Pregnancy and critical care

Also in this issue
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The shortage of transplant organs is a pressing issue around the world. In an effort to increase the number of donated organs, various initiatives have been implemented in a number of countries to prompt people to donate their organs in the event of death.

Some of these interventions are referred to as nudges. Nudges are psychological and refer to behavioural change interventions that alter people’s behaviour by modifying the context of their choice in such a way as to make the “better” option the most salient or easiest choice without substantially changing the underlying incentive structure.

Several countries, such as Germany, Denmark, Lithuania and the Netherlands have a default opt-in registry whereby citizens have to actively choose to register as an organ donor. However, some countries, such as Austria, Spain, France, Italy, Belgium, Sweden and Greece have an opt-out system whereby citizens are automatically registered as organ donors and have to actively choose to opt-out if they prefer not to be an organ donor.

However, whether opt-in or opt-out, most organ donation legislative systems include a clause that allows the final decision to donate to be made by family members of the deceased. In the United Kingdom the NHS Blood and Transplant reported in 2016 that more than 500 families vetoed organ donations between 2010 and 2015 despite being informed that their relative was on the opt-in NHS Organ Donation Register. This translated into an estimated 1,200 people missing out on potential life-saving transplants.

This was one of the reasons why England recently announced plans to change their opt-in registry to an opt-out one in 2020. However, a recent study from Queen Mary University of London argues this move is unlikely to result in any significant increase in donated organs. Although the authors of the study note that several studies have shown that default opt-out systems have substantially increased registered donations and give examples from Belgium where kidney donations increased from 10.9 to 41.3 per million people during a 3-year period, and from Singapore where kidney donations increased from 4.7 to 31.3 per year over a 3-year period. Nonetheless, in the study, published in May this year, the authors argue that under an opt-out system the family would perceive the donor’s preference as weaker because it involves a passive choice to donate compared to a default opt-in system where an active choice to donate is made.

The study concludes that the opt-out system is unlikely to increase actual rates of organ donation or reduce veto rates, all it will do is increase the number of people on the organ donation register.
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**Most alarms are not clinically relevant**

A review of research studies that assessed alarm accuracy and/or clinical relevance in hospitalized patients published over a 30-year period found low proportions of clinically relevant patient alarms. The findings underscore the need for more rigorous alarm intervention research as hospitals work to meet Joint Commission requirements to reduce unnecessary alarms and implement new practice standards related to electrocardiographic (ECG) monitoring from the American Heart Association.

“Measurement of Physiological Monitor Alarm Accuracy and Clinical Relevance in Intensive Care Units” examined the approaches used to measure alarm accuracy and/or clinical relevance of physiological monitor alarms in intensive care units (ICUs).

The integrative review also compared proportions of inaccurate and clinically irrelevant alarms reported in the studies, which were published from 1986 through 2015. When clinically irrelevant alarms were compared as a percentage of total annotated alarms, most studies revealed that only 5 to 13 percent were clinically relevant; however, the definitions of clinical relevance were inconsistent across studies, which made clinical relevance of alarms difficult to determine.

Co-author Halley Ruppel, RN, MS, is a PhD candidate at Yale University School of Nursing, West Haven, Connecticut, and a Robert Wood Johnson Foundation Future of Nursing scholar. She worked with Yale nursing professors Marjorie Funk, PhD, RN, and Robin Whittemore, PhD, APRN, on the article.

Advances in monitoring technology may have improved the accuracy of alarm systems and simplified much of the data collection but haven’t affected the clinical relevance of alarms. “Clinical relevance can be a subjective term, and interventions should focus on reducing clinically irrelevant alarms, with careful consideration for how clinical relevance is defined and measured,” Ruppel said. “Especially in ICUs, nurses may use alarms to help them track changes in a patient’s condition. Clinical relevance should reflect alarms that may be informative, even if not immediately actionable or corresponding to a life-threatening incident.”

For the review, the authors conducted an in-depth search of five databases for relevant articles, analysing more than 1,700 records before identifying 12 studies that met the inclusion criteria.

The review follows the recent publication of “Update to Practice Standards for Electrocardiographic Monitoring in Hospital Settings: A Scientific Statement From the American Heart Association.” The comprehensive document provides an interprofessional, comprehensive review of evidence and recommendations for indications, duration and implementation of continuous ECG monitoring of hospitalized patients. The updated practice standards address several emerging issues related to ECG monitoring, including the overuse of arrhythmia monitoring among a variety of patient populations and alarm management.

“Alarms have become ubiquitous in ICUs, but inaccurate or clinically irrelevant alarms remain a threat to patient safety,” said Funk, who also served as a co-author of the AHA statement. “Further research is needed to ensure that we are providing the best-quality monitoring for those who truly benefit from this diagnostic intervention.”

American Association of Critical-Care Nurses
https://tinyurl.com/y7pf9m2r

**Study finds stress hormone may identify family members likely to suffer from anxiety after loved one’s hospitalization**

When a loved one has been hospitalized in intensive care for a critical illness, many family members experience anxiety, depression, post-traumatic stress or other negative effects lasting months, according to new research led by Intermountain Medical Center.

The new research suggests that determining which family members are likely to suffer long-term effects could offer guidance to caregivers about how to help them. The study is believed to be the first research of its kind to investigate the link between cortisol levels of family members of adult ICU patients and subsequent anxiety.

Participants in the study were family members of patients who had been admitted to Intermountain Medical Center’s medical/surgical intensive care unit. Family members were followed by researchers for three months. Three months after the patient was discharged, researchers found that 32 percent of the family members studied were anxious, 16 percent had symptoms of depression, and 15 percent reported signs of post-traumatic stress.

Researchers also found an increase of about 50 percent in family members’ cortisol levels after they woke up in the morning, which was associated with anxiety in family members three months after...
Cortisol is sometimes called the “stress hormone” because it can spike during periods of stress, such as when a loved one is critically ill. Unlike the surge in cortisol shortly after awakening, general cortisol levels weren’t found to predict long-term symptoms of mood disorders among participants in the study.

Family members were studied because an ICU admission can affect the entire family. Family members experience new challenges, including caring for a loved one, learning details of providing medical care, and a reduction or break from employment.

“Family members need time to adjust to these new roles, situations and responsibilities,” said Ellie L. Hirshberg, MD, MS, a critical care physician at Intermountain Medical Center, who led the study, and who co-directs the Center for Humanizing Critical Care at the hospital.

“This study confirms the long-held belief that family members are experiencing stress during an ICU stay. This is important,” said Dr. Hirshberg. “The next step we hope to take in the future is to study support interventions that can reduce this stress and the associated anxiety, depression, and PTSD that may follow.”

Researchers targeted family members because they’re an important part of a patient’s recovery team and often have their own unmet needs. “There’s likely a link between family member wellness and a patient’s trajectory for recovery,” Dr. Hirshberg said.

Reducing light and noise made a psychiatric ICU unit calmer and safer

Turning down the lights and reducing noise levels as part of a stimulation reduction initiative can decrease assaults and the amount of time patients must spend in restraint at psychiatric intensive care units, according to new research from the University of Alabama at Birmingham. Findings showed that simple techniques to reduce sensory overstimulation played a major role in creating a safer environment for both patients and staff.

“The time period roughly between 4-7 p.m. often sees an environment of commotion and disquietude on high acuity psychiatric units resulting in a higher incidence of assaults and/or need to place patients in restraints to control aggressive behaviour” said Rachel E. Fargason, M.D., professor in the UAB Department of Psychiatry and senior author of the study. “On many psychiatric units, this three-hour period between the end of structured activities and the dinner meal is the most problematic of the day.”

Fargason says the combination of bright lights, talkative staff, anxious evening visitors, clattering housekeeping carts and physician traffic can create a highly overstimulating environment.

“Sensory overstimulation is irritating to healthy individuals, but can be intolerable to individuals with neuro-psychiatric disorders,” said Badari Birur, M.D., assistant professor of psychiatry at UAB and a study co-author. “Healthy individuals regularly engage in centering activities such as stroking their hair or tapping a foot. However, neuro-psychiatrically challenged individuals are often unable to self-identify their sensory needs or execute these adaptive behaviours.”

Fargason and her team began a structured change in sensory stimulation on the 20-bed, locked psychiatric intensive care unit at UAB Hospital in October 2015 by dimming lights in the common spaces of the units at 4 p.m. This was followed by sound reduction and the introduction of music in November. Between December and February 2016, the team turned down the lights and reduced noise levels as part of a stimulation reduction initiative can decrease assaults and the amount of time patients must spend in restraint at psychiatric intensive care units, according to new research from the University of Alabama at Birmingham. Findings showed that simple techniques to reduce sensory overstimulation played a major role in creating a safer environment for both patients and staff.

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added tactile and visual art activities, movement, stretching, and aromatherapy. “Both assaults and use of restraints dropped dramatically as we implemented these sensory adaptations,” Fargason said. “Rates for both fell to close to zero, well below industry benchmarks and regulatory requirements.” The need for restraints fell by 72 percent, to just over half of 1 percent of total patient hours requiring restraint usage. Assault rates fell 83 percent to a rate of 0.06 percent. Since the completion of the study, the psychiatric ICU has continued to utilize the stimulation reduction techniques and continues to see positive results on a regular basis. “Once the project was fully implemented, the evident calming effects on the patients became reinforcing,” Birur said. “Altering the sensory milieu on a busy psychiatry unit requires multidisciplinary efforts by leaders and frontline team champions to influence this kind of beneficial culture change.” The team, which included nurses, occupational and physical therapists, patient care technicians, and physicians, reports that the quieter auditory and low-light culture became the new normal on that unit. “While initially implementing the process changes, assistant nurse manager Barbara Aguilar had to remind patients, visitors and even staff to leave overhead lights off and to speak in quiet voices,” said Melissa Bearden, OT/L, occupational therapy manager for the Center for Psychiatric Medicine. “Eventually the culture shifted, and patients and staff now remind each other or self-correct.” Fargason says the findings could have impact on other hospital units, particularly where patients are behaviourally challenged due to dementia, delirium or medication. University of Alabama at Birmingham https://tinyurl.com/ydd949rw

Rapid whole-genome sequencing of neonatal ICU patients is useful and cost-effective

Rapid whole-genome sequencing (WGS) of acutely ill neonatal intensive care unit (NICU) patients in the first few days of life yields clinically useful diagnoses in many cases, and results in lower aggregate costs than the current standard of care, according to recent findings. Shimul Chowdhury, PhD, FACMG, Clinical Laboratory Director at the Rady Children’s Institute for Genomic Medicine, and his colleagues focused their analysis on a broad swath of NICU patients for whom a genetic diagnosis might help inform treatment decisions and disease management. They studied the clinical utility and cost-effectiveness of sequencing infants and their parents. “Newborns often don’t fit traditional methods of diagnosis, as they may present with non-specific symptoms or display different signs from older children,” said Dr. Chowdhury. In many such cases, he explained, sequencing can pinpoint the cause of illness, yielding a diagnosis that allows doctors to modify inpatient treatment and resulting in dramatically improved medical outcomes in both the short and long term. Because of the potential for early intervention and immediate adjustment in care, the researchers used a rapid WGS procedure that took three to seven days from sample collection to delivering results to patients’ families. The process can be further accelerated if medically necessary. In contrast, most clinical diagnostic tests take four to six weeks. In 34 (35%) of the 98 patients enrolled in the study, WGS yielded a genetic diagnosis, and in 28 (80%) of those patients, that diagnosis led to changes in medical management, such as the use of medications targeted to the underlying disease, avoidance of unnecessary surgery, and guidance about palliative care. Cost-effectiveness analyses are ongoing, but among the first 42 infants sequenced, the researchers calculated a $1.3 million net cost savings for that hospitalization versus the current standard of care. “The cost savings were especially striking, given that sequencing costs are still high – even with those costs, we found that rapid WGS was not just clinically useful but economically prudent,” Dr. Chowdhury said. Currently, the researchers are looking to expand their study and assess the effectiveness of their approach across health systems and populations. Ongoing partnerships with children’s hospitals in California and Minnesota involve scaling up the rapid WGS process to meet demand and yield new insights about its clinical utility, cost-effectiveness, and ease of implementation in different environments. Dr. Chowdhury noted the important contribution of genetics research to their progress so far. “Translational research leading to improvements in the speed and accuracy of sequencing tests is so important to our work, and has a real impact on patients and their families,” he said. American Society of Human Genetics https://tinyurl.com/yda3rc6g
One key change is that intensive care unit (ICU) patients will represent an increasingly large proportion of hospital patients in the future. There are several reasons for this. First, improved disease prevention and primary care, shorter post-surgery hospital stays and facilitated home care will mean that patients who are hospitalized will be more seriously ill than at present and more likely to need intensive care. Another reason for the increased need for ICU beds is prolonged life expectancy. Improved healthcare means that the average age of the population is increasing worldwide, and older patients are more likely to have multiple comorbidities and to develop complex acute illness. In one report from the US, the number of hospital beds decreased by 2.2% while ICU beds increased by 17.8% over a 10-year period.

As such, the hospital of the future will be composed of a large number of ICU beds with relatively few hospital beds (other than daycare) for other patients (see figure). The ICU may be a physical unit at a strategic place within the hospital, or it may be a more “virtual” ICU with beds dispersed around the hospital. It is possible that in the future all hospital beds will have the potential to be an ICU bed, limiting the need for patient transfers between wards and reducing the time for key ICU interventions to be put into place when a patient is identified as deteriorating. This could also reduce any problems associated with ICU bed shortages. The potential limitations of such an approach include the need for all nursing staff to be trained in intensive care.

So, assuming that the physical ICU structure remains, at least for the near future, what will it look like? With current patient demands for privacy and problems associated with multiresistant pathogens, the ICU will almost certainly consist of multiple single rooms. These rooms will be large and spacious with easy access to the bed from all sides and room for relatives to visit and stay and for the patient to mobilize when possible. The rooms will have large interactive screens with access to patient results and monitored parameters, the ability to call and speak to healthcare staff via telemedicine, and of course standard entertainment channels. Because almost all monitoring, of hemodynamic parameters as well as laboratory values, will be non-invasive and results transmitted to the doctor’s smartphone and to central remote monitoring hubs by wireless technology, there will be much less visible equipment, cables and tubes. What equipment is still necessary will be much smaller, less cumbersome and more user-friendly than at present. Continuous monitoring, multiple feedback systems and computerized interrogation across multiple systems and disciplines will make ICUs much safer with fewer iatrogenic errors.

Visiting hours will be unrestricted throughout the hospital, including in the ICU, and family members,
including children, will be welcomed. This open access and greater involvement will impact positively on patients and on their families, reducing anxiety and helping to reduce post-ICU stress.

The hospital as a whole will be much more technology oriented than at present and interactive screens will be responsible for much of the routine administration with robots involved in basic services, such as delivery of food and medication, as well as patient mobilization and social stimulation. Care will be more patient-centered and personalized and the flow from home to general ward to ICU will be much more of a continuum. Indeed, some patients may be discharged directly home from the ICU, an option facilitated by continued surveillance using telemedicine. Patients and healthcare staff will have continuous and real-time access to patient medical results and data. Such data will be fed automatically into large international databases to help continuously improve patient management. This process will have become routine and current issues related to data privacy will no longer be a problem.

There will be fewer medical and nursing staff physically present on the wards as telemedicine will be more widely used, enabling remote control of drug infusions and other interventions and e-consultations at the request of the physician or patient. Although healthcare staff may therefore be seen less frequently, they will actually be able to spend more quality time talking to patients and their families.

Technological advances are changing how the world around us operates and the hospital is no exception. Future hospital and ICU design needs to provide flexibility and adaptability to continued technological developments. Healthcare workers and patients will need time to adapt to these changes and to learn how best to use them to improve care and outcomes. We must all be involved in developing the ICU of the future. As Abraham Lincoln said, “The best way to predict the future is to create it”.

Suggested reading:
1. Vincent JL. Critical care--where have we been and where are we going? Crit Care 2013;17 Suppl 1:S2.

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CALENDAR OF EVENTS

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Big data in the ICU - critical care databases and decision support

The deluge of data produced during medical care has typically been under-utilized or simply wasted. In the era of paper, this was explicable. However, in spite of nearly three decades of computerization, medical data remains difficult to access and organize, let alone use. Such a gap is both critical and dramatic in the intensive care unit (ICU), where the complexity of illness and new possibilities unveiled by the unremitting march of technology transcend typical cognitive capabilities. In turn, this serves to further highlight the critical role of data support in evidence-based healthcare decision making.

From structured analysis to personalized treatment

Big Data’s case in the ICU, whose environment is both critical and intense by definition, is self-evident. One of the first arguments in its favour is that new ICU patients usually require extremely close monitoring. This is a highly data intensive process. The accumulation of data, in turn, can cause information overload in physicians who are providing the care.

Some experts foresee using Big Data in the ICU for structured analysis of complex decisions and the quantifying of expected benefits versus harms in different treatment options. Although such a tool has not been well received by several clinicians, it has considerable potential in terms of personalizing treatment. Today, ICU patients in particular can be provided with interventions that sustain life in spite of severe organ dysfunction. However, the treatments can also result in prolonged suffering with no guarantee of outcomes in line with patient preferences. Decision analysis based on Big Data might enable such concerns to be addressed.

Reducing uncertainty

There are several other practical drivers for Big Data in the ICU. Very often, ICU decisions have to be made with a high degree of uncertainty, and clinical staff may have minutes or seconds to make those decisions. These could cover issues such as knowing patient sub-populations that experience significant divergences in efficacy or unanticipated delayed adverse effects from drug treatments. At present, ICU practices vary due to either an absence of medical knowledge or conflicting opinions. Given time constraints, therapeutic decisions and choices depend largely on clinician preference and local practice patterns, leading to significant variability in quality of care.

Study shows scale of challenge in ICU interventions

As it stands, however, a large number of ICU interventions are not based on proven cases or standardized guidelines. In 2008, a team at Erasmus Hospital in Brussels, Belgium, made a systematic review of 72 multi-centre randomized controlled trials evaluating the effect of ICU interventions on mortality and found that just 10 (about one in seven) showed benefit. 55 had no measurable value while as many as 7 (one in ten) were actually harmful.

Organizing critical care

Apologists for the lack of use of Big Data in the ICU point out that medicine can be as much art and science, and standardized protocols and best practices are not always sufficiently flexible. Such flexibility can indeed be imperative in an ICU, where decisions are subject to exceptional complexity and variability in patient status and clinical situation.

Nevertheless, a study on the concept of ‘organized care’ showed that applying W. Edwards Deming’s process management theory to manage variation in providing care can yield huge savings to the healthcare system. The study, titled ‘How Intermountain trimmed healthcare costs through robust quality improvement efforts’, was published in the June 2011 issue of ‘Health Affairs’. Its authors estimated that such efforts could save the US healthcare system about USD 3.5 billion (£3 billion) a year. As a result, it may well be argued that variability in ICU practices is the result of a failure to research and establish evidence for a particular approach, in spite of the fact that both the data and the technology exist.

Scoring systems

Typical Big Data deployments in the ICU would be focused on the most expensive or high-risk parts of current clinical practice in critical care, and cover predictive alerts and analytics for complex case patients, decompensation and adverse events, intervention optimization for multiple organ involvement as well as triaging and readmissions. Progress has already been made by using clinical data to infer high-level information in ICU scoring systems. These are largely used to compare ICU performance in terms of outcomes.
APACHE and SAPS
Two of the best known scoring systems are APACHE (Acute Physiology and Chronic Health Evaluation) and SAPS (Simplified Acute Physiology Score).
APACHE was designed to provide morbidity scores for a patient and help decide on a specific therapy. Methods to derive a predicted mortality from this score exist, but they are yet to be sufficiently well defined and precise.
SAPS was originally aimed at predicting mortality, originally for benchmarking. It has since been updated to provide a predicted mortality score for a particular patient or patient group by calibrating against recorded mortalities on an existing set of patients. SAPS can be used to compare the evolution in performance of an ICU over a period of time or compare treatment at different ICUs.

Variety of ICU databases in development
At present, ICU databases are being developed by hospitals/professional societies, academic institutions and medical equipment vendors. They structure and aggregate demographic data (age and sex of patient, condition or disease, co-morbidities, length of stay, date and time of discharge, mortality, readmission etc.) and provide such information on a hospital-specific basis. Rather than decision or standardization of protocols and practice, such databases simply provide monitoring and selective comparisons of ICU patient outcomes and costs – over time, or by region. However, there are new efforts to go further and build decision support tools.

Non-commercial databases
One good example of a non-commercial database is the Adult Patient Database (APD) from the Australia and New Zealand Intensive Care Society (ANZICS). It contains data from over 1.3 million patient episodes and is considered one of the largest single datasets on intensive care in the world. The database collects episodes from over 140 ICUs in Australia and New Zealand on a quarterly basis, and is used to benchmark performance of individual units.
The Danish Intensive Care Database (DID) is another non-commercial database, with data for over 350,000 ICU stays. DID made a big leap in introducing the ICU scoring indicator, SAPS II in 2010, which however remains less than 80% complete. DID quality indicators include readmission to the ICU within 48 hours and standardized mortality ratios for death within 30 days of admission using case-mix adjustment (age, sex, co-morbidity level and SAPS). Process indicators consist of out-of-hour discharge and transfer to other ICUs for capacity reasons.

Commercial databases
ICU databases are also being developed by medical technology vendors for commercial use. Cerner has created APACHE Outcomes, which has gathered physiologic and laboratory measurements from over 1 million patient records across over 105 ICUs since 2010. Although large, it still contains incomplete physiologic and laboratory measurements, and does not offer waveform data and provider notes. Another commercial database known as eICU is provided by Philips. This telemedicine-intensive care support provider archives data from participating ICUs and is available to qualified researchers via the eICU Research Institute. The database size is estimated at over 1.5 million ICU stays, and it is reported to be adding 400,000 patient records per year from about 180 subscribing hospitals. As with APACHE Outcomes, eICU does not archive waveform data. However, provider notes are captured if entered into the software.

MIMIC
In contrast to commercial databases like eICU and APACHE Outcomes, MIMIC (Multiparameter Intelligent Monitoring in Intensive Care) is an open and public database with a host of clinical data from ICUs, vital signs, medications, laboratory measurements, observations and notes, fluid balance, procedure codes, diagnostic codes, imaging reports, hospital length of stay, survival data, and more.
Currently in its third generation, MIMIC provides a unique research resource with data from about 40,000 critical care patients. Hundreds of researchers from over 30 countries are given free access under data use agreements. In addition, several thousands of students, educators and investigators have used MIMIC’s waveform data, which is freely available to all.

History
MIMIC is the fruit of a collaboration since the early 2000s between Beth Israel Deaconess (a unit of Harvard Medical School), the Laboratory of Computational Physiology at the Massachusetts Institute of Technology (MIT), and Philips Healthcare, with support provided by the National Institute of Biomedical Imaging and Bioinformatics. MIMIC was launched as a research project to establish a critical care alert and display (CCAD) system and assist decision support in the ICU, on the basis of a large temporal ICU patient research database. The system generated abnormal clinical values as clinician alerts via a user interface designed to allow efficient and ergonomic display of data. Within a short time after launch, it was producing over 50 alerts per patient ICU day.

Unique capability has promise for modelling
The MIMIC database is considered unique due to its capability to capture structured and extremely granular data. This includes per minute changes in physiologic signals, as well as time-stamped treatments with dosages, and permits modelling individual response to clinical intervention, which, in turn, allows for improved risk-benefit calculation and prediction of outcomes.
Some of these models might be optimal to develop effective early triage in terms of level of care and monitoring, as well as the allotment of scarce human and technical resources. In turn, such tools could assist emergency departments facing limitations in ICU resources.

Findings
Recent observational studies on the MIMIC ICU database have yielded several findings of interest. These cover areas such as long-term outcomes of minor elevations in troponin, heterogeneity in impact of red blood cell transfusion, the optimization of heparin dosing to minimize chance of under- or over-anticoagulation and the impact of selective serotonin reuptake inhibitors (SSRI) on mortality. Researchers are also studying areas of potentially great impact such as determining the proper duration for a trial of aggressive ICU care among high-risk patients.

International expansion
The MIMIC database is being used to design and develop decision support tools. Outcomes of concern are not limited to mortality or length of stay, but will instead be extended to include factors such as the probability of discharge to a nursing facility and expected duration of stay there, as well as the need for procedures such as hemodialysis or repeat hospitalization.
In spite of its clear utility, MIMIC is currently limited because its data is derived entirely from just one institution, namely Beth Israel Deaconess, and does not therefore account for practice variation across ICUs. There are however plans to expand the project to include data from ICUs in Britain and France.
A helping hand for pediatric intensive care

Doctors working in the eight-bed Pediatric Intensive Care Unit at the Ramón y Cajal University Hospital in Madrid use point-of-care ultrasound extensively to evaluate the condition of critically ill children, and find it essential to their work. Dr José Luis Vázquez Martínez, Head of UCIP at Hospital Ramón y Cajal, with over 25 years’ experience in pediatric intensive care medicine, explained.

Point-of-care ultrasound (POCUS) is used extensively in our unit, allowing comprehensive, head-to-toe assessment of critically ill children, including respiratory, oncology and post-operative cardiac patients, as well as those being treated for sepsis or multiple trauma. The POCUS approach allows not only an initial diagnosis, but also routine monitoring of treatment to see whether or not a patient's condition changes, enabling alternative strategies to be implemented if there is no improvement.

POCUS helps pediatric doctors in many ways. For example, ultrasound scans enable evaluation of a patient's hemodynamic state, looking at their heart function and blood volume to see if these factors are contributing to respiratory failure. Conversely, doctors can see if a lung problem, such as pneumonia, is affecting the heart. For a patient in a coma due to multiple trauma, ultrasound is used to look for signs of bleeding – a potential cause of unexplained anemia – and to assess the intracranial pressure. It is also used to monitor kidney function in children with blood pressure problems, and visualize intestinal indications of sepsis. In addition, ultrasound guidance can be used for endotracheal intubation. In short, broader applications that we did not anticipate until very recently.

We have used ultrasound in our PICU for more than a decade, and have always had SonoSite systems, upgrading them as new technology is introduced. In the beginning, when my knowledge was more limited, the aim was to perform clinical echocardiography but, when the SonoSite representative showed me the linear probe and the various techniques available, it was as if I was being shown electricity after using candles! It was amazing, a real turning point in the use of ultrasound, and everyone recognized it as a step forward in the pediatric intensive care world. For the patients, a major benefit of ultrasound is that exposure to radiation can be reduced. Before ultrasound, X-ray examinations were performed two or three times in the first few days after admission to try to establish the cause of the problem, often with limited success. With ultrasound, we can scan the patient as often as necessary, implementing treatment and monitoring its effect without exposing the child to more radiation.

In PICU, we consider an ultrasound system essential – there is nothing else that gives us so much information, so quickly and non-invasively – and today we have a dedicated Edge II ultrasound system with linear, including hockey stick, and adult and pediatric cardiac transducers. It is in constant demand and is a perfect fit for our work, fulfilling all our expectations. All my colleagues use it, and we are very satisfied with it. The system is high quality and ergonomic, and strikes a good balance between image quality and ease of use. It is also quick to boot up, which is crucial for an instrument that is frequently moved between different beds in the unit. Robustness is vital too; if a patient deteriorates, we may have to move any equipment surrounding the bed very quickly to create space to treat them. However careful you are, there is always the risk of unintentional knocks to the system.

A while ago someone said to me that they ‘sell ultrasound machines but don’t offer training’, but this view isn’t enough – it’s very short-sighted – training is very important. Ramón y Cajal pioneered the use of ultrasound in PICUs across Spain, and was the first hospital to offer external training courses for doctors from other facilities, initially focused on clinical echocardiography. Over time, this has expanded to include neuromonitoring, respiratory and abdominal monitoring. I acquired my ultrasound experience through a combination of external training in adult ultrasound and practical, hands-on learning, and am largely self-taught. If courses like these had been available when I started using ultrasound, I would have saved so much time. FUJIFILM SonoSite is clearly committed to organising and supporting ultrasound training, and this is unquestionably a great benefit to the scientific community – long may it last!

Today, we are seeing a boom in the use of ultrasound in pediatric care, as it non-invasively provides immediate information in situations where time is of the essence. Our advice to people attending our training courses who do not have – or have to share – an ultrasound system is to tell their hospital managers that, just like a ventilator, it is an essential piece of equipment for an intensive care unit.

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Pregnancy and critical care

Though global maternal mortality has declined by 1.3 percent a year since 1990, the rate continues to remain stubbornly high in certain regions. At present, fewer than one of 50 pregnant women require critical care. However, both maternal and fetal mortality can be high when it is required. In industrialized countries, the rate of obstetric ICU admissions varies from 50 to over 400 per 100,000 deliveries with an overall case-fatality rate of 2%. In developing countries, fatality in obstetric ICU patients can be 3-5 times higher.

Obstetric disorders in the ICU
Obstetric ICU patients include those with obstetric disorders as well as pregnant patients with medical/surgical disorders. The bulk of patients are admitted to the ICU for obstetric disorders. In general, obstetricians are aware of all obstetric patients in hospital, whether they have a medical or obstetric problem. There are several obstetric conditions which can require ICU admission. The most common are hemorrhage and hypertensive disorders, above all pre-eclampsia toxemia (PET) and eclampsia. In industrialized Western countries, these typically account for 30-35% and 20% of admissions to the ICU.

Hemorrhage leading cause of mortality, ICU admission
Obstetric hemorrhage is either antepartum or postpartum, and remains the leading cause of maternal mortality. Antepartum hemorrhage occurs in 5 percent of pregnant women, and in the bulk of cases carries no risk to the mother or fetus. Major causes involve the placenta and uterine rupture. Postpartum hemorrhage (PPH) is the single most frequent indication for ICU admission, and involves major blood loss, regardless of the mode of birth. Though there is no universally accepted definition, it typically means more than a half litre of blood loss within 24 hours. In about two out of three cases, PPH is due to failure of uterine contraction after delivery, with most of the rest caused by placental retention. Genital trauma, due to laceration of the vagina or cervix because of instrument delivery, is also increasingly implicated in PPH.

Patient management of obstetric hemorrhage depends on identifying the cause and whether or not delivery has occurred. In PPH, management is aggressive, beginning with administration of oxytocin, emptying of the bladder and massage of the uterus. The care team also begins intravenous prostaglandin therapy, coupled with uterine tamponade via balloon compression or packing. If bleeding persists, surgical intervention is indicated: arterial ligation, suture, Cesarean hysterectomy or uterine artery embolization. Should bleeding continue, recombinant factor VIIa is administered and repeated, if there is no response.

Hypertensive disorders
Pre-eclampsia toxemia (PET) occurs in 2 to 3 percent of all pregnancies after 20 weeks of gestation, and is classified as mild, moderate or severe. Its pathogenesis results from abnormal placenta formation, and it is characterized by impaired organ perfusion due to impaired vasodilation and placental ischemia. As pregnancy progresses, the ischemia worsens. This makes the mother hypertensive, with a risk of renal dysfunction. Severe PET is associated with significant morbidity and mortality, both for the mother and fetus. It requires one or more of the following indicators: hypertension (BP over 160 systolic or 110 diastolic), proteinuria higher than 5 grams per 24 hours or oliguria below 400 ml per 24 hours, along with cerebral irritability, epigastric pain, and pulmonary edema. PET usually resolves following delivery of the fetus but may manifest postpartum. A variety of antihypertensive agents, including hydralazine, labetalol, sodium nitroprusside, alpha blockers, calcium channel blockers and methyl dopa, have been advocated in PET. Hydralazine and labetalol are the most widely used in the critical care setting. Magnesium is usually co-administered to provide vasodilatation and prevent seizures. Care should be taken with fluid resuscitation because of the risk of pulmonary edema.

Eclampsia is an extreme complication of PET, and is marked by the occurrence of convulsions and seizures, 40% of which occur following delivery. The seizures tend to be self-limiting, with a very rare incidence of status epilepticus. Though the mortality from eclampsia has been high in the past, death is now uncommon. Common causes of mortality are hepatic complications, including hepatic failure, hemorrhage, or infarction.

Other challenges of pregnancy
Peripartum cardiomyopathy is another challenging condition during pregnancy, albeit of unknown cause. It is one of the leading causes of maternal death, with mortality as high as 25-50%. It can occur from the final month of pregnancy up to 5 months after delivery. Other conditions unique to pregnancy include HELPP syndrome (hemolysis, elevated liver enzymes and low platelets), placental disorders (abruption, previa or retention), amniotic fluid embolism and chorioamnionitis, and acute fatty liver.
Changing epidemiology
The epidemiology of obstetrics in the ICU has changed dramatically since the past decade. Obstetric conditions such as thrombocytopenic purpura of pregnancy, which were rare in the past, are now being diagnosed more frequently. Massive hemorrhage from adherent placenta is increasing due to the growing number of pregnant women bearing scars from previous cesarean sections (CS). Uterine rupture during labour is also sometimes associated with previous CS. Another condition is ovarian hyper-stimulation syndrome, which is not uncommon any more due to the sharp growth in the availability of assisted reproduction techniques. There are now many older mothers with pre-existing disorders and chronic medical conditions, some of which can be in an advanced stage. Typical co-morbidities today including essential hypertension, Type 2 diabetes and coronary heart disease. Obesity is also a major concern, which poses numerous challenges for managing pregnant patients in the ICU.

Impact on multiple physiological systems
Pregnancy affects several physiological systems – among them, the cardiovascular, respiratory, renal, hematologic and endocrine. These tax a patient’s reserves and often compromise responses needed to combat a disease state during pregnancy and the peripartum period. Pregnancy’s impact on physiological systems is twofold: first, by worsening pre-existing conditions, and second, by heightening susceptibility. For example, cardiovascular conditions which can deteriorate significantly in pregnancy include aortal coarctation, primary pulmonary hypertension and valvular disease; congenital heart disease is another such condition. Cardiovascular issues are also important since that shortness of breath is a very common symptom in pregnancy. When this occurs, clinicians must distinguish the dyspnea resulting from underlying medical disorders versus that caused by normal physiologic changes in pregnancy. The latter include anemia, upward displacement of the diaphragm, and respiratory alkalosis. One of the most confounding cardiovascular challenges is associated with PET. Aside from hypertension, patients also show increased systemic vascular resistance and reduced intravascular volume, which cause a reduction in cardiac output as disease severity progresses. In such cases, left ventricular function can deteriorate leading to a risk of pulmonary edema after fluid resuscitation.

On the other side, pregnant women also face an increase in risk for a gamut of infections ranging from varicella pneumonia and urinary tract infections to malaria and hepatitis. In the respiratory system, the impact of pregnancy on cystic fibrosis is well known. However, pregnant women also face a concurrent increase in susceptibility to venous embolisms and pulmonary thromboembolism. This kind of dual impact is also faced by the renal, endocrinical and neurological systems. Pregnancy worsens renal insufficiency and glomerulonephritis and enhances susceptibility to acute renal failure. In the endocrinical system, it worsens diabetes and preeclampsia or obstetric hemorrhage, rather than as the precipitant of their ICU admission.

Two patients in one
As a result of the above factors, obstetric critical care represents a major challenge for medical professionals. Obstetricians need to master both maternal and fetal physiology, and avoid any potentially adverse effects on a fetus of diagnostic and therapeutic interventions given as part of care for the mother. Indeed, it is a common statement that obstetricians treat two patients, the mother and the fetus. They must also assess two separate risks – maternal and fetal – from continuing with a pregnancy and decide if termination of the pregnancy improves the outcome for the mother. This is a very charged challenge since a fetus is generally robust despite maternal illness, and it has been demonstrated that pregnancy-induced critical illnesses are resolved by delivery of the fetus.

Mastering general principles
Obstetric ICU practice consists of firstly mastering general principles such as drug safety, ventilation and management of patient airways, monitoring of the fetus, muscle relaxation and sedation, cardiovascular support, thromboprophylaxis, as well as radiology and ethical issues. This is followed by the acquisition of expertise in the management of obstetric and medical conditions. Critical care interventions for an obstetric patient are similar to those for the non-pregnant patient. However, it is often necessary to adjust physiologic targets for metabolic, pulmonary, and hemodynamic control.

The need for teamwork
Given the complexity and time-sensitive-ness of critical care medicine, teamwork skills are essential. Typically, the team for an obstetric patient at an ICU is multidisciplinary, consisting of the intensivist, obstetrician, anesthesiologist, maternal-fetal medicine specialist, the neonatologist and the ICU nurses. This team needs to operate effectively alongside regular staff. Although clinicians working in critical care environments are generally highly trained and competent, they have traditionally not learned how to work well as part of a team. Remedy this has become a priority on both sides of the Atlantic. As part of a paper on standards of care, the European Board and College of Obstetrics and Gynaecology (EBCOG) explicitly recommends “multidisciplinary, high-quality teamwork” as being “essential” in obstetric medical care and urges healthcare providers to ensure that maternity services have adequate facilities, expertise, capacity and back-up for “timely transfer to intensive care.” EBCOG also seeks to give substance to such a mission. It urges a system of “clear referral paths” to enable pregnant women requiring additional care to be managed and treated by the appropriate specialist teams when problems are identified. One of its most interesting recommendations is for development and routine use of an obstetric ‘early warning chart’ to help in the timely recognition, treatment and referral of women developing a critical illness.
Many rectal STIs in women missed by genital testing only

Testing women for the presence of sexually transmitted infections (STIs) only at the urogenital site will miss approximately 20% of STIs in women who report having receptive anal intercourse, a STD surveillance network study indicates.

“As an obstetrician-gynecologist, I thought it would be interesting to analyze data from women who report having receptive anal intercourse and see what the rates of chlamydia and gonorrhea might be,” Eloisa Llata, MD, MPH, Centers for Disease Control and Prevention, Atlanta, Georgia, said in podcast prepared by the journal, Obstetrics & Gynecology.

“We found that about one in five women who reported having receptive anal intercourse will only be infected at the rectal site, so if we only screen women with a urine-based approach, we are going to miss these women and the opportunity to stop transmission,” she added.

“So this study underscores the need to ascertain a comprehensive sexual history for all patients, male and female, in order to identify risky behaviours and to test accordingly,” Llata emphasized.

The researchers selected and analysed data from the STD Surveillance Network involving 10 state and local health jurisdictions for all visits between January 2015 and December 2016.

The researchers included 94,094 visits made to STD clinics in five jurisdictions in the analysis.

A total of 7.4% of women presenting for care during a 2-year interlude reported having receptive anal intercourse. Some 94.1% of women were tested for Chlamydia trachomatis at the urogenital site, whereas 94.5% were tested for Neisseria gonorrhoea at the same site.

Fewer women, at 76.9%, were tested for the same two STIs at the rectal site. C trachomatis positivity was 9.1%, and N gonorrhoea positivity was 5.4% among women tested only at the genital site.

Results differed among women who were tested only at the rectal site. In this subgroup of women, C trachomatis was detected in 26.7% of samples and N gonorrhoea in 6.1% of them.

Investigators then identified infection rates for each of the two STIs separately in women who were tested at both the genital and rectal sites. Analysis of this subgroup of women found that 10.4% of women tested positive for C trachomatis; of these, 20.9% of women were positive for the infection at the genital site only, whereas 58.6% of women tested positive at both the genital and rectal sites. Another 20.5% of women were positive for C trachomatis only at the rectal site.

For women who were tested at both the genital and rectal site for N gonorrhoea, 4.5% of women had been infected with the STI.

Chemotherapy may lead to early menopause in young women with lung cancer

A new study suggests chemotherapy may cause acute amenorrhea leading to early menopause in women with lung cancer. The study is the first to comment on amenorrhea rates in women younger than 50, concluding that women with lung cancer who desire future fertility should be educated about risks and options before starting treatment.

According to the Mayo Clinic, although the rate of lung cancer diagnoses in men has decreased by 32% since 1975, it has risen 94% percent in women and now has surpassed breast cancer as the leading cause of cancer death in US women. Although lung cancer is more common in older adults, women are diagnosed at a younger age compared with men, and approximately 5,000 premenopausal US women are diagnosed with lung cancer annually. Extensive research of women receiving treatment for breast cancer has found that between 40% and 80% have premature menopause. However, early menopause rates after lung cancer treatments are understudied.

Unique to the premenopausal survivor population is the concern that systemic chemotherapy may cause acute amenorrhea and menopause, leading not only to hot flashes, vaginal dryness, and bone loss but also the possibility of loss of fertility. Premenopausal women with lung cancer may want children and should consult their healthcare providers about options for embryo and oocyte cryopreservation, the gold standard for fertility preservation. The study included 182 premenopausal women (average age at diagnosis, 43 years). The Mayo Clinic Epidemiology and Genetics of Lung Cancer Research Program surveyed women between 1999 and 2016 at diagnosis and annually thereafter about their menstrual status. Types of lung cancer treatments were recorded, and frequencies of self-reported menopause at each survey were calculated.

Although the study is small, for the 85 women who received chemotherapy, 64% self-reported that they were menopausal within a year of diagnosis. Only 15% of the 94 patients who did not receive systemic therapy within a year of diagnosis experienced self-reported menopause. Three patients received targeted therapy alone, two of whom remained premenopausal at the final survey completed a median of 3 years after diagnosis. The results suggest that chemotherapy for patients with lung cancer increases the risk of the early loss of menses in survivors.

“Although more definitive research is needed, premenopausal women who need chemotherapy for lung cancer appear to have a similar risk of amenorrhea, early menopause, and loss of fertility as premenopausal women receiving chemotherapy for breast cancer and lymphoma,” according to Dr. JoAnn Pinkerton, executive director of NAMS. “I agree that premenopausal patients with lung cancer need to be educated about the risk for chemotherapy-related amenorrhea, menopause issues (hot flashes, vaginal dryness, and bone loss), and the potential loss of fertility before chemotherapy is initiated.”

North American Menopause Society
https://tinyurl.com/yd6gdkof

Abbreviated breast MRI may be additional screening option for dense breasts

Among women with dense breast tissue, for whom traditional mammograms are less effective at detecting cancer, who request additional screening after a negative mammogram, abbreviated breast MRI (AB-MR) may be a valuable cancer detection tool. In a study of 195 asymptomatic women with dense breast tissue who had a negative mammogram within the previous 11 months, AB-MR detected five additional cancers after a negative screening mammography, according to preliminary findings from a Penn Medicine team presented this week at the Radiological Society of North America meeting in Chicago.
To put this in perspective, the cancer detection rate of mammography is roughly 4 cancers in 1,000 women who have a mammogram. Digital tomosynthesis (DBT), or 3D mammography, does slightly better, detecting approximately 25 percent more cancers, or roughly 5 cancers in 1,000 women screened. Based on the preliminary results at Penn Medicine, the cancer detection rate of AB-MR screening is 25 cancers per 1,000 patients. One in eight women in the United States will develop breast cancer at some point during their life.

“Having dense breast tissue makes it more difficult to detect a cancer on a mammogram,” said the study’s lead author, Susan Weinstein, MD, an associate professor of Radiology and the director of breast MRI at Penn Medicine. “Based on the literature and our results, women with dense breast tissue who desire supplemental screening, these results suggest that AB-MR may be a better option than other supplemental screening tests such as whole breast ultrasound.

The most common exam offered for asymptomatic patients seeking supplemental screening is a whole breast screening ultrasound examination. However, screening ultrasound examinations have higher rates of false positives, meaning more cases of positive screenings where no cancer is present.

Based on the results from Penn’s study, the AB-MR may be a better option. American Cancer Society guidelines currently recommend a full breast MRI, not an AB-MR, in women who, based on family history of breast or ovarian cancer and/or previous treatment for Hodgkin disease, have a 20 to 25 percent or greater lifetime risk of breast cancer.

Penn Medicine
https://tinyurl.com/yd4hph83

New treatments, screening methods dramatically reduce breast cancer deaths

In the last few decades, dozens of new breast cancer drugs — from chemotherapies to targeted compounds — have become available for clinical use, and mammogram technology has gone from film to digital. But are the changes making a difference in how many women die of breast cancer?

The answer to that question is a resounding yes, according to a multi-institutional network of researchers who have modeled the effect of breast cancer screening and treatment on mortality rates.
Inconsistencies with breast density protocols can be solved

While everyone in the healthcare industry agrees that early detection of breast cancer saves lives, much less consensus can be found across the broader conversation of breast cancer screening in general. This inconsistency is especially apparent as it pertains to breast density, an issue that carries significant weight for both clinicians and patients. It is necessary for radiologists to not only acknowledge and understand how breast density impacts screening in general, but also to recognize the discrepancies in today’s breast density protocols, best practices for handling them and how this can affect clinicians and patients.

To start, consider the way a patient’s breast density is currently assessed. Most commonly, radiologists complete a visual assessment, which involves looking at digital images of the patient’s breasts and determining which of the categories her tissue fits into best according to a classification system known as the Breast Imaging Reporting and Data System (BI-RADS). There are four classifications to establish breast density type, which include – from least to most dense – fatty, scattered fibroglandular, heterogeneously dense, and extremely dense. Although the four categories help establish what radiologists should be looking for visually to determine if a woman has dense breasts, each radiologist’s individual perceptions are open to interpretation, potentially leading to inconsistencies in classification. As a result, some women may be misinformed about what their breast density is, which can be problematic considering breast density has long been recognized as a risk factor for cancer. In fact, women with very dense breasts are four to five times more likely to develop breast cancer than women with less dense breasts [1,2].

Screening protocol for dense breast patients

Once a woman’s breast density is classified, there is a good deal of debate regarding next steps for breast cancer screening. In fact, in a 2017 Kadence study, only 32 percent of the surveyed radiologists in Europe indicated they have a formal screening protocol in place for patients with dense breasts [3]. There are a number of modalities radiologists can choose to utilize when screening women for breast cancer, however, very dense breasts are challenging to read, particularly when using traditional 2D mammography. This is because suspicious calcifications appear white on a mammogram, blending in with dense breast tissue that is similar in colouring that is also known as a “masking effect.” Therefore, the imaging modality used to screen patients, especially those with dense breasts, truly matters. In the U.S., for example, Hologic’s 3D Mammography Exam is the only mammogram that is FDA-approved as superior to standard 2D mammography for routine breast cancer screening of all women, including those with dense breasts [4]. Despite this, there are no official guidelines that radiologists are encouraged to follow when screening their patients with dense breasts. As a result, patients may be missing the opportunity to receive a breast cancer diagnosis earlier on so they can start treatment right away because they weren’t screened with the most appropriate technology.

Clearly, there are many ways that clinicians across the world are currently approaching breast density protocols, especially as they pertain to assessment and screening. These inconsistencies are creating confusion among clinicians and patients alike. Fortunately, there are a number of solutions for this issue. When assessing density, radiologists should consider technology available to them to help remove subjectivity from their evaluations. In fact, clinicians can combine their patient-specific knowledge with artificial intelligence (AI), which—thanks to machine learning-based algorithms—can be used to classify breast tissue within the BI-RADS category, allowing for objective, accurate assessments. As a result, women can and should be better informed about what their breast density truly is, which may help those who didn’t realize they were at risk for cancer to be more compli-ant with screenings. Additionally, radiologists and their facilities should offer their patients the best possible technology that exists for screening dense breasts, pending they have no extenuating limitations based on their individual patient profiles.

Healthcare professionals owe it to their patients to find solutions that provide the best possible outcomes. By making breast density and the inconsistencies surrounding it a priority for reconciliation, radiologists can best deliver care to their patients.

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University Hospital Governance

How university hospitals and aligned universities collaborate to advance goals

ABSTRACT:
As a follow-up to a 2017 global study on governance, interviews with four health care leaders spotlight how university hospitals and aligned universities can bridge different cultures to promote collaboration and advance innovation within their institutions. The leaders describe ideas they use to strengthen alignment across clinical care, research and education as well as create environments that stimulate entrepreneurial performance and results.

As their institutions face the impact of national health care reform, a selective portfolio approach featuring centers of excellence is deployed to serve key patient groups, achieve financial goals and withstand competition. These thought leaders share why it is critical to develop the next generation of leaders and provide medical education techniques adapted to new clinical practices and team-based learning styles.

Is the French model of a university hospital still relevant?

ABSTRACT:
While university hospitals are about to celebrate their sixtieth anniversary, they have never been so challenged. They are now competing with the private sector. They are the envy of lower level public non-university hospitals. A change in their governance system is requested by the universities. They are questioned for their double ministerial supervision, constrained by the national economic and budgetary context. They are also recently empowered with new missions in their areas. Since the beginning of 2018, they have finally been at the center of an unprecedented criticism in the media. Reflections are currently underway to determine what will be the university hospital of tomorrow.
Geneva: hospitals, state and university join forces for outstanding treatment and care

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ABSTRACT
In Geneva, the university hospitals, the University’s Faculty of Medicine and the State form a trio of partners that each guarantee an exceptional level of care to the local population, as well as high-quality medical research and cutting-edge medical training. This article presents the system of governance in place between the three institutions and highlights the keys to their success in a context of close collaboration, shared responsibility and regular interaction. It draws parallels between the structure of the HUG’s senior governance and those of other Swiss university hospitals, for a closer look at the potential for optimization in each one.

Governance in Iranian public hospital

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ABSTRACT:
Since the early 1990s, Iran has initiated a series of structural and decentralization reforms in the hospital system. Hospitals have experienced many changes in their structures, aiming to increase the quality of hospital services, reduce government spending, and enhance hospitals’ control over their revenues and expenses. Hospital autonomy and board of trustees were main reforms that have influenced organization and management of hospitals affiliated to the Ministry of Health and Medical Education. It seems that the approach to hospitals’ autonomy and Board of Trustees has not achieved its desired goals. Reform in hospitals in Iran showed lack of suitable management authority and lack of cooperation and coordination between stakeholders, policymakers and hospital management team in implementing hospital reforms.

Role of governance in university hospitals in emerging markets – A case study

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ABSTRACT
The role of Governance in the OECD and emerged markets has a long track record of implementation. Through decades of development, governance especially in the context of universities and academic medical institutions has been shaped and implemented with key principles embedded in governance structures that are effective and relevant to the institution. Emerging markets have adopted over a shorter period, governance principles relevant to their institutions based on their country context, institutional objectives, board leadership, and strategic plan. This paper addresses key governance roles and implementation issues based on actual experience at both governance and executive levels. These key lessons learned can be of value to emerging market university hospitals and academic health institutions (which do research) to either strengthen existing boards or set up new governance structures.
**Finding solutions in perfectly imperfect health-systems-markets: framing options for the governance and finance of a Collegium Medicum**

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ABSTRACT
The long-term challenges of governance and finance in university hospitals in Poland and Ethiopia may seem far apart. In two recent projects, a common conceptual approach proved remarkably useful in stimulating broad engagement on obstinate financing challenges. The approach links but also challenges traditions in both explicitly (public) financial institution narratives of healthcare ‘markets’ and explicitly (public) health and medical narratives of ‘health systems’. If university hospitals are seen as hubs, in a wider social-economic but professional-information networks, new intra- and inter-institutional possibilities in governance and finance can open. Thorough international comparative analysis of these remarkable institutions is needed.

**Driving the value of hospitals and service delivery: an OECD perspective**

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ABSTRACT:
A core objective of a healthcare organisation is to maximise the quality of care for every patient. But data on key quality dimensions of safety, effectiveness and people-centeredness are not systematically captured from patients’ perspective. This means that governing bodies are basing decisions that determine success in a competitive marketplace on incomplete information. Addressing this requires routine measurement of outcomes and experience from patients themselves. The OECD PaRIS initiative is helping build capacity of countries and organisation to capture the patient voice through validated, comparable indicators. But successful implementation means engaging frontline staff and patients and integrating these metrics into existing information infrastructure.

**Exploring variations in hospital performance – An international perspective**

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ABSTRACT:
National efforts to profile hospital quality have been transitioning from a focus on measuring processes of care to the assessment of outcomes to provide a broader perspective on organisational performance. Hospital performance varies widely across hospitals, both within and across countries. The OECD developed a framework to guide cross-national comparisons and benchmarking across various quality indicators. One such measure is 30-day Acute Myocardial Infarction (AMI) mortality rates. While mortality rates for AMI patients are decreasing over time, significant international variation persists. Hospital characteristics only account for a small proportion of this variation in performance. This leads us to question who is responsible for AMI outcomes and how health care systems can be navigated to improve the outcomes of care? As a result, countries are beginning to shift towards integrated systems of care, encompassing care before, during and after hospitalisation to improve quality outcomes for both the hospitals and the patients.
Tackling wasteful spending as a strategy to improve hospital service capacity

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ABSTRACT:
As much as one-fifth of health spending is wasteful and could be eliminated without undermining access or quality of care. This article points to the many ways in which hospitals, which absorb two-fifths of all OECD health expenditure, are involved in wasteful spending. When it comes to low-value procedures or adverse events, hospitals can be held partly responsible for generating wasteful spending. However, minimising avoidable admissions, unwarranted ER visits or delayed discharges requires systemic responses. Even if tackling waste could mean seeing fewer patients, hospitals which often struggle to meet the demands they face, may ultimately find it in their interest to be proactively involved.
New or worsened bedsores tied to poorer inpatient rehab outcomes

A new study from the University at Buffalo has shown that the presence of new or worsened bedsores is an effective indicator of the quality of care for rehab patients. The study is the first to examine whether this metric is, in fact, associated with outcome of care in inpatient rehabilitation settings.

New or worsened bedsores is a quality metric instituted as part of the Patient Protection and Affordable Care Act (ACA). The ACA requires that medical institutions be evaluated on their quality of care. Bedsores, also known as pressure ulcers, cost the U.S. healthcare system between $9.1 billion (€7.8 billion) and $11.6 billion (€9.9 billion) per year, according to the U.S. Department of Health and Human Services' Agency for Healthcare Research and Quality, the lead federal agency charged with improving the safety and quality of the nation's health care system.

Previous studies have shown an association between the presence of bedsores and a variety of outcomes for patients in acute care hospitals and long-term care facilities. However, the association between pressure injury development and rehabilitation outcomes hasn't been examined previously.

Margaret DiVita, who conducted the research as a doctoral student in epidemiology at UB, is now an associate professor at SUNY Cortland.

Using data from the Uniform Data System for Medical Rehabilitation, she examined the records for nearly 500,000 Medicare patients discharged between January 2013 and September 2014 — after this mandated measure of quality was implemented.

“We looked at how good a proxy measure of quality the new or worsened pressure ulcer measure was, in particular to see if it was associated with poorer outcomes for rehabilitation patients,” said Jo Freudenheim, the paper’s senior author and chair of the Department of Epidemiology and Environmental Health in the UB School of Public Health and Health Professions.

“We found that it was indeed associated with lower quality outcomes: less gain in function during treatment, and lower likelihood of leaving rehab to go to a community setting,” Freudenheim added.

“The focus of this paper is on an important question for the regulation of medical care. How do you measure whether someone is getting good care? In this case we were focused on the inpatient rehab facilities,” Freudenheim said. “We looked at one of the ways that quality is measured as part of the ACA — whether patients get a new pressure ulcer during their stay or, if they have one already, if it gets worse during their stay.”

While outcomes were poorer for those with new or worsened pressure ulcers, more than half of these patients were able to be discharged to a community setting. “A pressure injury prior to admission or greater likelihood of developing worse pressure injury are not appropriate grounds for denial of access to inpatient rehabilitation care,” the researchers write.

Compared to the control group, patients with a new or worsened bedsore tended to have a lower change score on the Functional Independence Measure (FIM), a basic indicator of patient disability, and to have, on average, longer rehabilitation stay. In this study, about 1 percent of patients experienced new or worsened bed sores during their rehabilitation stay.

University at Buffalo
https://tinyurl.com/yb6n56yn

Cannabis extract helps reset brain function in psychosis

Research from King’s College London has found that a single dose of the cannabis extract cannabidiol can help reduce brain function abnormalities seen in people with psychosis. Results from a new MRC-funded trial provide the first evidence of how cannabidiol acts in the brain to reduce psychotic symptoms. Cannabidiol, also referred to as CBD, is a non-intoxicating compound found in cannabis. A purified form of cannabidiol has recently been licensed in the USA as a treatment for rare childhood epilepsies, and a 2017 King’s College London trial has demonstrated cannabidiol has anti-psychotic properties.

However, exactly how cannabidiol may work in the brain to alleviate psychosis has remained a mystery.

“The mainstay of current treatment for people with psychosis are drugs that were first discovered in the 1950s and unfortunately do not work for everyone,” says Dr Sagnik Bhattacharyyya, from the Institute of Psychiatry, Psychology & Neuroscience (IoPPN). “Our results have started unravelling the brain mechanisms of a new drug that works in a completely different way to traditional anti-psychotics.”

The researchers studied a group of 33 young people who had not yet been diagnosed with psychosis but who were experiencing distressing psychotic symptoms, along with 19 healthy controls. A single dose of cannabidiol was given to 16 participants while the other 17 received a placebo.

All participants were studied in an MRI scanner while performing a memory task which engages three regions of the brain known to be involved in psychosis. As expected, the brain activity in the participants at risk of psychosis was abnormal compared to the healthy participants. However, among those who had cannabidiol, the abnormal brain activity was less severe than for those who received a placebo, suggesting cannabidiol can help re-adjust brain activity to normal levels.

The influence of cannabidiol on these three brain regions could underlie its therapeutic effects on psychotic symptoms. Intriguingly, previous research from King’s College London shows cannabidiol appears to work in opposition to tetrahydrocannabinol (THC), the ingredient in cannabis responsible for getting users high which has been strongly linked to the development of psychosis. THC can be thought of as mimicking some of the effects of psychosis, while cannabidiol has broadly opposite neurological and behavioural effects.

Dr Bhattacharyyya and colleagues at IoPPN are now launching the first large scale, multi-centre trial to investigate whether cannabidiol can be used to treat young people at high risk of developing psychosis.

Some estimates suggest that in England alone, over 15,000 people present with early symptoms of psychosis every year. Despite symptoms that can be extremely severe, there are currently no treatments that can be offered to patients at high risk of psychosis because current anti-psychotic drugs can have serious side-effects.

“There is an urgent need for a safe treatment for young people at risk of psychosis,” says Dr Bhattacharyyya. “One of the main advantages of cannabidiol is that it is safe and seems to be very well tolerated, making it in some ways an ideal treatment. If successful, this trial will provide definitive proof of cannabidiol’s role as an anti-psychotic treatment and pave the way for use in the clinic.”

Kings College London
https://tinyurl.com/y8n36su9
Nano-CT device successfully tested

Computer Tomography (CT) is a standard procedure in hospitals, but so far, the technology has not been suitable for imaging extremely small objects. A team from the Technical University of Munich (TUM) describes a Nano-CT device that creates three-dimensional X-ray images at resolutions up to 100 nanometers. The first test application: Together with colleagues from the University of Kassel and Helmholtz-Zentrum Geesthacht the researchers analysed the locomotory system of a velvet worm.

During a CT analysis, the object under investigation is X-rayed and a detector measures the respective amount of radiation absorbed from various angles. Three-dimensional images of the inside of the object can be constructed based on several such measurements. Up until now, however, the technology reached its limits when it came to objects as small as the tiny, 0.4 millimeter long legs of the velvet worm (Onychophora).

High-resolution images of this magnitude required radiation from particle accelerators, yet there are only a few dozen such facilities in Europe. Approaches suitable for the typical laboratory still had to struggle with low resolutions, or the samples investigated had to be made of certain materials and could not exceed a certain size. The reason was often the use of X-ray optics. Put simply, X-ray optics focus X-ray radiation similar to the way optical lenses focus light – but they also have several limitations.

The TUM Nano-CT system is based on a newly developed X-ray source, which generates a particularly focused beam, without relying on X-ray optics. In combination with an extremely low-noise detector, the device produces images that approach the resolution possible with a scanning electron microscope, while also capturing structures under the surface of the object under investigation.

“Our system has decisive advantages compared to CTs using X-ray optics,” says TUM scientist Mark Müller, lead author of the PNAS article. “We can make tomographies of significantly larger samples and we are more flexible in terms of the materials that can be investigated.”

Like so many other imaging instruments, the Nano-CT system was developed and installed at the Munich School of BioEngineering (MSB). This TUM interdisciplinary research centre is Europe’s thematically most comprehensive university facility for the intersection of medicine, engineering sciences and natural sciences. “Our goal in the development of the Nano-CT system is not only to be able to investigate biological samples, such as the leg of the velvet worm,” says Franz Pfeiffer, TUM Professor for Biomedical Physics, Director of the MSB, and a Fellow at the TUM Institute for Advanced Study (TUM-IAS).

“In the future, this technology will also
make biomedical investigations possible. Thus, for example, we will be able to examine tissue samples to clarify whether or not a tumour is malignant. A non-destructive and three-dimensional image of the tissue with a resolution like that of the Nano-CT can also provide new insights into the microscopic development of widespread illnesses such as cancer.”

TUM
https://tinyurl.com/y9x4jycu

Engineers scrap the stethoscope, measure vital signs with radio waves

No visit to the doctor's office is complete without a blood-pressure cuff squeezing your arm and a cold stethoscope placed on your chest. But what if your vital signs could be gathered, without contact, as you sit in the waiting room or the comfort of your own home?

Cornell engineers have demonstrated a method for gathering blood pressure, heart rate and breath rate using a cheap and covert system of radio-frequency signals and microchip "tags," similar to the anti-theft tags department stores place on clothing and electronics. The cracker-sized tags measure mechanical motion by emitting radio waves that bounce off the body and internal organs, and are then detected by an electronic reader that gathers the data from a location elsewhere in the room.

The system works like radar, according to Edwin Kan, professor of electrical and computer engineering. But unlike most radar systems that rely solely on radio waves to measure movement, Kan's system integrates "near-field coherent sensing," which is better at directing electromagnetic signals into body tissue, allowing the tags to measure internal body movement such as a heart as it beats or blood as it pulses under skin.

The tags are powered by electromagnetic energy supplied by a central reader, and because each tag has a unique identification code it transmits with its signal, Kan said up to 200 people can be monitored simultaneously using just one central reader.

"If this is an emergency room, everybody that comes in can wear these tags or can simply put tags in their front pockets, and everybody's vital signs can be monitored at the same time. I'll know exactly which person each of the vital signs belongs to," said Kan.

The idea originated after Kan and his graduate student, Xiaonan Hui, visited the Center for Sleep Medicine at Weill Cornell Medicine and NewYork-Presbyterian, where measuring vital signs can interrupt sleep patterns.

"So we were thinking about the kind of technology we were already using in our lab and thought we could probably get a signal from those vital signs," said Hui. "But after we figured out the theory and did the experiments, the signal quality was better than our prediction." The signal is as accurate as an electrocardiogram or a blood-pressure cuff, according to Kan, who said he believes the technology could also be used to measure bowel movement, eye movement and many other internal mechanical motions produced by the body.

Kan and Hui plan to do more extensive testing with Dr. Ana Krieger, medical director of the Center for Sleep Medicine and associate professor of clinical medicine, of medicine in clinical neurology and of clinical genetic medicine at Weill Cornell Medicine. They're also working with professor Jintu Fan and associate professor Huju Park from Cornell's Department of Fiber Science and Apparel Design, who have demonstrated a way to embroider the tags directly onto clothing using fibres coated with nanoparticles.

Hui envisions a future in which clothing can monitor health in real time, with little or no effort required by the user.

Cornell University
https://tinyurl.com/y9q3dbcy

Photoacoustic imaging could allow scientists to watch blood vessels with improved resolution

Researchers have reported an approach to photoacoustic imaging that offers vastly improved resolution, setting the stage for detailed in vivo imaging of deep tissue. The technique is based on computational improvements, so it can be performed with existing imaging hardware, and thus could provide a practical and low-cost option for improving biomedical imaging for research and diagnostics.

After further refinements, the approach could offer the opportunity to observe the minute details of processes occurring in living tissue, such as the growth of tiny blood vessels, and therefore provide insights on normal development or disease processes such as cancer.

“Our main goal is to develop a microscope that can see the microvasculature and capillary vessels,” said Ori Katz, a researcher with the Hebrew University of Jerusalem, Israel, and senior author of the study. “It's important to be able to watch these grow with nearby tumours, for example.” The researchers describe overcoming the acoustic diffraction limit, a barrier that previously limited the resolution obtainable with photoacoustic imaging, by exploiting signal fluctuations stemming from the natural motion of red blood cells. Such fluctuations might otherwise be considered noise or viewed as detrimental to the measurements.

“With photoacoustic imaging you can see much deeper in tissue than you can with an optical microscope, but the resolution is limited by the acoustic wavelength,” Katz said. “What we have discovered is a way to obtain photoacoustic images with considerably better resolution, without any change in the hardware.” Photoacoustic imaging combines optical illumination (which uses light waves) and ultrasound (which uses sound waves) to image biological samples in ways that would not be possible with either modality alone. Optical methods can provide excellent resolution but often only near the surface as light is highly scattered in tissue. Ultrasound can go much deeper but does not offer the same contrast as optical imaging. By integrating the two modalities, researchers have been able to overcome the drawbacks of each to advance a host of applications.

However, the imaging technique does have certain limitations. Photoacoustic imaging relies on acoustic detection, so the image resolution is determined by the acoustic wavelength. While optical microscopy, for example, can see objects on the scale of less than a micron, photoacoustic imaging is limited to tens of microns. This means that photoacoustic imaging cannot resolve small objects like microvessels or capillaries.
Katz devised the method for surpassing the acoustic diffraction limit in collaboration with Emmanuel Bossy, now at Université Grenoble Alpes in Grenoble, France. At the heart of their work is an advanced statistical analysis framework that they apply to images of red blood cells flowing through the vessels; the blood cells facilitate imaging by absorbing light at particular wavelengths. By increasing the resolution computationally, they avoided the need for any additional hardware, so the advances described can be attained using existing photoacoustic imaging systems.

The tools needed to achieve super-resolution with photoacoustic imaging were described nearly a decade ago in a work in optical microscopy with the technique of super-resolution optical fluctuation imaging (SOFI). Katz and colleagues came to this work after grappling with the problem of the acoustic diffraction limit and discovered that the same mathematics used with SOFI could be used for improving photoacoustic imaging.

"Someone just needed to make the connection," Katz said. "It's the same equation—the wave equation. Mathematically, you could say it's the same problem."

Katz and his colleagues demonstrated the ability to surpass the acoustic diffraction limit using a SOFI-inspired photoacoustic imaging technique. That work had two main limitations. First, it required the use of a long-coherence laser, not a standard part of photoacoustic imaging systems, in order to form dynamic structured interference patterns called speckle to create the signal fluctuations. Second, due to their small dimensions, the use of speckles as dynamic illumination resulted in the fluctuations having a low amplitude with respect to the mean photoacoustic signal, which in turn made it difficult to resolve the specimen in question.

In the new study, the researchers showed that they could overcome these limitations by applying the statistical analysis framework to the inherent signal fluctuations caused by the flow of red blood cells—so the researchers didn't need to rely on coherent structured illumination—and furthermore demonstrated experimentally that they could perform super-resolution photoacoustic imaging using a conventional imaging system. The demonstration served as a proof of principle for the new technique. The researchers are now focused on developing it further, to fulfill its potential for in vivo applications.

Katz described two main challenges in reaching this goal. The first is the problem of motion artifacts. In their demonstration, the researchers imaged blood streaming through small tubes. In animal models and in humans, though, blood flow is only one of the motions they would have to consider. The technique would also need to account for the heartbeat, the changing volume of the vessels and even microscale movements of the tissue itself.

The other main challenge relates to signal levels. In recent experiments blood was the only absorber in play, but in real-world scenarios other absorbers would be present. The researchers are now working on ways to better see the signal originating from flow while suppressing any background signals.
Recent study shows significant and sustained noise reduction in critical care

A recent study [1] used a SoundEar3-300 noise warning sign as an isolated intervention to determine whether visualizing noise could produce a sustained noise reduction in adult critical care. It proved a significant noise reduction of 3.9 dB (from 57.4 dB) in median ambient sound levels and saw a significant reduction in peak sound levels (0.7 dB reduction from 66.0 dB). After 4 months with continued use of the SoundEar3-300, researchers found a sustained noise reduction of 3.6 dB compared to baseline recording before introducing the SoundEar. The device acted as an isolated intervention to significantly reduce night-time ambient and peak sound levels, a change that was sustained after a four-month period.

In another study from 2014 [2], a SoundEar device was used as a part of a noise reducing initiative at an operating theatre in Hannover, Germany. This study showed a significant reduction in noise levels in the operating theatre from 63 dB to 59 dB. Moreover, the noise reduction led to a significant reduction in the number of complications after surgery and reduced surgeons' stress levels by 20%.

Evaluation studies confirm improved oncology patient pathways through HORIBA Medical’s new POC hematology analyser

Two studies have been published that successfully evaluate the use of its Yumizen H500 hematology analyser for point-of-care testing (POCT) to enhance the care of oncology patients. With near-patient, full blood count results, patients undergoing chemotherapy can receive treatment without delay and greatly reduce their hospital/clinic exposure times. Both UK-based studies were presented at the recent ISLH 2018 (International Symposium on Technical Innovations in Laboratory Hematology) in Brussels.

The evaluation studies were performed by the Cardiff and Vale Health Board (CAVHB), University Hospital of Wales [1] and the Spire Bushey Laboratory, London [2] and can be viewed on the HORIBA Medical global website. Both studies demonstrated that the compact, easy-to-use analyser delivered at the POC clinically key parameters that showed exceptional correlation with larger laboratory-based hematology analysers. Blood samples from oncology patients may be abnormal, having low counts and atypical blood cells, therefore it is essential that near-patient testing does not compromise the clinical integrity of results.

The studies both found that in addition to speed and ease of use, the Yumizen H500’s functionality and audit systems fully adhere to ISO standards (both 15189:2012 and 22870:2016) with the same internal quality controls as larger analysers. This in turn ensured detailed, accurate results for timely and sound clinical decision making.

For example, the Cardiff study concluded that by using the Yumizen H500, “In CAVHB the potential for clinical improvement is potentially vast, average TAT (vein to report) for FBC is ~4 hours, this could be reduced to <15 minutes. This would mean that in certain patient groups (thrombocytopenic and anemic) they can request blood components earlier and be transfused more quickly, this in turn would reduce hospital stays. In neutropenic patients their treatment options could be considered more readily and reduce hospital/clinic exposure time in those that would not be appropriate for chemotherapy.” With just three reagents and an intuitive touch screen user interface, HORIBA Medical’s Yumizen H500 compact hematology analyser is designed for ease of use; yet it offers a range of clinically key parameters, including: 5-population WBC differential, red blood cell parameters and platelet count. This makes the Yumizen H500 most suitable for rapid blood counting for use in POC settings for pediatric care and chemotherapy patients, as well as from emergency care to the routine laboratory.

The two POCT studies presented at ISLH 2018 can be viewed at: https://www.horiba.com/en_en/products/by-segment/medical/

EKF POC HbA1c analyser demonstrates excellent performance in international evaluation study

EKF Diagnostics has announced the successful evaluation of its Quo-Lab® point-of-care HbA1c analyser by the European Reference Laboratory for Glycohemoglobin. In a recently published paper. The reference laboratory’s evaluation study assessed HbA1c (glycated hemoglobin) POC devices using international quality targets, posing the question ‘Are they fit for purpose?’ Out of 30 available on the market and the four that agreed to participate, only EKF’s Quo-Lab and one other analyser passed the same stringent quality criteria as laboratory analysers, achieving excellent analytical performance.

The study aimed to evaluate the four POC HbA1c instruments according to Clinical and Laboratory Standards Institute (CLSI) protocols and how they performed when different criteria were applied using four certified IFCC and NGSP secondary reference measurement procedures (SRMPs). The reference laboratory study confirmed there was minimal bias between Quo-Lab and the mean of four SRMPs, it also passed all relevant performance criteria going far beyond what is required for NGSP and IFCC certification.

Notably, Quo-Lab showed no consistent clinically significant interference from the common hemoglobin (Hb) variants HbAS, HbAC, HbAD, HBAE and elevated A2. It also easily met imprecision criteria, achieving a ≤2.4% CV in IFCC SI units and ≤1.7% CV in DCCT units which represents a significant improvement on previous studies.

Commenting on the successful European Reference Laboratory for Glycohemoglobin evaluation, Gavin Jones, Diabetes Product Manager, EKF Diagnostics said, “The excellent performance that Quo-Lab has demonstrated in this latest study confirms that it is very definitely fit for purpose, delivering reliable HbA1c results in a range of settings. Quo-Lab® HbA1c is a desktop analyser designed specifically to meet the needs of diabetes clinics and laboratories in settings that demand low cost of operation and ease of use. From a simple semi-automated procedure, Quo-Lab provides test results within four minutes from a venous or finger prick blood sample of just 4 μL.”

www.ekfdiagnostics.com

www.soundear.com

2.https://www.pubfacts.com/detail/24394594/1143718767773#articleShareContainer
Ampronix’s advanced ultra-high definition technology facilitates cutting-edge medical imaging

The medical industry is entering a new epoch in imaging technology. Healthcare professionals are upgrading to ultra-high definition 4K resolution as the innovative technology provides four times the clarity than that of high definition. Typically, diagnostic and surgical procedures are guided via information gleaned from various imaging procedures. With so much weighing on these scans, the ultimate goal is to obtain unparalleled picture quality punctuated by incomparable clarity.

Our variety of UHD 4K medical display options from major brands including Barco, Sony, NDS, LG, and Eizo provide clients with a variety of smart choices. For those balancing today’s budgets that include improvements to equipment, Sony’s LMD-X550MD offers affordability, efficiency, and versatility. Available in 55 inches, its slim, ergonomic design and splash proof covering will improve any operating room.

In addition to a sleek exterior, the surgical monitor is equipped with Sony’s OptiContrast technology and original Advanced Image Multiple Enhancer, which allows users to visualize images without glare or reflection. The LED backlit monitor features Quad View Mode and a user-friendly interface, which allows users to view up to four images simultaneously, manipulate images via image mirroring as well as allowing users to take advantage of side-by-side comparison, picture-in-picture, and picture-out-picture.

In minimally invasive surgeries, large displays play an integral role in facilitating the visual components necessary to perform procedures. The HYBRIDPIXXX, an Ampronix original UHD 4K display recently made public, is unrivaled in image quality as it is equipped with our patented 4KBoxx.

The HYBRIDPIXXX 4KBoxx video manager gives physicians the ability to select desired images and exhibit them in various layouts on the UHD display. Beneficially, hundreds of potential layout options offer a multitude of customization possibilities. With the ability to input up to 27 analog or digital signals, the HYBRIDPIXXX is an ideal candidate for large scale viewing and multi-screen monitoring.

Those interested in adopting UHD 4K technology ought to consider endoscopic camera options, which will vastly improve the visual aspect of minimally invasive surgeries. These cameras have the ability to exhibit vibrant and clear images of internal structures to any UHD 4K display. Currently, Panasonic’s 4K Ultra HD 3MOS Camera is the smallest 4K camera head available.

Panasonic’s 4K camera has the ability to capture images in 3D and edit with tools to zoom-in and crop. The colour enhancement technology and video processor offers outstanding image reproduction and colorization capabilities. The camera has maximized connectivity with an output of up to 1600 lines, a resolution of 3840 x 2160 at 60p, and dual channel outputs.

The shift towards UHD 4K technology is quickly becoming a medical industry standard. Ampronix is proud to be at the forefront of leading technological shifts by equipping healthcare providers with only high caliber products. Moving forward, the company will be stocked with UHD 4K recorders from brands like Panasonic and Sony, slated for release in the upcoming months.

About Ampronix

Ampronix is a renowned authorized master distributor of the medical industry’s top brands as well as a world class manufacturer of innovative technology. Since 1982, Ampronix has been dedicated to meeting the growing needs of the medical community with its extensive product knowledge, outstanding service, and state-of-the-art repair facility. Ampronix prides itself on its ability to offer tailored, one-stop solutions at a faster and more cost effective rate than other manufacturers. Ampronix is ISO, and ANSI/ESD S20.20-2014 certified.

https://www.ampronix.com
Email: info@ampronix.com
Moving monitors, avoiding blind spots

Transporting sick patients can be a stressful task, and the sicker the patient, the greater the chance of problems during transport. The patient’s vital signs are monitored extensively and continuously in all care areas of the hospital but in the emergency room (ER), the operating room (OR), and the intensive care unit (ICU), it’s perhaps especially important as many patients in these units need very close surveillance and doctors need real-time information. When transferring these patients, it’s important not to lose vital information when unplugging and repugning equipment, so called blind spots.

It all starts with weighing the risks of patient transport against the benefits. Transferring a sick patient from the ICU or the ER to another unit or department in the hospital can be risky — and it is often stressful for both the patient and the healthcare professionals responsible for the transfer. Recent studies indicate that transported patients suffer two to four times more complications than non-transported ones, and about 46% of transported patients experience adverse events. Transport within the hospital is also associated with a longer patient stay in the ICU.

For a critically ill patient, the reduction or change of care and the movement itself can become the cause for serious complications and put their health at risk. Airway-related and pulmonary complications can occur during transport, as well as hemodynamic alterations. Cardiac arrest remains a concern for critically ill patients undergoing transfer, and intra-hospital transport has been suggested as a potential risk factor for infection. But intra-hospital transport can be necessary, as patients need diagnostic or therapeutic procedures or tests that are vital for their treatment and need to be conducted in another part of the facility.

Nurses play critical roles in helping to ensure that transports go smoothly and without blind spots, but the process may require cumbersome setups, especially when using large patient monitors which, because of their size, are not very convenient for this purpose. Also, transport monitors often have to be placed in patients’ beds. This means they sometimes get lost under the covers or may even drop on the floor. On the other hand, unplugging a patient from a monitor to be transferred, even for the shortest amount of time, means doctors lose some potentially critical information.

CARESCAPE ONE, launched at Euroanaesthesia 2018 in Copenhagen, is a lightweight plug-and-play transport monitor, designed to reduce complexity and transport within the hospital, while being durable enough to withstand drops to the floor — as can happen in the hectic hospital environment. It is fitted with a cable mount that holds all the cables, improving patient comfort. The parameter connectors of the new monitor are easy to attach and use identical USB ports so that any parameter may be plugged into any port.

GE HEALTHCARE
Medica Hall 3 / C56
www.interhospi.com & search 47357

Terminals for diverse hospital applications

Advantech, a provider of medical computing systems and services, has launched its HIT-W183 and HIT-W153 healthcare infotainment terminals specifically designed for a wide range of hospital applications. Featuring an Intel® N4200 processor, dual operating systems (Windows 10 IoT and Android 6.0.1), and an 18.5”/15.6” 16:9 widescreen display with projected capacitive (PCAP) 10-point touch control, HIT-W183/W153 offers healthcare providers a cost-effective and highly flexible medical computing device. In addition to a 5MP camera, HIT-W183/W153 is equipped with rear-access I/O that includes USB 2.0, USB 3.0, RJ12, RJ45, optional power-over-Ethernet (PoE) support (HIT-W153 only), and dual isolated Ethernet ports that enable separate Internet (patient use) and intranet (caregiver use) traffic for superior connectivity and data security. The IP65-rated true-flat front panel protects against water and dust ingress and can be cleaned easily to ensure the highest levels of hygiene and infection control.

For nurse call applications, HIT-W183/W153 features an integrated nurse call button with LED indicator and a handset equipped with two microphones and noise cancellation technology to guarantee optimal responsiveness and superior patient care. Compliant with EN 60601-1 and IEC 62368 medical and ITE certification standards, the HIT-W183/W153’s ultra-slim (43 mm) design allows it to be easily mounted on walls, counter tops, mobile carts, and bedside swing arms to serve as medical equipment control panels, nurse station terminals, pharmacy information systems, medical cart devices, and patient infotainment terminals. Moreover, to expand the functionalities according to specific usage needs, HIT-W183/W153 terminals can be integrated with a smart card reader, RFID/NFC reader, and optional barcode scanner and TV tuner modules. HIT-W183/W153 is built with an integrated handset that features two microphones and noise cancellation technology to eliminate environmental noise and provide optimal sound quality during nursing assistance calls. Advantech’s HIT-W183/W153 terminals are equipped with a red emergency call button and LED indicator that can be integrated with a hospital’s existing nurse call system to allow patients to request assistance or alert staff of any emergencies. The red emergency call button uses a separate power supply from that of the HIT system. This allows the red emergency call button to remain functional even when the terminal is powered off. Additionally, considering patients and staff usage requirements, the HIT-W183/W153’s front-facing function buttons are built-in at a 60° angle for accessibility and easy operation. HIT-W183/W153 can be installed in bedhead units or mounted on bedside swing
arms to function as bedhead terminals or patient infotainment devices, respectively. Healthcare staff can use the terminals to access medical records and hospital information systems, retrieve laboratory results, monitor patient vital signs, and document treatment observations. Meanwhile, patients can use the terminals to watch movies/TV, make phone calls, play games, surf the Internet, send emails, request nurse assistance, and manage the ward environment, such as adjust the bed height, lighting, and curtains. These infotainment terminals provide a single solution that enables efficient provision of digital entertainment and clinical services at the point-of-care for improved service quality.

Anesthesia machine

The Flow-c anesthesia machine is a compact anesthesia machine where every detail has been designed to ease the daily work. Based on the Servo ventilator platform and with the same innovative technology as Flow-i, the Flow-c ensures superior ventilation performance with the power and precision needed to ventilate all patient categories. The Flow-c is designed to simplify everyday anesthesia workflow in the fast-paced OR. The intuitive and easy to use touch screen gives one point of control for all functions, and the system’s operational simplicity saves time and contributes to improved mobility in the ORs. Despite its compact design, Flow-c packs in a great rail length using every millimeter of space. The stepless rails allow monitors, tables and other accessories to be added where it best suits the user. And with the neatly routed back, covered by specially designed panels, Flow-c minimizes the clutter of hoses and cables, and contributes to an improved hygiene and safety in the OR. As all Getinge Flow models, the Flow-c has the special O2 Guard feature to prevent hypoxia as a standard feature. This safety mechanism overrules the clinician’s settings and increases the flow of fresh gas and oxygen if the O2 level should drop below 21%.

GETINGE
www.interhospi.com & search 47355

Pressure redistribution system adapts surface to conform to body

A unique, patented technology that re-distributes pressure to prevent tissue damage by emulating the effects of a body “floating” in a fluid medium is now available for hospitals and long-term care facilities. All Dolphin FIS (Fluid Immersion Simulation) surfaces provide an environment that promotes tissue perfusion and prevents injury related to compromised blood flow. Dolphin FIS has been proven clinically effective at speeding the healing of advanced stage or multiple pressure ulcers, flaps, skin grafts, burns and other wound conditions and is available for beds and seat cushions, providing protection for high risk patients throughout their hospital stay or at home. Dolphin FIS software uses complex algorithms, a microprocessor and sophisticated dynamic pressure waveform analysis to precisely adjust the density of the surface for the unique anatomical features of the patient. It continuously monitors the patient’s weight, 3D surface area and movements to automatically calculate the exact settings to effectively manage the pressure of the patient’s body in the medium. The result is that the patient is truly floating, cradled in a simulated fluid environment and suspended in a near neutrally buoyant state. Distortion to the body is minimized and orientation of bone, muscle and subcutaneous tissue is normalized.

Dolphin FIS is the first and only technology proven to maintain near normal blood flow and prevent pressure injuries across the care continuum. The system is mobile and is available for most frames in a hospital, including hospital beds, stretchers, wheelchairs, and bariatric and pediatric surfaces. It’s a standardized intervention that provides a single, cost-effective solution for operating rooms, post-anesthesia care units, coronary care units, intensive care units, spinal cord injury units, medical-surgical units, emergency departments and long-term care facilities. Dolphin FIS technology is extremely easy to use. There’s virtually no programming, no manual data input, and no need for caregiver/staff intervention. The system is simply plugged into the wall and the patient is placed on the surface.

JOERNS
Medica Hall 14 / B33
www.interhospi.com & search 47351
QA measurement system for specific X-ray modalities

RaySafe X2 Solo is a new product line that covers the measurement needs of specific X-ray modalities. It’s based on the same technology as RaySafe X2, but instead of multi-modality capability, each model meets specific needs. RaySafe X2 Solo features a large touch screen showing all parameters simultaneously, sensors ready for measurements without special settings or modes and a base unit storing all readings and showing full waveforms. It offers true ease-of-use, which saves valuable time and minimizes the risk of making faulty measurements. RaySafe X2 Solo removes unnecessary steps in taking a measurement – like positioning the sensor, choosing a setting, or interpreting results. The R/F and DENT sensors are both orientation-independent so the only thing to do is to place the sensor in the X-ray beam and turn on the instrument. The rest is automatic – no menus or special settings needed. RaySafe X2 Solo combines state-of-the-art sensor technology with an intuitive and proven user interface, ensuring user friendliness. Each X2 Solo includes a specific sensor to cover specific needs.

FLUKE BIOMEDICAL/RAYSafe
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www.interhospi.com & search 47358

Cardiac ultrasound solutions with anatomical intelligence

Built on the EPIQ ultrasound platform, the EPIQ CVx cardiovascular ultrasound system is specifically designed to increase diagnostic confidence and simplify workflow for clinicians and reducing the need for repeat scans. Philips is also introducing the EPIQ CVxi, specifically tailored for use in the interventional lab. EPIQ CVx and EPIQ CVxi are CE marked and have received 510(k) clearance from the U.S. FDA. By using advanced 3D organ modeling, image slicing, and proven
quantification, anatomical intelligence is helping make ultrasound exams easier to perform and more reproducible. The EPIQ CVx includes higher processing power, exceptional image clarity and sharpness, improved exam efficiencies and more robust and reproducible quantification, enabled by anatomical intelligence. The EPIQ CVx includes TrueVue, giving clinicians the ability to see photo-realistic renderings of the heart, which improves cardiac anatomy analysis by offering detailed tissue and depth perception imaging through a new virtual light source. The system provides cardiologists with high image quality through the latest generation OLED monitor, offering a more dynamic, wider viewing angle for side-by-side image comparison. The system offers a variety of new features including Dynamic Heart Model which uses anatomical intelligence to automatically quantify left ventricle function to produce a multi-beat analysis for adult patients. Dynamic Heart Model has been shown to reduce the amount of time to generate a 3D Ejection Fraction by 83%. It also delivers a high level of robustness and reproducibility, even for patients with an arrhythmia. The system also includes the new S9-2 PureWave Transducer, which simplifies pediatric cardiac exams by displaying high levels of detail and contrast resolution through the single-crystal technology. It also provides tissue information at greater depths and enhances pediatric capability for coronary artery visualization.

The EPIQ CVx includes a cardiology-specific user interface that simplifies the exam experience through a user-configurable touch-screen interface, allowing clinicians to personalize their controls and improve workflow for their cardiology exams. Strong security capabilities and protocols are also provided. Specifically designed for use in the cath lab, the EPIQ CVxi with EchoNavigator is Philips’ third-generation interventional solution to streamline communication between the interventional cardiologist and the echocardiographer during complex interventional exams. Combining live ultrasound and X-ray information into one intuitive view, EchoNavigator helps interventional cardiologists oversee procedures along with the location of key anatomical structures. In addition, MultiVue provides more flexibility when using 3D during diagnostic or interventional procedures as the clinician can see multiple and flexible views at once.

**PHILIPS ULTRASOUND**

Medica Hall 10 / A22

i www.interhospi.com & search 47348

**Cardiovascular MRI scanner**

The Magnetom Sola Cardiovascular Edition is a 1.5 Tesla magnetic resonance imaging (MRI) scanner designed specifically for cardiovascular examinations. Magnetom Sola Cardiovascular Edition incorporates the latest technologies with the specific aim of providing the maximum diagnostic information in cardiovascular examinations. This leads to faster, more reliable, and definitive diagnoses for a larger number of patients with underlying ischemic, structural, and arrhythmogenic conditions. The MRI scanner’s innovative applications can cut examination times down to 20 minutes and clarify a broad range of clinical questions in cardiology. Guidelines issued by the European Society of Cardiology (ESC) have long described magnetic resonance imaging as the gold standard for assessing the morphology and function of the heart. Over 25 ESC Guidelines now contain specific recommendations describing instances where MRI should be used in cardiac diagnosis. This is primarily due to the accuracy of MRI when quantifying cardiac volume, mass, and wall motion, as well as its ability to diagnose ischemia and myocardial viability. There are also diseases such as myocarditis (inflammation of the heart muscle), for which cardiovascular MRI is the only non-invasive diagnostic option with the pre-requisite sensitivity. By receiving the right diagnosis at the right time, this group of patients can avoid unnecessary invasive procedures.

The Compressed Sensing Cardiac Cine application accelerates MRI scanning sequences so that cardiac function can be measured while the patient is breathing freely. Previous scanners required patients to hold their breath for up to 20 seconds several times during the process. This means that the benefits of the gold standard are now available to new groups of patients, including individuals with arrhythmia or dyspnea who were previously not eligible for CMR. The MyoMaps application provides quantitative information on the tissue composition of the cardiac muscle. This can be used to diagnose diseases of the heart muscle, scar tissue and edema at a very early stage of the condition, allowing the right treatment option to be chosen for the patient as soon as possible. Clinical conditions such as myocarditis can even be detected without using contrast agents. Cardiac Dot Engine is a unique software package which provides step-by-step guidance for standardized diagnostic cardiac MRI exams. It is based on artificial intelligence algorithms, allows users to navigate confidently through the cardiovascular MRI scanning process. Also, BioMatrix Technology automatically adjusts to the biovariability of different patients to prevent undesirable variations in the scanning process. As a result, BioMatrix Technology reduces examination times, cuts down on the number of repeat scans, and leads to consistent, high quality scanning results.

**SIEMENS HEALTHINEERS**

Medica Hall 10 / C21

i www.interhospi.com & search 47347
KIMES 2018: The Korean trade show previews the future of medical devices and technology

The 34th Korea International Medical and Hospital Equipment show held in Seoul last March gathered 1,313 exhibiting companies from 34 countries, including 649 domestic Korean manufacturers over 40,122 sq m of exhibition space. The 4-day event attracted over 73,000 visitors from 92 countries. About 30,000 items of medical equipment, including high tech devices, medical information systems, rehabilitation equipment and healthcare supplies were presented at the show. Over the years, KIMES has succeeded in establishing itself as the leading technology-oriented and most prominent medical exhibition in the whole of the South East Asian region.

In tune with this year's theme 'Think the Future', a number of exhibitors, mostly domestic, were involved in robotic solutions applied to healthcare, showing a variety of robotic medical devices, for example medical sterilization robots, artificial joint orthopedic surgery robots, walking assistance robots as well as robotic rehabilitation systems. There was even a special rehabilitation robot booth in Hall B.

For the third consecutive edition of the show, the Global Bio & Medical Plaza organized by KOTRA (Korea Trade Investment Promotion Agency) provided extra business opportunities for domestic exhibitors by helping to develop commercial and business relationships between foreign and overseas guests and Korean companies. KIMES is a definite must for international buyers interested in the latest product developments from the particularly dynamic and innovative Korean medical device industry as well as for foreign companies keen to boost their market share in the Korean growing healthcare industry fuelled by increasing consumer demand. KIMES 2019 will take place in Seoul from 14 to 17 March of next year.

KIMES
www.kimes.kr

Compact refrigerators for secure and sustainable clinical storage

A new series of compact refrigerators has been specifically developed to address the need of clinical laboratories and patient care facilities for cold storage equipment that enable secure and energy-efficient storage of vaccines, medicines, lab kits and breast milk, while offering quiet operation and a small footprint. Powered by Phononic’s solid state cooling technology, the new TSG refrigerators have been designed to provide uninterrupted temperature stability and cleanroom-compatible readiness for reliable storage of the most sensitive materials. Furthermore, the systems offer quiet operation at less than 35 dBa, meaning they can be placed in clinical laboratories, nurse’s stations, and even patient rooms and intensive care units, without disrupting the work environment and patient comfort. With ENERGY STAR-rated performance, the TSG Series refrigerators consume significantly less energy than similar models, meeting clinical settings’ sustainability objectives and reducing operating costs. In addition, as they feature fewer refrigeration components compared to other available units, they require only minimal maintenance and offer increased storage capacity. The solid state technology used in the TSG Series allows for minimal impact on the clinical environment through reduced operational noise and heat output, while the systems’ small size maximizes working space. As with the Thermo Scientific TSX Series of freezers and refrigerators, the new TSG Series uses environmentally-friendly refrigerants in line with global initiatives aimed at minimizing greenhouse gas emissions. Additionally, the systems feature an alarm capability, notifying users of temperature fluctuations, door ajar and power failure, enabling for corrective action to ensure ideal storage conditions are always maintained throughout the internal chamber. The TSG Series refrigerators are available in undercounter (TSG505) and countertop (TSG205) configurations to suit varying application needs.

THERMO FISHER SCIENTIFIC
Medica Hall 3 / F96
www.interhospi.com & search 47354

Compact refrigerators for secure and sustainable clinical storage

High-quality images taken with the Viera wireless ultrasound scanner are comparable to mid-tier cart systems, and are easy to access. Images are transmitted directly to a smartphone or without Internet access. They can be integrated seamlessly with existing PACS infrastructure or by the convenience of the Cloud. And with many preset imaging controls, including automated gain and frequency settings, Viera ultrasound is as easy to use as the camera on a smartphone. Viera ultrasound provides easy access to imaging throughout the facility, including preset modes for breast, dense breast, interventional, vascular and small parts applications. Viera handheld ultrasound is a wireless tool that leverages existing smart devices - no Internet access required when scanning. Viera ultrasound’s exceptional portability gives on-demand access to imaging. It offers an efficient way to perform guided interventional procedures, like biopsies, marker placements, and wire localizations. It also helps augment capabilities for facilities with limited imaging capacity. The Viera portable wireless ultrasound scanner is ideal for quick diagnostic looks, visual confirmations, interventional procedures, vascular access, and small parts exams and procedures. Easy access to these capabilities will help optimize clinical workflow and patient pathway. Features includes preset modes for breast, dense breast, and interventional procedures; customizable annotations package enabling efficient documentation; breast reporting package for quickly documenting services and ensuring accurate billing and audit. This portable ultrasound scanner is wireless, works with a mobile app and is compatible with most iOS and Android smart devices available today. And, unlike traditional systems, Viera ultrasound can be carried around for quick exams and guided procedures.

HOLOGIC
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Product News
The 81th China International Medical Equipment Fair (CMEF Spring 2019)
The 28th International Component Manufacturing & Design Show (ICMD Spring 2019)
The Digital Era of Healthcare

May 15–18, 2019
National Exhibition and Convention Center (Shanghai)

Introducing Quantra™ 2.2 Breast Density Assessment

- Enables quick and accurate breast density assessments across your entire patient population.
- Includes texture and pattern analysis, offering more consistent, reliable breast density scoring.
- Available with the only mammogram superior for women with dense breasts compared to 2D mammography alone.1,2

Learn more at 3DimensionsSystem.com

1. FDA submissions P080003, P080003/S001. 2. Results from Friedewald, SM, et al. “Breast cancer screening using tomosynthesis in combination with digital mammography.” JAMA 311.24 (2014): 2499-2507; a multi-site (13), non-randomized, historical control study of 454,000 screening mammograms investigating the initial impact of the introduction of the Hologic Selenia® Dimensions® on screening outcomes. Individual results may vary. The study found an average 41% increase and that 1.2 (95% CI: 0.8-1.6) additional invasive breast cancers per 1000 screening exams were found in women receiving combined 2D FFDM and 3D™ mammograms acquired with the Hologic 3D™ Mammography System versus women receiving 2D FFDM mammograms only.

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