appropriate, even in the absence of discomfort, and can actually improve the quality of dying.”

The degree of involvement of family members in end-of-life decision making also varies, with families more frequently involved in Northern Europe and the US than in southern European countries. This is in part related to the traditional paternal approach to medical practice still widespread in many southern European countries. Family-centered decision making is also common in East Asian countries, such as Japan, China and South Korea.

The reasons for these international differences are complex. Many are related to the marked cultural and religious diversity among countries. Lack of available resources and financial constraints can also influence end-of-life decision making, particularly in lower income countries. There are also differences among ICUs within a country and among individual intensivists, related again to the cultural and religious backgrounds of the physicians, but also to local legislation, peer and family pressure, and ICU casemix and organization amongst others. The key ethical principles of autonomy, beneficence, non-maleficence and distributive justice must always be used as the basis for any end-of-life decision, but the ways in which these are interpreted and their relative importance may vary according to local factors. It is therefore inappropriate to try and develop a universal consensus on end-of-life decisions as some have suggested, although local guidelines may be useful. Open discussion of these difficult issues must be encouraged within the ICU team and good communication with the family is essential. The aim must always be to provide compassionate end-of-life care, appropriate for the individual patient and his/her particular circumstances.

Suggested reading

The author
Jean-Louis Vincent, MD, PhD
Dept of Intensive Care,
Erasme University Hospital,
Université libre de Bruxelles,
Route de Lennik 808,
1070 Brussels,
Belgium
Tel. +32-2-555-3380
Fax +32-2-555-4555
E-mail: jlvincent@intensive.org

---

**The four possible approaches to management in patients with no likelihood of benefitting from ongoing ICU treatment**

<table>
<thead>
<tr>
<th>Approach</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do everything to preserve life</td>
<td></td>
</tr>
<tr>
<td>Withhold new therapies, but do not withdraw interventions already in process, e.g., nutrition, mechanical ventilation or renal replacement therapy</td>
<td></td>
</tr>
<tr>
<td>Withhold and/or withdraw interventions but do not use sedatives to hasten death</td>
<td></td>
</tr>
<tr>
<td>Withhold and/or withdraw interventions and/or increase the doses of sedatives to hasten death</td>
<td></td>
</tr>
</tbody>
</table>
ICU patients lose helpful gut bacteria within days of admission

The microbiome of patients admitted to the intensive care unit (ICU) at a hospital differs dramatically from that of healthy patients, according to a new study. Researchers analysing microbial taxa in ICU patients’ guts, mouth and skin reported finding dysbiosis, or a bacterial imbalance, that worsened during a patient’s stay in the hospital. Compared to healthy people, ICU patients had depleted populations of commensal, health-promoting microbes and higher counts of bacterial taxa with pathogenic strains – leaving patients vulnerable to hospital-acquired infections that may lead to sepsis, organ failure and potentially death.

What makes a gut microbiome healthy or not remains poorly defined in the field. Nonetheless, researchers suspect that critical illness requiring a stay in the ICU is associated with the loss of bacteria that help keep a person healthy. The new study, which prospectively monitored and tracked changes in bacterial makeup, delivers evidence for that hypothesis.

“The results were what we feared them to be,” says study leader Paul Wischmeyer, an anesthesiologist at the University of Colorado School of Medicine. “We saw a massive depletion of normal, health-promoting species.”

Wischmeyer notes that treatments used in the ICU – including courses of powerful antibiotics, medicines to sustain blood pressure, and lack of nutrition – can reduce the population of known healthy bacteria. An understanding of how those changes affect patient outcomes could guide the development of targeted interventions to restore bacterial balance, which in turn could reduce the risk of infection by dangerous pathogens.

Previous studies have tracked microbiome changes in individual or small numbers of critically ill patients, but Wischmeyer and his collaborators analysed skin, stool, and oral samples from 115 ICU patients across four hospitals in the United States and Canada. They analysed bacterial populations in the samples twice – once 48 hours after admission, and again after 10 days in the ICU (or when the patient was discharged). They also recorded what the patients ate, what treatments patients received, and what infections patients incurred.

The researchers compared their data to data collected from a healthy subset of people who participated in the American Gut project dataset. (American Gut is a crowd-sourced project aimed at characterizing the human microbiome by the Rob Knight Lab at the University of California San Diego.) They reported that samples from ICU patients showed lower levels of Firmicutes and Bacteroidetes bacteria, two of the largest groups of microbes in the gut, and higher abundances of Proteobacteria, which include many pathogens.

Wischmeyer was surprised by how quickly the microbiome changed in the patients. “We saw the rapid rise of organisms clearly associated with disease,” he says. “In some cases, those organisms became 95 percent of the entire gut flora – all made up of one pathogenic taxa – within days of admission to the ICU. That was really striking.” Notably, the researchers reported that some of the patient microbiomes, even at the time of admission, resembled the microbiomes of corpses. “That happened in more people than we would like to have seen,” he says.

American Society of Microbiology
http://tinyurl.com/hz9Bug9

Simple measures cut sepsis deaths nearly in half

Sepsis, commonly called blood poisoning, is a common affliction that can affect people of all ages. A series of simple measures tested at a Norwegian hospital can make a difference in successfully treating sepsis.

Researchers were able to cut the number of patients who died from sepsis, or infections that spread to the bloodstream, by 40% (from 12.5% to 7.1%) after the introduction of relatively simple steps at the wards at Levanger Hospital in Nord-Trøndelag, Norway.

The steps, which included increased training and a special observation chart, were introduced as part of a research project carried out by Nord University, Levanger Hospital, and the Mid-Norway Centre for Sepsis Research at NTNU and St. Olavs Hospital in Trondheim, Norway.

“This study suggests that ward nurses have a key function in increasing the survival for patients with serious infection. The use of cost-effective and clear tools for the identification of sepsis and the scoring of severity in patients as well as a standardized treatment course can achieve this,” says Erik Solligård, the senior author of the study and head of the Mid-Norway Centre for Sepsis Research. “These simple steps should be implemented in all Norwegian hospitals.”

According to the Global Sepsis Alliance, a worldwide alliance of healthcare providers working to increase knowledge about the problem, the majority of sepsis cases are caused by common infections. Pneumonia, urinary tract infections, skin infections like cellulitis and infections in the abdomen (such as appendicitis) can cause sepsis, as well as invasive medical procedures like the insertion of a catheter into a blood vessel. The Alliance says sepsis is the primary cause of death from infection, despite advances in modern medicine like vaccines, antibiotics, and intensive care.

“Sepsis is a very common and serious condition that many people die from,” Solligård says. “Patients with lifestyle diseases such as diabetes or cancer are particularly at risk. However, sepsis doesn’t attract nearly as much attention.”

Solligård says rates of sepsis are expected to increase in the future, fuelled by the double problem of increasing incidences of lifestyle diseases and antibiotic-resistant bacteria. For that reason, hospitals should have a standardized observation regime so sepsis can be diagnosed early in its progression, and should create clear treatment plans for addressing sepsis, he said.

“We need much more research on sepsis, especially on how the illness can be prevented,” he said.

In their study, the researchers created a flow-chart for the identification of sepsis and an observation chart with a severity score that nurses at Levanger Hospital could use at the ward (for triage). Doctors who worked in the ward were given written information, whereas nurses and nursing students were given a 4-hour training course, and the treatment course was standardized with clear guidelines for doctors and nurses.

In addition to increasing survival, the use of these measures reduced the development of serious sepsis during hospital stays by 30% and the number of days in intensive care was reduced by an average of 3.7 days per patient, thus making the methods not only life-saving, but simple and cost effective.

Gemini
http://tinyurl.com/hh3dvtt
Daily sedation interruption in critically ill children

Over sedation among critically ill adult patients in intensive care units has been shown to be associated with longer duration of ventilation, longer hospital stay and adverse patient outcomes, such as withdrawal and delirium. Daily sedation holds have been shown to mitigate many of these problems. However, the evidence in the critically ill pediatric population is not well established. Vet et al. have conducted a multicentre randomized control trial among intensive care units in the Netherlands comparing protocolized sedation (PS) to protocolized sedation with daily sedation interruptions (PS+DSI).

There was no difference between groups in ventilator-free days. The cumulative drug doses did not significantly differ between the two groups. The need for intermittent bolus administration in the DSI + PS group counterbalanced the reduction in continuous sedation. The essence of DSI is to minimize sedation use. The authors argue that protocolized management in control arm may have minimized sedation such that it negated any potential beneficial effect in the treatment arm. However, not all studies demonstrate a benefit in protocolized sedation practice. Furthermore, the expected mean number of ventilator-free days in the sample size calculation was lower than observed in the study, likely due to the selection of relatively more stable patients.

The authors also discuss the increased mortality among the treatment group. This is most likely to represent a type 1 error. No explanation for the increased deaths was found by independent review, and similar studies do not demonstrate a similar finding. Furthermore, the authors claim that the “timeframe between active participation in the study and death makes a causal relationship unlikely”.

In the PS group, there were significantly more reintubations compared to the PS + DSI group (9 vs. 2, p = 0.03). The authors suggest that patients in the DSI + PS group were possibly more alert and therefore extubation may have been more successful. However, relatively small numbers make it difficult to be certain.

There are two previous studies of DSI in pediatric populations. Both show shorter durations of mechanical ventilation, shorter ICU stays and less use of sedatives. However, protocolized sedation was not used in the control arm of one study and the primary pathology among patients in the other study was very different (with a predominance of neurological as opposed to respiratory illness).

It is difficult to draw any firm conclusions from this study based on the small number of patients enrolled. However, it raises a number of important issues, including the difficulty in recruiting patients in pediatric ICU studies. A pragmatic protocol, which may allow a greater proportion of screened patients to be enrolled, may benefit future studies.

European Society of Intensive Care Medicine
http://tinyurl.com/hsajzzt

Helmet-based ventilation is superior to face mask for patients with respiratory distress

A new study shows that using a transparent air-tight helmet instead of a face mask helps critically ill patients breathe better and can prevent them from needing a ventilator. Patients with helmet ventilation also spent less time in the intensive care unit and had better survival.

The study followed 83 patients suffering from acute respiratory distress syndrome (ARDS), a severe, often lethal, injury to the lungs. ARDS causes fluid to accumulate in the lungs’ microscopic air sacs. It can lead to partial collapse of the lungs, dangerously low blood-oxygen levels and death.

The subjects in this study all required mechanical breathing assistance. They were randomly assigned to receive some form of non-invasive ventilation, using either a standard mask, strapped onto the face and covering the nose, mouth and chin; or the helmet, which surrounds the patient’s entire head and is sealed with a soft air-tight collar that wraps around the patient’s neck.

A primary goal of non-invasive ventilation is to prevent intubation, placement of a tube through the mouth or nose into the trachea to pump air into the lungs. Complications of endotracheal intubation are common. They include pneumonia, the need for strong sedatives, and delirium.

“In this group of critically ill patients, the helmet made a substantial difference,” said pulmonologist John P. Kress, MD, professor of medicine at the University of Chicago and senior author of the study. “The University’s data and safety monitoring board recommended that we stop the trial early because the helmet consistently demonstrated multiple advantages, particularly the reduced need to intubate patients and longer-term reduction in mortality.”

“After reviewing our data,” he added, “the board felt that it would be difficult to justify enrolling more patients in the face-mask arm of the trial, which exposed them to greater risks.”

The helmet “confers several advantages over the face mask,” the authors wrote. It is less likely to leak. This enables the care team to increase air pressure into the helmet, which helps keep the airway and lungs open and improves oxygen levels. It is also more comfortable, easier to tolerate because it doesn’t touch the face, and patients can see through it well enough to watch television, talk or read.

Patients who required the face mask for oxygenation for at least 8 hours were eligible to enroll in the study. Forty-four of the 83 patients who qualified to participate were then randomly assigned to the helmet group. The other 39 were assigned to the face-mask group.

All patients were severely ill with a 50 percent risk of requiring intubation or dying in the intensive care unit. About half of the patients had weakened immune systems from cancer or transplantation.

Patients in the helmet group, however, were three times less likely to require intubation, the study’s primary endpoint. Only 18.2 percent of those wearing a helmet required an endotracheal tube, versus 61.5 percent of those wearing a face mask. The helmet group had, on average, more ventilator-free days (28 vs 12.5).

Helmet patients were also more likely to survive. When compared at 90 days, 34 percent (15 patients) in the helmet group had died, compared to 56 percent (22 patients) in the face mask group.

Adverse trial-related events were minor. They included 3 skin ulcers for each group.

“The helmet interface has unique advantages and disadvantages,” wrote Jeremy Beitler, MD, MPH, of the University of California, San Diego, in an accompanying editorial. “Careful selection of patients is important.” This approach, he wrote, “warrants testing in a multi-centre trial.”

“These findings build on a shifting paradigm where less is more in the care of critically ill patients,” said Bhakti Patel, MD, clinical instructor of medicine at the University and first author of the study. “We have chosen less sedation for more mental animation; less bed rest for more physical activity; and now we’re choosing less intubations for more non-invasive ventilation.”

University of Chicago
http://tinyurl.com/hqt2bnv
Shear wave elastography - reducing need for invasive biopsy

Liver disease is a growing problem across the world. It includes a large range of disorders, such as fatty liver disease (both alcoholic and non-alcoholic), drug-induced liver damage, primary biliary cirrhosis and hepatitis (viral and autoimmune).

Biopsy is gold standard for liver disease

Fibrosis is a relatively common consequence of chronic liver diseases, and its staging, alongside exclusion or confirmation of early compensated cirrhosis, are considered to be vital for surveillance and treatment decisions. The gold standard for the confirmation of hepatic fibrosis is biopsy. However, biopsy of the liver has several disadvantages. First of all, it is invasive. It is also associated with rare but serious complications. Finally, it can sample only a small portion of the parenchyma (functional rather than connective tissue). This makes it vulnerable to sampling errors.

Non-invasive tests becoming norm

To overcome such constraints, a variety of non-invasive imaging and serological methodologies have been researched and developed for assessing fibrosis. Aside from staging, an ever-growing corpus of data from non-invasive liver tests is also yielding considerable insights for prognostic patient care. Liver biopsy is now largely restricted to patients showing unexplained discordances in non-invasive testing or those where hepatologists suspect additional etiologies of the disease.

Indeed, non-invasive tests are fast becoming the norm in much of the world, outside the US, although there are several exceptions. The reasons for the lower penetration of non-invasive tests in the US are discussed later.

Ultrasound at forefront

New non-invasive methods for assessing liver fibrosis consist of ultrasound elastography, a diagnostic methodology to evaluate stiffness of tissue, magnetic resonance elastography and serologic testing. To some of its proponents, elastography is simply a form of the centuries-old systems of diagnosing and assessing diseases via palpation, now extending beyond the scope of physical touch.

While a biopsy is invasive and carries bleeding and infection risks, elastography is seen as a way to get the data needed by clinicians to diagnose and stage liver diseases without the associated complications.

Ultrasound-based elastography is not only used as an alternative to liver biopsy for measuring fibrosis, but also to predict complications in patients with cirrhosis. Another advantage is that elastography, like other non-invasive imaging modalities, can be repeated as often as required to monitor disease progression. Due to their risks, this is simply not feasible with biopsy.

Strain elastography and shear wave elastography

The best-known commercial ultrasound-based techniques for assessing fibrosis include strain elastography and shear wave elastography (SWE). SWE is a real-time two-dimensional elastography technique which enables making quantitative estimates of tissue stiffness in kilopascals (kPa) by virtue of the shear wave speed. Technologically, even though strain elastography predates SWE, the latter is more easily reproducible than strain elastography, and has rapidly gained interest as the preferred technique. The two are quite different, and outside the hepatology area, seem to have significant complementarities. Broadly speaking, strain imaging is a qualitative/semi-quantitative method influenced by histotype and lesion size. The use of semi-quantitative indices does not improve performance. Neither does it reduce inter-operator variability.

SWE provides accuracy, comparability

Shear wave, on the other hand, is a quantitative method which provides a more accurate and easily comparable assessment of spatial distribution of tissue stiffness. Most practitioners see SWE as quick and easy to perform, and easily repeated to monitor liver disease progression and measure the effect of a particular treatment. An ultrasound shear wave propagates like ripples of water, as it spreads across tissue. A coherent pattern indicates that a pulse has been applied properly and that there are no artifacts (e.g. from vessels) that would provide erroneous results.

SWE systems provide variable depth of measurement. A depth of 5-6 cms may make it difficult to scan the liver in a large or obese patient, but depths of up to 8 cms are available in certain SWE systems. However, results are not reproducible at such depths, across commercial SWE vendors.

Ease of use not universally accepted

Nevertheless, not everyone agrees that the procedure is easy, especially if SWE results need to be matched against reproducible serological tests. The Society of Radiologists in Ultrasound notes the considerable...
training required for precision. SWE begins with the positioning of a patient in a left posterior oblique position with the arm raised. Patients need to also breathe slowly, and when asked, suspend breathing, since movement of the liver can reduce accuracy in measurement.

**Liver is principal application for SWE**

So far, SWE has been used to evaluate and quantify liver fibrosis/cirrhosis of multiple etiologies or with complicating comorbidities, including chronic hepatitis, liver cancer, steatohepatitis, and biliary atresia. The two-dimensional shear wave elastographic technique offers better performance for assessing liver fibrosis as compared to conventional transient elastography, according to a May 2016 study in the Chinese publication, *World Journal of Gastroenterology*.

**SWE and hepatitis C**

SWE practitioners see it as a tool to assist in earlier detection of conditions such as hepatitis C, and both fatty liver and alcoholic liver disease. Alongside lab studies, SWE offers a means to closely monitor the impact of treatment and assess if the liver will normalize. For many hepatologists, fighting a liver condition before Stage 4 cirrhosis provides a good chance of reversibility. SWE can also provide information on which hepatitis C patients might benefit from viral therapy. There are numerous reports of patients who would not have been suspected of severe fibrosis or cirrhosis, based on traditional ultrasound grey scaling. At best, the latter provides indicators such as anomalies in the liver contour. However, it does not show signs of cirrhosis such as surface nodularity which are immediately apparent in elastography.

**Guiding biopsies**

Some clinicians have sought to use SWE to guide liver biopsies and in certain cases, avoid or postpone biopsy. As part of this process, they have addressed one of the major limitations of biopsy, namely restrictions to choice of affected areas, erroneous samples, or inadequacy in sample size enough for interpretation. SWE allows multiple sampling across the liver and generating a mean value. This reduces what in the past would have been a large number of unnecessary biopsies, and minimizes the morbidity of liver biopsy.

**SWE in children**

SWE has shown specific advantages in pediatric patients. Cincinnati Children’s Hospital Medical Center is gathering data on ‘normal’ stiffness values in children, and on rates of progression, given that published data is almost wholly based on adults. The study groups cover children with liver transplants, metabolic disorders, cystic fibrosis and those on prolonged intravenous feeding (TPN). One specific area for attention is biliary atresia, a rare but life-threatening condition where the bile ducts in an infant’s liver lack normal openings. The bile builds up and causes damage to the liver. The pediatric data collection for SWE on newborns with jaundice or cholestasis makes ten measurements. This adds just 5 minutes to a typical ultrasound exam. Nevertheless, pediatric SWE also has its limitations. According to Dr. Sara O’Hara, who heads the Ultrasound Department at Cincinnati Children’s Hospital, SWE can give variable results in areas such as children with non alcoholic steatohepatitis (NASH) and fatty liver disease.

**Breast applications benefit from SWE-plus-strain elastography**

In adults, aside from the liver, SWE is seen as a useful technique for evaluation of breast lesions and prostate imaging. In both cases, the technique seems to provide best results in combination with another elastography mode. For instance, a literature review published in the *Journal of Ultrasound* in 2012 reported that SWE and strain elastography complement each other and overcome mutual limitations in the evaluation of breast lesions. Clearly, when both types of elastography provide similar results, there is a greater degree of confidence - especially in terms of a near-total elimination of false negatives, which sharply cuts the need for breast biopsies which later prove unnecessary. There are however some limitations which have been reported in measuring shear wave velocity in the stiffest of breast lesions. Here, rather than propagating through the tumour, the shear wave tends to bounce back. Nevertheless, ongoing improvements in SWE, which have been further reducing examination time and enhancing field of view, means that at some point it could be a tool for breast cancer screening.

**Prostate applications benefit from SWE-plus-MR elastography**

The use of SWE in prostate cancer, too, shows similar potential for benefits as with breast screening. The first factor is a reduction in biopsies, which prove to have been unnecessary post facto. Studies are under way which seek to correlate stiffness with abnormalities (as well as aggressiveness of tumours) and to assist urologists determine when patients with low-grade prostate cancer must start treatment. As with SWE and strain elastography in the breast, best results in terms of the prostate are obtained by complementing SWE with another imaging modality - magnetic resonance (MR) elastography. Some findings reveal SWE significantly superior in detecting prostate cancer in the peripheral zone - which is where most tumours occur. However, MR seems to show greater promise in the anterior gland and transitional zone. Again, as with the breast, the fusion of two modalities permits multiple sampling and tackles a major limitation of prostate biopsy, namely inconvenience and risk, as well as limited choice of affected areas. A few experimental procedures have also targeted fusing MR and SWE images to help guide biopsies.

**Using SWE in other organs**

SWE has also demonstrated considerable (if still early-stage) promise for evaluating thyroid nodules, indeterminate lymph nodes and uterine fibroids. Another area for investigating SWE include kidney transplants, in order to to avoid excessive biopsies. However, limitations to shear wave captured depth remains a technology challenge for manufacturers to address.

**US remains laggard in ultrasound elastography**

While most of the world’s regions (Europe, Asia and Latin America) are seeing growth in the use of ultrasound elastography (both SWE and strain), in the US neither is eligible for reimbursement, even in the largest application area - the liver. This is unlike transient elastography, although critics allege it is a blind methodology which neither directly measure fibrosis and often over-estimates it. Currently, studies in both the US and other parts of the world are seeking to establish the clinical and economic benefits of SWE and strain elastography, including unnecessary invasive biopsies with their associated costs and complications. Eventually, the results of ongoing trials are expected to produce the data which will make ultrasound elastography eligible for reimbursement. The most self-evident advantage of ultrasound elastography is its non-invasive nature. Unlike a biopsy, it is clearly more feasible to use SWE to screen for patients at greatest risk of chronic liver disease and in need of referral or treatment.
Ultrasound devices market to reach €9.32 million, globally, by 2022

The radiology/gene-eral imaging segment accounted for the major share of 30% of the overall ultrasound market in 2015. This is primarily due to the wide adoption of ultrasound devices in the diagnosis of rising number of abdominal diseases. Urology has emerged as the fastest growing segment, registering a CAGR of 11.3% during the forecast period, due to the growing incidences of urinary tract infections coupled with the rapidly aging patient population.

A new report published by Allied Market Research, titled, "Ultrasound Devices Market - Global Opportunity Analysis and Industry Forecast, 2014 - 2022", projects that the global ultrasound market would reach $10,476 million (€9.32 million) by 2022. Diagnostic ultrasound system would continue to be the highest revenue-generating segment throughout the forecast period. Europe accounted for almost one-third of the market share in 2015, and is expected to dominate the overall market during the study period.

The major factors boosting the market growth include technological advancements (such as advent of 3D and 4D ultrasound that provides detailed information about a known abnormality from different angles), rising incidence of chronic diseases, and increasing geriatric population worldwide. The rising number of application areas of ultrasound coupled with increasing adoption of ultrasound systems in the obstetrics and gynecology field, is set to boost the growth of the ultrasound market worldwide. Cost effectiveness, safety, high accessibility, and clinical value in preliminary diagnosis are strengthening the technology's value proposition in technological advancements in the ultrasound market. In addition, increase in number of diagnostic imaging procedures, and rising awareness for early diagnosis of clinical disorders are anticipated to further drive the demand for ultrasound devices. However, dearth of skilled and experienced sonographers and technological limitations of ultrasound systems are some of the factors restricting the market growth.

Diagnostic ultrasound devices such as 2D ultrasound, 3D & 4D ultrasound, and Doppler devices have given rise to new applications (such as biopsies and image-guiding interventions) across different clinical specialities. The growing demand for both ultra-portable and portable diagnostic ultrasound systems in diagnostic and image guidance area at points-of-care have further boosted the market growth. The advent of portability in ultrasound has built a strong path for the increased demand of these devices for point-of-care applications such as emergency medicine, anesthesiology, musculoskeletal, and critical care medicine. The trolley/cart-based ultrasound devices segment accounted for the major market share of the total ultrasound market in 2015, whereas, the compact/handheld ultrasound devices segment is expected to grow at a higher CAGR during the forecast period.

Data analysis links autism severity to genetics, ultrasound

For children with autism and a class of genetic disorders, exposure to diagnostic ultrasound in the first trimester of pregnancy is linked to increased autism severity, according to a study conducted by researchers at UW Medicine, University of Washington Bothell and Seattle Children's Research Institute. The study looked at the variability of symptoms among kids with autism, not what causes autism. The researchers found that exposure to diagnostic ultrasound in the first trimester is linked to increased autism symptom severity. The greatest link is among kids with certain genetic variations associated with autism; 7 percent of the children in the study had those variations.

CEUS uses liquid suspensions of tiny gas microbubbles to improve the clarity and reliability of an ultrasound image without exposing patients to ionizing radiation. The microbubbles are smaller than red blood cells and, when they are injected into a patient's arm vein, they improve the accuracy of diagnostic ultrasound exams. The microbubbles are expelled from the body within minutes.

David Cosgrove, Emeritus Professor at Imperial and Kings Colleges London, said the findings demonstrate the vast potential benefits of using microbubble ultrasound contrast agents as a safe, convenient and effective diagnostic imaging tool that improves patient care without exposing individuals to ionizing radiation. "CEUS is an excellent modality that can help differentiate benign from malignant tumours," he added.
Study yields new knowledge about materials for ultrasound and other applications

Piezoelectric materials turn mechanical stress into electrical energy, and vice versa. In 1997, researchers developed piezoelectric materials that were 10 times better at coupling electrical and mechanical responses than prior state-of-the-art materials. But even scientists did not understand why the newer materials were so responsive. Now, scientists at the Department of Energy’s Oak Ridge National Laboratory and their research partners have used neutron scattering to discover the key to piezoelectric excellence in the newer materials, which are called relaxor-based ferroelectrics. (A ferroelectric material has electrical polarization that is reversed by application of an electric field.) Their findings may provide knowledge needed to accelerate the design of functional materials for diverse applications. Relaxor-based oxide ferroelectrics have revolutionized piezoelectric devices. In medical ultrasound, for example, the mechanical pressure of sound waves generates images of a person’s interior. Compared with the performance of traditional materials, the stronger response of relaxor-based ferroelectrics yields a more detailed electrical signal that produces better images. Instead of having somewhat blurry guidance from 2D images to diagnose a cause of pain, assess prenatal condition, guide a biopsy or assess damage after a heart attack, doctors now rely on finely detailed 3D imagery. These modern materials also made it possible to focus ultrasound waves for non-invasive medical treatments of conditions such as tumours or gallstones. This technology passes individual beams harmlessly through tissue; the beams converge on a target where their effects are concentrated, like light passing through a magnifying glass to ignite paper.

“We figured out at an atomic level why certain materials are so great at mechanically responding to an electric field by changing shape or size,” said lead author Michael Manley of ORNL. “The finding provides a basis for high-performance actuators and sensors.” Compared to traditional polycrystalline materials, the newer piezoelectric crystals generate a greater mechanical force in response to an applied electric field.

Oak Ridge National Laboratory
http://tinyurl.com/57s466

Diagnostic quantum leap with 3D ultrasound holography

Ultrasonography is now the most widely used imaging method in medicine. But it also contains some disadvantages: for example, the fine detail of the generated images is low; the results are also dependent on the experience of the examiner. Another shortcoming is the lack of reproducibility of the images. In order to eliminate these disadvantages, instead of using classic sonography which is based on the “phased array” method, the holographic sonography or 3D ultrasonic holography demonstrates new and efficient technology to perfection.

The holographic ultrasound has several clear advantages over classic sonography: For example, 100% of the scattered or reflected sound waves can be evaluated from the perspective of their information content. Since there is no phase noise with holographic ultrasound and only one barrier – sound wave diffraction – holographic ultrasound achieves a significant increase in resolution. By using “very clean” sound waves (i.e. with very well-defined phases), no information is lost during the process. The conventional method, however, does lose valuable information as the waves created by the superposition of different waves are generated by several transmitters, thus being able to create a clean wave by interference only in certain points. But there are also areas where the waves do not interfere favourably from the standpoint of image formation – causing artefacts – and opposing anything real. The classic technique is also not able to provide 3D information directly. The customary market-based sonography devices only produce cross-sectional images of a relatively thick, averaged layer, which are then assembled into a three-dimensional image. Using our 3D ultrasonic holography, it is possible to directly generate many three-dimensional images per second in real time, which can be reproduced an optional amount of times.

A further advantage of holographic ultrasound is the fast and efficient learning stage for staff in our easy-to-use technology. The behaviour of the measuring head is simple, because the sound wave includes greater range: unlike traditional ultrasound, where the measuring head has to be moved several times to capture different structures from all possible angles of incidence, the 3D holographic method only has to be applied in one position to gather and generate the same and more information in a shorter time frame and at higher resolution. The electronics used can generate stronger impulses which is advantageous especially when a greater range is necessary and/or desired. Furthermore, 3D ultrasonic holography enables the production of portable 3D sonography devices.

Innovision
http://tinyurl.com/zurhrg4

Ultrasound scanners and OEM components

TELEMED Ltd.
Dariaus ir Gireno str. 42
Vilnius LT-02189
Lithuania

http://www.telemed.lt
http://www.pcuultrasound.com

e-mail: info@telemed.lt
phone: +370-(5) 2106272
fax: +370-(5) 2306733
Digital breast tomosynthesis - evidence of superiority versus mammography, but more research needed

Digital tomosynthesis creates a three-dimensional (3-D) picture using X-rays. In this respect, tomosynthesis is close to a CT (computed tomography) scan. Nevertheless, there are differences between the two. In fact, the development of CT is considered to be one of the reasons for a decline in interest in tomosynthesis, until recently.

One of the principal applications for tomosynthesis today is breast cancer. The basic difference between a digital breast tomosynthesis (DBT) and conventional mammography lies in detail. DBT removes confusing overlying tissue, thus providing clearer imaging and clarity. It also has improved low contrast visibility over mammography, even at a reduced dose. Some explain the difference between DBT and mammography as that of a ball compared to a circle. Nevertheless, in spite of its higher accuracy, the X-ray dose for DBT is similar to that of a mammogram.

Tomosynthesis and CT
Tomosynthesis is now increasingly seen as a low-dose alternative to CT, and is being evaluated against both CT and radiography in several areas, such as erosion in arthritis, or fractures accompanied by metal artifacts. Technically, tomosynthesis combines digital image capture with the tube/detector motion of CT. However, there are several differences. In CT, the detector makes at least one complete 180-degree (half circle) rotation around the subject. Images are then reconstructed from this data. Tomosynthesis uses a far smaller rotation angle and a lower number of discrete exposures than CT. The lack of comprehensiveness in projections, compared to CT, is compensated by digital processing - with reconstruction of slices at varying depths and thicknesses. The result is that the images are similar to CT, but have a lower depth of field. The reduction in projections, as compared to CT, cuts down on both radiation dosage and cost.

Mammography: the approaches
A mammogram is basically an X-ray examination. However, it uses a machine designed specifically for examining breast tissue. The X-ray format in a mammogram is different while radiation dosages are lower than a conventional X-ray. One of the problems with the latter is that X-rays do not easily penetrate breast tissue. In a mammogram, two glass plates compress the breast to spread out the tissue allowing for a better and more accurate image, using less radiation.

Mammography, formally known as full-field digital mammography (FFDM), usually takes two X-rays of the breast from above (cranial-caudal view, CC) and from an oblique or angled view (mediolateral-oblique, MLO). Single-view mammography uses only the MLO view, and was widespread in the early days of screening. However, it has lower sensitivity and higher recall rates, compared to two-view mammography. Theoretically, the only advantages of single-view mammography are less radiation (which is especially important for young women, who are more sensitive to radiation) and quicker examination speed.

Breast cancer and the mammogram
Breast cancer shows as a typically denser zone than adjacent healthy breast tissue in a mammogram, where it appears as an irregular white area or ‘shadow’. The term ‘digital’ mammography sometimes confuses patients. However, it simply applies to the storage medium. While regular mammography provides film pictures, digital mammography records images on a computer.

The DBT procedure
While a mammogram is a modified X-ray machine, DBT is delivered by a modified mammogram. It positions the breast in the same way as a mammogram. However, the compression required is less than the latter, in effect just enough for preventing the breast from movement. The X-ray tube then moves around the breast in a circular arc, typically taking 11 X-ray images of 1 mm thickness from different angles, usually over 10 minutes. The images are synthesized by a computer into a clear and highly-focused 3-D image throughout the breast. This allows specialized breast radiologists to see clearly through layers of tissue, including dense tissue, and examine zones of concern from a full range of angles.

Patient comfort is a factor clearly favouring DBT. The breast compression required for a mammogram can be uncomfortable and even sometimes painful, deterring several women from getting tested.

The challenge of false negatives and positives
From a clinical perspective, the high degree of breast compression required by a mammogram can also result in causing folds and overlaps in breast tissue, which can hide the cancer. In other words, negative results do not a guarantee that a woman is cancer-free. The false negative rate is estimated to be as much as 15-20%. It is also higher in younger women as well as in women with dense breasts.

On the other side, mammograms also face major challenges from false positives. A mammogram may show areas that are considered suspicious or abnormal. This is followed by additional tests (further mammograms, ultrasound and MRI, or an invasive breast biopsy).

One study, published in the May 2014 issue...
European Congress of Radiology
ECR 2017
VIENNA
MARCH 1–5
THE FLOWER GARDENS
of RADIOLOGY

SUBMIT YOUR ABSTRACT

Submission open until October 15, 2016

REGISTER NOW

myESR.org
DBT and multiple tumours
Tmosynthesis also has another major advantage. It has a far greater likelihood than mammography of detecting multiple tumours (which occur in about one in 7 breast cancer patients).

History of DBT
Massachusetts General Hospital (Mass General) in the US is generally credited with pioneering the development and implementation of DBT into a screening programme. In 1992, the hospital’s specialized breast imaging team began researching application of tomosynthesis. In March 2011, just one month after breast tomosynthesis was approved by the US Food and Drug Administration (FDA), Mass General announced that it had performed the first clinical DBT exam in the US. In 2014, the hospital adopted breast tomosynthesis plus mammography as standard protocol for all breast screening.

The hospital states that breast tomosynthesis research in large populations consistently shows “improved breast cancer detection rates, especially invasive cancers” as well as a “decrease in call backs, which may lessen anxiety for patients.”

DBT not yet standard of care
Even though digital breast tomosynthesis is now FDA-approved for more than five years, it is not yet considered the standard of care for breast cancer screening. A 2009 recommendation from the US Preventive Services Task Force (USPSTF) has recently been updated. However, it observes that current evidence still remains insufficient to assess the benefits and harms of DBT as a primary screening methodology for breast cancer. Nevertheless, DBT is available at a small but growing number of US hospitals. These are generally licensed and accredited by the FDA as well as the American College of Radiology (ACR).

DBT in Europe
In Europe, the European Reference Organisation for Quality Assured Breast Screening and Diagnostic Services (EUREF) has recently updated its breast tomosynthesis protocol (version 1.01). Key changes concern technique and methodology (back-projection, dosimetry etc.). European breast cancer experts frequently cite US studies that show a significant decrease in recall rate using DBT as adjunct to mammography, as well as the increase in cancer detection rates. Meanwhile, there have recently been several European trials on DBT.

STORM: DBT versus 2D mammograms
The results of one of the first European trials, known as Screening with Tomosynthesis OR standard Mammography (STORM), were published in 2013. This was a prospective comparative study conducted at the University Hospital of Trento, Italy. It sought to determine if DBT overcame some of the limitations of conventional 2D mammography for detection of breast cancer.

The findings were conclusive. The authors of the study estimated that conditional recall could have reduced false positive recalls by 17.2% without missing any of the cancers detected in the study population.

DBT and mammography combinations studied in Norway
Combinations of DBT with reconstructed 2D images or standard (digital) mammography have also been investigated for screening in Norway.

The Norwegian study was led by a team at Oslo University Hospital, Ullevaål. It sought to compare the performance of two versions of reconstructed two-dimensional (2D) images in combination with DBT versus standard FFDM plus DBT.

Cancer detection rates over two different periods were 8.0 and 7.8 per 1,000 screening examinations for FFDM plus DBT, and 7.4 and 7.7 per 1,000 screenings for reconstructed 2D images plus DBT. False-positive scores were 5.3% and 4.6% (over the two periods for FFDM plus DBT, respectively), and 4.6% and 4.5% (for reconstructed 2D images plus DBT).

The conclusion of the Norwegian study, published in the June 2014 issue of ‘Radiology’ was clear: “The combination of current reconstructed 2D images and DBT performed comparably to FFDM plus DBT and is adequate for routine clinical use when interpreting screening mammograms.”

Sweden: DBT versus mammography, and combinations
Meanwhile, a trial in Sweden, known as the Malmö Breast Tomosynthesis Screening Trial (MBTST), published its results in 2015. MBTST claims to be the first trial designed to assess the efficacy of one-view DBT versus two-view mammography in breast cancer screening, along with a combination of one-view DBT and one-view mammography versus two-view mammography.

The authors, from the University of Lund’s Malmö campus found “a significant increase in cancer detection rate when using one-view DBT as a standalone screening modality, compared to two-view DM (digital mammography). The recall rate increased significantly but was still low.” They concluded that one-view DBT might be feasible as a standalone breast cancer screening modality.

DBT and ultrasound
European researchers have also sought to go beyond comparing DBT with mammography alone. In March 2016, the European CanCer Organisation (ECCO) released interim results from a trial called ASTOUND (Adjunct Screening with Tomosynthesis or Ultrasound in Mammography-negative Dense breasts) at a conference in Amsterdam.

ASTOUND has been recruiting asymptomatic women who attend for breast screening at five imaging centres in Italy and who have extremely dense breasts (defined by the BI-RADS Breast Imaging and Reporting and Data System as being in Categories 3 and 4).

The researchers, led by Dr. Alberto Tagliafero, a radiologist and Assistant Professor of Human Anatomy at the University of Genoa, Italy, have found that adding either DBT or ultrasound scans to standard mammograms could detect breast cancers that would have been missed in women with dense breasts.

Outlook for the future
In general, whether in the US or Europe, more remains to be done to conclusively establish the advantages of DBT in screening. However, it is indisputable that DBT does result in a significant increase in cancer detection rates.

An article in the April 2016 edition of ‘Breast Cancer’ by P. Skane (who led the Norwegian trial mentioned above) argues that “DBT should be regarded as a better mammogram that could improve or overcome limitations of the conventional mammography, and tomosynthesis might be considered as the new technique in the next future of breast cancer screening.”
Markets, development assistance, and access to medicines in Africa: lessons from the Affordable Medicines Facility for malaria (AMFM)

OLUSOJI ADEYI
DIRECTOR HEALTH, NUTRITION & POPULATION GLOBAL PRACTICE
THE WORLD BANK GROUP

ABSTRACT: Access to essential medicines in low- and middle-income countries is affected by market failures and government failures. This paper reviews the design and lessons learned from the multi-country Phase I of the Affordable Medicines for Malaria (AMFM) and the political economy of decision making around findings from its independent evaluation. It concludes with reflections on lessons learned, the potential applicability of the private-public approach to other health commodities and countries, and the implications of this experience for evidence-based decisions in global health and development assistance.

Driving Innovation in Low Resource Settings

ADRIANA VELAZQUEZ-BERUMEN
SENIOR ADVISER AND FOCAL POINT FOR MEDICAL DEVICES
WORLD HEALTH ORGANIZATION

MANIRAGAV MANIMARAN
INTERN
WORLD HEALTH ORGANIZATION

ABSTRACT: As of 2015, it was estimated that 400 million people lacked access to essential health services. The Universal Health Coverage (UHC) Initiative aims to address this issue by delivering quality health service to people around the world whilst minimizing costs. Access to affordable medical technology is a cornerstone to this initiative. Consequently, the World Health Organization (WHO) has developed the "Compendium of Innovative Technologies for Low-Resource Settings" in order to highlight 327 innovations that could help to address these health issues.

In low resource settings, the lack of reliable infrastructure can limit the success of medical devices, but it is clear that technology developed specifically for such settings could have a more sustained impact. The "Feasibility Tool" was designed by the WHO to quantitatively analyze whether a medical device could be successfully implemented in a particular setting.

The WHO has taken steps towards establishing criteria to encourage medical device innovation for appropriate and affordable technologies and local production of basic products, when feasible, in low resource settings. It is evident that encouraging this paradigm shift in our perception of medical technology development and manufacture will benefit healthcare systems around the world.

Healthcare in Egypt: A Synopsis on the System and the Anticipated Reforms

SALAH FAKHOURI
CHIEF EXECUTIVE OFFICER, AS SALAM INTERNATIONAL HOSPITAL
ALAMEIDA HEALTHCARE GROUP, EGYPT

ABSTRACT: The general state of healthcare in the Arab Republic of Egypt has been deemed mediocre at best. With a system that has not kept up with the challenges of a rapidly growing population, the first decade of the 21st century has seen considerable inequality and a lack of social justice in the provision of healthcare services as well as in the passing of necessary and critical reforms. However, in light of the new political order, the healthcare system of the Arab Republic of Egypt is one that is ripe with possibilities for growth and improvement. The new constitution of Egypt, established after the Egyptian political revolution of 2011, sets forth very ambitious goals for the healthcare sector of the country. These goals include a doubling of government spending on public healthcare to 3% of Egypt’s GDP by 2017, and the creation of state health councils to centralize the implementation of new public policy and reforms in the healthcare sector.
Life-saving hospitals – A role in UHC for Africa. Building health Dreams

DR. DELANYO DOVLO
DIRECTOR OF THE HEALTH SYSTEMS AND SERVICES CLUSTER WHO REGIONAL OFFICE FOR AFRICA (AFRO)

DR. HUMEKHY KARAMEGI
HEALTH SYSTEMS DEVELOPMENT ADVISOR WHO REGIONAL OFFICE FOR AFRICA (AFRO)

ABSTRACT: There has been significant improvement in health in Sub-Saharan Africa due to global commitment such as the Millennium Development Goals (MDGs). However, progress has been slow due to the double burden of diseases which is affected by weak health systems. The Sustainable Development Goals (SDGs) with one of its targets of Universal Health Coverage (UHC) emerges as a transformation in fighting health challenges.

This article addresses how effective hospital services are as an essential component of achieving SDGs and UHC in Africa. However, currently, hospitals in the region are overwhelmed with shortcomings in healthcare infrastructure and poor efficiency. Countries need to establish core hospitals strategy to ensure that people-centered services are accessible to all. In addition, the WHO Africa Region foresees an approach of improving health systems including hospital services by: a) Increasing technical investments in the development and creation of national health policies, strategies and plans including hospitals as part of services delivery strategies b) Providing technical guidance and standards c) Implementing essential packages of services in primary health care d) Improving information collection on hospital catchment areas. Furthermore, countries will need to increase the capacity of hospitals to train health workers, improve management of hospital operations and efficiency. It is critical for African countries to strengthen all aspects of hospital services which can then position the region in achieving the SDGs and UHC.

Leveraging Technology in Effective Management of Epidemics in Developing Countries: Lessons from the Ebola Outbreak in West Africa

DR. EGUBE OSIFO-DAWODU MRCP, MSC, MBA
PARTNER ANADACH GROUP

DR. ENOMA ALADE, BDS, DDS, MPH
PARTNER ANADACH GROUP

DR. SUSAN EKURI, MBBS
SENIOR CONSULTANT ANADACH GROUP

ABSTRACT: The problem of disease epidemics is an ever-present threat in our increasingly connected world. One that many nations particularly in the developing world, continue to struggle with. However, in recent times, the use of technology has played a crucial role in the effective management of disease outbreaks. The 2014 Ebola outbreak in West Africa witnessed unprecedented applications of digital innovations to key areas of public health response, disease surveillance, health worker training, and public education. Results were encouraging. Nigeria, in particular, these interventions were partly credited with the swift containment of the outbreak and prevention of significant catastrophic damage. These technological solutions, though relatively simple, present the possibility for reverse technology transfer. Long-standing protocols and approaches in disaster response currently in use in developed countries can be modified and improved upon, taking into account lessons from successes achieved using technology in the fight against Ebola in West Africa.

The Cashless Clinic: Acceptability and Benefits of Mobile Money in Kenya’s Health Sector

MARIYAN OMMEH
MHEALTH LAB PROGRAM MANAGER DODCARE, NAIROBI, KENYA

ALEXANDER KOHNSTAMM
DIRECTOR EXTERNAL AFFAIRS AT JOEP LANGE INSTITUTE, AMSTERDAM, NETHERLANDS

CEES HESP
DIRECTOR MHEALTH RESEARCH LABS AT PHARMACCESS FOUNDATION, AMSTERDAM, NETHERLANDS

MELISSA MENKE
CEO ACCESS AFYA NAIROBI, KENYA

ABSTRACT: Mobile payment acceptance in healthcare is a relatively new area of research, under explored when compared to related areas of research such as mobile technology for health information and communication. The objectives of this study were to find out the effects of Safaricom’s M-pesa (MPesa) (LVM) use on clinic administrative costs and revenue, and to study the uptake and acceptability of LVM by patients. The study researched mobile payment acceptability by turning a clinic to be completely cashless for a six-week period. Baseline data was collected to gauge the effects of mobile payment on administrative costs and revenue. Surveys in-depth interviews were carried out to assess the acceptability of mobile payment among staff and patients. Findings from this experiment demonstrate that mobile technology is acceptable when it is perceived as useful and more convenient to use.
Reverse innovation experiences from the RAFT e-learning and telemedicine network

CAROLINE PERRIN
PHD STUDENT, GENEVA UNIVERSITY GLOBAL HEALTH PROGRAM

PROF. CHEICK OUMAR BAGAYOKO
PROFESSOR, MEDICAL INFORMATICS, MALI UNIVERSITY SCHOOL OF MEDICINE
DIRECTOR, CERTIF., CENTER OF EXPERTISE AND RESEARCH, TELEMEDICINE
EHEALTH, MALI AND COORDINATOR OF THE RAFT NETWORK

DR. GEORGES BEDIANG
RESEARCH AND TEACHING ASSISTANT, FACULTY OF MEDICINE AND BIOMEDICAL SCIENCES, YAOUNDE UNIVERSITY

PROF. ANTOINE GEISSBUHLER
PROFESSOR OF MEDICINE, CHAIRMAN OF THE DEPARTMENT OF RADIOLOGY AND MEDICAL INFORMATICS AT GENEVA UNIVERSITY
DIRECTOR, DIVISION OF EHEALTH AND TELEMEDICINE AT GENEVA UNIVERSITY HOSPITALS
DIRECTOR OF THE RAFT TELEMEDICINE NETWORK

ABSTRACT: Available infrastructure, resources, and provided services in low- and middle-income countries differ significantly from high-income countries. In healthcare for example, the uneven distribution of health professionals and lack of human resources are real barriers to equitable access to quality health care and services in most developing countries and particularly in Sub-Saharan Africa. As available resources are lower and infrastructure is less developed, many services and tools that have been developed for a high-income context cannot be used or are not sustainably affordable in a low-income environment, which led to the development of tools and services that are affordable and appropriate for this context. These range from concepts of blended learning, open tools for distance education and diagnostic to hardware like affordable and robust smartphones, connected devices and services like mobile payments. Many of these solutions and tools also have a great potential to be utilized in a different context and some of them have been deployed in high-income countries.

African healthcare innovation: An untapped resource?

DR. MATTHEW PRIME
TRAUMA & ORTHOPEDIC SURGEON
CLINICAL RESEARCH FELLOW
INSTITUTE OF GLOBAL HEALTH INNOVATION, IMPERIAL COLLEGE LONDON

DR. YASSER BHATTI
RESEARCH FELLOW
INSTITUTE OF GLOBAL HEALTH INNOVATION, IMPERIAL COLLEGE LONDON

PROFESSOR ARA DARZI
DIRECTOR, INSTITUTE OF GLOBAL HEALTH INNOVATION
CHAIR, IMPERIAL COLLEGE HEALTH PARTNERS
HONORARY CONSULTANT SURGEON, IMPERIAL COLLEGE HOSPITAL, NHS TRUST

DR. MATTHEW HARRIS
CONSULTANT, PUBLIC HEALTH MEDICINE

ABSTRACT: Healthcare systems across the world are in need of innovations that can achieve more with less, for more people. African nations have always been good partners for high-income institutions as they develop and test new ideas. However, they are now at the forefront of developing novel approaches to healthcare, grounded in community-centered approaches, which can also capitalize on the potential of digital healthcare. African healthcare leaders should be bold in realizing their own potential, and leaders from high-income countries must open to innovations emerging from non-traditional sources.

Critical drivers in implementing quality health care strategies in the national referral hospitals in Kenya

DOUGLAS ODHIAMBO
HEAD OF DEPARTMENT RISK AND QUALITY ASSURANCE
KENYATTA NATIONAL HOSPITAL, KENYA

ABSTRACT: This study investigated critical drivers in implementing quality health care strategies in the national referral hospitals in Kenya. The health service delivery system in Kenya is organized across six levels of care with the national referral hospitals at the apex. The population of this study comprised two national referral hospitals in Kenya, namely Kenyatta National Hospital and Moi Teaching and Referral Hospital. Qualitative data analysis was done using one-tailed test to establish regression co-efficient at 95% confidence interval and qualitative data was subjected to content analysis. Application of descriptive statistics involving mean within a Likert scale was used. The critical drivers in the implementation of quality healthcare strategies included strategic plan, service delivery charter, vision and mission. Other implementation drivers were effective quality improvement teams, staff commitment, availability of human and physical resources, and specific programmatic interventions at the functional units. This implies that a holistic approach focusing on standards, resources and people is required to ensure positive results at all levels in the hospitals’ service delivery systems.

Improving the quality of service delivery in South Africa Healthcare Establishments

STUART WHITTAKER
BOARD MEMBER OF THE OFFICE OF HEALTH STANDARDS COMPLIANCE, VISITING PROFESSOR IN THE DEPARTMENT OF PUBLIC HEALTH AND FAMILY MEDICINE OF THE UNIVERSITY OF CAPE TOWN

LIZO MAZWAI
CHAIRMAN OF THE BOARD OF THE OFFICE OF HEALTH STANDARDS COMPLIANCE
EMERITUS PROFESSOR OF SURGERY AT WALTER SIGEL UNIVERSITY MEDICAL SCHOOL

ABSTRACT: The focus of this paper is on the potential of public and private clinicians and researchers, working collaboratively with the Office of Health Standards Compliance (OHSC) and other role players, to bring about enhanced quality and equity in health service provision.
Device to monitor fetal oxygen levels

Rice University students have created a prototype of a device to monitor the pulse and oxygen levels of a fetus undergoing endoscopic fetal surgery in a mother's womb. The WombOx team of senior engineering students worked in close collaboration with the Texas Children's Fetal Center to create their device, which miniaturizes the components found in a pulse oximeter commonly clipped to a patient's finger in a doctor's office.

Pulse oximeters "see" oxygen levels in the blood by comparing light from a source to the light that reaches a detector on the other side of the finger. The instrument can calculate oxygen saturation by how much light it senses is absorbed by the tissue. That kind of information hasn't been available to doctors working to help fetuses suffering from congenital defects such as spina bifida, the incomplete closure of the backbone along the spinal cord.

Texas Children's Hospital is pioneering efforts to treat such conditions through the endoscopic procedure known as fetoscopic surgery. During surgery, doctors are able to monitor the health of a fetus through ultrasound, but that only gives them a basic heartbeat. Knowing oxygen levels in the blood is critical when doctors need to act quickly to help a fetus in distress, and the WombOx device shows potential for providing such data in real time.

To build the prototype, the bioengineering students, Claudia Iriondo, Thomas Loughlin, Samir Saidi and Kathryn Wallace, worked closely with Dr. Magdalena Sanz Cortes, an associate professor of obstetrics and gynecology at Baylor College of Medicine and a clinician at the Texas Children's Pavilion for Women, as well as their Rice faculty adviser, engineering lecturer Eric Loughlin. It is the product of their senior design project, required of most senior engineering students at Rice.

A few weeks after winning the top Willy Revolution Award, a $5,000 prize presented at Rice's annual Engineering Design Showcase for innovation in design, and days before commencement, the team spent a morning in a device-testing suite at the Pavilion for Women to watch their prototype in action.

"This project was challenging because of the size of the instruments that we work with," Sanz Cortes said. "When we started talking about the whole project, we talked about the size of a pulse oximeter. Transforming that into the size of the device they have created is very challenging.

"The other challenging part was the mechanics, how to design something that is safe enough for the baby and can be compatible with our surgeries. It's not a trivial matter, and they did a great job," she said.

At first glance, the device is a loop of wire on a hollow stick. But a closer look reveals that the wire is a special hybrid that expands to a predetermined shape at the correct temperature. It carries LEDs and a photodetector on miniature circuit boards that illuminate and sense the flow of blood through the tissue underneath.

The loop is packaged in a retractable sheath that fits through the small incision made in fetoscopic surgeries. The WombOx device is used like all other endoscopic tools, with a miniature camera. The idea is to insert the tube into the mother's womb and extend the loop. Once it expands, doctors use the video feed to guide the loop around a limb and gently tighten it, putting the sensors in place to monitor the fetus throughout the surgical procedure.

"Our design, like other endoscopic tools, is intended for single use," Iriondo explained. "The device is durable enough to withstand unsheathing, expansion in the womb, attachment to the fetus and resheathing during removal."

Rice University
http://tinyurl.com/z3p6dmc

Artificial placenta holds promise for extremely premature infants

The development of an artificial placenta — used successfully in premature lambs — could revolutionize the treatment of extreme prematurity. Researchers at the University of Michigan are working to improve survival rates in the tiniest, most premature babies in a groundbreaking way: through an artificial placenta that mimics the womb.

The technology hasn't reached a clinical trial, but researchers from U-M's C.S. Mott Children's Hospital and Extracorporeal Circulation Research Laboratory are making dramatic progress. An extracorporeal artificial placenta at the institution has kept five extremely premature lambs alive for a week. The lambs were transferred to the artificial placenta, which utilizes extracorporeal membrane oxygenation (ECMO), without ever taking their first breath.

The ultimate goal of nearly a decade of sustained work would be for an artificial placenta to help extremely premature babies with the greatest risks of disability or death continue critical organ development outside of their mother's womb.

Despite significant advances in the treatment of prematurity, the risk of death and long-term disability remains high for extremely premature infants (born before 24 weeks). Their bodies simply are not prepared for life outside the womb.

"One of the graver risks for extremely premature babies is undeveloped lungs that are too fragile to handle even the gentlest ventilation techniques," says George Mychaliska, M.D., the principal investigator and the director of U-M's Fetal Diagnosis and Treatment Center. "If a baby's lungs are severely immature, they cannot provide the brain, heart and other organs the oxygen they need to survive."

Mychaliska, who has been referred to as Michigan's "fetus fixer" for his renowned fetal intervention work, has been leading research to improve outcomes for premature infants.

"We thought, 'Why don't we solve the problem of prematurity by re-creating the intrauterine environment?"' he says. "Maybe we should treat this tiny baby like a fetus. Maybe we should treat these babies as if they are still in the womb. This is a complete paradigm shift. Our research is still in a very preliminary stage, but we've passed a significant milestone that gives us promise of revolutionizing the treatment of prematurity."

"Although many of our current therapies are lifesaving, they are not designed for premature babies and are often ineffective or contribute to complications," he adds.

The innovative artificial placenta simulates the intrauterine environment and provides gas exchange without mechanical ventilation. By recapitulating normal fetal physiology to re-create the intrauterine environment, the artificial placenta holds the promise of normal growth and development outside the womb for extremely premature infants until they are ready for postnatal life.

The success of keeping lambs alive through this technique was a crucial milestone in securing a $2.7 million (€2.4 million) R01 National Institutes of Health grant to accelerate this research.

Over the next five years, researchers expect to demonstrate that an artificial placenta can simulate the intrauterine environment and support a foetal lamb from extreme
prematurity to normal newborn physiology. The next step would be to determine if the milestones would justify preliminary clinical trials in extremely premature babies.

University of Michigan
http://tinyurl.com/zzhz9o3

Rising opioid prescriptions following low-risk surgeries

Physicians are prescribing more opioid painkillers than ever before to patients undergoing common surgeries, according to new research from the Department of Anesthesiology and Critical Care at the Perelman School of Medicine at the University of Pennsylvania. Their work is published online simultaneously with a major new guideline from the Centers for Disease Control and Prevention (CDC) that calls on physicians to avoid overprescription of opioids for surgical patients and other patients with painful conditions. Opioid abuse and addiction is a growing concern in the U.S. with the National Institute on Drug Abuse estimating that approximately 2.1 million Americans suffer from substance use disorders related to prescription opioid pain relievers and an estimated 467,000 Americans are addicted to heroin, with increasing recognition of the strong relationship between opioid use and heroin abuse.

The new study, which included researchers from the University of Toronto, analysed insurance claims from 2004 through 2012 for 155,297 adults undergoing four common outpatient surgeries—carpal tunnel repair, laparoscopic gall bladder removal, some minimally invasive knee surgeries, and hernia repair. In an analysis of patients with minor injuries, according to a UCSF-led study, which tracked the use of the imaging from 2005 to 2013.

While CT scans enable clinicians to swiftly pinpoint life-threatening conditions, exposure to its ionizing radiation is associated with an increased risk of cancer. According to a 2009 report by the FDA, a single CT scan may be associated with a fatal cancer in one in 2,000 patients.

In the study, researchers at UCSF and Stanford studied more than 8 million adult patient visits at 348 state hospitals, using data from the California Office of Statewide Health Planning and Development. These patients had been discharged after being seen in emergency departments for injuries such as minor falls or low-impact vehicle accidents. The study found that 3.51 percent of patients underwent at least one CT scan in 2005, versus 7.17 percent in 2013.

“The reasons for this increase are multifactorial,” said senior author Renee Hsia, MD, professor of emergency medicine and health policy at UCSF. “They range from defensive medicine practices, the superior diagnostic accuracy of CT scans compared with X-rays, to their increased availability and convenience in emergency departments at California hospitals, according to a UCSF-led study, which tracked the use of the imaging from 2005 to 2013.

OPTICAL SCANNER SHOWS POTENTIAL FOR REAL-TIME 3D BREAST CANCER SCREENING

Scientists have developed a handheld optical scanner with the potential to offer breast cancer imaging in real time.

The device, developed primarily at Florida International University, uses a near-infrared laser diode source to produce an image of the breast tissues.

One advantage of the device is that it is more adaptable to breast shape and density, and that it allows imaging of the chest wall regions, which are harder to image with conventional techniques.

“The women scanned always commented on how comfortable it was to be scanned by our device – many of them said that they didn’t feel anything,” explains Sarah Erickson-Bhatt, an author on the paper. The device builds an image of the tissue by mapping the optical absorption, which is altered by the concentration of hemoglobin – the protein in red blood cells. Regions with higher concentrations of hemoglobin may indicate higher blood flow due to an abnormality such as a tumour.

The optical analysis developed offers several benefits over mammography, with no ionizing radiation dose and fewer issues imaging dense tissues.

“Eventually, we hope that physicians will be able to use this for real-time imaging of breast tissues as part of regular visits by the patients” adds Anu Godavarty, also an author of the paper. “We’re current working on the mathematical tools required to process the images and produce 3D tomographic images, in order to determine tumour size and depth.”

Institute of Physics
http://tinyurl.com/hb6dV3z

Study shows surge in use of CTs in patients with minor injuries

Twice as many patients with non-serious injuries, such as fractures or neck strain, are undergoing CT scans in emergency departments at California hospitals, according to a UCSF-led study, which tracked the use of the imaging from 2005 to 2013.

“By 2013, nearly 1 in 3 patients with minor injuries were undergoing CT scans in emergency departments at California hospitals, according to a UCSF-led study, which tracked the use of the imaging from 2005 to 2013.”

“Twice as many patients with non-serious injuries, such as fractures or neck strain, are undergoing CT scans in emergency departments at California hospitals, according to a UCSF-led study, which tracked the use of the imaging from 2005 to 2013.”

Most notably, the amount of opioid medication dispensed to patients after surgery also increased markedly between 2004 and 2012 for all procedures studied. Among patients undergoing knee arthroscopy, for example, the investigators estimated a greater than 18 percent increase in the average total amount of opioid dispensed, driven by a change in the average daily dose.

“These data show us a concerning trend,” said the study’s senior author, Mark Newman, MD, MSc, an assistant professor of Anesthesiology and Critical Care and director of the Penn Center for Perioperative Outcomes Research and Transformation (Penn CPORT). “The growth we observe over time in opioid prescribing after surgery occurs against the backdrop of a major public health crisis of prescription opioid abuse. Additional work is needed to understand how postoperative opioid prescribing patterns might play into this epidemic, and to define better strategies for treating postoperative pain safely and effectively in the future.”

The CDC’s guidelines address pain management outside of active cancer treatment, palliative care, and end-of-life care, recommending nonopioid therapy for the treatment of chronic pain, stating that opioids should be reserved for situations where the benefits for pain and function are expected to outweigh the risks. The guidelines also recommend that clinicians establish treatment goals before prescribing opioids and address how opioids can be discontinued if benefits do not outweigh risks. In addition, the CDC recommends that clinicians prescribe the lowest effective dosage, carefully reassessing benefits and risks when considering increasing dosage and evaluate the benefits and harms of continued opioid therapy with patients every three months or more frequently for high-risk combinations or dosages.

Penn Medicine
http://tinyurl.com/gt5cjqw

OPTICAL SCANNER SHOWS POTENTIAL FOR REAL-TIME 3D BREAST CANCER SCREENING

Scientists have developed a handheld optical scanner with the potential to offer breast cancer imaging in real time.

The device, developed primarily at Florida International University, uses a near-infrared laser diode source to produce an image of the breast tissues.

One advantage of the device is that it is more adaptable to breast shape and density, and that it allows imaging of the chest wall regions, which are harder to image with conventional techniques.

“The women scanned always commented on how comfortable it was to be scanned by our device – many of them said that they didn’t feel anything,” explains Sarah Erickson-Bhatt, an author on the paper. The device builds an image of the tissue by mapping the optical absorption, which is altered by the concentration of hemoglobin – the protein in red blood cells. Regions with higher concentrations of hemoglobin may indicate higher blood flow due to an abnormality such as a tumour.

The optical analysis developed offers several benefits over mammography, with no ionizing radiation dose and fewer issues imaging dense tissues.

“Eventually, we hope that physicians will be able to use this for real-time imaging of breast tissues as part of regular visits by the patients” adds Anu Godavarty, also an author of the paper. “We’re current working on the mathematical tools required to process the images and produce 3D tomographic images, in order to determine tumour size and depth.”

Institute of Physics
http://tinyurl.com/hb6dV3z

Study shows surge in use of CTs in patients with minor injuries

Twice as many patients with non-serious injuries, such as fractures or neck strain, are undergoing CT scans in emergency departments at California hospitals, according to a UCSF-led study, which tracked the use of the imaging from 2005 to 2013.

While CT scans enable clinicians to swiftly pinpoint life-threatening conditions, exposure to its ionizing radiation is associated with an increased risk of cancer. According to a 2009 report by the FDA, a single CT scan may be associated with a fatal cancer in one in 2,000 patients.

In the study, researchers at UCSF and Stanford studied more than 8 million adult patient visits at 348 state hospitals, using data from the California Office of Statewide Health Planning and Development. These patients had been discharged after being seen in emergency departments for injuries such as minor falls or low-impact vehicle accidents. The study found that 3.51 percent of patients underwent at least one CT scan in 2005, versus 7.17 percent in 2013.

“The reasons for this increase are multifactorial,” said senior author Renee Hsia, MD, professor of emergency medicine and health policy at UCSF. “They range from defensive medicine practices, the superior diagnostic accuracy of CT scans compared with X-rays, to their increased availability and convenience in emergency departments at California hospitals, according to a UCSF-led study, which tracked the use of the imaging from 2005 to 2013.

While CT scans enable clinicians to swiftly pinpoint life-threatening conditions, exposure to its ionizing radiation is associated with an increased risk of cancer. According to a 2009 report by the FDA, a single CT scan may be associated with a fatal cancer in one in 2,000 patients.

In the study, researchers at UCSF and Stanford studied more than 8 million adult patient visits at 348 state hospitals, using data from the California Office of Statewide Health Planning and Development. These patients had been discharged after being seen in emergency departments for injuries such as minor falls or low-impact vehicle accidents. The study found that 3.51 percent of patients underwent at least one CT scan in 2005, versus 7.17 percent in 2013.

“The reasons for this increase are multifactorial,” said senior author Renee Hsia, MD, professor of emergency medicine and health policy at UCSF. “They range from defensive medicine practices, the superior diagnostic accuracy of CT scans compared with X-rays, to their increased availability and convenience in emergency departments at California hospitals, according to a UCSF-led study, which tracked the use of the imaging from 2005 to 2013.

While CT scans enable clinicians to swiftly pinpoint life-threatening conditions, exposure to its ionizing radiation is associated with an increased risk of cancer. According to a 2009 report by the FDA, a single CT scan may be associated with a fatal cancer in one in 2,000 patients.

In the study, researchers at UCSF and Stanford studied more than 8 million adult patient visits at 348 state hospitals, using data from the California Office of Statewide Health Planning and Development. These patients had been discharged after being seen in emergency departments for injuries such as minor falls or low-impact vehicle accidents. The study found that 3.51 percent of patients underwent at least one CT scan in 2005, versus 7.17 percent in 2013.

“The reasons for this increase are multifactorial,” said senior author Renee Hsia, MD, professor of emergency medicine and health policy at UCSF. “They range from defensive medicine practices, the superior diagnostic accuracy of CT scans compared with X-rays, to their increased availability and convenience in emergency departments at California hospitals, according to a UCSF-led study, which tracked the use of the imaging from 2005 to 2013.

While CT scans enable clinicians to swiftly pinpoint life-threatening conditions, exposure to its ionizing radiation is associated with an increased risk of cancer. According to a 2009 report by the FDA, a single CT scan may be associated with a fatal cancer in one in 2,000 patients.

In the study, researchers at UCSF and Stanford studied more than 8 million adult patient visits at 348 state hospitals, using data from the California Office of Statewide Health Planning and Development. These patients had been discharged after being seen in emergency departments for injuries such as minor falls or low-impact vehicle accidents. The study found that 3.51 percent of patients underwent at least one CT scan in 2005, versus 7.17 percent in 2013.

“The reasons for this increase are multifactorial,” said senior author Renee Hsia, MD, professor of emergency medicine and health policy at UCSF. “They range from defensive medicine practices, the superior diagnostic accuracy of CT scans compared with X-rays, to their increased availability and convenience in emergency departments at California hospitals, according to a UCSF-led study, which tracked the use of the imaging from 2005 to 2013.
Life sciences at the service of human health

ALAN & CO
Manufactures medical and dental disposable products: cotton, wound dressings and cellulose protection. Customers are importers and distributors only.

www.alan.be

BELDICO
Is a Medical Device CMO and leading manufacturer of sterile baby bottles and breast shields for maternity wards, distributed worldwide.

www.beldico.com

CAE
Since 1996, CAE has been developing and manufacturing innovative, SUPERIOR QUALITY WEIGHING SOLUTIONS, which combine ergonomics, robustness, hygiene and design.

www.cae.be

CERHUM
Is specialized in ceramic additive manufacturing (3D printing) and helps customers to design, select best biocompatible materials and realize finished products from prototypes to series.

www.cerhum.com

CRAFT ENGINEERING
Designs, Develops & Manufactures since 1989 tropicalized autonomous units for production of medical fluids: OXYGEN (O2) - NITROGEN (N2) - Medical AIR - Medical VACUUM as well as drinkable water plants. Active in South America, Africa & South Asia through a channel of distributors.

www.craft-engineering.com

LACAR MDX
Strives to deliver innovative molecular diagnostic solutions that enable the best clinical outcomes for patients.

www.lacar-mdx.com

MAHUSACA
Produces the Dropper, an energy self-sufficient infusion pump, using mechanical compression only, not needing energy supply (no batteries, no electricity), allowing constant drip flow.

www.droper.be

MEDSYS
Develops, manufactures and distributes:
- Disposable and reusable medical devices
- High quality surgery supplies
- Titanium instruments

www.medsys.be

OneLIFE
Biomedical company specialized in high-level enzymatic detergents for medical devices with proprietary detection and biofilm treatment technologies.

www.onelife-biofilmfree.com

STERISYS
Is a global solution provider for industrial ethylene oxide (EO) and steam sterilisation systems.

www.sterisys.eu

WILL-PHARMA
Besides the delivery of pharmaceutical products, Will-Pharma is the legal manufacturer of gelatin sponges, oxidized regenerated cellulose, surgical mesh and neurosurgical patties.

www.willocare.com

WOW TECHNOLOGY
Produces first-class reclining ergometers for stress echocardiography. Our multi-position examination tables enable both pharmacological and exercise stress tests.

www.wowtechnology.com

2-OBSERVE
The LIFE OBSERVER MOBILE® is the only continuous supervision for high-risk patients in General Wards. Contactless, emission free, without consumables.

www.2-observe.com

3D-SIDE
Using 3D Technologies (ISO13485), 3D-Side S.A. develops, manufactures and commercializes Patient-Specific Surgical guides and dedicated implants for complex bone surgeries.

www.3dside.eu

SMI
Is a manufacturer of absorbable and non-absorbable sterile surgical sutures. SMI developed a complete range with a total of more than 1000 different products notably for ophthalmic, cardiac and plastic surgery.

www.sutures.be

Visit us at MEDICA 2016!
MEDICA Halls 3-J90 / 3-K74 & 17-D42 / 17-C41

BioWin
The Health Cluster of Wallonia (Belgium), focuses on human health. Its ambition is to bring together all the Walloon stakeholders committed to promoting innovation and training in the field of health biotechnology and medical technologies.

www.biowin.org

Feel inspired
departments, and the demand to expedite discharge of patients.“ The authors noted that CTs were more likely to be ordered in hospitals that were designated high-level trauma centres. Some 39 percent of those in the study were ordered at level I and II trauma centres, compared with 3 percent at low-level centres.

“This may reflect an underlying work culture largely centred around the management of severely injured patients, guided by standard trauma CT protocols, and also the fact that level I and II trauma centres see sicker patients,” the authors wrote in their paper.

Also disproportionately visible were patients between the ages of 18 and 24, “those at greatest risk for radiation,” wrote the authors, as well as those over 45. “With the aging of the U.S. population, physicians may be influenced toward greater advanced imaging even in the case of low-mechanism injuries, given the atypical presentations and more serious pathology that older adults may have,” said Hsia.

The authors reported an upswing in the use of CTs from 2005 to 2009, followed by a gradual decline to 2011 — reflecting awareness of overuse — which was preceded by a resurgence from 2011 to 2013 that almost reached the zenith of 2009.

“The message for both patients and physicians is that there are long-term risks associated with radiation exposure and there may be situations where imaging is not definitively warranted or beneficial,” said Hsia.

Researchers develop brain-mapping technology

Researchers at the University of Arizona are developing a non-invasive brain-scanning technology that could produce images far superior to those obtained with the most commonly used systems — electroencephalography and functional magnetic resonance imaging. The technique, which incorporates sound waves to measure electrical activity in neural tissue, could improve diagnosis and treatment of many disorders, including epilepsy, Parkinson’s disease and traumatic brain injury.

Russell Witte, a UA associate professor of medical imaging, biomedical engineering and optical sciences, is principal investigator of the research project.

“We know very little about how neurons act collectively to guide our thoughts, emotions and behaviours — or cause seizures or mood swings,” Witte said.

“Functional magnetic resonance imaging and electroencephalography have provided some clues. But both fMRI and EEG share a major limitation: They produce images with poor resolution,” he said. “We think our new technology could overcome that limitation.”

Researchers have long known of the acoustoelectric effect, in which ultrasound energy alters a material’s physical properties like electrical conductivity.

Witte is one of the first researchers to apply the phenomenon to biomedical imaging.

He has developed a non-invasive imaging technique for detecting irregular heartbeats and is working with Tech Launch Arizona, the UA office that commercializes inventions stemming from University research, to create a startup for acoustoelectric cardiac imaging.

With the new study, Witte takes his research into new terrain: the brain. The research team will develop and test the non-invasive technology, called acoustoelectric brain imaging, or ABI, on mammalian brains for the first time.

ABI involves applying ultrasound waves externally to the brain, where they interact with electrical currents to produce a “signature” wave that is picked up by an electrode attached outside the head. ABI can better localize the source of electrical activity than EEG, because it overcomes the problem of interference from the skull, and it works much faster than fMRI, which measures metabolic activity.

“Sensory input, thoughts and behaviours are happening so fast,” said Cowen, a neuroscientist.

“With speech or motor activity, many actions require split-second decisions — actually, on the scale of tens of milliseconds,” Cowen said. “If a brain-imaging technology is working only in seconds — fMRI, for example, can measure brain activity once every two seconds — it may be missing some of the most important details.”

Cowen added: “This is a very interesting adventure we’re undertaking, because nobody knows what ABI will actually measure. Will it measure the activity of tens of thousands, or hundreds of thousands, of neurons? Will it detect the activity at a specific frequency, or at a range of frequencies?”

ABI also could provide a clearer picture of activity in structures deep in the brain, such as the amygdala and hippocampus.

University of Arizona
http://tinyurl.com/zw5f6he

Web-based, self-help intervention helps prevent depression

Among patients experiencing some symptoms of depression, the use of a web-based guided self-help intervention reduced the incidence of major depressive disorder over 12 months compared with enhanced usual care, according to a study.

Major depressive disorder (MDD) is a common condition associated with substantial illness and economic costs. It is projected that MDD will be the leading cause of premature mortality and disability in high-income countries by 2030.

Evidence-based treatments for MDD are not very successful in improving functional and health outcomes. Attention has increasingly been focused on the prevention of MDD.

Claudia Buntrock, M.Sc., of Leuphana University Lueneburg, Germany, and colleagues randomly assigned 406 adults with sub-threshold depression (some symptoms of depression, but no current MDD per certain criteria) to either a web-based guided self-help intervention (cognitive-behavioural and problem-solving therapy supported by an online trainer; n = 202) or a web-based psycho-education programme (n = 204). All participants had unrestricted access to usual care (visits to the primary care clinician).

Among the patients (average age, 45 years; 74 percent women), 335 (82 percent) completed the telephone follow-up at 12 months. The researchers found that 55 participants (27 percent) in the intervention group experienced MDD compared with 84 participants (41 percent) in the control group. The number needed to treat to avoid 1 new case of MDD was 6.

“Results of the study suggest that the intervention could effectively reduce the risk of MDD onset or at least delay onset,” the authors write. “Further research is needed to understand whether the effects are generalizable to both first onset of depression and depression recurrence as well as efficacy without the use of an online trainer.”

Sciencedaily
http://tinyurl.com/ju4rn9j
Researchers advocate improvements in end-of-life care

An outcomes study led by Alexi Wright, MD, MPH, a researcher and a gynecological oncologist in the Susan F. Smith Center for Women's Cancers at Dana-Farber, surveyed families of older patients who had died of advanced lung and colorectal cancer, asking what factors were associated with “excellent” end-of-life care for their loved ones.

The families were more likely to assess care as excellent — by relatively large margins — when:
the patient had hospice care for more than three days, compared with fewer than three days or none;
the individual wasn't admitted to an intensive care unit (ICU) in the last 30 days of life;
the patient died at home or some other location outside the hospital, such as a hospice facility.

“Our study findings are a powerful argument for the importance of advance care planning,” Wright said. “The more information patients have, the more likely they are to receive the kind of medical care they want near death. And patients’ deaths influence family members’ perceptions of their quality of care.”

Wright reported that end-of-life care could be of higher quality if there are efforts to enroll patients in hospice earlier — not when death is imminent — and to avoid intensive care unit admissions in the final weeks.

Terminally ill patients should have the legal option to choose physician-assisted death, even if — as is often the case in USA States where it is legal — they don’t use it, wrote Susan Block, MD, founding chair, Department of Psychosocial Oncology and Palliative Care at Dana-Farber and two other authors of a “Viewpoint” opinion piece.

Patients nearing the end of life want control over their bodies and their lives as “a small measure of self-preservation,” they noted. Such individuals can gain peace of mind when they have a “backup” plan, they added.

“When physicians are willing to explore and work with a patient requesting physician-assisted death, patients can experience substantial benefits that are more apparently under an open legal process,” said the authors.

Dana-Farber Cancer Institute
http://tinyurl.com/jx6wwxz

New microscopy may identify best sperm cells

TAU researcher’s cutting-edge innovation pinpoints top candidates for assisted reproductive technology. More than 10% of American women aged 15-44 struggle to conceive or maintain full-term pregnancies, according to the Centers for Disease Control and Prevention (CDC). Assisted reproductive technology (ART), through which eggs are fertilized with sperm in a lab and then returned to a woman’s uterus, is often the last resort for reproductively-challenged couples. But the physical, emotional, and financial toll they exact is high because the success rates of ART treatments are low — only 20-30%, according to the CDC.

New microscopic technology from Tel Aviv University promises to be a game-changer in the field of reproductive assistance. A team of TAU scientists have devised a new method of microscopy allowing scientists to perform clinical sperm analysis without the use of staining, which can affect the viability of sperm samples. Sperm cells are nearly transparent under standard microscopy methods. Their optical properties differ only slightly from those of their surroundings, resulting in a weak image contrast. Sperm cells cannot be stained, if fertilization is the goal, because the process might damage the resulting fetuses. The challenge is to pinpoint strong sperm candidates without staining, while still being able to characterize their viability.

The research was led by Dr. Natan Shaked, PhD, of the Department of Biomedical Engineering at TAU’s Faculty of Engineering and his masters student, Dr. Miki Hifler, MD. Sperm cells for the study were obtained from the Male Fertility Clinic at Chaim Sheba Medical Center in Israel.

There are two effective ART methods available today. The first is in vitro fertilization (IVF), in which a woman is treated with drugs that cause her ovaries to produce multiple eggs. These are placed in a Petri dish with a man’s sperm for fertilization for
three to five days, then implanted in the woman’s uterus. The second is intracytoplasmic sperm injection (ICSI), in which a single sperm is injected into a mature egg and then transferred to a woman’s uterus. Dr. Shaked’s method is applicable to both methods, but is especially helpful in ICSI. “Until now, clinicians have chosen the ‘best’ sperm according to their speed, but speed is not necessarily an indicator of DNA quality,” Dr. Shaked says. “Some of the best sperm candidates are slow or even immobile because their tails have malfunctioned. If we can better determine the full structure and composition of the sperm, the success rate of ART treatments will be higher. Success means more births without congenital defects. In cases where sample staining is impossible — such as in vitro fertilization and ICSI — our device provides a promising new direction.”

His new device, a small “black box” attached to an existing microscope, is smaller, cost-effective, and easier to align than conventional interferometer imaging methods. It is joined to new automated software that produces a thickness map of the sample and other physical parameters to evaluate the sperm’s viability in real time.

Dr. Shaked believes his new imaging process, which harnesses phase imaging methods to record the passage of light through a sample to assess its thickness, can quantify the quality of sperm used in ART, leading to more successful ART treatments.

American Friends of Tel Aviv University
http://tinyurl.com/h5665oc

Custom Android MyHealth mobile app

Stanford Health Care recently released a new app that allows patients using Android smartphones to easily access their own medical information anywhere in the world. The Android version and the iOS 8 MyHealth mobile app are both designed to put a patient’s health information right at their fingertips, making it quick and simple for them to manage their care, including reviewing test results, paying medical bills, managing prescriptions, scheduling appointments, and conducting video visits with Stanford physicians.

“At Stanford Health Care we are continuing to develop a suite of mobile offerings and innovations that empower our patients, making it easy and convenient for them to access the information and tools they need to manage their health,” said Pravene Nath, MD, Chief Information Officer, Stanford Health Care. “By developing and incorporating new digital technology and leveraging available health data, we are providing increased, flexible opportunities for patients to engage with clinicians and better manage their overall care.”

Over 200,000 people are now messaging their physicians, scheduling appointments, and reviewing their medical records through Stanford Health Care’s MyHealth. The in-house developed apps leverage Stanford Health Care’s digital platform, which with its electronic health record integration provides a seamless experience for the user to get all the important health information they need. Additionally, the apps allow patients to communicate directly with their care team through a confidential and secure messaging system, and make quick, easy, and secure online payments.

This latest version also includes new features such as: TouchID for faster and more secure entry; and In app and Apple Watch alerts when new lab results and messages from the patient’s care team are received.

Stanford Health Care
http://tinyurl.com/zmfwdv8

Engagement issues still stand between ‘wearables’ and healthcare

A survey finds that consumers are enthusiastic about the future of wearables, especially in health and wellness, but they’re still having issues staying motivated. Roughly one-third of those who bought smart clothing have admitted they aren’t using them as much anymore. The drop-off rate meanwhile, is 18 percent for fitness bands, 22 percent for smart watches and 16 percent for smartglasses. According to the survey, consumers say they lose their enthusiasm for wearables after a while, finding them ineffective, uncomfortable or unstylish, or finding that they can’t synch seamlessly with a smartphone or hold battery power.

“For consumers to commit to wearables for the long term, a device should not only be attractive and comfortable, but should also reach beyond data delivery to provide knowledge and benefits unavailable elsewhere,” states the report, titled “The Wearable Life 2.0: Connected Living in a Wearable World.”

While that news is discouraging, healthcare should take note of the rising numbers of consumers investing in wearables. Of those surveyed, 45 percent own a fitness band, 27 percent now own a smartwatch and 12 percent own sensor-embedded clothing. And while the percentage of people who see a bright future for wearable has jumped 16 percent since PwC’s 2014 survey, the number of respondents who have security or privacy concerns about wearables has dropped about 8 percent in those past two years.

The survey also highlights a trust issue in healthcare. While the provider community hasn’t embraced consumer-facing wearables because they don’t think the data coming from them is reliable enough to use in clinical situations, consumers have their concerns as well. It’s a good news-bad news issue. According to the survey, some 65 percent of consumers are excited about the possibility of using a wearable provided or endorsed by their doctor’s office, while 62 percent feel that way about wearables coming from a hospital or their insurer. On the other hand, only 41 percent would trust a wearable coming from their doctor, while only 38 percent would trust a hospital-supplied wearable and only 34 percent would place their faith in a payer-supplied device. Farther down the list, 57 percent are excited about a wearable coming from their pharmacy, but only 29 percent would trust the device. And 25 percent of those surveyed said they wouldn’t trust their personal information to any branded wearable.

So what motivates someone to use a wearable? According to the survey, more than half say they’d be motivated by a monetary reward, while 45 percent like gaming features that allow them to compete with others. Another 45 percent would use wearables if they provided information that they’d otherwise not have, and 36 percent want it to look good. They also want the device to sync with their smartphone – 78 percent said they’d use a wearable more frequently if it connected seamlessly to their smartphone, and 97 percent are happy with a smartphone application supporting the wearable.

mHealth Intelligence
http://tinyurl.com/hz3qzr3
Siemens and Dutch hospital ADRZ to jointly build and manage new operating theatres

Dutch hospital Admiraal De Ruyter Ziekenhuis (ADRZ), based in Goes, and Siemens Healthineers have signed an agreement to build and supply equipment for six operating theatres, including a hybrid OR. Siemens will build the new building complex with its partner companies Engie and Jan Snel. Under a Managed Equipment Service (MES) agreement, Siemens will also equip the new operating theatres with medical systems and service and update the equipment for ten years. Once the construction work is completed, Siemens will act as lessee, leasing both the new building and the medical systems to ADRZ. This model will enable ADRZ to handle a major investment without providing too high financing capital.

Earlier this year, the hospital operator and Siemens have entered into a similar agreement to build ADRZ’s new Nuclear Medicine Centre in Goes. Also in this case, Siemens will be involved in the construction and will supply the medical systems on an MES basis.

With 2,200 employees and 23,000 hospitalizations annually, ADRZ is the biggest hospital in the Zeeland Province in the southern part of the Netherlands. The new complex housing six operating theatres should be completed in February 2017. The total project cost is more than EUR 10 million. All the theatres are set up the same, which in turn results in uniform running lines and logical order. For a surgeon, it makes no difference in which operating theatre he or she is working; every room is set up the same way. This also applies for the medical equipment. This set-up is supposed to provide for best possible patient safety and to support the medical staff to achieve the highest possible medical outcome.

“This is a next step in upgrading the care infrastructure at ADRZ. After a period of austerity and reorientation this is literally and figuratively the next building block of the new ADRZ. We are delighted with our partner Siemens, who is supporting us in developing and implementing such a technically complex infrastructure. In this case it involves six operating theatres, whereby quality and safety for our patients are key aspects,” said Claudia Brandenburg, Chairperson of the Board of Directors of ADRZ.

“We at Siemens Healthineers intend to be the enabler for our healthcare partners. For this, our partnership with ADRZ is an excellent example: with our customized, long-term MES partnership, we enable ADRZ to continuously take advantage of state-of-the-art technology and processes within an affordable model. At the same time, ADRZ is able to concentrate on its medical core competence. By this collaborative model, we jointly drive operational performance and ultimately patient outcomes,” said Sourabh Pagaria, Head of Enterprise Services at Siemens Healthineers.


High flying point-of-care ultrasound

Ultrasound technology is taking to the skies with the Essex & Herts Air Ambulance Trust, a charity that provides a free, life-saving Helicopter Emergency Medical Service for the critically ill and injured of Essex, Hertfordshire and the surrounding areas. Stuart Elms, Clinical Director of the Trust, explained: “We operate two helicopters crewed by full-time pre-hospital care doctors and critical care paramedics who can be rushed to the scene of an incident with highly specialized and advanced life-saving equipment and pharmacy. As part of our practice, we are moving towards using ultrasound for management of cardiac arrest and advanced life support. Working with expert sites such as the Essex Cardiothoracic Centre at Basildon, Harefield Hospital and SonoSite, our aim is to train our critical care paramedics to use point-of-care ultrasound, allowing us to tailor our cardiac care even more accurately.” “SonoSite is a world leader in point-of-care ultrasound, and its hand-carried iViz instrument lends itself perfectly to pre-hospital use, both in the aircraft and at the scene. The system is small and portable with a good screen that gives a brilliant view, and can be used one handed. The preset views allow rapid set-up and scanning, and are supported by a training mode that allows comparison of normal and abnormal pathology. Ultimately, we also hope to take advantage of the system’s mobile computing capacity to automatically upload data to electronic patient report forms prior to arrival at the hospital. Our aim is to make as much use of ultrasound as we currently do of stethoscopes – whether they are cardiac, medical or trauma patients – helping to improve outcomes.”

www.sonosite.com

Sony Europe Ltd. acquires eSATURNUS NV

Sony Europe Ltd. (“Sony”) recently announced the acquisition of eSATURNUS NV (“eSATURNUS”), a Belgium-based company that provides leading clinical Video over IP solutions in the medical field. Sony expects this acquisition to help further materialize Sony’s vision and strategy of providing new services and end-to-end clinical image workflow solutions for hospitals. eSATURNUS’s deep know-how of hospital operating room workflows, as well as IP-based video integration software, enables processing, control and distribution of multiple image sources combined with medical information. Coupled with Sony’s leading imaging and AV/IT technologies in this field, the combined company expects to further develop a wide variety of smart clinical Video over IP solutions for inside and outside operating rooms.

Sony’s acquisition of eSATURNUS includes all of eSATURNUS’s assets, covering intellectual property rights, as well as its technologies and software solution capabilities. Sony intends to expand the business first in Europe, with further international deployment to follow in the future.

Adam Fry, Vice President, Sony Professional, Sony Europe, commented, “Over the past few years, we’ve seen the requirements within hospitals significantly change. There is a constant need to maximize the investment hospitals make in clinical equipment but with the advent of new technology and workflow solutions, it has never been more important to them to be able to invest in ‘future proofed’ installations, with a holistic and long-range view. This means hospitals are looking for end-to-end and state-of-the-art workflows that perform efficiently but that can also evolve over time. Together with eSATURNUS, Sony will aim to further develop smart, scalable and leading-edge clinical Video over IP workflow solutions in digitally-integrated operating room systems.”

Thomas Koninckx, CEO & Co-Founder, eSATURNUS NV, added, “The integration of eSATURNUS within Sony will make us part of an incredible organization, and provide access to Sony’s leading technology platform. The aligned vision of eSATURNUS and Sony means that existing and prospective customers can expect even faster technological evolution in the future, and excellent global service. We are pleased to be able to deliver new smart solutions in digitally integrated operating rooms.

www.pro.sony.eu
www.esaturnus.com
British invention set to save hundreds of lives at the Hajj pilgrimage

The UK-based inventors of CAERvest®, a revolutionary new device for the treatment of heatstroke, are undertaking a clinical trial to be held at this year’s Hajj in September. The trial is being led by a team of doctors from the prestigious King Abdul-lah Medical City (KAMC) and will assess the effectiveness of treating heatstroke earlier than has ever before been possible. It is expected that hundreds of lives will be saved during the study.

Every year millions of pilgrims attend the annual Hajj pilgrimage to Mecca (Makkah), Saudi Arabia which is scheduled to be performed over five days. Attendees travel from all over the world to undertake the ritual acts that all Muslims must perform (if able) at least once during their lifetime. This annual event is a phenomenal undertaking for the Saudi Arabian government hosts. Many challenges have to be overcome when preparing for a mass gathering of millions of people in a confined area and over such a short space of time. Over the years there have been a variety of incidents that have led to fatalities and the Saudi authorities have taken many positive steps, often at great expense, to avoid further such issues.

One serious, progressive and very often fatal danger facing pilgrims is heatstroke. Heatstroke is a medical emergency in which people who are exposed to extreme temperatures (such as the daily average of over 45°C faced at Mecca) succumb to rapid body overheating which, at best, requires urgent medical treatment and, at worst (in up to 50% of cases), can prove fatal.

The date for Hajj moves every year to follow the lunar Islamic calendar. This means that for the next decade or so Hajj will be moving from the relatively cooler autumn months into the much hotter summer period, increasing the likelihood of pilgrims suffering from the condition. For some time the Saudi authorities have been searching for a simple, effective and portable treatment that can be applied immediately. CAERvest® is a single use device which can be easily carried and is activated and applied in under a minute and gets to work at once. It has been shown to reduce human core body temperature from 42°C (which can be rapidly fatal) to safe levels in minutes and, if needed, continues cooling the patient down to normal temperature from 42°C (which can be rapidly fatal) to safe levels in minutes and, if needed, continues cooling the patient down to normal levels for at least one hour.

Heatstroke is a medical emergency that for the next decade or so Hajj will be moving from the relatively cooler autumn months into the much hotter summer period, increasing the likelihood of pilgrims suffering from the condition. For some time the Saudi authorities have been searching for a simple, effective and portable treatment that can be applied immediately. CAERvest® is a single use device which can be easily carried and is activated and applied in under a minute and gets to work at once. It has been shown to reduce human core body temperature from 42°C (which can be rapidly fatal) to safe levels in minutes and, if needed, continues cooling the patient down to normal levels for at least one hour.

The UK-based inventors of CAERvest®, a revolutionary new device for the treatment of heatstroke, are undertaking a clinical trial to be held at this year’s Hajj in September. The trial is being led by a team of doctors from the prestigious King Abdul-lah Medical City (KAMC) and will assess the effectiveness of treating heatstroke earlier than has ever before been possible. It is expected that hundreds of lives will be saved during the study.

Every year millions of pilgrims attend the annual Hajj pilgrimage to Mecca (Makkah), Saudi Arabia which is scheduled to be performed over five days. Attendees travel from all over the world to undertake the ritual acts that all Muslims must perform (if able) at least once during their lifetime. This annual event is a phenomenal undertaking for the Saudi Arabian government hosts. Many challenges have to be overcome when preparing for a mass gathering of millions of people in a confined area and over such a short space of time. Over the years there have been a variety of incidents that have led to fatalities and the Saudi authorities have taken many positive steps, often at great expense, to avoid further such issues. One serious, progressive and very often fatal danger facing pilgrims is heatstroke. Heatstroke is a medical emergency in which people who are exposed to extreme temperatures (such as the daily average of over 45°C faced at Mecca) succumb to rapid body overheating which, at best, requires urgent medical treatment and, at worst (in up to 50% of cases), can prove fatal.

The date for Hajj moves every year to follow the lunar Islamic calendar. This means that for the next decade or so Hajj will be moving from the relatively cooler autumn months into the much hotter summer period, increasing the likelihood of pilgrims suffering from the condition. For some time the Saudi authorities have been searching for a simple, effective and portable treatment that can be applied immediately. CAERvest® is a single use device which can be easily carried and is activated and applied in under a minute and gets to work at once. It has been shown to reduce human core body temperature from 42°C (which can be rapidly fatal) to safe levels in minutes and, if needed, continues cooling the patient down to normal levels for at least one hour.

Philips leads eHealth initiative to deliver care for chronic disease patients across Europe

Royal Philips and a consortium of leading European healthcare regions, companies, universities and hospitals* have announced the start of the first large scale care coordination and telehealth programme in the European Union to support tens of thousands of people living with chronic conditions. The three-year ACT@Scale programme will collect and analyse the health outcome and economic impact data for large populations of chronic patients and elderly people to develop, test and consolidate ‘best practice’ care coordination and telehealth programmes that can be replicable and successfully rolled out across the European Union. The programme aims to reach more than 75,000 patients in the United Kingdom, the Netherlands, Spain and Denmark by 2019.

“Today, 70 percent of Europe’s health-care budget is spent on patients living with chronic conditions, largely a result of Europe’s aging population and rapidly changing care needs,” said Jeroen Tas, CEO Connected Care and Health Informatics, Philips. “The ACT@Scale programme will provide the evidence needed to successfully deliver a seamless patient experience with better outcomes at lower cost.”

The five participating healthcare regions are all in the process of rolling out innovative care coordination and telehealth services. Within the ACT@Scale programme, they will share an agreed and standardized data set including programme outcomes such as the number of patients included, (re)hospitalizations, duration of hospitalizations and mortality rates. They will also assess economic impact factors such as cost per patient and the impact on hospitals income models. This data is to support the development of new and sustainable business models. Next to this, patient satisfaction scores are measured and the degree to which connected technology empowers people and affects health outcomes.

The regions involved comprise Catalonia (Spain), which has developed programmes to support nursing homes, reduce hospital re-admissions, manage complex cases and promote physical activity; Southern Denmark (Denmark), which is rolling out a telehealth programme to deliver psychiatric treatment; Northern Ireland (UK), which has remote telemonitoring programmes to support COPD and diabetes patients, and manage maternal obesity; Northern Netherlands (The Netherlands), with programmes to provide specialist support for COPD, asthma and heart failure patients, and connect healthcare and community services for chronic disease patients; and the Basque Country (Spain), which is rolling out programmes to support older people with complex health and social care needs, plus telehealth services for chronic heart failure patients.

“Telehealth and coordinated care services may offer the elderly and otherwise frail individuals the ability to maintain their independence for longer and enjoy a significantly better quality of life, but they also involve significant changes to the health-care system and the recipients’ ability to self-manage,” said Professor Erik Buskens, Professor of Medical Technology Assessment at University Medical Center Groningen (UMCG). “ACT@Scale will allow us to determine the most cost-effective ways of implementing those changes while also maximizing the benefits for Europe’s ageing population.”

The ACT@Scale scientific consortium members comprise of University Medical Center Groningen (The Netherlands), Aristotle University of Thessaloniki (Greece), City University London (UK), Universitätsklinikum Würzburg/Klinikum der Bayerischen Julius-Maximilians-Universität (Germany), University of Hull (UK), Kronikgune-Centre for Research Excellence in Chronicity (Basque Country, Spain), Hospital Clinic of Barcelona (Spain) and Philips. It is anticipated that the first preliminary findings will be available from the end of Q4, 2016.

ACT@Scale builds on the successful ACT programme, a two-and-a-half year study (2013 – 2016) that looked into the results of European integrated care programmes. Thousands of interviews were conducted with participating patients and care providers. These learnings on success factors are applied to significantly grow the ACT@Scale healthcare regions’ coordination and telehealth programmes. The programme is part of the European Innovation Partnership on Active and Healthy Ageing (EIP-AHA), an initiative from the European Commission under its Innovation Union strategy, and aims to increase the average healthy lifespan by two years by 2020.

www.philips.com
Connectivity now available on POC HbA1c analysers

Quo-Test and Quo-Lab from EKF Diagnostics now come with POCT1-A2 connectivity, QC and user ID lockout as standard. It is now possible to record patient ID easily with a barcode scanner, or by using the new keyboard and complete patient records with new demographic information, such as family name and date of birth. The new connectivity upgrade also features QC lockout functions, with three different QC schemes designed to enforce regular testing of QC materials (after a period of time, after a number of tests or at a defined time). Users can now add additional commentary to test results, via the keyboard or by selecting from a pre-defined list. Quo-Test and Quo-Lab exploit the so-called fluorescent quenching properties of a patented reagent to measure HbA1C, matching the performance of existing laboratory-based methods. The total amount of hemoglobin is also quantified by absorption measurement. The combination of these two measurements produces an HbA1C % result. The system is a fully automated homogeneous assay i.e. there are no separation steps and all the critical steps that may influence or affect the quality of the result are controlled. All of this combines to deliver results in about three minutes from a blood sample of under 5 mL.

POC connectivity developed for patient-dedicated blood gas analysis

Sphere Medical’s Proxima patient-dedicated blood gas analysis system can now be connected into the Conworx family of laboratory information system interfaces and data management solutions. This is a significant development since it ensures the seamless transfer of blood gas and electrolyte test results from Proxima directly into laboratory information systems and electronic patient records - a key requirement for the successful implementation of point of care (POC) testing. With the availability of the new software drivers, users will be able to directly import all diagnostics data from Proxima at the patient’s bedside into Conworx’s POCCelebrator. UniPOC middleware data management products. In addition, the new interface will allow direct connectivity into CliniSys laboratory information management systems (LIMS) through the CliniSys PoCT Solutions interface. Both Conworx and CliniSys software solutions are widely used in hospitals internationally, ensuring that data transfer from this novel blood gas analyser can be easily implemented, and its use and performance also readily monitored remotely. Conworx’s middleware solutions provide connectivity, management and integration for more than 150 different POCT device types, as well as all relevant information and patient record systems. The Conworx customer base includes 1800 hospitals in 25 countries. Conworx compatibility allows customers to use one middleware solution for all of their POC connectivity needs and greatly simplifies the implementation of Proxima within the hospital. CliniSys software systems are used in over 2500 laboratories in 35 countries. Moreover, CliniSys products are utilized in 40% of NHS Trusts in England and Scotland, with a further significant presence in Germany, Netherlands, Belgium, France and Spain. The CE-marked Proxima supports proactive patient care, particularly at critical times, since it enables rapid and frequent blood gas and electrolyte measurements without the clinician leaving the patient. This is possible as the Proxima sensor produces an HbA1C % result. The combination of these two measurements produces an HbA1C % result. The system is a fully automated homogeneous assay i.e. there are no separation steps and all the critical steps that may influence or affect the quality of the result are controlled. All of this combines to deliver results in about three minutes from a blood sample of under 5 mL.

EKF DIAGNOSTICS
MEDICA Hall 3 / C70

PREMIUM ULTRASOUND SYSTEMS WITH WORKFLOW INNOVATIONS

Ultrasound is a user-intensive modality, which means that simplifying the way a clinician interacts with the system will greatly improve the overall user experience. This was the focus behind Siemens Healthineers’ newly designed family of ultrasound systems, the Acuson S Family, HELX Evolution with Touch Control. Targeting the premium market segment, each of the three systems in the Acuson S Family features innovative technologies that improve system operation and reduce user errors during examinations. Healthcare providers including hospitals, clinics and private practices can upgrade or update their systems at any time providing investment protection for their existing systems. Following intensive user research conducted by Siemens Corporate Research across four key regions and over 170 usability sessions, HELX Evolution with Touch Control was designed for easy usability. A completely reworked user interface simplifies operation with 44% fewer software keys, 33% fewer tactile keys and 22% fewer home-base controls. The control panel features an intuitive touch display that helps eliminate unnecessary workflow steps. The systems feature new imaging optimization technologies to enhance image quality with challenging patients and for abdominal, breast, vascular and musculoskeletal exams. Shear wave elastography technologies are improved to provide more information in a single image for the quantitative or qualitative characterization of tissue. Multi-modality imaging, where real-time ultrasound is superimposed onto 3D CT or MRI volumes, is complemented with newly enhanced workflow tools to make it more relevant and more practical to use in the clinical routine. The Acuson S Family offers solutions to meet a large variety of user needs. The Acuson S3000 ultrasound system is designed for multi-modality imaging in general imaging and interventional radiology. The Acuson S2000 is an all-purpose ultrasound system for general imaging and includes special functions for women’s health. For cardiology and vascular imaging needs, the Acuson S1000 ultrasound system delivers great value.

SIEMENS HEALTHINEERS
MEDICA Hall 9 / E33

SPHERE MEDICAL
www.ihe-online.com & search 47094
**Patient monitoring platform with additional measurement technologies**

The IntelliVue patient monitoring platform is now available with Masimo rainbow SET technology. Philips also offers its customers the option to add rainbow SET to existing IntelliVue monitors, and the company is working to integrate the technology into its Philips SureSigns and Philips Efficia patient monitoring platforms. In conjunction with the appropriate patient monitoring platform, Masimo rainbow SET technology analyses multiple wavelengths of light to accurately measure total hemoglobin (SpHb), oxygen content (SpOC), carboxyhemoglobin (SpCO), methemoglobin (SpMet) and Pleth Variability Index (PVI) noninvasively and continuously. Continuous monitoring of rainbow SpHb on a Philips monitor at the point-of-care provides clinicians with real-time visibility to changes in hemoglobin in between invasive blood sampling. To ensure that customers have choice of SpO₂ pulse oximetry measurement technology, the company continues to offer Philips FAST SpO₂ pulse oximetry and Covidien’s OxiMax SpO₂ pulse oximetry, depending on the patient monitoring platform.

**Carbon monoxide breath test**

Carbon monoxide is a colourless and odourless gas, making its presence difficult to detect. CO Screen has been designed to enable emergency service responders to carry out a simple breath test to establish carbon monoxide levels in a subject’s blood. When dealing with CO, time is critical. In the blood stream carbon monoxide has an affinity with hemoglobin some 200 times greater than oxygen. When this happens, the blood is no longer able to carry oxygen, and this lack of oxygen causes the body’s cells and tissue to die. CO Screen will give instant breath results in %COHb and PPM. Both measurements are backed up with colour traffic lights for immediate visual display. CO Screen complements the company’s CO Check devices for helping people to quit smoking.

**RIGEL**

Rigel has extended its range of test instrumentation for biomedical equipment with the introduction of a specialist ventilator tester. The Rigel VenTest 800 gas flow analyser is ideal for both benchtop and field service testing of all commonly available ventilators to verify that the ongoing accuracy and reliability of the equipment remains within the required performance standards. Precise sensor technology enables the VenTest 800 to accurately measure flow, pressure, temperature, and O₂ concentrations bidirectionally and is compatible with 13 gas standards and 7 gas types. The three model range includes a standard VenTest 800 analyser for use with all standard ventilators, including adult, neonatal, pediatric and high frequency equipment, as well as anesthesia machines and spirometers. In addition, specially adapted models for the testing of vacuum measurements (VenTest 810) and low flow pressures (VenTest 820) are also available. The VenTest 800 incorporates a simple, intuitive user interface and graphics display for ease of operation during testing and calibration settings. As well as an internal memory, at the push of a button, all measured values can be transferred to PC records by USB, RS-232 and optional Ethernet interfaces. Once saved, optional software is available that provides a wide range of graphical analysis capabilities, including real time flow/pressure curves, functional zoom and certification documentation.

**PHILIPS HEALTHCARE**

The IntelliVue patient monitoring platform is now available with Masimo rainbow SET technology. Philips also offers its customers the option to add rainbow SET to existing IntelliVue monitors, and the company is working to integrate the technology into its Philips SureSigns and Philips Efficia patient monitoring platforms. In conjunction with the appropriate patient monitoring platform, Masimo rainbow SET technology analyses multiple wavelengths of light to accurately measure total hemoglobin (SpHb), oxygen content (SpOC), carboxyhemoglobin (SpCO), methemoglobin (SpMet) and Pleth Variability Index (PVI) noninvasively and continuously. Continuous monitoring of rainbow SpHb on a Philips monitor at the point-of-care provides clinicians with real-time visibility to changes in hemoglobin in between invasive blood sampling. To ensure that customers have choice of SpO₂ pulse oximetry measurement technology, the company continues to offer Philips FAST SpO₂ pulse oximetry and Covidien’s OxiMax SpO₂ pulse oximetry, depending on the patient monitoring platform.

**MD DIAGNOSTICS**

Results from the TRAPID-AMI clinical study confirm a novel approach for a more rapid diagnosis of heart attack in
patients with acute chest pain. The strategy is based on the cardiac troponin T high-sensitivity test (cTnT-hs) and reduces the observation time needed to rule-in or rule-out a heart attack from 3-6 hours to just 1 hour. It is well established that a fast and reliable diagnosis of heart attack is critical because every hour of delay from the onset of symptoms to treatment increases the mortality risk. Troponin is a heart muscle protein that is released into the blood stream during a heart attack. A limitation of the earlier generations of blood tests was the time required to detect the troponin release, sometimes requiring up to six hours with less sensitive troponin tests. The mortality rate of heart attacks is highest within hours of onset, so an early diagnosis and initiation of treatment greatly impacts outcome and potentially saves lives.

The Elecsys cardiac Troponin T high-sensitivity (cTnT-hs) test from Roche detects cardiac troponin which is the preferred biomarker for the diagnosis of heart attack in clinical practice. In combination with an electrocardiogram (ECG), it has become the gold standard for the diagnosis of heart attack. The high sensitivity of the Roche cTnT-hs assay in conjunction with this novel procedure significantly accelerates “rule-in” and “rule-out” decision-making, thereby maximizing the potential for effective treatment. At the same time, the faster decision-making may help to better manage the emergency room workload and related costs for healthcare systems.

ROCHE
i www.ihe-online.com & search 47101

To sharply focus on the specialized requirements in echocardiography, Toshiba engineers have built the new Aplio i900CV with a total redesign of hardware and software. The new Aplio i-series is a premium addition to the award-winning Aplio 500 platform, which is used in over 31,000 clinical settings to date. The system works very fast with a reduced requirement for user interaction, which translates into a significant time saving for the echocardiography lab.

The Aplio i-series features an architecture that gives it on-board capabilities for ultra-fast processing of advance applications, and with a new range of high frequency and ultra-wideband transducers. New with the Aplio i900CV is a 3-D transesophageal echocardiography (TEE) transducer that brings the possibility to view aortic leaflets, or to measure mitral valve parameters where it is possible not only to see the opening, but even also the stitches where the valve has been repaired. Yet, thanks to the new ultra-wideband transducers, a TEE exam is not always required. With the wider coverage and extremely good penetration up to 28 centimetres, it is possible to evaluate the aortic valve area with a transthoracic approach. Clinicians are able to see distinctly four-chamber views, and have found excellent resolution in subcostal views. Using a hybrid format in one display makes it possible to see calcified segments of coronary arteries derived from CT along with a quantification of the stenosis thanks to 3-D strain imaging, and at the same time a superimposition to the myocardium derived by CT.

Using an innovative tool called Activation Imaging, it is possible to add measurements to a specific coronary artery, can be seen as a superimposition on a CT image, enabling clinicians to make a decision as to intervention. At the heart of an enhanced image quality is the iBeam technology, Electrical dynamic focus with individual matrix element control and multiplexing with ultra-fast processing narrows and sharpens the signal for real-time 3-D beam forming. Advanced features include Superb Micro-Vascular Imaging (SMI) that combines the new transducers for more brilliant images with reduced motion artefacts, allowing extensive perfusion examination capabilities across all regions of human anatomy; Quad Fusion capability for interventional procedures or advanced diagnostics, with a simultaneous combination of CT/MRI images with real-time ultrasound and 3-D ultrasound rendering of a live procedure; super precise 3-D imaging boosted by Aplio i-series iBeam and thin slice acquisition to render near-photo quality images of anatomical structures.

TOSHIBA MEDICAL SYSTEMS
MEDICA Hall 9 / D05
i www.ihe-online.com & search 47092

Join us in 2017
Carestream demonstrates diagnostic advantages of Touch Prime Ultrasound Systems at Euroson Congress

Carestream will showcase its CARESTREAM Touch Prime and Touch Prime XE Ultrasound Systems at the 28th Euroson Congress of the EFSUMB taking place in Leipzig, Germany from 26 to 29 October. Both Touch Prime and Touch Prime XE systems provide exceptional image quality. They also streamline measurements to expedite clinician access to critical imaging information while boosting staff productivity. Advanced computing power and the company’s SynTek architecture deliver a simultaneous increase in frame rate, improved penetration and uniform focus throughout the field of view. Touch Prime and Touch Prime XE systems offer Smart Flow, Smart Flow Assist and Smart Select technology designed to further enhance workflow.

Smart Flow imaging technology eliminates the transducer angle limitations of ordinary Doppler ultrasound, and its proprietary Smart Flow method can visualize and measure velocity even when blood flow is perpendicular to the acoustic beam. The resulting measurements are angle independent—and therefore less prone to measurement error. The new ultrasound systems also visualize blood flow in all directions including axial and transverse, which provides more comprehensive information about hemodynamics to assist with diagnostic decisions. The benefits offered by this advanced ultrasound imaging technology can play a vital role in accurately assessing clinical applications such as evaluation of hemodialysis vascular access (AV fistulas and grafts) and quantification of complex flow patterns in the presence of stenosis. Colour coding and arrows automatically display information from Smart Flow technology on the Touch Prime Ultrasound platform. The length of the arrow, in addition to the colour, indicates magnitude. The orientation of the arrow indicates flow direction. Ordinary colour and spectral Doppler ultrasound only measure velocity of flow components toward or away from a transducer.

Smart Flow Assist automatically determines the highest area of flow, and places and adjusts sample size as well as angle corrections. This reduces the number of key strokes for velocity and volume measurements. Integrated one-touch transducer activation and a mode-programmable Smart Select button on the transducers allow a sonographer to reduce key strokes and improve productivity. A single touch of a button allows the user to activate the transducer as well as program two additional functions from a list of 16 commonly used functions.

Carestream’s advanced SynTek Architecture simultaneously provides enhanced spatial detail with increased frame rates for improved visualization of moving structures, while optimizing image formation to reduce noise and artifacts. Imaging and Doppler improvements allow for more consistent visualization of subtle tissue contrast differences and can increase the ability to see small structures. These systems also deliver uniform lateral resolution over the entire depth and deeper penetration for imaging of the abdomen and other areas.

Carestream offers specialized transducers for vascular imaging as well as radiology, OB/GYN and musculoskeletal imaging. A direct transducer interface to the ultrasound processing board delivers lower noise and higher image quality, and four transducers can be connected simultaneously to any of the system’s four ports. The Touch Prime XE is capable of frame rates in excess of 100Hz while maintaining enhanced imaging detail, and includes optional features such as a DICOM package, barcode and RFID badge readers. Wireless connectivity provides rapid image transfers to PACS, RIS and other systems. An integrated gel warmer delivers added convenience and patient comfort.

The Touch Ultrasound platform’s design is based upon recommendations by sonographers and ultrasound professionals across the world. These systems have earned praise for a sealed, all-touch control panel that combines the speed and flexibility of a soft user interface with the tactile feedback of traditional keys. Etched marking for primary controls equips the user to easily locate frequently used functions without looking away from the image display monitor.

**CARESTREAM HEALTH**

**EUROSON Hall 2 / C07**

**MEDICA Hall 10 / E65**

i www.ihe-online.com & search 47100

**CALENDAR OF EVENTS**

<table>
<thead>
<tr>
<th>Dates</th>
<th>Event Name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 1-5, 2016</td>
<td>ESICM</td>
<td>Milan, Italy</td>
</tr>
<tr>
<td>November 14-17, 2016</td>
<td>MEDICA</td>
<td>Düsseldorf, Germany</td>
</tr>
<tr>
<td>October 4-6, 2016</td>
<td>Public Health</td>
<td>Kiev, Ukraine</td>
</tr>
<tr>
<td>November 21-22, 2016</td>
<td>HIMSS Europe</td>
<td>World of Health IT</td>
</tr>
<tr>
<td>October 5-6, 2016</td>
<td>Hospital Expansion Summit</td>
<td>Ankara, Turkey</td>
</tr>
<tr>
<td>November 27-Dec 2, 2016</td>
<td>RSNA</td>
<td>Chicago, USA</td>
</tr>
<tr>
<td>October 13-14, 2016</td>
<td>26th EAHM Congress</td>
<td>Bologna, Italy</td>
</tr>
<tr>
<td>January 23-26, 2017</td>
<td>MEDLAB at Arab Health</td>
<td>Dubai, UAE</td>
</tr>
<tr>
<td>October 29-1 Nov, 2016</td>
<td>CMEF Autumn 2016</td>
<td>Shenzhen, China</td>
</tr>
<tr>
<td>February 10-12, 2017</td>
<td>Meditech Healthcare Asia</td>
<td>Ahmedabad, Gujarat, India</td>
</tr>
<tr>
<td>October 20-22, 2016</td>
<td>Medikos</td>
<td>Prishtina, Kosovo</td>
</tr>
<tr>
<td>February 15-17, 2017</td>
<td>Intex</td>
<td>Osaka, Japan</td>
</tr>
<tr>
<td>October 26-29, 2016</td>
<td>Euroson</td>
<td>Leipzig, Germany</td>
</tr>
<tr>
<td>March 1-5, 2017</td>
<td>ECR</td>
<td>Amsterdam, The Netherlands</td>
</tr>
<tr>
<td>October 30-Nov 3, 2016</td>
<td>IHF</td>
<td>40th World Hospital Congress</td>
</tr>
<tr>
<td>March 2-4, 2017</td>
<td>IHE</td>
<td>Durban, South Africa</td>
</tr>
</tbody>
</table>

For more events see [www.ihe-online.com/events/](http://www.ihe-online.com/events/)

Dates and descriptions of future events have been obtained from usually reliable official industrial sources. IHE cannot be held responsible for errors, changes or cancellations.
Asia Pacific’s medical industry platform serving the entire value chain for the healthcare market, the industry assembly of technology innovation, trading, learning and networking.

**CMEF**
China International Medical Equipment Fair

**The Digital Era of Healthcare**

Shenzhen Convention & Exhibition Center, China

www.CMEF.com.cn
INTRODUCING TOUCH ULTRASOUND.
From a world leader in imaging that brought you the first cassette-sized wireless DR detector and a mobile X-ray unit with the first collapsable column, Carestream now introduces a revolution in ultrasound: The CARESTREAM Touch XE Ultrasound System – with a unique configurable All-Touch control panel.

The combination of touch and sound has arrived.